open space, but the steeper grade in these areas would counter any reduction in the coefficient as the water has less time to infiltrate. For these reasons, a general runoff coefficient of 0.5 has been adopted for residential areas located throughout the entire City with the rationale that this coefficient accounts for either the relatively high density of single family areas or the steep ground slopes. The 0.5 value is slightly conservative.

Runoff coefficients for downtown business areas are generally recommended to be from 0.70 to 0.95. In El Cerrito, commercial land use practice tends to have relatively little area devoted to landscaping and pervious areas; therefore, a coefficient of 0.95 is recommended for planning purposes in these areas.

Runoff coefficients for parks and other unimproved open areas is generally recommended to be 0.10 to 0.30. In El Cerrito, much of the open space area tends to be in the steeper hillside areas. Therefore, a runoff coefficient of 0.3 is recommended for these areas, with a coefficient of 0.25 utilized for developed park areas with relatively flatter slopes.

Hydrology computations of the peak flow rates for El Cerrito were performed using a computer program developed for this purpose using the dBase IV programming language. A database file was created for each hydrology subarea that contained the necessary hydrologic data. This data included the drainage area, roof to gutter time, runoff coefficient, average annual rainfall, and the length and slope of open space and roadway gutters. For larger watersheds flowing into El Cerrito, a pre-computed time of concentration was input into the hydrology database. Details of the structure of the hydrology database are contained in the Technical Appendix.

The actual dBase program code is contained in a program called ELCSDQ, which stands for El Cerrito Storm Drain flow. This program performs both the hydrology analysis and the hydraulic analysis (described in the section below) during one pass through the storm drain information database. The procedure, followed by the hydrology portion of the computer program, starts computations at an upstream node point of the storm drain system. A time of concentration is computed for the upstream subarea based on the travel time from the most distant point in the subarea to the inlet node point. This time of concentration is utilized with the rainfall intensity equation to estimate the 10-year and 100-year intensity rainfall for that subarea. The product of the drainage area, runoff coefficient, and rainfall intensity results in the 10-year and 100-year flow estimate at a given node point.

For downstream storm drain segments, the flow value calculated for the upstream node is utilized until another hydrology node point is encountered. For each intervening drain segment, the velocity of flow in the drain is calculated, and the travel time through the length of the drain is added to the time of concentration computed for the upstream node. At the next downstream node point, the resulting

time is utilized to compute new rainfall intensities. These intensities are lower than those computed for upstream areas due to the nature of the rainfall frequency curves which have lower average rainfall over longer periods of time. The drainage area is accumulated as the hydrologic model proceeds downstream. The product of the drainage area and the runoff coefficient is also accumulated to represent the applicable values for the entire watershed upstream of the new node point, and then total flow rates are calculated.

The hydrologic database stores the tributary acreage, computed time of concentration, and computed flow rates for each hydrologic node point. At junction points where two storm drain branches meet, the program utilizes the longest time of concentration between all of the incoming branches to compute the total flow rate at the junction.

The computed flow rates are intended for the purpose of determining the deficiencies of the mainline storm drain system only. The estimation of flows at points other than the hydrology node points used for the Storm Drain Master Plan would require a separate analysis of the drainage areas and time of concentration. The difference in peak flow between two different node points does not represent the required capacity of inlets or connector drains at that location. Due to the timing of storm hydrographs, the required flow capacity at such inlets would generally be higher than this difference in flow rate and would require a separate analysis.

The hydrologic analysis assumes that surface flow enters the storm drain system at the first possible inlet, disregarding any overflow to the streets which may take a longer overland path before reaching the next inlet. This assumption provides a maximum possible flow rate at a particular node.

6.1.2 Hydraulic Analysis

The hydraulic flow capacity of the existing storm drain facilities was estimated for all significant drain segments in the City. Ditches and creeks were generally not analyzed for capacity, since it appeared during the field inspection phase of the Master Plan that these open drains would not represent constraints to the drainage system.

The hydraulic computations were done using the dBase IV computer program ELCSDQ described above which also performed the hydrology computations. The hydraulic capacity of each drain segment was automatically stored by the computer program in the appropriate field of the storm drain information database.

The hydraulic calculations are based on full flow condition without surcharge in the storm drain. This assumption is conservative since a slightly greater flow rate may actually be carried in a drain when it is not quite full. In addition, pressure flow

(surcharge) conditions may allow the slope of the hydraulic gradeline to be steeper than the slope of the pipe which may result in a greater flow capacity. These conservative assumptions are somewhat balanced as minor energy losses at bends, inlets, and manholes were not included in the analysis. It is important to note that the capacity calculations are for general planning purposes. Short, single drain segments, may actually have a greater capacity than the estimated full flow capacity. However, the capacity of long drain segments or several consecutive drain segments will probably be very close to the full flow capacity.

The Manning formula was utilized to estimate the hydraulic capacity. Manning's "n" value (roughness coefficients) of 0.013 was used for concrete drains (concrete pipe and concrete box culverts) and smooth metal pipe, while a value of 0.024 was utilized for corrugated metal pipe. A value of 0.030 was utilized for open channel areas.

Although hydraulic capacities were not estimated for open channel areas, a velocity was estimated for the purpose of estimating the travel time through the reach. Velocities were estimated by assuming a channel sideslope of 1:1, using a bottom width of one foot for every 50 cfs of flow, and estimating the channel flow characteristics necessary to carry the 10-year flow with the channel slope given in the storm drain information database.

Storm drain slopes were obtained from the City's existing storm drain maps or from available construction plans. However, these actual drain slopes were available for only about 25 percent of the storm drain facility segments in the storm drain information database. In some cases, drain invert elevations were available at locations separated by several drain segments. In these cases, average drain slope was utilized, although the actual slopes for individual drain segments may be higher or lower than the average slopes. In other cases, an estimated slope was utilized which was based on the general geographic location of the drains and typical slopes of other drains in the same general area. Table 4 shows the estimated slopes used in the various geographical locations. The estimated slopes are generally conservative. However, some drains may have slopes which are flatter than these slopes. Slopes in the hillside area vary considerably, with actual slopes of 5 to 30% in this area. In the cases where the drain sections were found to be hydraulically deficient, more refined values of estimated slopes were determined using available ground surface information including benchmark elevations and approximate elevations from USGS and other topographic maps.

TABLE 4 ESTIMATED DRAIN SLOPES	
Area	Estimated Slope
Upper Hillside	5%
Foothill, East of San Pablo Avenue	2%
West of San Pablo Avenue	1%

While estimation of storm drain capacities using assumed slope values are less accurate than those with actual slope information, the hydraulic flow equation is less sensitive to the drain slope than other hydraulic parameters since flow capacity varies with the square root of the slope. For example, an actual slope that is double the estimated slope would have a flow capacity that is only 41% greater than the estimated slope.

Before designing and constructing storm drain improvements, a detailed hydraulic analysis should be performed with updated survey data in order to more accurately determine the capacity and location of the existing drain.

6.1.3 Existing Hydraulic Capacity Deficiencies

A hydraulic capacity deficiency analysis was performed based on the 10- and 100-year peak flow rate calculations and the hydraulic capacity calculations for the existing storm drain segments. A comparison was made between the flow rates and the hydraulic capacities. The storm drain segments which do not have capacity for the 10-year peak flow rate are designated as being hydraulically deficient.

The 10-year flow rate was used as the flow value for estimating deficiencies in the storm drain system. A 10-year flow is defined as a storm flow that will be equaled or exceeded on the average once every ten years. Since the definition is based on a probability, the actual time between 10-year storms may be greater or less than 10-years, and could actually occur more than once during a single year. The use of the 10-year flow is common practice for small urban watersheds where flooding, if it occurs, would generally last for a short period of time. This standard recognizes that larger flows can and will occur, but the financial burden of constructing storm drain facilities to carry larger flows may be greater than the benefits that may be received. In most cases, if the 10-year storm flows are adequately carried in the underground

storm drain system, the 100-year flow may adequately be conveyed above ground. The main concern in a 100-year storm is to avoid injury and property damage, whereas during a 10-year storm there is an additional requirement of keeping streets relatively free of water to maintain traffic patterns.

A listing of the storm drain information database file is contained in Appendix C. In this listing, input data for each storm drain segment is shown, along with the computed flows and capacity for each segment. A flag located next to the 10-year flow column indicates those segments that have capacities that are less than the estimated 10-year flow. A flag is not shown if there is not a flow capacity problem. One to four characters are shown when there is a capacity problem, with four characters indicating the worst case problem of flow 100 percent greater than capacity. The characters indicate the information known about the slope of the drain segment, with an "E" for estimated slope and "*" for actual or average slope. Capacity problem areas designated with an "E" are less certain than those with "*". Drain segments with less than 10 percent capacity deficiency are indicated with a ".", indicating that a more detailed hydraulic analysis may indicate that there is not actually a deficiency problem at this location.

6.2 CONDITION DEFICIENCIES

Many of the drainage problems relate to the condition of the existing drain facilities, separate from the hydraulic capacity deficiencies that have been identified.

During the field inspection portion of the Storm Drain Master Plan, the interior of a number of storm drain facilities were inspected to determine the current condition. These inspections indicated the general condition of typical storm drain facilities in El Cerrito.

No unusual problems were observed in the concrete structures examined. In some cases, a slight misalignment of pipes at joints was observed, but this probably occurred during construction of these drain segments. In Cerrito Creek at the outlet of the large box culverts off Carlson Boulevard, some erosion has occurred under the end of the concrete footing due to the flow of the creek, but no distress in the structure was visible. A storm drain segment located between Richmond Street and Clayton Street north of Central Avenue was previously inspected by the City using a video tape. This drain, constructed with concrete and other materials, has many segments that are in poor condition. This is probably largely due to poor construction during initial installation.

While there may be additional problems with some concrete drain segments in El Cerrito, it is assumed that reinforced concrete pipes are generally in fair to good condition.

Most of the corrugated metal pipes (CMP) viewed during field inspection had some problems with corrosion and perforation of the invert sections of the pipes. The drain segments that were examined appear to still be structurally sound, with no distortion or eminent collapse of the upper portion of the pipe occurring yet. However, these drains are candidates for rehabilitation or replacement in the near future before more deterioration occurs. More serious problems may exist in portions of the drainage system that were not inspected, and a more complete inspection program of the CMP drains should be undertaken in order to locate areas where extremely serious problems may be present.

