CITY OF LIVE OAK

Study Session of the City Council
Live Oak Council Chambers
9955 Live Oak Blvd., Live Oak, CA 95953

The Council may take up any agenda item at any time, regardless of the order listed. Action may be taken on any item on this agenda. ***Members of the public may comment on any item on the agenda at the time that it is taken up by the Council. Requests to speak on the item should be made to the Mayor at the time an item is discussed****. We ask that members of the public come forward to be recognized by the Mayor and keep their remarks brief. Absent permission from the Mayor, comments will be limited to three (3) minutes.*

Mayor – Gary A. Baland
Vice Mayor – Steve Alvarado
Council Member – Rob Klotz
Council Member – Felicity Clark
Council Member – Diane Hodges

April 19, 2011 **6:00 PM**

A. CALL TO ORDER

B. ROLL CALL

C. REPORTS AND MISCELLANEOUS

1. Master Drainage Study and Storm Drain Connection Fee

D. ADJOURNMENT

CITY OF LIVE OAK

DATE: April 15, 2011

TO: Mayor and Members of the City Council

FROM: Jim Goodwin, City Manager

COUNCIL AGENDA STAFF REPORT

SUBJECT: Completion of Master Drainage Study and Proposed Storm Drain Connection Fee

RECOMMENDATION: Review only. No action required at this meeting

FISCAL IMPACTS: Establish fees at appropriate levels based on build-out of the 2030 General Plan

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A key implementation item for the new 2030 General Plan is the adoption of the completed Master Drainage Study and update of storm drain connection fees. The findings of the study and recommendations for the proposed fee will be reviewed in Study Session.

The attached presentation materials and Technical Memorandum from Doug Moore from West Yost Associates provides details for the discussion. Mr. Moore will be present to report on the findings and recommendations.

Following review at Study Session, adoption of the study and fees will be on the agenda for consideration at a future City Council meeting.

Respectfully Submitted,

Jim Goodwin
City Manager

WEST YOST ASSOCIATES

TECHNICAL MEMORANDUM

DATE: March 23, 2011 Project No.: 047-00-08-15.006

TO: Jim Goodwin
City Manager, City of Live Oak, California

FROM: Douglas T. Moore, R.C.E. #C58122 DTM

REVIEWED BY: Steven R. Dalrymple

SUBJECT: City of Live Oak Recommended Storm Drainage Connection Fees

INTRODUCTION

West Yost Associates (West Yost) recently completed the Master Drainage Study (MDS) for the City of Live Oak (City) (March 2011). The MDS identified a Recommended Drainage Program (RDP) and presented estimates of the construction and capital costs of the RDP. This Technical Memorandum (TM) provides a recommended update of the City's storm drain connection fee based on the estimated total capital cost of the RDP. The City intends to update the storm drainage connection charges to provide funding for the capital projects that are planned in the MDS.

The City owns, operates and maintains a system of storm drainage facilities. The City currently charges a one-time "storm drain connection charge" to residential property of $3,598 per acre or $850 per residence and to commercial property of $4,318 per acre. The City's master fee schedule also includes AB1600 development impact fees for flood control facilities of $2,185 per dwelling unit for R1, R2, and R3; $734 per dwelling unit for R4; and $14,663 per acre for commercial and industrial land uses.

The proposed 2011 Storm Drain Connection Fee (SDCF) includes a future infrastructure component and an administrative charge component.

- Future infrastructure component – This fee component covers the cost of the future infrastructure that is required for the future growth of the City. The estimated cost of the future infrastructure was developed in Table 14-2 of the MDS (a copy is provided in Appendix A of this TM). These future infrastructure costs include only the costs of projects that are needed for the future growth of the City. The future infrastructure costs do not include costs for infrastructure that is needed to solve existing flooding problems.
- Administrative charge component – This fee component covers the costs for City staff to manage the Storm Drain Connection Fee Program.

Presented in Table 1 is a summary of the recommended 2011 SDCFs by land use type. For low-density residential, small-lot residential and medium-density residential, the SDCF is established as a cost per dwelling unit. For all other land uses, the 2011 SDCFs are established as a cost per acre. Also included in Table 1 are the land use types from the existing City areas.

For the parks, civic, urban reserve, and buffer land uses, the 2011 SDCF was set to zero. Assessment of fees to the parks and civic land uses would result in the City assessing fees to the City, school district, Sutter County, or other government agencies, which would in turn have to pass the cost of these fees on to the public. Assessment of fees to the urban reserve and buffer land uses is inappropriate because these land uses do not result in development of the land nor cause an increase in the potential runoff.

Different land use types generate different runoff rates. For example, low-density residential areas have an imperious coverage of about 30 percent, meaning that about 30 percent of the land use area is covered with roads, houses, driveways, or other impervious surfaces. Commercial areas typically have an impervious coverage of about 85 percent. These impervious surfaces prevent rain from infiltrating into the ground, and therefore, impervious surfaces produce more total runoff volume than pervious areas such as lawns or landscape areas. Also, the impervious areas are usually constructed to drain more quickly than pervious surfaces. For example, house roofs are sloped to force runoff to quickly flow to the house gutters, the gutters convey the runoff to the downspouts, which often covey the water directly to the street gutters. However, rain falling on lawns is trapped among the blades of grass, and flows very slowly to the street gutters. Thus, impervious surfaces produce more total runoff and produce runoff at higher flow rates than pervious surfaces. The higher runoff rates require larger, more costly storm drain infrastructure to convey or detain the runoff. Therefore, land uses with higher impervious surface coverages should be charged higher storm drain connection fees than land uses with lower impervious surface coverages.

