



CITY COUNCIL AGENDA REPORT

MEETING DATE: AUGUST 15, 2006

ITEM NUMBER:

SUBJECT: CITY'S MASTER DRAINAGE PLAN UPDATE

DATE: AUGUST 3, 2006

FROM: PUBLIC SERVICES DEPARTMENT/ENGINEERING DIVISION

PRESENTATION BY: ERNESTO MUNOZ, CITY ENGINEER

FOR FURTHER INFORMATION CONTACT: ERNESTO MUNOZ, CITY ENGINEER AT (714) 754-5343

RECOMMENDED ACTION:

- Adopt the updated City Master Drainage Plan (Attachment 1).
- Introduce for first reading an Ordinance amending the Costa Mesa Municipal Code (CMMC), Title 15, Chapter III, to update the City's drainage requirements (Attachment 2).
- Adopt a resolution setting the new Drainage Impact Fees pursuant to Section 15.65 of the CMMC (Attachment 3).

BACKGROUND:

The City's Master Drainage Plan (MDP) was last updated in 1984. The existing drainage requirements and drainage fee of \$1,000 per acre was established in 1971, and has not been amended to date. Presently, the drainage fee is imposed on any new development or redevelopment project in the City. This fee is meant to be used towards construction and/or upgrades of drainage facilities in conformance with the Master Drainage Plan.

Since the last update, significant changes in population density, land use, and surface coverage have taken place, which makes it necessary to update the Master Drainage Plan. Storm drain construction costs have also increased significantly since the Drainage Impact Fee was last updated. New development and City-initiated capital improvements have also changed the City's drainage characteristics since the last update.

A consultant engineering firm was retained by the City to perform the update, and they have now completed the extensive scope of work, which included the following:

- Creation of a Geographic Information System (GIS) layer to identify the City's existing storm drain facilities and the proposed upgrades.
- A comprehensive drainage study of the City.
- Identification of existing drainage systems not meeting the latest criteria accepted by the City.
- Analysis and ranking of the severity between the capacity provided by the existing system and the capacity needed to achieve the latest criteria.
- Preparation of cost opinions for system upgrades, and a 20-year Capital Improvement Program (CIP) under which to implement the upgrades.

- A Financing Study to establish the Drainage Fee (Appendix A of Attachment 1).
- Conversion of all storm drain data available on paper to electronic format.

ANALYSIS:

1. Existing Storm Drain Facilities and GIS Layer

The City owns and maintains a storm drain system of approximately 64.7 miles. Included in this system are pipes, channels, inlets, and boxes of varying sizes and materials. Prior to modeling the City for a hydrology analysis to determine the amount of runoff generated, every storm drain element (pipes, catch basins, boxes, etc.) was identified, categorized, and uploaded into the City's electronic GIS mapping system. GIS storm drain features were created primarily from record drawings. Using the Global Positioning System (GPS), manholes and catch basins were accurately surveyed and located. The storm drain centerlines were digitized or electronically traced as individual storm drain segments, each with unique identifiers. Each segment is attributed with material type, dimensions, shape type, owner, inverts, slope, and length. This highly functional GIS layer quickly displays information regarding all existing storm drain systems and all recommended upgrades within the City. Access to this storm drain graphic database will save staff considerable time when analyzing development proposals and City Capital Improvement Program (CIP) projects.

2. Drainage Study and Capacity Analysis

The City encompasses approximately 15.63 square miles of land area. The City drains its storm runoff into two major drainage areas, the Newport Bay Drainage Area and the Santa Ana Drainage Area. For the purpose of the drainage model, the City was divided into 17 primary watersheds. These watersheds vary in size and land use, and usually contain existing storm drain systems within their boundaries. In addition, 20 smaller watersheds were also identified to model the periphery of the City. In most cases, these smaller watersheds do not contain any storm drain facilities and generally drain on the surface into adjacent jurisdictions.

The Master Drainage Plan uses the Orange County Hydrology Manual as the basis of hydrology modeling to arrive at the quantities of runoff generated by each watershed. All 17 primary watersheds were analyzed for 10-year and 25-year frequency storm events. Floods are classified according to their frequency and intensity. For instance, there are 10-year, 25-year, 50-year, 100-year, and 500-year floods. These terms simply mean that in any given year, a 10-year flood has a 10 percent chance of occurring; a 25-year flood has a four percent chance of occurring; a 50-year flood has a two percent chance of occurring; a 100-year flood has a one percent chance of occurring; and a 500-year flood has a 0.2 percent chance of occurring. A 100-year flood, although less frequent than a 10-year flood, is much more significant in size and is potentially far more destructive.