CMP drains consist of relatively thin walled metal pipe that has been bent to add corrugations which provide the bearing strength that the thin metal pipe could not otherwise provide. The pipe is generally galvanized to provide corrosion protection. Some pipes are also provided with an asphalt coating on the lower part of the pipe to provide additional protection against abrasion. Failure of this type of pipe is generally initiated by sand, gravel, or other abrasive material carried by the flow of water which removes the corrosion protection from the pipe. Corrosion leads to perforation and eventual removal of the lower portion of the pipe. While the arch formation of the pipe can continue to support the load of the material above it, if the soil is prone to erosion, supporting material can be washed away until a collapse of the pipe and the surrounding area occurs. As an example, at a 48" CMP drain located in San Pablo Avenue at Moeser Lane, the flow of water falling into the pipe from a side drain has eroded a hole more than one foot below the original invert of the drain.

The life of CMP pipe is difficult to predict as it depends on many factors, including the amount of sediment carried, flow rate, slope of pipe, velocity of water, and soil and moisture conditions. Based on several surveys of drainage facilities, the expected life of CMP pipe (16 gage metal) has been estimated to be, generally, 20 to 30 years. With a bituminous lining, the service life of CMP pipes has been estimated to be about 40 years under normal conditions.

The larger CMP drains in the City, especially those that receive water from natural open space areas, appear to be in poorer condition than other CMP drains. These larger drains experience higher and more continuous flows and the open space areas generate more sediment. Many of the connector pipes from catch basins to storm drains are constructed with small diameter CMP pipes. The condition of the pipes may be better considering the flows experienced in these pipes.

Most of the CMP pipe was probably installed in the late 1940's and early 1950's and is now at least 40 years old. Since this exceeds the expected life of 20 to 30 years for this type of pipe, the condition of CMP drains is assumed in to be poor to fair condition, unless an inspection has shown otherwise.

6.3 OPERATION AND MAINTENANCE DEFICIENCIES

During the field inspection of the storm drain system, a number of maintenance deficiencies were noticed. Many of these deficiencies consisted of relatively minor problems such as debris accumulation in catch basin inlets, and broken grates on catch basins. A list of these items has been prepared and provided to the City.

In addition, there are several more serious maintenance problems observed that may justify structural improvements. These problems are generally related to the collection of sediment and debris in the larger storm drains which threatens to cause flooding problems due to the potential blockage of the drain.

In the area east of San Pablo Avenue between Moeser Lane and Portola Drive, two shopping carts were discovered at different locations in the storm drain. These had apparently been dumped into the open channel area near BART, carried downstream by high flows, and became lodged at locations where the size of the drain changed. Another shopping cart was observed in the culvert conveying Cerrito Creek across San Pablo Avenue. Debris bars across the headwall in these areas and other similar locations may be desirable to prevent large objects from entering the drainage system.

Areas downstream of existing open space are subject to accumulations of debris and sediment. One such location is the drain entrance at Hillside Park near Navellier Street and Scott Street. Although a debris barrier is located at this entrance, the amount of debris and sediment has bent the bars of the debris barrier and threatens to block the entrance to the drain. Regular maintenance and better debris removal facilities may be desirable at this and other similar locations.

6.4 100-YEAR FLOODING DEFICIENCIES

The Master Plan hydrology analysis included the estimation of the 100-year flows throughout the storm drain system, but no evaluation has been made of flooding problems that would occur during the 100-year flood. In most cases the existing storm drain system would be inadequate to carry these flows, and excess storm water would be carried in the streets. The exact overland flowpath would be difficult to predict.

The area of El Cerrito currently located in the 100-year flood plain as identified by FEMA is described in section 5. Flooding in this area appears to be caused by under capacity drainage channels and undersized drainage facilities crossing the I-80 freeway and Southern Pacific Railroad located in Richmond.

One barrier to the 100-year flows may be the area along the BART right-of-way. The former railroad grade along this path was slightly elevated in several locations, and streets crossings in these areas may be raised to meet this grade. This may have altered the natural

drainage pattern towards the west. Some drainage structures crossing the BART area consist of bridges, channels, or oversize culverts and may provide enough capacity to provide passage of the 100-year flows. In other cases, the existing drainage structures would not provide adequate capacity, and some ponding of water behind the embankment could be expected during high flows.

It is the current practice to construct buildings or grade lots in such a manner as to minimize structural damage caused by flood waters overflowing the streets. Many of the older existing structures in El Cerrito, however, were not built with lot grading that provides adequate drainage protection to these structures. Therefore, these structures may be susceptible to flooding during large storms when overflow from the storm drain system lead to street flooding. Where redevelopment of existing lots is contemplated, the City should require regrading to ensure that the new building pads are above the street curb height or require other methods be used to provide protection against flooding problems. Modification of the City's permit requirements may be necessary to ensure that this protection is adequately addressed.

7. STORM DRAIN IMPROVEMENTS

7.1 IMPROVEMENT GOALS

The improvements we recommended for the El Cerrito storm drain system are intended to bring the existing facilities up to an acceptable condition and to provide adequate capacity to carry the 10-year storm water runoff through the City without causing flooding damage to personal property or City infrastructure.

Based on the evaluation of the existing deficiencies in the storm drain system, the following are recommended goals for El Cerrito to utilize in planning future improvements to the drainage system:

1. Replace all storm drains in substandard condition.

2. Provide capacity in the storm drain system to convey the 10-year peak flow rate.

3. Convey all public storm water through drainage facilities located on public street right of ways or within public drainage easements.

7.2 PRIORITIZATION OF IMPROVEMENTS

Meeting these storm drain improvement goals will require a long term commitment of considerable financial resources. In order to allocate resources to those improvements which are most critical and present the most benefit to the City, a priority assessment was performed based on the existing storm drain deficiencies.

Several factors were considered in developing the priority list of storm drain improvement projects. The general factors included were: (1) quantity of storm water flow being conveyed, (2) the hydraulic capacity, (3) deteriorated condition, (4) location of drainage facility (on public right-of-way or on private property), and (5) whether flood damage has recently occurred. For each of these general conditions, a severity factor was applied. Problems that occur more frequently, affect more people, or cause more damage should have a higher priority in being corrected than less severe problems.

In order to provide a somewhat objective evaluation of storm drain problems, a simple point system was used as a means of rating known and suspected problem areas. This system assigned points for each of the deficiency evaluation factors that were evaluated. These points were applied to each storm drain segment. These points were weighted so that pipe segments in poor condition or lacking capacity that are located on private property were

rated as higher priority improvements than similarly deficient segments within public right-of-way. Sites with the highest total points have the highest priority for corrective action.

The following is a description of the deficiency evaluation factors, and the method used for assigning points for each of these deficiency factors.

Storm Drain Flow Factor

In order to measure problem severity for different sites based on magnitude of flow rate, a general estimation of the 10-year peak flow rate at each site was assumed. The approximate flow rate range at a site was established as: 0 to 25 cfs (approximate capacity of 18-inch drain), 25 to 50 cfs (approximate capacity of 24-inch drain), 50 to 100 cfs (approximate capacity of 36-inch drain), and greater than 100 cfs.

While larger flows have a higher priority in this rating scheme, the spread between the points given to the largest flow sites and the smallest sites has been kept to a ratio of two to one. This allows sites with smaller flows and a number of problems to still receive a priority that equals or exceeds some of the larger sites with only one problem.

Hydraulic Capacity Factor

The hydraulic capacity factor assigns points based on an evaluation of the degree to which the existing drain fails to provide capacity for the estimated 10-year flow. The number of points for capacity problems are based on both the magnitude of the flow at a site, and the percentage by which the estimated flow exceeds the capacity. The total points for these two evaluations would reflect the overall severity of the capacity problem.

Deteriorated Condition Factor

The deteriorated condition factor assigns points based on an evaluation of the known or assumed condition of the drain. No serious conditions of concrete drains were observed during the field review, and a number of metal drains in poor condition were observed; thus, metal pipes would receive a rating for deteriorated condition unless an inspection has shown them to be in good condition.

Private Property Factor

The private property factor assigns points for drains that carry water from City-owned property through private property. These areas are felt to present more of a risk to the City and justify a higher priority assignment.

Flooding Potential Factor

The flooding potential factor assigns points based on the flooding potential for a site. Areas located at the low point of a street where significant ponding and flooding of property could occur would receive points. No points would be assigned to locations where overflows would flow down a street right of way, unless flooding problems are known to occur at this location.

Point assignments used for each of the evaluation factors are shown in Table 5.

A computer program was developed using dBase IV to access each of the storm drain segments in the storm drain information database, and determine the number of priority points based on the evaluation of each of the priority factors. This point count was then stored in a field of the database. The database was sorted in descending order by priority points in order to obtain a ranking list of all deficient storm drain segments.

The resulting priority ranking of all storm drain segments that have deficiencies is contained in the Technical Appendix.

TABLE 5
POINT ASSESSMENT FOR DEFICIENCY CONDITIONS

10-Year Flow (cfs: Approximate drain size: Capacity deficiency (%) **Evaluation Factor**	0 - 25 18" 10 - 25 **Points**	25 - 50 24" 25 - 50	50 - 100 36" 50 - 100	>100 >100
Storm Drain Flow	2	3	4	5
Capacity Deficiency Percent	1	2	3	4
Deteriorated Condition	6	8	10	12
Private Property	6	8	10	12
Flooding Potential	1	2	3	4

7.3 STORM DRAIN IMPROVEMENT OPTIONS

There are a number of options available to correct the identified deficiencies in storm drain capacity and condition. The determination of the best option for each site will require a careful evaluation of a number of factors specific to each project and a determination of the cost of various options.

For planning purposes at a master plan level, it is beneficial to provide a general outline of possible options. Several factors were identified that would most likely influence the options that would be used to correct the deficient conditions. These factors included whether or not there was a condition problem, whether or not there was a capacity problem, and whether or not the drain was located in a public right of way.

Table 5 shows the possible combinations of these factors and a likely option that may be utilized for correcting the deficiency.

In determining the likely options, it is assumed that in most cases the desirable option for existing drainage facilities not on a public right-of-way is to reroute these flows to an existing nearby right-of-way. This generally provides better access to the facilities for future maintenance and would limit liability to the City. If the capacity of the existing drain is adequate and an inspection of the drain indicates that there is no deterioration of the drain, then replacement of the drain could reasonably be delayed until a future time. In some cases, rerouting the flow may not be feasible due to topography constraints which prevent a gravity flow drain from being installed at a reasonable cost. In these cases, obtaining a drainage easement through the property should be considered as a possible alternative.