In this rate study, the differences in runoff volumes and rates for different land use types are accounted for by the use of Equivalent Drainage Dwelling Units (EDDUs) as explained below. For the future land use types, a single low-density residential unit is assigned a value of 1 EDDU. An average acre of low-density residential land use has 3.89 dwelling units, which is equal to 3.89 EDDUs. However, an acre of Community Commercial land use has 6.56 EDDUs. By developing EDDUs for each land use type, the costs of the stormwater infrastructure can be apportioned fairly among the various land uses.

The 2011 SDCFs were developed through the following steps:

1. Convert the expected land use coverage to EDDU density, and calculate the total EDDUs for each land use type within the future growth areas of the City and the parcels within the existing City that will develop in the future (Table 2).
2. Document the future infrastructure estimated costs associated with the future growth of the City (see Table 14-2 of the MDS reproduced in Appendix A of this TM).
3. Develop the total cost per EDDU for the infrastructure needed for the future growth of the City, including the costs associated with financing the future infrastructure (Table 3).

4. Spread the future infrastructure costs to each future land use type and calculate the future infrastructure component of the SDCF (Table 4).
5. Develop the 2011 SDCF by summing the future infrastructure component of the SDCF and a 2 percent administrative fee component (Table 1).

The process to derive the 2011 SDCFs is discussed in more detail below.

DEVELOPMENT OF EQUIVALENT DRAINAGE DWELLING UNITS FOR THE FUTURE GROWTH AREAS

The development of EDDUs for each land use type within the future growth areas of the City and the parcels within the existing City that will develop in the future is presented in Table 2. The future land uses are described and defined in Table LU-2 of the recently adopted City of Live Oak 2030 General Plan. The areas of each land use within the future growth areas of the City were developed and provided by AECOM. The parcels within the existing City that will develop in the future were also identified by AECOM. AECOM was the City's consultant for the preparation of the City of Live Oak 2030 General Plan. The residential land use dwelling unit density is the anticipated average density of each type of residential dwelling units. The dwelling unit density was also provided by AECOM, and falls near the middle of the range of potential densities presented in Table LU-2 of the *City of Live Oak 2030 General Plan.*

Table 2 develops the total EDDUs for the future growth areas of the City by land use type, as described below.

- The area of each land use type and dwelling unit density for residential development were provided by AECOM.
- The impervious percentages by land use type are from Table 7-1 of the MDS. The impervious percentage is the fraction of the land that is covered by impervious surfaces such as buildings, parking lots, roads (versus pervious coverage such as lawn or landscape areas).
- The pervious and impervious area C-values are from the City of Live Oak Public Works Improvement Standards. These values are roughly proportional to the expected runoff rate from the pervious and impervious land coverages.
- The area weighted composite C-value is the area weighted average of the pervious and impervious area C-values. For example composite C value for a Low Density Residential parcel is 0.48.
- The ratios of composite C-value to the low density residential C-value is calculated for each land use type. This ratio estimates the relative peak runoff rate for each land use in comparison to the runoff rate from a low-density residential dwelling unit. For example, one acre of commercial mixed use land use is expected to produce a peak runoff rate about 1.69 times the runoff from one acre of low-density residential land use.
- The EDDU density for each land use type is calculated by multiplying the C-value ratio by 3.89 EDDUs per acre.

- The total EDDUs is calculated by multiplying the EDDU density by the area for each land use type. The parks and open space, civic, reserve, and buffer land uses represent undeveloped lands or public lands (from a City development/growth perspective) which will not pay for draining infrastructure; thus these land uses were assigned no EDDUs in Table 2.

CALCULATION OF THE FUTURE INFRASTRUCTURE COMPONENT OF THE SDCF

The storm drainage infrastructure required for buildout of the 2030 General Plan is identified in the MDS prepared for the City by West Yost (March 2011). The RDP facilities are shown on Figure 14-1A of the MDS. The capital cost of the RDP was developed in Table 14-2 of the MDS, and the total capital cost was estimated to be $39.98 million. Copies of Figure 14-1A and Table 14-2 of the MDS are provided in Appendix A of this TM.

For this rate study, it has been assumed that the capital cost of the future infrastructure ($39.89 million) will be financed through a sale of bonds. The financing costs of the bonds is shown in Table 3. This financing plan results in a net present value of the bond debt service of about $61.43 million. If this present value is shared by the future EDDUs, the cost is $3,682 per EDDU, as shown in Table 3.

In Table 4, the future financed infrastructure cost is assigned to the various land use types in the future growth areas of the City. The costs are assigned based on the total EDDUs in each land use type, at a cost of $3,682 per EDDU. The future infrastructure component of the SDCF is then calculated by dividing the total cost for each land use type by the acreage of that land use type. For example, the future infrastructure cost component of the SDCF for the commercial mixed use land use is $24,170 per acre.