The City's adopted criteria of a 10-year and 25-year frequency are the widely accepted design standard countywide. The hydrology analysis prepared by the consultant produced 10-year and 25-year flows at over 3,670 critical locations in the City. For each of these 3,670 locations, the existing capacity of the storm drain system was compared to the flows computed by the hydrology model. Whenever the computed flows are larger than the capacity of the existing system, an upgrade is required to meet the selected criteria. A computation is then performed to determine the size of the upgrade required to accommodate the runoff within the storm drain system. The analysis determined that 918 locations require varying degrees of upgrades to the existing storm drain facilities. In addition, the consultant identified three sites: 1) Lions Park, 2) TeWinkle Park, and 3) the Costa Mesa High School as potential storm runoff storage sites. Constructing underground storage systems at or under these sites could result in cost savings by decreasing the storm drain upgrades required in that particular watershed area. The sites could be used to temporarily detain the area runoff during the peak of the storms, and release it thereafter when the storm drain system capacity has been restored.

3. System Upgrade Costs and 20-Year CIP Priority List

Cost Estimates for Storm Drain Upgrades

Cost opinions were prepared by a financial sub-consultant firm to provide an order of magnitude estimate to facilitate long-term Capital Improvement Program planning. Actual construction costs could vary from these opinions based on the specific project characteristics, final design analysis, and prevailing construction costs at the time of construction. Appendix B, Table B.1 of Attachment 1, lists the costs associated with upgrades of the storm drain systems within the entire City.

The unit costs used for the Master Plan facilities estimates are based on current construction bids received by the City for various storm drain projects.

Cost-to-Benefit Index (CBI)

The construction cost opinions are integral to the preparation of the Cost-to-Benefit Index (CBI) analysis and the Capital Improvement Program prioritization process. The CBI is a ratio of the estimated cost of flood damage potential over the cost to upgrade the local drainage system. The CBI ranges from 1.00 for the most beneficial upgrade to 0.00 for the least beneficial upgrade. Appendix B, Table B.1 of Attachment 1, lists the CBI associated with each storm drain system upgrade.

20-year Storm Drain Capital Improvement Program

The new Master Plan analysis identifies 918 of the 3,670 locations as requiring storm drain system upgrades. The total cost to provide all these upgrades and installations Citywide, has been estimated at \$103.5 million. However, the hydraulic model generates upgrade projects any time the selected criteria are exceeded by even a very small amount, which may not be significant in terms of flooding potential. In order to provide a more realistic upgrade scenario, a 20-year Storm Drain Capital Improvement Program priority list was developed by taking into consideration the following factors:

- 1) Areas that historically experience excess surface water during a heavy rainstorm.
- 2) Cost-to-Benefit Index (CBI).
- 3) Locations also considered as good candidates for roadway rehabilitation.
- 4) Cost to implement the upgrade.

The proposed 20-year CIP Priority List (Attachment 4) would provide upgrades in eight different watersheds throughout the City. The total cost for the proposed 20-year CIP is estimated at \$17,565,600 based on current market prices.

Drainage Fee and Financing Study

The consultant's financial sub-consultant performed a Financing Study (Appendix A of Attachment 1). The study explores possible funding mechanisms to implement all the proposed upgrades and new installations. These funding mechanisms range from development impact fees on new development to Citywide debt financing techniques and special district user charges.

The Financing Study assigns the fair share of the total cost to individual parcels in the City based on the estimated relative contribution of each parcel to the drainage runoff. The calculation of the runoff takes into account various factors, including topography and intensity of land use. The City has been divided into two drainage areas, the Newport Bay Drainage Area and the Santa Ana River Drainage Area. The relative use of the drainage system by each drainage area differs due to varying topographical characteristics. Further, each parcel's relative contribution to the runoff varies with the extent of open surface and, therefore, the type

of land use. This has been estimated based on density (residential use) and floor area ratio (non-residential use). It should be noted that land parcels north of the I-405 Freeway are assumed to have development agreements with the City to provide the necessary drainage improvements as part of their development, estimated at \$6.1 million. These parcels are also responsible to pay for the existing drainage fee of \$1,000 per acre at the time of development.

The total cost for the proposed drainage system upgrades south of the I-405 Freeway is estimated at \$97.4 million (based on current market prices). These costs are divided almost equally between the two drainage areas: \$51.6 million for the Newport Bay Drainage Area and \$45.8 million for the Santa Ana River Drainage Area.