In some cases, the existing storm drain may discharge into or receive flow from an open channel area that local residents feel is a significant natural resource. Rerouting flows may disrupt or eliminate these areas. If replacing the facilities along the existing alignment would be difficult (specifically, where additional capacity should be provided), a possible solution is to allow low flows (for example a 6-inch pipe) to continue through the open channel areas and divert the majority of flows through a rerouted drain.

If utilization of the existing alignment on private property is considered to be the best alternative, various methods can be considered for replacement or rehabilitation of the drain. A drainage easement along the alignment would be desirable to allow for future maintenance and replacement. Replacement of the existing drain with a new concrete pipe would be the most desirable option for the long term benefit of the drainage system. If installation of a new drain would be too disruptive or costly, rehabilitation of the existing drain could be considered. If the bottom of larger CMP drains (30-inch and larger) has deteriorated but the remainder of the pipe is structurally sound, lining the bottom of the pipe to extend the life of the existing pipe can be considered. The City has performed this rehabilitation on a section of a 48-inch CMP drain located on Coronado Street near Fairmount. The City maintenance staff installed a horizontal section of concrete across the

bottom of the drain. An inspection of this section during the Master Plan Study shows that the section remains in good condition. It is suggested, however, that in future relining projects, the lining should be more concave in order to keep low flows in the center of the pipe. Access would be more difficult for smaller CMP drains, and it is not certain if they could be adequately cleaned and lined to make rehabilitation worthwhile.

Installation of a plastic liner into existing CMP drain pipe could also be considered. With the better hydraulic flow characteristics of a plastic pipe, a pipe insert with a smaller diameter than the original pipe could carry as much or more than the original CMP pipe. The structural aspects of the eventual load transfer to the pipe insert and the adequate side bracing of the insert should both be considered.

TABLE 6
OPTIONS FOR CORRECTING STORM DRAIN DEFICIENCIES

Deteriorated Condition	Capacity Problem	Public Right-of-Way	Likely Option
No	No	Yes	No correction required
No	No	No	Reroute in future if opportunity
No	Yes	Yes	Parallel drain, same route
No	Yes	No	New drain on alternate route if possible
Yes	No	No	Rehabilitate drain
Yes	No	Yes	Replace or rehabilitate
Yes	Yes	Yes	Replace drain
Yes	Yes	No	New drain on alternate route if possible

7.4 UNIT COSTS OF DRAINAGE IMPROVEMENTS

Estimates of storm drain construction costs were obtained in order to plan the cost and financing requirements for storm drain improvements included in the Storm Drain Master Plan. For storm drain replacement, unit costs per foot of drain were estimated for various diameters of pipes as shown in Table 6. These costs are based on 1992 prices using standard construction cost guides (Means, 1992) and assume the use of Class III reinforced concrete pipe (RCP), and include backfill and paving requirements that would be typical for installation in a city street.

For use in the preparation of the Storm Drainage Master Plan, the basic drain construction cost has been increased to account for additional costs that the City would likely incur for the actual implementation of the storm drain project. The basic drain construction cost has been increased by 50 percent to account for administration, engineering, and contingencies for the recommended construction program described in section 8.2, where specific alternative routes for storm drains have been planned.

For estimating the order of magnitude costs of replacing storm drains throughout the entire City as described in section 8.1, the costs used include the basic cost plus 50 percent as used for the specific recommended projects, and the drain segments not located on public right-of-way include an additional 50 percent. This additional amount accounts for the fact that the unit cost is applied only to the length of the existing drain segment, whereas with actual construction projects that reroute flow, a longer drain route would probably be required and some replacement of existing drain segments without deficiencies may be required in order to connect the drain replacement to existing drains.

The cost of rehabilitating existing drains was assumed to be one half of the construction cost of a new storm drain.

Costs do not include the cost of obtaining drainage easements if required.

TABLE 7 STORM DRAIN REPLACEMENT UNIT COSTS			
Drain Diameter (inches)	Basic Cost[1] ($/foot)	Master Plan Project Cost[2] ($/foot)	Citywide Planning Costs[3] ($/foot)
12	45	68	90
15	55	82	110
18	65	98	130
21	75	112	150
24	85	128	170
27	100	150	200
30	110	165	220
36	135	202	270
42	150	225	300
48	165	247	330
54	185	278	370
60	200	300	400
72	245	368	490

[1]Reinforced concrete pipe, Class III, without gaskets. Includes select granular backfill for entire trench depth, and street paving for entire trench width.

[2]Used for cost of Master Plan replacement project along specific alternate route. Includes basic cost plus 50% to account for administration (10%), engineering (15%), and contingencies (25%).

[3]Used for planning costs of Master Plan replacements for various classes of drain deficiencies, where specific alternatives have not been identified for individual sites and where existing drains are not located on public right-of-way. Costs are applied to lengths of existing drains that are deficient. Includes basic cost plus 50% as described in (2) plus additional 50% to account for longer length of rerouted drains, and possible replacement of some drain segments that are not deficient in developing specific replacement projects.

8. STORM DRAIN MASTER PLAN IMPROVEMENT PROGRAM

8.1 CITY-WIDE DRAINAGE SYSTEM IMPROVEMENT COSTS

To generally estimate the overall costs of upgrading the El Cerrito storm drain system, the construction cost of improving all storm drains with deficiencies was estimated. These costs are also segregated according to the improvements required for each specific class of deficiency in order to better plan the required expenditures.

These costs were estimated by analyzing each of the storm drain segments in the storm drain information database. The deficiencies were classified in terms of whether or not the storm drain was located on public right-of-way, whether or not the drain was potentially in poor condition, and whether or not the drain had a capacity problem. For those drain segments with deficiencies, the deficiency classification was determined and the size of a replacement drain was determined utilizing the 10-year flow and the actual or estimated slope of the existing drain. For drains on public right-of-way, in good condition, with a capacity problem, it was assumed that the existing drain could be utilized to carry a portion of the total flow. The size of a drain parallel to the existing drain was determined and used for estimating costs.

For costing purposes, the length of the replacement drain was assumed to be equal to the length of the existing drain. For existing drains not located on public right-of-way, a higher than normal unit cost was used for this estimate as described in section 7.4 and Table 6. These higher costs accounted for the longer length most likely required for rerouting storm flows in a new drain.

The results of the estimate for Citywide storm drain replacement costs are listed according to drainage basin location and totaled for the entire City. These results are shown in Table 8. It is estimated that about 60 percent of the storm drain system, in terms of length, probably has some deficiency. The order of magnitude cost estimate indicates that improvement of the entire storm drain system may require approximately 13 million dollars. Of the total estimated improvement costs, about $3.8 million would be required for correction of the highest priority problem of drains in poor condition, of which about $21 million of this cost is for drains in poor condition located on private property, and about $1.7 million of the this cost is for drains in poor condition on public right-of-way.

TABLE 8
EL CERRITO STORM DRAINAGE MASTER PLAN
SUMMARY OF DRAIN LENGTHS AND REPLACEMENT COSTS

PUBLIC ROW	POOR CONDITION	CAPACITY PROBLEM		BASIN NUMBER								TOTAL LENGTH (ft)	TOTAL COST $1000	TOTAL COST %
				1	2	3	4	5	6	7	8			
NO	YES	YES	LENGTH (ft)	20	1120	590	250	130	710	560	2995	6375		
			REPL COST ($1000)	$2.6	$159.9	$100.3	$42.0	$32.1	$85.5	$63.6	$721.0		$1,207.0	9.1
NO	YES	NO	LENGTH (ft)	410	290	540	100	400	130	2165	3800	7835		
			REPL COST ($1000)	$43.5	$27.3	$48.6	$15.0	$52.0	$19.5	$261.2	$455.5		$922.6	7.0
NO	NO	YES	LENGTH (ft)	460	1145	130	1033	230	775	1965	2498	8236		
			REPL COST ($1000)	$56.0	$191.4	$63.7	$289.6	$69.0	$151.8	$462.3	$713.6		$1,997.2	15.1
NO	NO	NO	LENGTH (ft)	1170	1100	3770	150	2810	3503	2035	3280	17818		
			REPL COST ($1000)	$148.8	$145.8	$635.7	$40.5	$460.5	$525.3	$250.5	$812.9		$3,019.9	22.8
YES	YES	YES	LENGTH (ft)	65	986	885	935	210	155	2385	2963	8584		
			REPL COST ($1000)	$6.4	$132.4	$73.9	$169.8	$33.2	$15.6	$415.8	$392.5		$1,239.6	9.4
YES	YES	NO	LENGTH (ft)	265	40	40	270	1065	350	1605	2724	6359		
			REPL COST ($1000)	$18.0	$2.7	$3.3	$18.4	$84.7	$37.7	$87.5	$226.8		$479.1	3.6
YES	NO	YES	LENGTH (ft)	230	720	817	1320	4059	5033	7575	12879	32633		
			REPL COST ($1000)	$17.1	$58.8	$192.0	$178.8	$335.2	$668.1	$961.9	$1,970.5		$4,382.4	33.1
YES	NO	NO	LENGTH (ft)	985	2719	3124	5887	5542	8208	9671	15609	51745		
			REPL COST ($1000)	0	0	0	0	0	0	0	0		$0.0	0.0
			LENGTH (ft)	3605	8120	9896	9945	14446	18864	27961	46748	139585		
			REPL COST ($1000)	$292.4	$718.3	$1,117.6	$754.0	$1,066.7	$1,503.4	$2,502.6	$5,292.7		$13,247.7	100.0

8.2 PHASE 1 CONSTRUCTION PROGRAM

The Master Plan Improvement Program has been divided into two phases. The first phase, to be implemented during the first five years of the construction program, would include those existing areas with the most serious deficiencies. Other storm drain problems would be corrected during the second phase.

The first phase of the storm drain improvement program includes most drain segments with 12 or more deficiency points. This phase would include: (1) all drains on private property that have known or potential condition problems (CMP drains), (2) the drains with more serious capacity problems on private property, and (3) the drains with more serious capacity and condition problems on public right of way. The correction of some drainage problems with a lower priority would occur simply due to their proximity to a higher priority problem. It would be reasonable to include all improvements in the same area in one construction project.

The first phase construction program includes 60 specific projects, each of which would correct identified deficiencies in one or more drain segments. Projects were selected to be independent construction projects that can be implemented without additional improvements. Projects were based on rerouting of storm drains to public rights-of-way wherever feasible. Where rerouting did not appear feasible, projects are based on rehabilitating existing drains where there is no capacity problems, or replacement of the drain at the same location on a drainage easement where there is a capacity problem.