For the low-density residential, smaller-lot residential, and medium-density residential land uses, the net value per dwelling unit is shown because for these land uses the SDCF is a fee per dwelling unit. For these land uses, the SDCF per dwelling unit is calculated in Table 4 by dividing SDCF per acre by the average dwelling unit density for each of these land uses. For example, the future infrastructure component of the SDCF for smaller-lot residential dwelling units is $2,764 per dwelling unit.

CALCULATION OF THE SDCF

The recommended SDCFs by land use type are summarized in Table 1. The proposed SDCF includes the future infrastructure component, and an administrative charge component, which is 2 percent of the future infrastructure component. For example, the SDCF for commercial mixed use land is $24,654 per acre. The SDCF for a smaller-lot residential dwelling units is $2,819 per dwelling unit.

DTM:tlb

Table 1. Summary of the Recommended 2010 Storm Drain Connection Fee by Land Use Type

Land Use	Future Infrastructure CIP Component of the SDCF		Administrative Charge Component (at 2 %) of the SDCF		SDCF	
	Cost per Dwelling Unit ($/DU)	Cost Per Acre ($/acre)	Cost per Dwelling Unit ($/DU)	Cost Per Acre ($/acre)	Cost per Dwelling Unit ($/DU)	Cost Per Acre ($/acre)
Low-Density Residential (and Signle Family in Existing City Area)	$3,682		$74		$3,756	
Small-Lot Residential (and Duplex in Existing City Area)	$2,764		$55		$2,819	
Medium-Density Residential (and Mobile Home in Existing City Areas)	$1,969		$39		$2,009	
Higher-Density Residential (and Multi Family in Existing City Area)		$23,275		$466		$23,741
Commercial Mixed Use		$24,170		$483		$24,654
Downtown Mixed Use		$24,170		$483		$24,654
Community Commercial (and Commercial in Existing City Area)		$24,170		$483		$24,654
Employment (and Office, Industrial, and Warehouse in Existing City Area)		$24,170		$483		$24,654
Parks and Open Space						
Civic						
Urban Reserve						
Neighborhood Center		$21,664		$433		$22,097
Civic Center		$19,873		$397		$20,271
Buffer						

Table 2. Development of the EDDUs by Land Use Type for Future Growth Areas

Land Use	Acres	Dwelling Unit Density (dwelling units/acre)	Impervious Percentage	Pervous Area C Value	Impervious Area C Value	Area Weighted Composite C Value	C Value Ratio to Low-Density Residential C-Value	Equivalent Drainage Dwelling Unit Density (EDDU/ac)	Total Equivalent Drainage Dwelling Units (EDDU)
Low-Density Residential (1 EDDU)	1,594	3.89	30%	0.30	0.90	0.48	1.00	3.89	6,200
Smaller-Lot Residential	1,288	5.83	40%	0.30	0.90	0.54	1.13	4.38	5,638
Medium-Density Residential	71	10.00	60%	0.30	0.90	0.66	1.38	5.35	382
Higher-Density Residential	17	19.45	80%	0.30	0.90	0.78	1.63	6.32	105
Commercial Mixed Use	188		85%	0.30	0.90	0.81	1.69	6.56	1,231
Downtown Mixed Use	23		85%	0.30	0.90	0.81	1.69	6.56	152
Community Commercial	59		85%	0.30	0.90	0.81	1.69	6.56	387
Employment	181		85%	0.30	0.90	0.81	1.69	6.56	1,188
Parks and Open Space	133		5%	0.30	0.90	0.33	0.69	2.67	0
Civic	1		85%	0.30	0.90	0.81	1.69	6.56	0
Urban Reserve	3,045		1%	0.25	0.90	0.26	0.53	2.08	0
Neighborhood Center	94		71%	0.30	0.90	0.73	1.51	5.88	554
Civic Center	157		61%	0.30	0.90	0.67	1.39	5.40	847
Buffer	19		5%	0.30	0.90	0.33	0.69	2.67	0
Total	**6,870**								**16,684**

Notes:

Land use acreges were provided by the City's General Plan update consultant.

Impervous Percentages are from the Table 7-1 of the Master Draiange Study prepared for the City of Live Oak (March 2011).

C-Values are from the City of Live Oak Public Works Improvement Standards (June 2003).

For parks and open space, civic, urban reserve, and buffer land uses, the total EDDUs was set to zero to eliminate collection of stormwater Connection fees from these land uses.