Drainage fees are collected when a developer processes a tract map, parcel map, and/or constructs a new building as defined in the City of Costa Mesa Municipal Code. Currently, the only designated revenue source available to fund storm drain improvements is the Drainage Impact Fee. The City's current drainage fee of \$1,000 per acre of new development was established in 1971. The fee is significantly out of line with current construction costs, and is relatively low compared with neighboring jurisdictions, which currently range from \$0 to \$9,000 (Attachment 5). The fees collected under the current ordinance have generally been allocated to implement minor upgrades.

In order to fully finance the needed \$97.4 million of storm drain upgrades, other alternative funding mechanisms may be considered, including General Obligation Bonds, Assessment Bonds, Mello Roos Community Facility District (CFD) Bonds (special taxes), and Special Utility District user charges. These funding mechanisms would require a two-third's majority vote by the public for Mello-Roos special taxes and a possible Special Utility District user charge, and a majority vote plus one for General Obligation and Special Assessment Bonds.

There are also special funds from Redevelopment Areas (RDA), Community Development Block Grants (CDBG), and potential Water Quality Grants, which may be considered as additional alternatives for funding of all identified upgrades. The estimated improvement costs that fall within the boundaries of these special areas include: RDA (\$4.4 million) and CDBG (\$38.6 million). In addition, there are opportunities for the City to compete with other agencies for grants through various Water Quality programs. Drainage Impact Fees for the system upgrade are levied only on new development or parcels that redevelop or substantially remodel. Using the current, estimated cost figures, Table "A" below breaks down the recommended drainage fee for different land uses:

Land Use	Fee per Acre
Residential	
Low	\$12,307
Medium	\$14,768
High	\$19,691
Commercial/Industrial	\$22,153

Table A: Recommended Drainage Fee

In order to implement the needed storm drain upgrades and calculated drainage fees, the City's Municipal Code must be amended. This amendment will bring the City's code on drainage requirements up to the latest criteria and the fee closer to current construction costs. Attachment 6 is the City's existing Municipal Code on drainage requirements highlighted with the proposed changes.

After accounting for the proposed Drainage Impact Fees, as shown on Table "A" above from new and redeveloped land, the current funding gap Citywide is estimated at \$74.3 million. An alternative to make up the funding gap is for the City to consider long term bonding. The costs to the City for the use of the various funding mechanisms available to finance storm drain

upgrades is tabulated in the attached System Upgrade Fees and Financing Study (Appendix A of Attachment 1).

ALTERNATIVES CONSIDERED:

1. Adjust the Drainage Fee and Reduce the Cost Benefit Index Range

The City Council may consider upgrading storm drain systems so that only those projects with a CBI ranging from 1.00 to 0.10 are completed. This is a reasonable approach since upgrades with a CBI below 0.10 result in relative minor gains in storm drain capacity, while upgrades with CBI's higher than 0.10 achieve more significant flood protection. This approach reduces the total Citywide cost to \$49.7 million, and the number of upgrades to 320 from 918. Using the current estimated cost figures for this alternative, Table "B" below is the breakdown of the drainage fee for different land uses:

Land Use	Fee per Acre
Residential	
Low	\$6,283
Medium	\$7,539
High	\$10,052
Commercial/Industrial	\$11,309

Table B: Proposed Drainage Fee for Alternative 1

Based on historical review of previous development with this alternative, the estimated annual revenue is \$211,000, and the funding gap is estimated at \$37.9 million. The City may elect to finance the estimated gap by any of the available financing methods.

2. Limit the Upgrades to High Priorities Under \$400,000

The City Council may elect to consider upgrading storm drain facilities with the highest CBI's only, and approve only those projects not exceeding \$400,000 in costs per year. An Alternative 20-year CIP Priority List (Attachment 7) was developed for this alternative. The total cost for the Alternative 20-year CIP Priority List would be \$8.0 million. A flat drainage fee of \$1,330 per acre citywide will cover the current estimated cost of \$8.0 million. Based on historical review of previous development with this alternative, the estimated annual revenue is \$31,920. This approach will only cover storm drain upgrades for two watersheds of the total 17 watersheds.

This alternative is not recommended since it would limit the upgrades to two watershed areas throughout the City for the next 20 years. Moreover, this alternative is not recommended by the City Attorney due to concerns about potential liability.