The first phase construction program does not address all deficiencies in storm drains that have been identified. The drainage problems with lower priorities would be deferred to a later construction program. A few drains with higher priorities have been excluded from the first phase construction program due to special circumstances. For instance, several drain segments near Cypress Avenue have a high priority but improvements would not be effective without correction of downstream capacity problems in the City of Richmond.

Drains with identified deficiencies but with a lower priority assessment than those included in the first phase construction program should be reviewed further to determine if there are any special circumstances not considered in the Master Plan which would warrant a higher priority rating. For instance, plans for road reconstruction or drainage improvements in conjunction with specific developments may make the correction of some lesser drainage deficiencies easier to perform during the construction process than at some later time.

A summary report of the projects recommended for the first phase storm drain improvement program is contained in Table 9, and the location of these projects is shown in Exhibit "E" identified by project number. Project numbers were assigned based on geographical areas with project 1 at the north City boundary and the numbers increasing southerly. Projects in Table 9 are shown in priority order based on the highest number of priority points assigned to any drain segment within the specific project. It is important not to confuse the

TABLE 9 (SHEET 1 OF 2)
PRIORITY LISTING FOR
PROPOSED STORM DRAIN IMPROVEMENT PROJECTS

PROJ. ID. NO.	DRAIN NO.	LOCATION	EXISTING DRAIN	PRIV. PROP.	CAP. PROB.	REPLACE DRAIN	REPLACEMENT LOCATION	LENGTH (FT)	COST ($/FT)	PROJ COST($1000)	COST <$25	SUM COST<$25	COST $25 TO $100	SUM COST $25 TO $100	COST>$100	SUM COST>$100	SUM PROJ COST($1000)
1 16	330/338	GLADYS	36" CMP/BOX	X	X	42	GLADYS	1200	$225	$270					$270	$270	$270
2 60	872/895	FAIRMOUNT	48" CMP/36" RCP	X	X	48	FAIRMOUNT	2800	$247	$692		$0		$0	$692	$962	$962
3 42	683/693	LINCOLN/NORVELL	36" RCP/48" CMP	X	X	42	EUREKA/EVERETT	1400	$225	$315		$0		$0	$315	$1,277	$1,277
4 54	788/793	RICHMOND/CLAYTON	36"/42" CMP	X	X	42	CENTRAL	1450	$225	$326		$0		$0	$326	$1,603	$1,603
5 43	698/712	ASHBURY/HOTCHKISS	48" CMP	X	X	42	HOTCHKISS	1300	$225	$293		$0		$0	$293	$1,896	$1,896
6 12	194/202	KENILWORTH/WALNUT	24" CMP	X	X	21	CUTTING	1500	$112	$168		$0		$0	$168	$2,064	$2,064
7 2	36/42	POINSETT	24" CMP	X	X	24	POINSETT	1370	$128	$175		$0		$0	$175	$2,239	$2,239
8 17	378/381	NAVELLIER/LAWRENCE	30" CMP	X	X	30	EASEMENT	300	$165	$50		$0	$50	$50		$2,239	$2,289
9 57	844/845	COLUSA/BONNIE	30"/36" CMP	X		27	SUSAN	400	$150	$60		$0	$60	$110		$2,239	$2,349
10 40	651/665	STOCKTON	24"/15" CMP	X	X	24/15/12	STOCKTON	600/500/650	$128/82/68	$162		$0		$110	$162	$2,401	$2,511
11 21	440/442	SAN PABLO	48" CMP		X	60	SAME	400	$300	$120		$0		$110	$120	$2,521	$2,631
12 22	459/460	SCHMIDT/LIBERTY	33"/36" RCP	X	X	48	SCHMIDT/BART	1050	$247	$259		$0		$110	$259	$2,780	$2,890
13 23	462/463	SCHMIDT	36" CMP		X	48	SAME	400	$247	$99		$0	$99	$209		$2,780	$2,989
14 24	472	SCHMIDT	36" CMP		X	42	SAME	60	$225	$14	$14	$14		$209		$2,780	$3,003
15 55	817/827	EUREKA	24"/30" CMP	X		21	EUREKA	1700	$112	$190		$14		$209	$190	$2,970	$3,193
16 25	475	HILLSIDE PARK	30" CMP		X	30	SAME	750	$165	$124		$14		$209	$124	$3,094	$3,317
17 27	487	DUKE CT	30" CMP	X		REHAB	SAME	130	$82	$11	$11	$25		$209		$3,094	$3,328
18 29	501	KING	30" CMP	X		24	ROW	180	$128	$23	$23	$48		$209		$3,094	$3,351
19 45	717/720	TERRACE	30"/48" CMP	X		REHAB	SAME	160	$123	$20	$20	$68		$209		$3,094	$3,371
20 46	722	SEAVIEW	30" CMP	X		REHAB	SAME	110	$82	$9	$9	$77		$209		$3,094	$3,380
21 49	746	SEAVIEW	48" CMP	X		REHAB	SAME	70	$123	$9	$9	$86		$209		$3,094	$3,389
22 58	850/852	VILLAGE/SEAVIEW	30" CMP	X		REHAB	SAME	180	$82	$15	$15	$101		$209		$3,094	$3,404
23 10	139/141	CYPRESS			X	NO PROJ				$0	$0	$101		$209		$3,094	$3,404
24 41	668/670	KEARNEY	BOX CULV	X	X	60	LEXINGTON/FAIRMOUNT	900	$300	$270		$101		$209	$270	$3,364	$3,674
25 6	104/109	JORDAN/GLORIA	18" CMP	X	X	18	ALTA PUNTA/CEDAR	1450	$98	$142		$101		$209	$142	$3,506	$3,816
26 9	168/172,180	HAGEN/CUTTING	12" CMP	X	X	18/12	HAGEN	750/750	$98/68	$125		$101		$209	$125	$3,631	$3,941
27 11	182/186	HILL	30" CMP		X	36	HILL	1050	$202	$212		$101		$209	$212	$3,843	$4,153
28 20	411/416	DONAL	12"/18" CMP	X	X	24/18/12	DONAL	500/500/900	$128/98/68	$174		$101		$209	$174	$4,017	$4,327
29 26	480/481	CONTRA COSTA	15" CMP	X	X	18	EASEMENT	160	$98	$16	$16	$117		$209		$4,017	$4,343
30 34	557/561	KEARNEY	21" VCP	X	X	36	WALDO	1000	$202	$202		$117		$209	$202	$4,219	$4,545
31 4	68/74,77,78	BARRETT	18"/12" CMP	X	X	21/18	BARRETT/ARLINGTON	1400/700	$112/98	$225		$117		$209	$225	$4,444	$4,770
32 30	505/507	ARLINGTON	24" CMP		X	24	SAME	250	$128	$32		$117	$32	$241		$4,444	$4,802
33 31	519	ARLINGTON	12" CMP	X	X	15	ARLINGTON	400	$82	$33		$117	$33	$274		$4,444	$4,835

TABLE 9 (SHEET 2 OF 2)
PRIORITY LISTING FOR
PROPOSED STORM DRAIN IMPROVEMENT PROJECTS

PROJ. ID. NO.	DRAIN NO.	LOCATION	EXISTING DRAIN	PRIV. PROP.	CAP. PROB.	REPLACE DRAIN	REPLACEMENT LOCATION	LENGTH (FT)	COST ($/FT)	PROJ COST($1000)	COST <$25	SUM COST<$25	COST $25 TO $100	SUM COST $25 TO $100	COST>$100	SUM COST>$100	SUM PROJ COST($1000)
34 1	10/11	YUBA AVE	18" CMP	X	X	18	EASEMENT	85	$98	$8	$8	$125		$274		$4,444	$4,843
35 3	45/50	BARRETT	21" RCP	X	X	24	BARRETT	800	$128	$102		$125		$274	$102	$4,546	$4,945
36 7	126/132	JORDAN	24" CMP/18" RCP	X		18	JORDAN	1400	$98	$137		$125		$274	$137	$4,683	$5,082
37 13	267	ARLINGTON	48" CMP	X		REHAB	SAME	100	$124	$12	$12	$137		$274		$4,683	$5,094
38 14	248	WALNUT	36" CMP		X	36	SAME	35	$202	$7	$7	$144		$274		$4,683	$5,101
39 35	591	ASHBURY	24" RCP	X	X	30	POMONA/WALDO	600	$165	$99		$144	$99	$373		$4,683	$5,200
40 47	726	SHEVLIN	24" CMP	X		REHAB	SAME	140	$64	$9	$9	$153		$373		$4,683	$5,209
41 48	730	KING	24" CMP	X		REHAB	SAME	100	$64	$6	$6	$159		$373		$4,683	$5,215
42 50	757	TERRACE	24" CMP	X		REHAB	SAME	270	$64	$17	$17	$176		$373		$4,683	$5,232
43 52	779	ALBEMARLE	15" CMP	X	X	15	CLAYTON	200	$82	$16	$16	$192		$373		$4,683	$5,248
44 15	307/308	POTRERO	16X25 CMPA		X	24	SAME	125	$128	$16	$16	$208		$373		$4,683	$5,264
45 39	644	SAN PABLO	24" CMP		X	27	SAME	150	$150	$23	$23	$231		$373		$4,683	$5,287
46 5	87	JORDAN	15" CMP	X		12	EDWARDS/JORDAN	550	$68	$37		$231	$37	$410		$4,683	$5,324
47 8	163	JUNCTION	24" CMP	X		REHAB	SAME	60	$64	$4	$4	$235		$410		$4,683	$5,328
48 19	403/407	NAVELLIER/SCOTT	24" CMP	X		18	DONAL/LAWRENCE	950	$98	$93		$235	$93	$503		$4,683	$5,421
49 28	496	CONTRA COSTA	12" CMP	X		REHAB	SAME	100	$34	$3	$3	$238		$503		$4,683	$5,424
50 32	525/526	DON CAROL/ARBOR	18" CMP	X		REHAB	SAME	275	$49	$13	$13	$251		$503		$4,683	$5,437
51 33	535	BURNS CT	30" CMP	X		REHAB	SAME	130	$82	$11	$11	$262		$503		$4,683	$5,448
52 36	608	GALVIN	30" CMP	X		REHAB	SAME	200	$82	$16	$16	$278		$503		$4,683	$5,464
53 37	611	GALVIN	24" CMP	X		REHAB	SAME	410	$64	$26		$278	$26	$529		$4,683	$5,490
54 38	619/621	GALVIN/SEAVIEW	24"/30" CMP	X		REHAB	SAME	600	$82	$49		$278	$49	$578		$4,683	$5,539
55 44	714	BALRA	48" CMP			REHAB	SAME	50	$123	$6	$6	$284		$578		$4,683	$5,545
56 51	775/776	NORVELL	15" CMP	X	X	15	ALBEMARLE/LINCOLN	400	$82	$33		$284	$33	$611		$4,683	$5,578
57 53	767/768	EUREKA	12" CMP		X	15	SAME	300	$82	$25		$284		$611		$4,683	$5,578
58 56	829/837	ERROL	30"/36" CMP	X		18	ERROL	1250	$98	$123		$284		$611	$123	$4,806	$5,701
59 59	856/858	BONNIE/BALRA	15"/18" CMP	X		12	SEAVIEW/BONNIE	1050	$68	$71		$284	$71	$682		$4,806	$5,772
60 18	400	NAVELLIER	10" RCP	X	X	12	SAME	280	$68	$19	$19	$303		$682		$4,806	$5,791