Table 3. Future Infrastructure Cost Per EDDU Including Financing Costs	
Item	Cost
Total Capital Cost	$39,980,000
Financing Evaluation	
Interest Rate (%)	6%
Term (years)	30
Bond Load Factor (%)	15%
Annual Debt Service ($)	$3,340,179
Total Debt Service ($)	$100,205,370
Discount Rate (%)	3.5%
Net Present Value of Debt Service at Discount Rate ($)	$61,432,724
Net Proceeds ($)	$39,980,000
Financing Cost	$21,452,724
Number of Future EDDUs	16,684
Future Infrastructure Cost Component of the SDCF per EDDU (Net Present Value of Debt Service at Discount Rate per EDDU)	$3,682

Table 4. Assignment of the Future Infrastructure Costs and Future Infrastructure SDCF Cost Components to the Future Growth Areas by Land Use Type

Land Use	Total EDDU	Cost per EDDU ($/EDDU)	Total Cost by Land Use Type ($)	Future Infrastructure CIP Component of the SDCF Per Acre ($/acre)	Future Infrastructure CIP Component of the SDCF Per Dwelling Unit ($/dwelling unit)
Low-Density Residential	6,200	3,682	22,827,116	14,323	3,682
Small-Lot Residential	5,638	3,682	20,760,229	16,114	2,764
Medium Density Residential	382	3,682	1,405,980	19,694	1,969
Higher-Density Residential	105	3,682	386,135	23,275	
Commercial Mixed Use	1,231	3,682	4,533,631	24,170	
Downtown Mixed Use	152	3,682	559,543	24,170	
Community Commercial	387	3,682	1,426,050	24,170	
Employment	1,188	3,682	4,374,832	24,170	
Parks and Open Space					
Civic					
Urban Reserve					
Neighborhood Center	554	3,682	2,040,079	21,664	
Civic Center	847	3,682	3,119,129	19,873	
Buffer					
Total	**16,684**		**61,432,724**		

APPENDIX A

Figure 14-1A and Table 14-2 from the Master Drainage Study
prepared for the City of Live Oak by
West Yost Associates
(March 2011)

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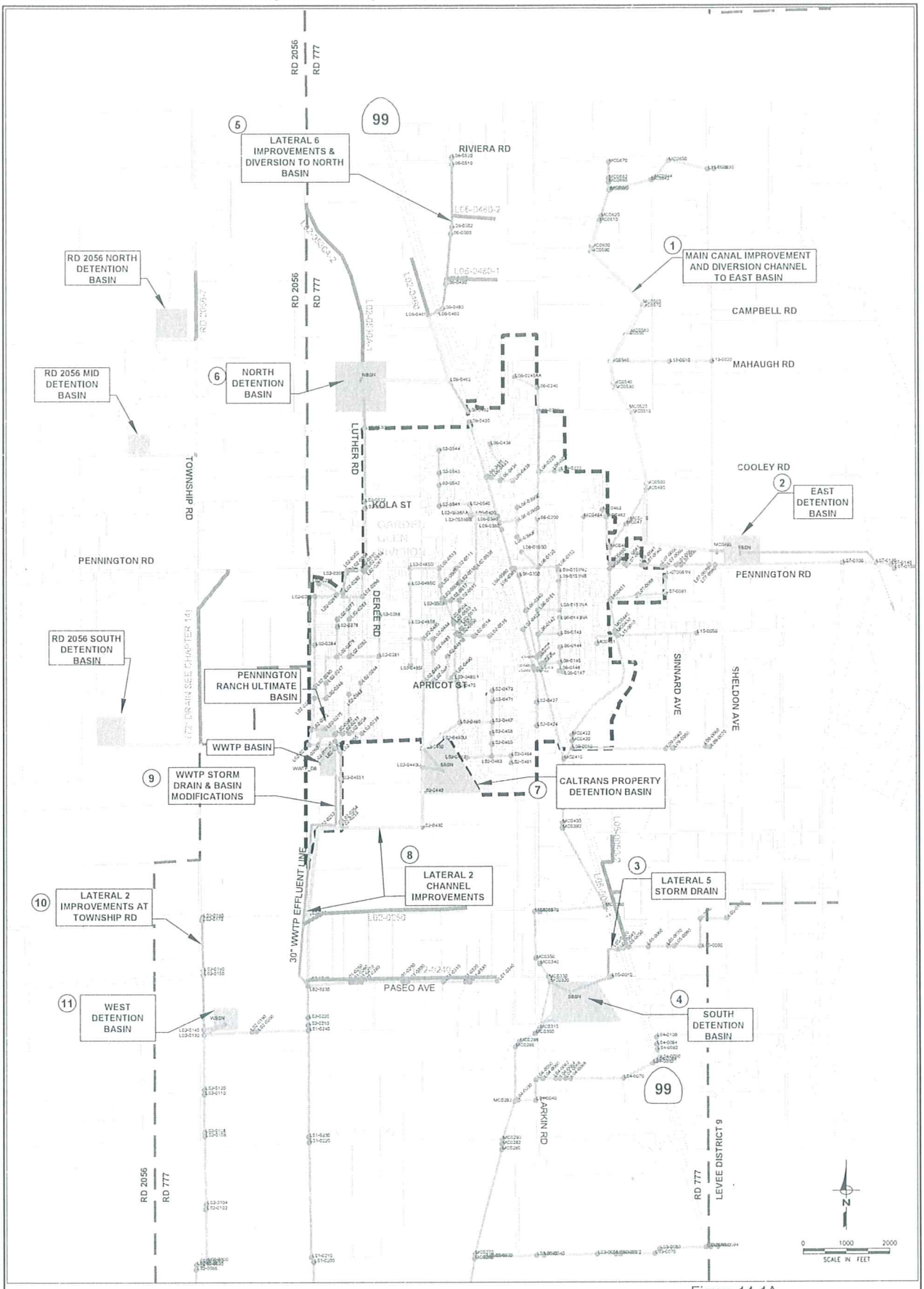