3. Adjust the Drainage Fee and Continue to Make Upgrades as Funding Becomes Available

Another alternative the City Council may consider is to increase the drainage fee, as shown on Table "A" of this report, to bring it closer to current construction costs, and upgrade the priority storm drain systems throughout the City as identified in the 20-year Storm Drain Capital Improvement Program Priority List (Attachment 4), as funding becomes available to close the funding gap between fees and actual upgrade costs. Drainage fees are collected when a developer processes a tract map, parcel map, and/or constructs a new building as defined in the City of Costa Mesa Municipal Code. Based on historical review of previous development with this alternative, the estimated annual revenue is \$400,000

Over the years, the City has taken this approach, and supplemented Drainage Fees with General Funds and Community Development Block Grant Funds, when the improvements are

located within low-to-moderate income areas of the City. This alternative is preferred over the issuance of debt to close the funding gap, and will, in the long term, accomplish the identified priority upgrades on the 20-Year Capital Improvement Program. It should be noted that this alternative is recommended in the resolution (Attachment 3).

4. Continue with Existing Drainage Impact Fee

The City Council may also consider leaving the existing Drainage Impact Fee unchanged, and continue collecting \$1,000 per acre when a developer processes a tract map, parcel map, and/or constructs a new building. As mentioned before, the \$1,000 per acre Drainage Fee was established back in 1971, and it is significantly out of line with current market conditions. The estimated Drainage Impact Fee collected to date is approximately \$860,000. The average annual revenue collected under the existing fee program is approximately \$24,500 per year. The current fee significantly reduces the City's ability to implement even modest storm drain upgrades; therefore, this alternative is not recommended.

FISCAL REVIEW:

The Drainage Fee Fund currently generates approximately \$24,500 per year and may be used towards storm drain upgrade projects Citywide. A Drainage Impact Fee increase would generate additional revenue to offset the cost of the recommended storm drain upgrades. City Council may consider additional appropriations for storm drain upgrades at their annual budget deliberations. These appropriations would be subject to funding availability.

LEGAL REVIEW:

Due to the age of the existing drainage plan (1984), the City Attorney recommends that the Council consider adopting the updated Master Drainage Plan, as well as an increased drainage fee to offset the costs of developing and upgrading drainage facilities to serve new development and redeveloped properties. If the City does not have a reasonable, updated program in place to provide for necessary improvements, the City could face liability exposure from which it might otherwise be protected if such a program were in place. A drainage fee increase would help fund needed facility upgrades and installation to reduce the City's risk of liability exposure. In addition, the City Attorney's Office recommends that changes in the ordinance be made to more equitably apply the drainage fee. The City Attorney has prepared the proposed amendment to the drainage ordinance and recommends City Council consideration for approval of the changes.

CONCLUSION:

The City's Master Drainage Plan has been updated per the latest criteria generally accepted by all Orange County cities and the Orange County Flood Control District. This update identifies storm drain facilities, which may be upgraded to meet the latest criteria. The total cost to upgrade the entire Citywide storm drain system is estimated at approximately \$103.5 million, with \$97.4 million of this needed for drainage system upgrades south of the I-405 Freeway (based on current market prices). Presently, the City's Drainage Fee Fund is the only dedicated source of funding for any storm drain project. The Citywide drainage fees of \$1,000 per acre are out of line with existing market conditions and relatively low compared with neighboring jurisdictions. Additional sources of funding such as General Obligation Bonds, Assessment Bonds, Mello Roos CFD Bonds (special taxes), and Special Utility District user charges may be considered to accelerate construction of the drainage upgrades. These funding mechanisms would require a two-third's majority vote of the public for Mello-Roos special taxes and a possible Special Utility District user charge, and a majority vote plus one for General Obligation and Special Assessment Bonds. These funding measures would take a significant amount of time and effort to implement. Therefore, staff recommends increasing the existing drainage fee as found in Exhibit "A" of Attachment 3.

It is recommended that the City Council adopt the updated Master Drainage Plan (Attachment 1) and give the attached Ordinance (Attachment 2) first reading to amend the Costa Mesa Municipal Code (CMMC), Title 15, Chapter III, which amends the drainage requirements and fees. Staff also recommends adoption of the resolution to set the updated Dainage Impact Fee (Attachment 3).

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- ATTACHMENTS:
- 1 [Master Drainage Plan Report](#)
 - 2 [Ordinance](#)
 - 3 [Resolution](#)
 - 4 [Proposed 20-Year CIP Priority List](#)
 - 5 [Drainage Fees from Neighboring Cities](#)
 - 6 [Municipal Code on Drainage Requirements with the Proposed Changes Highlighted](#)
 - 7 [Alternative 20-Year CIP Priority List](#)

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