NOTES:

(1) Projects are listed in order from the highest to lowest priority, based on the highest priority points assigned to any drain segment covered by that project.
(2) PROJ. ID. NO. – Location reference number as shown in Exhibit "E".
(3) DRAIN NO. – Drain segment numbers (first segment number/last segment number) used for reference in the storm drain information database.
(4) PRIV. PROP. – Indicates those projects where one or more existing drain segments are located on private property.
(5) CAP. PROB. – Indicates those projects where one or more existing drain segments have a hydraulic capacity deficiency problem.
(6) REPLACE DRAIN – Estimated size of replacement drain. REHAB indicates that rehabilitation of the existing drain may be a more feasible solution than rerouting flow to a different location.
(7) REPLACEMENT LOCATION – Indicates general street location identified for rerouting flows. SAME indicates the location would be the same as the existing drain location.
(8) PROJ COST – Estimated construction cost in 1992 dollars.
(9) COST <$25 – Estimated construction cost for small projects, less than $25,000.
(10) SUM COST <$25 – Sum of the total costs to this point in the priority list for small projects, less than $25,000.
(11) COST $25 to $100 – Estimated construction cost for medium sized projects, $25,000 to $100,000.
(12) SUM COST $25 to $100 – Sum of the total costs to this point in the priority list for medium projects, $25,000 to $100,000.
(13) COST >$100 – Estimated construction cost for large sized projects, greater than $100,000.
(14) SUM COST >$100 – Sum of the total costs to this point in the priority list for large projects, greater than $100,000.
(15) SUM PROJECT COST – Sum of the total costs to this point in the priority list for all projects.

project number with the priority points. Costs in this table are based on approximate lengths of rerouted drains and necessary connecting drains. The estimated cost of implementing all of these projects is about $5.8 million.

Project costs have been divided into small projects (less than $25,000 each), medium projects ($25,00 to $100,000), and large projects (more than $100,000). If financing of the entire first phase storm drain improvement program is not possible at the present time, the City may find it beneficial to implement a number of small or medium sized projects, rather than including only a few of the large projects.

Most of the recommended construction projects consist of the replacement or rehabilitation of existing storm drains. For some projects, additional factors about the existing drains or the recommended improvements are described in the Technical Appendix.

8.3 100-YEAR FLOODPLAIN IMPROVEMENTS

For the Bayview area of the City currently within the Flood Zone area, El Cerrito cannot independently alleviate the flood problems since the under-capacity channels are located downstream in the City of Richmond. Improvements to these channels and/or the culverts crossing I-80 and the railroad may be required to alleviate flooding during the 100-year flood. Storm drain improvements in the area along San Pablo Avenue may eliminate street flooding during a 10-year storm, but would not eliminate flows from these sources during a 100-year storm.

Until downstream improvements can be made, El Cerrito should insure that any land use changes in the area are consistent with its status as a floodplain area. These would include raising ground levels or structure floor levels above flood elevations wherever possible, or the implementation of suitable floodproofing measures.

There is very little that can be done to protect existing structures in this flood plain. Information programs for new residents may be desirable to keep them aware of the flood potential in this area. Flood warning systems and evacuation procedures should be established and periodically reviewed with public safety personnel. Contact should be maintained with agencies controlling downstream areas including the City of Richmond and Caltrans to ensure that any changes proposed by these jurisdictions would be beneficial to El Cerrito.

9. FINANCIAL MECHANISMS

An essential requirement for the implementation of El Cerrito's Storm Drainage Master Plan is a feasible funding program. Once the Master Plan is adopted, positive steps should be taken to assure that adequate monies will be available to construct the required facilities. The following discussion outlines a number of possible sources of funds and financing methods. Many of these are commonly known and relatively simple, and consequently have been discussed only briefly. More lengthy narratives have been devoted to those methods which appear most appropriate for the City of El Cerrito or which are not in common usage now.

In considering these potential funding mechanisms, it may become evident that no single financing method will be sufficient to provide the funding necessary to implement all of the recommendations contained in the Master Drainage Plan. Accordingly, the City may want to consider various combinations of financing mechanisms and/or funding sources in implementing this plan.

9.1 SOURCES OF FUNDS

General Fund

One source of funds which can legally be used for drainage facility construction is the City's General Fund. However, since this is a limited source of revenue, the tremendous demands for funding other services usually places construction of drainage facilities below more immediate priorities.

Redevelopment Funds

The City of El Cerrito has formed a redevelopment agency to encourage economic redevelopment of its business district. Redevelopment funds can be used to pay for public improvements within the project area or for improvements outside the project area required to accommodate redevelopment projects.

To finance public improvements and promote economic development, redevelopment agencies can spend current tax increment, leverage tax increment by issuing tax allocation bonds or agree to use tax increment either directly or indirectly to make payments on certificates of participation or lease revenue bonds. Redevelopment agencies are also empowered to issue limited tax bonds secured by sales taxes collected within a project area and bond anticipation notes with a maturity up to five years. The sale of all debt obligations

of a redevelopment agency may be authorized by resolutions adopted by the Redevelopment Board of Directors and the City Council, and no community-wide vote is required.

The redevelopment agency has prepared a list of projects to be funded as part of a 1992 plan amendment. This project list includes funds for storm drain improvements in the project area. Redevelopment funds are limited and retail projects have a higher priority. It is unlikely that this funding source will be available for seven to ten years.

Gas Tax Funds

Gas tax funds received by the City pursuant to Sections 2105, 2106, and 2107 of the California Streets and Highways Code may be used for the construction and/or maintenance of drainage facilities located within public street right-of-ways. In order to receive Section 2105 allocations, the City is required to expend from its General Fund for street and highway purposes an amount not less than the annual average of its expenditures from its General Fund during the 1987-88, 1988-89, and 1989-90 fiscal years. This is commonly referred to as a "Maintenance of Effort" requirement to receive these funds. It should also be noted that Section 2107.4 of the Streets and Highways Code will not allow more than one-quarter of these gas tax funds to be used to make principal and interest payments on bonds issued for construction, if the issuance of such bonds is authorized by a proposition approved by a majority of the votes cast thereon.

The City currently receives approximately $400,000 annually of gas tax funds which is committed to high priority street repair. Use of these funds for storm drainage improvements would reduce or eliminate the street repair program which currently operates at 50% of the recommended level. For this reason, it is unlikely that this funding source will be a major factor in storm drainage reconstruction.

Development Exactions/Fees

Development exactions are conditions placed on a development to provide community infrastructure facilities. Development fees or impact fees are intended to compensate the community for the extra cost of public facilities that the development will cause. AB 1600, effective January 1, 1989, as Government Code Section 66006 requires a city to go through a process to establish a reasonable relationship, or "rational nexus," between a development project or class of development projects and the public improvement for which the developer fee is charged.

El Cerrito is a built out community with only two small parcels of land with potential for being subdivided into approximately 35 residential lots. Except possibly in the redevelopment area, there is not enough potential for future development within El Cerrito to generate a large amount of fees or "exactions" from this mechanism.

Special Tax

One option available to the City to fund storm drainage improvements is the levy of a special tax, the proceeds of which would be devoted to finance these improvements. This tax could be imposed on various types of activities or services. It could take the form of a utility users tax, a hotel occupancy tax, or any other type of tax the City sought to impose. According to Article XIIIA of the California Constitution, special taxes require the approval of two-thirds of the City electorate before such taxes may become effective.

As the California Supreme Court stated in City and County of San Francisco v. Farrell (1982) 32 Cal.3d 47, a special tax is a tax in which the proceeds are devoted to a special fund or purpose. In this particular instance, the proceeds would be devoted to the improvement of the storm drainage system. As such, the tax proceeds could only be used for that specific purpose. This is to be distinguished from a general tax in which the proceeds are not earmarked but instead become a part of the general fund to be appropriated by the legislative body as all other general fund revenues.

At present, the issue of how, and in what manner, a local entity may impose a general tax is the subject of great controversy and litigation. According to Proposition 62, codified in Government Code Section 53723 et seq, the enactment of a general tax requires a two-thirds vote of the legislative body as well as a majority vote of the local electorate. There has been much speculation, however, that this requirement of a vote by the electors violates certain California constitutional provisions regarding the taxing powers of local government. There are presently several lawsuits awaiting decision concerning the constitutionality of Proposition 62.

It is difficult to predict the outcome of litigation. However, the best guess of those persons who have been following this is that Proposition 62 will probably be found unconstitutional. If that occurs, a local entity will be able to impose general taxes solely by the actions of its legislative body and without voter approval. In terms of the City of El Cerrito, this would enable Council to enact a general tax on a wide variety of services and/or activities for the purposes of augmenting the general fund. The City could then always choose to appropriate monies from the general fund for improvements to the storm drainage system.

Utility Users Tax

In 1991, the El Cerrito City Council adopted Ordinance No. 91-3 amending Title Four, Revenue and Finance, of the El Cerrito Municipal Code, by adding a new Chapter 4.40, establishing a utility users tax. This ordinance authorizes the tax on users of telephone, electric, gas, water, cable television, and garbage, rubbish, and recyclable material collection and disposal services within the City of El Cerrito. At present, this tax is levied only on gas, electric, telephone and cable television services. The tax is collected by the respective utility companies at the same time as their charges are made in accordance with their regular

billing practices. The rate of this tax is set by resolution of the City Council of the City of El Cerrito. The intent to increase this tax rate requires publishing of a notice of this intent in a newspaper of general circulation at least one time, a minimum of five days prior to the meeting at which the City Council considers this increase. The current tax rate established by the City Council is eight percent. For each one percent increase in this tax rate, the City has the ability to raise an additional $225,000 annually (based on the current set of activities subject to the tax without water or garbage recycling.