LEGEND

- CITY LIMITS
- RD777 BOUNDARY
- CITY PLANNING AREA
- PROPOSED STORAGE
- MODEL LINK (EXISTING DRAIN OR CHANNEL)
- L02-0120 MODEL NODE AND IDENTIFICATION
- PROPOSED CHANNEL IMPROVEMENTS
- PROPOSED STORM DRAIN
- ADDITIONAL PROPOSED TRUNK DRAINS (SEE TABLE 13-1)
- (11) IMPROVEMENT IDENTIFICATION

Figure 14-1A

City of Live Oak
Master Drainage Study
RECOMMENDED PROJECT

WEST YOST ASSOCIATES
Consulting Engineers

Table 14-2. Cost Estimate for the Recommended Project				
Item	Unit of Measure	Cost, dollars	Quantity	Cost, dollars
1. Main Canal Improvement and Diversion Channel to East Basin				
Site Preparation (Clear and Grub)	acre	500	33.0	16,500
Channel Excavation (on-site)	CY	4	88,000	352,000
Landscape and Erosion Control	acre	10,000	29.9	299,000
18-Inch Orifice Plate	each	2,000	1	2,000
36-Inch RCP	feet	216	514	111,024
42-Inch RCP	feet	252	240	60,480
60-Inch RCP	feet	330	548	180,675
Headwalls	each	8,000	14	112,000
12' Asphalt Access Road	feet	72	18,316	1,318,717
Mobilization/demobilization (at 5 percent)				122,620
Construction Contingency (at 20 percent)				490,480
Estimated Construction Cost				3,065,500
Land/Easements (for channel)	acre	50,000	29.9	1,495,000
Engineering, CM/Insp, CEQA, City Admin (Note 1, at 40 percent)				1,226,200
Estimated Capital Cost				5,786,700
2. East Detention Basin				
Site Preparation (Clear and Grub)	acre	500	12.4	6,199
Basin Excavation	CY	4	50,082	200,328
Landscape and Erosion Control	acre	2,000	8.6	17,120
Rock Scour Protection	CY	100	10	1,000
Pump Station (20 cfs)	cfs	39,500	20	790,000
36-Inch RCP	feet	216	2,400	518,400
12' Asphalt Access Road	feet	72	2,950	212,400
Mobilization/demobilization (at 5 percent)				87,270
Construction Contingency (at 20 percent)				349,090
Estimated Construction Cost				2,181,810
Land/Easements (for basin)	acre	25,000	12.4	310,000
Engineering, CM/Insp, CEQA, City Admin (Note 1, at 40 percent)				872,700
Estimated Capital Cost				3,364,500
3. Lateral 5 Storm Drain				
12-Inch RCP	feet	72	300	21,600
48-Inch RCP	feet	288	661	190,368
60-Inch RCP	feet	330	1,255	414,150
Maintenance Holes	each	6,000	5	30,000
Drain Inlets	each	5,000	10	50,000
Mobilization/demobilization (at 5 percent)				35,310
Construction Contingency (at 20 percent)				141,220
Estimated Construction Cost				882,650
Engineering, CM/Insp, CEQA, City Admin (Note 1, at 40 percent)				353,100
Estimated Capital Cost				1,235,800
4. South Detention Basin				
Site Preparation (Clear and Grub)	acre	500	28.0	14,017
Basin Excavation	CY	4	267,884	1,071,534
Landscape and Erosion Control	acre	2,000	26.0	51,904
Rock Scour Protection	CY	100	10	1,000
Side Flow Weir (CY of concrete)	CY	500	50	25,000
54-Inch RCP	feet	311	100	31,050
42-Inch RCP	feet	252	100	25,200
24-Inch RCP	feet	144	268	38,592
24-Inch Flap Gate	each	2,800	1	2,800
Headwalls	each	8,000	6	48,000
Aggregate Base Access Road	feet	20	4,704	94,080
Fencing	feet	16	4,704	75,264
Mobilization/demobilization (at 5 percent)				73,920
Construction Contingency (at 20 percent)				295,690
Estimated Construction Cost				1,848,050
Land/Easements (for basin)	acre	25,000	28.0	700,900
Engineering, CM/Insp, CEQA, City Admin (Note 1, at 40 percent)				739,200
Estimated Capital Cost				3,288,200
5. Lateral 6 Improvements and Diversion to North Detention Basin				
Site Preparation (Clear and Grub)	acre	500	6.3	3,150
Channel Excavation (on-site)	CY	4	26,400	105,600
Landscape and Erosion Control	acre	2,000	4.4	8,700
12-Inch RCP	feet	72	540	38,900
54-Inch RCP	feet	311	916	284,500
66-Inch RCP	feet	347	1,576	546,100
72-Inch RCP	feet	360	1,827	657,720
5' x 6' Box RCP	feet	600	677	406,200
Maintenance Holes	each	6,000	9	54,000
Drain Inlets	each	5,000	18	90,000
Headwalls	each	8,000	3	24,000
12' Asphalt Access Road	feet	72	2,085	150,120
Mobilization/demobilization (at 5 percent)				118,450
Construction Contingency (at 20 percent)				473,800
Estimated Construction Cost				2,961,240
Land/Easements (for channel)	acre	50,000	6.3	313,500
Engineering, CM/Insp, CEQA, City Admin (Note 1, at 40 percent)				1,184,500
Estimated Capital Cost				4,459,200
6. North Detention Basin and Storm Drain				
Site Preparation (Clear and Grub)	acre	500	33.9	16,954
Basin Excavation	CY	4	306,607	1,226,427
Landscape and Erosion Control	acre	2,000	188.2	376,400

Item	Unit of Measure	Cost, dollars	Quantity	Cost, dollars
Rock Scour Protection	CY	100	10	1,000
12-Inch RCP	feet	72	360	25,920
18-Inch RCP	feet	108	554	59,832
30-Inch RCP	feet	180	72	12,960
36-Inch RCP	feet	216	1,940	419,040
Headwalls	each	8,000	2	16,000
12' Asphalt Access Road	feet	72	4,704	338,688
Maintenance Holes	each	6,000	6	36,000
Drain Inlets	each	5,000	12	60,000
Mobilization/demobilization (at 5 percent)				129,460
Construction Contingency (at 20 percent)				517,840
Estimated Construction Cost				3,236,520
Land/Easements (for basin)	acre	50,000	33.9	1,695,400
Engineering, CM/Insp, CEQA, City Admin (Note 1, at 40 percent)				1,294,600
Estimated Capital Cost				6,226,500
7. Caltrans Property Detention Basin				
Site Preparation (Clear and Grub)	acre	500	25.5	12,774
Basin Excavation	CY	4	119,750	478,999
Landscape and Erosion Control	acre	2,000	21.4	42,700
Rock Scour Protection	CY	100	10.0	1,000
Side Flow Weir (CY of concrete)	CY	500	50.0	25,000
24-Inch RCP	feet	144	268.0	38,592
24-Inch Flap Gate	each	2,800	1.0	2,800
12' Asphalt Access Road	feet	72	4,120	296,640
Mobilization/demobilization (at 5 percent)				44,930
Construction Contingency (at 20 percent)				179,700
Estimated Construction Cost				1,123,130
Land/Easements (for basin)	acre	10,000	26.0	260,000
Engineering, CM/Insp, CEQA, City Admin (Note 1, at 40 percent)				449,300
Estimated Capital Cost				1,832,400
8. Lateral 2 Improvements from Caltrans Property Detention Basin to Paseo Road				
Site Preparation (Clear and Grub)	acre	500	19.2	9,600
Channel Excavation (on-site)	CY	4	141,600	566,400
Landscape and Erosion Control	acre	2,000	19.2	38,400
24-Inch Orifice Plate	each	2,000	1	2,000
18-Inch RCP	feet	108	80	8,640
48-Inch RCP	feet	288	120	34,560
Headwalls	each	8,000	6	48,000
12' Asphalt Access Road	feet	72	8,345	600,806
Mobilization/demobilization (at 5 percent)				65,420
Construction Contingency (at 20 percent)				261,680
Estimated Construction Cost				1,635,510
Land/Easements (for channel)	acre	50,000	17.0	851,600
Engineering, CM/Insp, CEQA, City Admin (Note 1, at 40 percent)				654,200
Estimated Capital Cost				3,141,300
9. WWTP Storm Drain and Inlet Weir Improvements				
Side Flow Weir (CY of concrete)	CY	500	50	25,000
12-Inch RCP	feet	72	300	21,600
30-Inch RCP	feet	180	3,600	648,000
36-Inch RCP	feet	216	2,133	460,663
Maintenance Holes	each	6,000	5	30,000
Drain Inlets	each	5,000	10	50,000
Mobilization/demobilization (at 5 percent)				61,763
Construction Contingency (at 20 percent)				247,053
Estimated Construction Cost				1,544,079
Engineering, CM/Insp, CEQA, City Admin (Note 1, at 40 percent)				617,600
Estimated Capital Cost				2,161,700
10. Lateral 2 Improvements at Township Road				
12-Inch RCP	feet	72	420	30,240
42-Inch RCP	feet	252	5,700	1,436,400
Maintenance Holes	each	6,000	7	42,000
Drain Inlets	each	5,000	14	70,000
Mobilization/demobilization (at 5 percent)				78,932
Construction Contingency (at 20 percent)				315,728
Estimated Construction Cost				1,973,300
Engineering, CM/Insp, CEQA, City Admin (Note 1, at 40 percent)				789,300
Estimated Capital Cost				2,762,600
11. West Detention Basin				
Site Preparation (Clear and Grub)	acre	500	6.9	3,464
Basin Excavation	CY	4	53,722	214,887
Landscape and Erosion Control	acre	2,000	6.0	11,912
Pump Station (5 cfs)	cfs	50,000	5.0	250,000
Headwalls	each	8,000	1	8,000
Aggregate Base Access Road	each	20	2,037	40,748
Fencing	each	16	2,200	35,200
Rock Scour Protection	CY	100	10	1,000
Mobilization/demobilization (at 5 percent)				28,260
Construction Contingency (at 20 percent)				113,040
Estimated Construction Cost				706,510
Land/Easements (for basin)	acre	50,000	6.9	346,402
Engineering, CM/Insp, CEQA, City Admin (Note 1, at 40 percent)				282,600
Estimated Capital Cost				1,335,500
12. RD 2056 Area North System - Channel and Basin				
Site Preparation (Clear and Grub)	acre	500	14.8	7,400