City-wide Storm Water Utility Fees (Enterprise Fund)

One of the most innovative approaches being considered by some cities to finance stormwater treatment facilities for compliance with the Clean Water Act of 1987 (NPDES) is the formation of a utility which deals exclusively with the management of stormwater discharge. A general law city may find specific authority to institute an enterprise for financing stormwater discharge from several sources, including the Revenue Bond Law of 1941, Section 5470 of the Health and Safety Code, and perhaps under Section 10001 of the Public Utilities Code.

The enterprise utility approach suggests that stormwater utilities are analogous to other public utilities such as water and wastewater facilities which are necessary to fill a public need where private provision of the service is unlikely. Hence, the function of the stormwater utility is more of a proprietary function than a governmental function and is, therefore, amenable to a user charge. The user charge is determined by developing rate factors which consider, for example, the stormwater runoff from a parcel based on the total acreage of the parcel or based on the amount of impervious surface area on the property.

The first approach would involve collection of a monthly or annual drainage service charge for each parcel in the City based on total acreage of the property. These charges could be established City-wide or by drainage district. If drainage districts were established, these charges would be based on the cost of providing adequate drainage facilities for each particular district. Funds collected from the service charge would be used only for the planning, design, construction and maintenance of drainage facilities. Service charge revenue could be used on a pay-as-you-go basis or pledged as income for support of a revenue bond issue. This type of program appears to offer an attractive alternative to assessment district proceedings in cities such as El Cerrito where substantial development has already occurred.

The impervious surface charge concept would apply a similar monthly or annual charge to properties within the various drainage districts. However, in this case, rather than proportioning charges on an acreage basis, charges would be imposed on the basis of the area covered with structures, paving, or other impervious surfaces. Where improvements already exist on the property, the actual coverage or estimated coverage based on land use, would be utilized in the computation of the charge. In those cases where no improvements

exist, the charge could be based on an estimate of probable ultimate coverage. While the coverage approach is theoretically more equitable than the service charge, it has certain inherent administrative disadvantages which would complicate its implementation.

Collection of this fee could be via an agreement with the local Sanitary District to collect it as part of their billing process, establish a City billing process, or have the County collect it via the property tax bill.

A major advantage in using stormwater utilities to finance stormwater discharge is that under California law, user fees are not deemed taxes if the charge does not exceed the benefit or service conferred. Moreover, a statutory provision provides that fees are not "special taxes" subject to the two-thirds electorate approval of Proposition 13 if the fee does not exceed the reasonable cost of providing the regulation or service. The fact that the service charge is associated with a municipal enterprise lends credibility to the notion that the charge is in fact a fee and not a special assessment.

If it is determined that existing law does not provide for General Law, cities implementing city-wide storm water utility fees, the City may find the concept of sufficient value to warrant pursuit of enabling legislation. It should be noted that Assemblyman Campbell has recently introduced AB 2768 to Amend the Contra Costa Flood Control and Water Conservation District Act to provide for the levy of benefit assessments jointly with the cities in the County to fund the activities associated with the national pollution discharge elimination system (NPDES) program. It may be possible to expand the use of these funds to include storm drain facility improvements.

9.2 FINANCING MECHANISMS

A special assessment is not a tax. It is instead a levy on land to finance the benefits which a specific public improvement confers on that land. Therefore, the main identifying feature of a special assessment is that the amount of the assessment parallels the relative benefit a given parcel receives from the particular improvement. Upon creation of an assessment district, a local entity may provide for the issuance of bonds to finance the improvement. The bonds are then re-paid through a yearly assessment on the benefitted property.

In the case of El Cerrito, a City-wide assessment district could be created to finance storm drainage improvements. The indebtedness which would result from the financing of bonds to pay for these improvements would then be re-paid through an assessment against property within the City which benefits from these improvements. The amount of the assessment would depend on the amount of benefit conferred upon that property.

There are numerous statutory enactments which authorize local entities to create assessment districts. Although these acts differ from one another, and all should be analyzed should the City decide to create such a district, the acts have certain similarities. The main

similarity is that prior to the legislative approval of such a district, the local entity is required to conduct a public hearing with individualized notice to every property owner included within the district. At the public hearing, an engineer's report must be presented which outlines the assessment to be imposed on each property within the district and which contains the methodology through which benefit was measured to arrive at that particular assessment. As can be imagined, the creation of the engineer's report is an enormous task both in terms of time and detail. Equally enormous is the provision of notice to each property owner within the proposed district.

The creation of an assessment district does not require that the electorate vote to approve the district. However, all of the acts authorizing such districts do provide for majority protest. Although some acts permit the legislative body to override a majority protest by a four-fifths vote, the ability to override is limited to specific types of situations.

The creation of a City-wide assessment district requires individual notice to each property owner in the City which is an onerous task. It also requires a detailed Engineer's Report which is costly and time consuming to prepare. It should also be noted that the public hearing required for an assessment district is usually attended more by those who oppose it than those who may be supportive.

Mello-Roos Community Facilities District

The Mello-Roos Community Facilities District Act of 1982 (Section 53311 et seq., California Government Code) established another method whereby cities may form a separate district to finance certain public facilities on a pay-as-you-go basis, certain public facilities through the sale of bonds, certain public services on a pay-as-you-go basis, or any combination of the above. The sponsoring public entity is authorized under the Act to raise funds to accomplish its financing objectives by collecting a special tax within the district.

A community facilities district (which may include areas that are not contiguous) may provide for the planning, design, purchase, construction expansion or rehabilitation of any real or other tangible property with an estimated useful life of at least five years. The facilities need not be physically located within the district.

A Mello-Roos community facilities district may provide flood and storm protection services including the operation and maintenance of storm drainage systems.

However, a community facilities district may provide only the levels of services mentioned above to the extent that they are in addition to those provided in the territory of the district before the district was created and may not supplant those services already available within that territory.

The proceedings to issue bonds and to form a community facilities district are similar because each requires action by the legislative body, a public hearing and an election. The proceedings to form the district and to use bonds may be undertaken concurrently.

This Mello-Roos financing method was established primarily for funding improvements related to private development projects. Bonds issued by a Mello-Roos District are paid for through the levy of a special tax, which must be approved by a two-thirds (2/3) affirmative vote within the District. This is more easily accomplished in the pre-development stage of a proposed subdivision where a limited number of individuals control the voting rights. In an already developed city like El Cerrito, it would be difficult to implement a City-wide Mello-Roos District to fund El Cerrito's Storm Drainage Improvement Program.

Municipal Improvement Act of 1913

The Municipal Improvement Act of 1913 is a procedural act that provides for forming an assessment district, levying an assessment, and imposing a lien against privately-owned real property; however, it does not alone contain provisions for using bonds. The issuance of bonds is normally done pursuant to the Special Assessment Bond Act of 1915.

Before ordering any work or improvements, the City must adopt a resolution of intention that identifies the district boundaries, describes the proposed improvements, declares the intention to levy an assessment to maintain, repair or improve a facility, provides for issuance of bonds, and states the associated maximum interest rate.

The resolution of intention must also include a report on the proposed improvements by the "Engineer of Record". This report includes the proposed assessment diagram, which is used to determine the assessment levied against each property and must be accepted by the City Council. Notices are then sent to property owners regarding a public hearing to be held not less than 30 days after the City Council adopts the resolution of intention.

At or before the public hearing, if a protest against the proposed improvement is made by more than fifty percent (50%) of the property owners of the area to be assessed, no further proceedings can be taken for a period of one year from the date of the hearing, unless the City Council overrules the protest by a four-fifths vote. If no majority protests, at the conclusion of the public hearing, the City Council may confirm the assessments. If confirmed, a lien is created against each assessed parcel and the assessments are recorded in the County Recorder's office.

The property owners are mailed notices of each parcel's exact confirmed assessment, and they have 30 days to pay in cash part or all of the assessment. On conclusion of the cash collection period, all unpaid assessments are aggregated, a bond issue is structured, and bonds are sold. Bonds may be issued pursuant to either the Improvement Act of 1911 or the Improvement Bond Act of 1915.

To expedite the improvement proceedings, the legislative board may lend funds as it deems necessary to a special fund out of available municipal funds. Such loans must be repaid from the proceeds of the assessments provided for in the 1913 Act.

Benefit Assessment Act of 1982

The State Legislature found and declared that it is in the public interest to allow local agencies to finance property-related services through the imposition of assessments on property that benefit from those services.

The Benefit Assessment Act of 1982 allows the City to levy an annual assessment on all benefitted properties within its jurisdiction for drainage, flood control, or street light services after a 50% affirmative vote, responding to the will of the majority but avoiding the two-thirds vote required for a tax. It also provides the only means available for a general law city to levy annual benefit assessment for street maintenance which may be accomplished without a vote if property owner or voters, as appropriate, are notified and produce less than a 25% protest.

Once the authority to assess has been established, the annual assessments are levied by ordinance or resolution.

The authority to issue bonds is not included. However, enacting a Benefit Assessment District can produce additional revenue to the City, which can be used in conjunction with another type of financing technique such as Certificates of Participation.

The Benefit Assessment Act of 1982 permits local agencies to levy benefit assessments to provide funds for the maintenance, operation and installation of drainage and/or flood control facilities. A district funding these services is formed after adoption of a resolution of intention, published and posted notice, a public hearing and a mandatory election by either landowners or registered voters, as appropriate. The local agency may annually (after the initial formation proceedings) determine the cost of the service and determine and impose the assessment by ordinance or resolution. There is no requirement of annual notice and public hearing.

Note that this statute provides specific guidance on the method of assessments related to flood control services. All of the following requirements must be met to levy an assessment for operation and maintenance of Drainage and Flood Control facilities:

1. The amount of the assessment shall be related to the benefit derived from the provision of the services. The district can be divided into zones which can be assessed differently depending on the benefit derived.

a. In the case of an assessment for Flood Control services, the benefit may be (but need not be) determined on the basis of proportionate storm water runoff from each parcel.

b. In the case of an undeveloped parcel, proportionate storm water runoff may be used as a measure of benefit only if such a parcel is found to benefit from the service of operation and maintenance of Flood Control improvements.

c. In the case of railroad, gas, water, telephone, cable television, electric utility or electric line, or other utility right-of-way (right-of-way) included in the area proposed to be assessed, such right-of-way shall be subject to assessment only if it is found to benefit from the service. In the determination of whether or not such right-of-way benefits from the service, its use as a right-of-way shall be presumed to be permanent. If found to benefit from the service such right-of-way shall be subject to the same penalties, procedure and sale in the event of delinquency, as other parcels in the district.