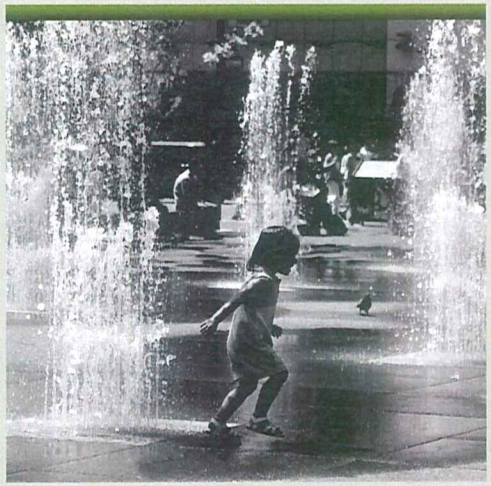
Item	Unit of Measure	Cost, dollars	Quantity	Cost, dollars
Channel Excavation	CY	4	12,480	49,920
Side Flow Weir (CY of concrete)	CY	500	50	25,000
Detention Basin Excavation	CY	4	76,238	304,952
Aggregate Base Access Road	feet	20	3,881	77,620
Fencing	feet	16	3,201	51,216
Landscape or Erosion Control Vegetation	acre	2,000	14.8	29,600
12-Inch CMP	feet	60	80	4,800
18-Inch CMP	feet	90	80	7,200
12-inch flap gate	each	1,000	1	1,000
18-inch flap gate	each	1,500	1	1,500
Headwalls	each	10,000	0	0
Rock scour protection	CY	100	10	1,000
Mobilization/demobilization (at 5 percent)				28,060
Construction Contingency (at 20 percent)				112,242
Estimated Construction Cost				701,510
Land/Easements (for channel)	acre	25,000	1.5	37,500
Land/Easements (for basin)	acre	25,000	13.3	332,500
Engineering, CM/Insp, CEQA, City Admin (Note 1, at 40 percent)				280,604
Estimated Capital Cost				1,352,114
13. RD 2056 Area Mid System - Channel and Basin				
Site Preparation (Clear and Grub)	acre	500	9.1	4,550
Channel Excavation	CY	4	22,400	89,600
Side Flow Weir (CY of concrete)	CY	500	50	25,000
Detention Basin Excavation	CY	4	28,452	113,808
Aggregate Base Access Road	feet	20	4,344	86,880
Fencing	feet	16	2,333	37,328
Landscape or Erosion Control Vegetation	acre	2,000	9.1	18,200
10-Inch CMP	feet	50	80	4,000
18-Inch CMP	feet	90	80	7,200
10-inch flap gate	each	900	1	900
18-inch flap gate	each	1,500	1	1,500
Headwalls	each	8,000	0	0
Rock scour protection	CY	100	10	1,000
Mobilization/demobilization (at 5 percent)				19,498
Construction Contingency (at 20 percent)				77,993
Estimated Construction Cost				487,458
Land/Easements (for channel)	acre	25,000	2.7	67,500
Land/Easements (for basin)	acre	25,000	6.4	160,000
Engineering, CM/Insp, CEQA, City Admin (Note 1, at 40 percent)				194,983
Estimated Capital Cost				909,941
14. RD 2056 Area South System - Channel, and Basin				
Site Preparation (Clear and Grub)	acre	500	19.0	9,500
Channel Excavation	CY	4	64,480	257,920
Side Flow Weir (CY of concrete)	CY	500	50	25,000
Detention Basin Excavation	CY	4	54,596	218,384
Aggregate Base Access Road	feet	20	9,987	199,740
Fencing	feet	16	10,187	162,992
Landscape or Erosion Control Vegetation	acre	2,000	19.0	38,000
12-Inch CMP	feet	60	80	4,800
18-Inch CMP	feet	90	80	7,200
12-inch flap gate	each	1,000	1	1,000
18-inch flap gate	each	1,500	1	1,500
Headwalls	each	8,000	1	8,000
Rock scour protection	CY	100	100	10,000
Mobilization/demobilization (at 5 percent)				47,202
Construction Contingency (at 20 percent)				188,807
Estimated Construction Cost				1,180,000
Land/Easements (for channel)	acre	25,000	7.8	195,000
Land/Easements (for basin)	acre	25,000	11.2	280,000
Engineering, CM/Insp, CEQA, City Admin (Note 1, at 40 percent)				472,000
Estimated Capital Cost				2,127,000
Total Estimated Construction Cost				23,527,000
Total Land/Easement Cost				7,045,302
Total Engineering, CM/Insp, CEQA, City Admin (Note 1, at 40 percent)				9,411,000
Total Estimated Capital Cost				39,980,000

Notes:

Engineering (conceptual and detailed design) at 15 percent of the construction cost
Construction period engineering services at 5 percent of the construction cost
CEQA environmental review and mitigation at 5 percent of the construction cost
Construction management and inspection at 10 percent of the construction cost
City administration (both during design and construction) at 5 percent
Costs are for June 2009 (20 City Average ENRCCI of 8,578).