2. The annual aggregate amount of the assessment shall not exceed the estimated annual cost of providing the service.

3. The revenue derived from the assessment shall only be used to pay the cost of service for which the assessment was levied.

Landscaping and Lighting Act of 1972

This Act authorizes local agencies to impose assessments on benefitted properties to finance the construction and ongoing maintenance and servicing of park and recreational improvements, landscaping improvements, lighting improvements, and traffic signals. The City of El Cerrito established this type of district in 1988.

The permitted uses can include improvements, acquisition of land for parks, recreation and open space, and the construction of lighting and landscaping improvements. It also includes the installation or construction of any facilities which are appurtenant to any of the foregoing or which are necessary or convenient for the maintenance or servicing thereof, including drainage facilities.

The Act allows some flexibility in setting the assessments within the district. The district can be divided into zones and each zone can be assessed at a different rate or exempted depending on the type of service provided in each zone.

The assessments for park or recreational improvements can be collected for a period of thirty years, while all other improvements can be spread over a maximum of five years. Bonds for park or recreational improvements can be issued under the auspices of the 1915 Act.

The implementation of a Lighting and Landscaping District is a City Council action that does not require voter approval. However, the Council must conduct a public hearing and the Resolution on Intention to form the District must be published and mailed to every property owner in the proposed district. A report including the plans and specifications, the costs, the boundaries of the district and an assessment of the costs must be prepared for the initial public hearing. The proceedings must be abandoned if a majority protest, by parcel area, is filed at the public hearing unless the protests are overruled by a four-fifth vote of the Council.

In subsequent years an annual hearing must be held on an engineer's report regarding the state and future of the improvements. The provisions for protest and abandonment only apply to the first year's hearing.

It should be emphasized that funds generated from a Landscaping the Lighting District would be restricted to drainage facilities serving park and recreation areas and landscaped areas. Therefore, these funds would have very limited use in terms of the overall drainage improvements required City-wide.

Revenue Bonds

Revenue bonds may be issued under the Revenue Bond Acts of 1933, 1941, or 1957 and are designed to finance facilities that provide benefits to a group of easily identifiable users. Revenue bonds are used in constructing or purchasing a specific project, and are to be repaid solely from the income generated by use of that property. Such revenues may include service charges, tolls, connection fees, stand-by charges, admission fees, leases and rents. The bond owner is generally entitled only to payments from these fees,unlike with general obligation bonds which provide a claim against the assets of the issuer. Investment-grade rated revenue bonds generally require a debt coverage ratio of net revenues (gross revenues less operation and maintenance costs) to annual debt service of 1.25 to 1.50.

Because the debt service on revenue bonds is directly paid from income generated by the facility, the debt is considered self-liquidating and generally does not constitute a debt of the issuer. Thus, revenue bonds are not subject to Gann spending limits.

Since revenue bonds require an ongoing stream of income to service the debt, they are appropriate only for those infrastructure facilities for which user fees are charged (e.g., water supply systems), but cannot be used for roads or other facilities which do not generate

fees. Thus, revenue bonds suffer from the disadvantage associated with user fees described earlier.

Revenue bonds issued under the 1941 and 1957 Acts require majority voter approval to authorize the size and purpose of the bond issue. In addition, bond owners are entitled to payment only from the fees and charges from the facility, and have no recourse to the general fund or assets of the issuer. Thus, revenue bonds must offer a higher yield to compensate for the increased risk and lessened security, making this form of financing more expensive to the borrower than general obligations bond.

General Obligation (GO) Bonds

General obligation (GO) bonds may be sold by the State of California or a local public entity, such as a county, that has the legal authority to levy a tax rate on real and personal property located within its jurisdiction. While new voter authorizations for GO bonding authority were suspended in 1978 with the passage of Proposition 13, Proposition 46 passed in 1986 amended the State Constitution to allow a two-thirds majority of those voting in a local election to authorize GO bonds for specific projects.

Qualified issuers may issue GO bonds to acquire, construct or improve real property but not to purchase equipment or pay for operating and maintenance costs. The issuer is authorized to levy an ad valorem tax on all taxable property within its jurisdiction at any rate necessary to collect enough money each year to pay for principal and interest due. In addition, the issue has pledged its full faith and credit to pay for the indebtedness.

GO bonds are the most secure type of municipal bond available and thus attain the lowest yields on any comparable long-term security. GO bonds are also the most efficient form of financing because neither a reserve fund nor funded interest during construction must be financed from bond proceeds. In addition, these bonds are the easiest to structure and analyze from a credit standpoint. Another advantage is that the property taxes levied to finance the improvements do not constitute "appropriations subject to limitation" under the Gann spending limit.

The main obstacle to the use of GO bonds is obtaining the two-thirds approval of local voters necessary to issue the bonds. Even if voter approval is achieved, the length of time and risk associated with the election process limits the usefulness of GO bonds for many financing projects.

Limited Obligation Bonds

Limited obligation bonds are secured by a specified amount of revenues received from any local source, including property taxes or sales taxes. Although neither the general fund nor

the taxing power of the issue is pledged to pay debt service, if the specified revenues held in a special fund are insufficient to pay debt service, the local agency may elect to pay principal and interest from other legally applicable sources of funds.

As in GO bonds, a two-thirds majority must approve the issuance of limited obligation bonds in a local election.

Limited obligation bonds have no major advantages.

Limited obligation bonds do not provide the level of security of GO bonds, thus they generate higher issuance and financing costs. Since limited obligation bonds also require two-thirds voter approval, they offer no real advantages over GO bonds or other financing techniques.

Certificates of Participation (COP's)

Certificates of participation (COP's) provide long-term financing through a lease-purchase, installment sale agreement, or loan agreement. This technique allows the public sector to purchase (in $5,000 increments) participation in the stream of lease, installment, or loan payments. At the end of the COP term when the debt is retired, the ownership of the building is turned over to the public entity. COP's may be issued by public entities with general leasing and borrowing powers.

The main security to the certificate holders for repayment of the debt is ownership of the public facility. If at any time the entity is unable or unwilling to continue making the COP payments, ownership of the building remains with the certificate holders and they may dispose of the facility as they see fit. However, repossession of public facilities can be time consuming and difficult. Thus, the public entity's need for the facility or equipment is the main form of security for COP's. If property is used to provide an essential service, a greater likelihood exists that the obligor will appropriate the annual payments to avoid default.

One advantage of COP's is that the issuer has no long-term obligation to make the COP payments, and may appropriate them annually out of the general fund. Another advantage of COP's is that they are subject neither to Gann spending limits nor to the statutory requirements applicable to bonds, including interest rate limitations, general election requirements in their uses than general obligation bonds, and may be used to finance acquisition or construction of land, equipment or facilities. Finally, whether the lessee is a public or private corporation, the holders of the COP's look solely to the public entity for repayment, exempting COP's from the registration requirements imposed by the Securities Act of 1933.

In most bond counsel's view, property must be depreciable and transferrable in order to be leased. Thus, it is generally held that street and roadway improvements cannot be subject

to a lease, since they could not be transferred to the lessor in the case of a default due to the easements granted to other public and private entities. This limits the usefulness of COP's for most infrastructure improvements and facilities.

In addition, since the "essential nature" of the leased property to the public entity is crucial to the credit worthiness of the COP's, the costs of COP's may be higher for non-essential facilities and equipment.

Lease Revenue Bonds

Lease revenue bonds are similar to certificates of participation in that both are based on a lease agreement and are not subject to the constitutional debt limitation. However, lease revenue bonds differ from COP's because the lessor must be either a governmental entity with the power to issue revenue bonds or a non-profit corporation that issues bonds on behalf of a political subdivision. Issuers that typically serve as lessors include non-profit public facilities corporations, redevelopment agencies, joint powers authorities, or parking authorities. The financed projects may be revenue producing or non-revenue producing. Security is provided through the lease agreement, with investor remedies in case of default limited to repossessing the leased property, leasing it to a third party, and suing the lessee for any difference in rent.

Lease revenue bonds issued by a non-profit corporation have no maximum interest rate. All other lease revenue bonds have a 12 percent interest rate limit under existing statutes.

Most lease revenue bonds are not subject to approval by the electorate. In addition, lease revenue bonds are exempt from Gann spending limits.

As for COP's, the main disadvantage of lease revenue bonds for financing infrastructure improvements is that many such improvements are not appropriate for leasing due to their inability to be transferred in the event of default on the lease. In addition, unlike COP's, lease revenue bonds are subject to the statutory requirements applicable to all municipal bonds.

Tax Allocation Bonds

Tax allocation bond financing is the primary funding tool available to redevelopment agencies. The major advantage of tax allocation bond financing is the redevelopment agency's ability to leverage its annual tax increment revenue into a borrowing based on the repayment of the debt with future property and/or sales tax increments. Twenty percent of tax increment revenues received by the agency must be used to finance the construction or rehabilitation of low and moderate income housing benefitting the redevelopment project area.

The Tax Reform Act of 1986 has effectively eliminated both direct and indirect private participation in purchasing land and building projects financed with tax-exempt tax allocation bonds. Under the new law, tax allocation bonds can be structured in three ways and can be sold alone or in combinations:

- Tax-exempt bonds for public improvements, as long as at lease 95 percent of bond proceeds fund typical government purposes like public streets and facilities

- Private activity bonds which will be tax-exempt if the bond qualifies as a qualified redevelopment bond

- Federally taxable bonds

Qualified redevelopment bonds may be sold only to acquire real property, clear and prepare land for redevelopment, rehabilitate real property acquired by the agency, or to provide relocation assistance. If real property is transferred to a private person, the property must be transferred at fair market value, rather than at below market prices to attract development. No more than 25 percent of the net proceeds can be used for retail food and beverage services, automobile sales or service, recreation or entertainment facilities, airplanes, skyboxes, other private luxury boxes, or health club facilities. No proceeds may be used for private or commercial golf courses, country clubs, massage parlors, hot tub facilities, suntan facilities, liquor stores, racetracks or other gambling facilities.

Because tax allocation bonds are a debt only of the redevelopment agency and not of the surrounding city or county, local public officials can use tax allocation bonds to diversify their debt structure and relieve an excessive debt burden on the general fund. Tax allocation bonds also do not require voter approval and are not subject to Gann spending limits.

Tax allocation bond financing is limited to projects within or benefitting redevelopment project areas. In addition, while redevelopment agencies once traditionally received 100 percent of tax increment revenues, recently designated redevelopment plans generally include agreements sharing tax increment revenues with other taxing agencies, decreasing the amount of increment available for project financing. Proposition 13 also had a major effect on the viability of tax allocation bond financing by reducing property tax rates as well as permitted escalation in property values.

9.3 FEDERAL AND STATE ASSISTANCE

Infrastructure financing has traditionally been a local issue. Over the decade of the 1970's, federal and state financial assistance to communities expanding their infrastructure increased substantially. However, during the 1980's the federal government substantially cut back many of these programs, placing the responsibility, once again, on state and local agencies.

Available federal and state programs for the financing of local infrastructure include the following:

1. Federal Community Development Block Grant Funds

   Federal Community Development Block Grant (CDBG) funds are allocated to city and county governments to be used in the promotion of local community economic development and neighborhood revitalization. CDBG funds for equipment, real estate, and public improvements are available to both private borrowers and public agencies.

   Due to its size, the City is not entitled to receive these funds directly, but must compete with other small cities within the County to receive funding from the County's Community Development Block Grant Program. All projects funded by CDBG must either directly benefit lower income persons or be located in areas that are occupied by residents who are lower income. There is a limited amount of funds available and the County gives preference to affordable housing projects over infrastructure projects. Accordingly the likelihood of receiving CDBG funds for this purpose is small.

2. Federal Economic Development Act (EDA) Public Works

   Under this program, public or quasi-public entities are entitled to grants for up to 80 percent of the cost of off-site public improvement projects. Available funds for this program are limited and the competition for grant moneys is very stiff. Selection is based on the need for the improvements, community economic conditions, and other factors.

3. Urban Creek Restoration Program

   Chapter 2, Title 23, of Subchapter 2.4 of the California Code of Regulations provides for a grant program under the Urban Creek Restoration and Flood Control Act of 1985. This Urban Creek Restoration Program is intended to protect, restore, and enhance urban creek channels by combining effective, low cost flood control with preservation and enhancement of the natural environment. Its purpose is to reduce flooding and erosion in ways which restore the ecological viability of creek environments located in predominately

urban areas, thereby enhancing aesthetic, recreational and fish and wild life values. This program is designed to provide assistance from the state to local communities such as El Cerrito.

The Urban Creek Restoration Program is designed to contribute to the long-term enhancement and restoration of natural creek corridors by encouraging projects which contribute to the education of the public in methods of stream restoration or stream corridor management and develop new techniques and innovative technologies in the field of stream restoration. Types of projects for which assistance is available include the following:

a. Projects designed to organize and/or supervise volunteer labor to clear debris from stream channels and perform erosion control and bank stabilization work.

b. Projects designated to develop and implement stream restoration plans.

c. Projects designed to use bioengineering techniques to install plant materials, rock, netting, mulch, wood fencing, irrigation or drainage systems necessary to control erosion or stabilization of banks.

d. Projects designed to remove culverts or storm drains as needed to stabilize and restore channels or accomplish flood control objectives.

e. Projects designed to carry out non-structural flood control actions that contribute to the goal to protect, restore and enhance natural stream environments, including the acquisition of land, and the elevation, relocation and/or flood-proofing of structures.

Grant funding in the amount not to exceed $200,000 per project shall be available for eligible project cost associated with the projects approved under this program. The grant application cycle is conducted on an annual basis. Applications are submitted to the California Department of Water Resources, who is responsible for administrating the program and establishing an annual priority list for receiving available funds.

This grant program may provide funds for improving portions of Cerrito Creek, the existing open channel east of San Pablo Avenue between Conlon Avenue and the northern City limits and the open channel through Arlington Park.

9.4 GENERAL DISCUSSION OF FINANCING MECHANISMS

Table 9 lists the priority storm drain improvement projects required to upgrade the City's system. Of the 60 projects listed in Table 9, 25 projects are estimated to cost less than $25,000, 13 projects costing between $25,000 and $100,000, and 22 projects costing over $100,000. It should also be noted that 18 of the top 30 priority projects are estimated to cost over $100,000. Given the magnitude of these priority projects required to upgrade the City's storm drain system, it appears that the mechanism chosen to fund these improvements should allow for financing the cost of these improvements rather than a pay as you go funding program. As stated above, after evaluating these potential funding mechanisms, the City may determine that a combination of funding sources is needed to generate adequate revenue to implement a comprehensive storm drain improvement program.

The most expedient way to generate additional revenue to fund the City's storm drain improvement program is to increase the City's existing utility user tax. The City can generate additional revenues from this source by either increasing the rate, expanding the base by applying this tax to other utilities, or a combination of both of these. The current tax rate of eight percent is on the high side of the state average for this tax. It is questionable whether the community would support an increase in this utility user tax in order to provide additional revenue for storm drain improvements. Each one percent of tax levied on the utilities that this tax is currently applied to, would generate approximately $225,000 annually. Alternatively, if this utility tax were expanded to include water, garbage service and recycling service the City could generate additional revenues in the range of $230,000 to $240,000 annually.

The use of assessment districts is a traditional form of financing local infrastructure improvements. Assessment districts are not limited by Proposition 13 and have the additional advantage of placing the cost of public facilities directly on the benefitted property owners. Upon issuance of bonds to finance the improvements, the district has the power to assess all property owners included in the district in order to repay the borrowed funds. The special assessment is levied across properties in the district in proportion to their share of benefit from the improvements funded by the district. Accordingly, the assessments are levied in a fair and equitable manner.

Table 7 has been developed to give an estimated assessment required to finance the Phase I, $5.8 million, storm drain improvement program for the City of El Cerrito. Each parcel assessment could be calculated directly based on actual square footage of impervious surface on that property, or based on an average equivalent runoff area factor (EFSFRU). This Table assumes an average equivalent runoff area factor of 4200 square feet per single family residence. The equivalent runoff factor used for multi-family residential parcels was calculated at sixty percent of the single family residence factor or 2520 square feet per multi-family residential parcel. The equivalent factor for commercial parcels was obtained by dividing the total commercial area within the City of El Cerrito by the average single family impervious surface area (i.e., 4200 square feet). These calculations resulted in a total

Table 10

CITY OF EL CERRITO STORM DRAINAGE MASTER PLAN

ANNUAL REVENUE/FINANCING OF PROPOSED STORM DRAIN IMPROVEMENT PROJECTS

LAND USE	UNITS	QUANTITY	CONVERSION FORMULA TO ERSFRU(1)	ERSFU(1)	$83.67/ERSFU
REVENUE					
Single-Family Residential	No. of Parcels	7342	No. of Parcels x 1 =	7,342	$614,400
Multi-Family Residential	No. of Parcels	782	No. of Parcels x .6 =	469	$39,250
Commercial	Lot Size (SF)	5227200	Lot Size(SF)/4200 SF(2)=	1,245	$104,150
TOTAL ANNUAL REVENUE					$757,800
FINANCING(3)					
Total Amount to Bond					$7,755,000
Less Bond Issuance Costs					($1,939,000)
Funds Available for Storm Drainage Improvements					$5,816,000
ANNUAL PAYMENTS					$757,800

Notes:

(1) ERSFRU = Equivalent Runoff Single-Family Residential Unit

(2) Average Equivalent Runoff Area for SFR = .7x6000SF (Ave area of SFR) = 4200 SF

(3) Assumes 8.5% average bond coupon and a 25 year term. Bond issuance costs are estimated to be 25% of the bond issue (includes a 10% reserve, 2% bond discount, 8.5% capitalized interest (i.e. 1st year interest payment), 2% bond counsel, 2% assessment engineering, 0.5% closing costs)

ERSFRU count in the City of 9,056. It was then calculated that the annual payments to fund a $5.8 million, storm drain improvement program would be approximately $757,800. Dividing this annual payment by the number of ERSFRUs in the City results in an annual assessment of $83.67 ERSFRU (i.e., per single family residential unit).

10. CONCLUSION

The main purpose in preparing this storm drain master plan for the City of El Cerrito is to address the City's concern for the increasing number of problems caused by deteriorating and inadequate storm drain facilities. These problems have recently emerged in the form of several claims filed against the City for damage due to flooding and saturated soil. This history of law suits has resulted in $307,000 of claim payments over the last ten years.

The City needs to limit their exposure to the potential of future claims by focusing of three objectives: (1) replace deteriorating metal pipes; (2) relocate public drainage facilities from private right-of-way (or easements); and (3) improve under-capacity storm drain lines. These three objectives are the basis for the improvement projects recommended in this study.

The research, inventory, and analysis conducted during development of the storm drain master plan has resulted in up-to-date computerized mapping system of the City's existing storm drain facilities, a general indication of deficient storm drain segments, a recommended construction plan to resolve high priority deficiencies, and cost estimates for future improvements needed to bring the City's storm drain system up to present standards.

There are three types of deficiencies within the existing storm drain system: condition deficiency, hydraulic capacity deficiency, and operation and maintenance deficiency. Based on field survey and pipe material life expectancy, it is generally assumed that metal pipes are in poor to fair condition and concrete pipes are in fair to good condition. The hydraulic capacity deficiencies are based on the standard practice of providing 10-year storm protection with the underground storm drain facilities. In general, it is not cost effective to convey major flood flows through minor underground storm drain pipes. Therefore, storms larger than a 10-year storm are accommodated by a system of overland flow facilities which consist of streets, channels, creeks, and open space. If the major overland system is lacking in a particular area, the City may wish to increase the design criteria for the underground improvements. Operation and maintenance deficiencies can be eliminated with routine maintenance of the storm drain system and a plan for a safe overland release point if a particular facility is not properly operating.

The cost estimate for City-wide storm drain improvements indicates a general magnitude cost of $13.25 million to be used for long-range planning purposes. This study outlines sixty proposed projects called the "Phase 1 Construction Program." These recommendations are aimed at resolving the high priority drainage problems which represent the most benefit to the community. These projects have an estimated cost of approximately $5.8 million; however, the cost of "no action" may result in damage to private property which could be many times the cost of constructing the improvements. For example, if the $5.8 million is spread to all the parcels in the City, the resulting cost is approximately $640 per parcel which may be less than claims resulting from flood damage. Possible funding mechanisms

for the improvements include a Utility User Tax, Benefit Assessment District, and Storm Drain Utility Fees. The annual assessment, if the City decides to finance the entire $5.8 million storm drain restoration program by assessing all of the parcels within the City corporate limits and selling bonds with the revenue generated by these assessments, is estimated to be about $84 per single family residence.

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