City of Live Oak Master Drainage Study (MDS)

April 19, 2011



WEST YOST ASSOCIATES

Agenda

- Background
- Existing Problems
- RD 777 Service Area Alternatives Evaluation
- Recommended Project
- Financial Evaluation
- Questions

Agenda

Background

Existing Problems

RD 777 Service Area Alternatives Evaluation

Recommended Project

Financial Evaluation

Questions

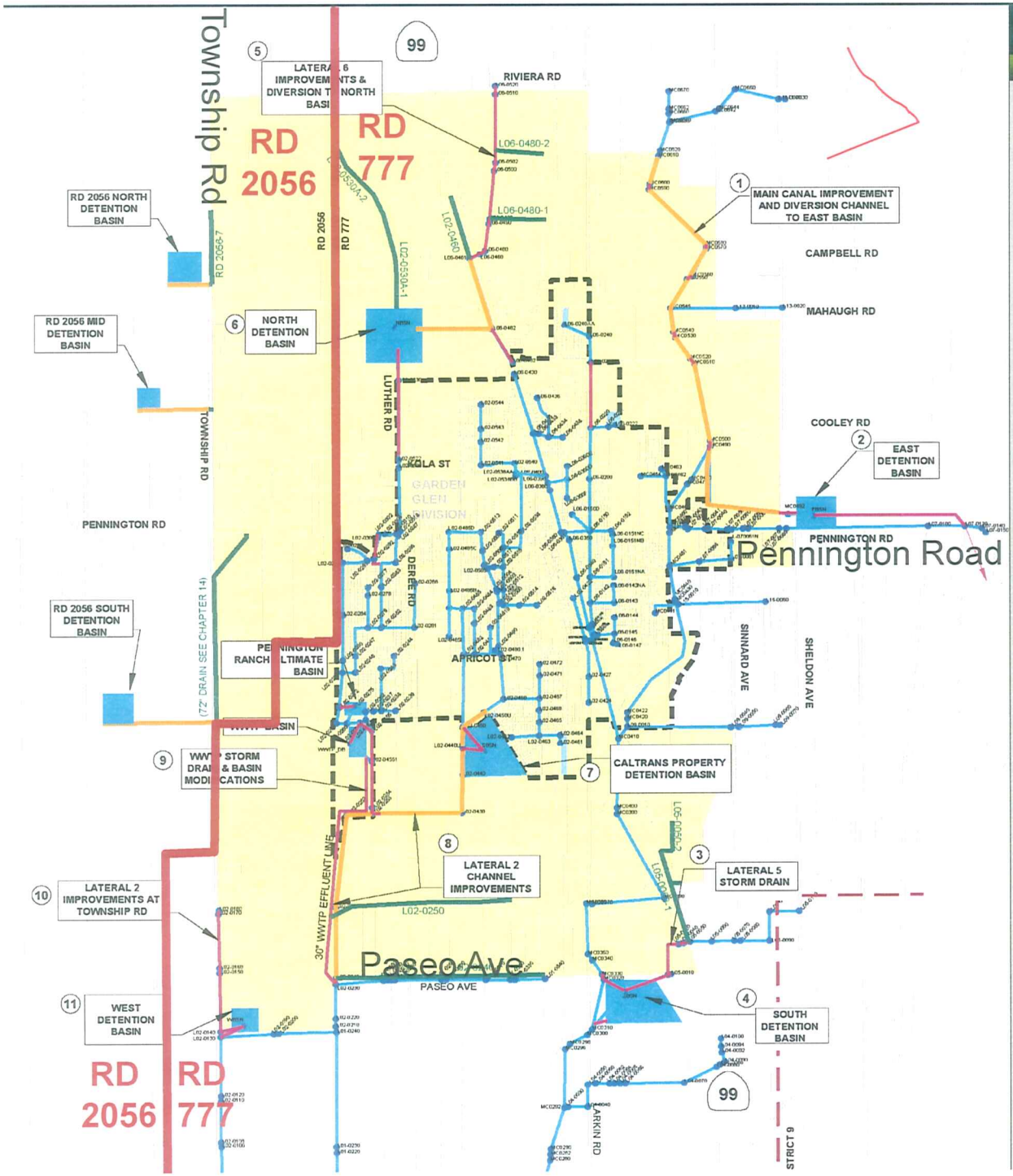
Background

Began as a MDS for RD 777 in 2005

→ Expanded Study to Support City's General Plan Update in 2008

Goal: Allow City to Grow Without Increasing City or Agricultural Flooding

- Developed Recommended Drainage Project
- Seeking Adoption of MDS



RD 777 and RD 2056 Service Areas

Agenda

- Background
- **Existing Problems**
- RD 777 Service Area Alternatives Evaluation
- Recommended Project
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- Questions

Existing Problems

1. J Street South of Pennington Road
2. L Street Between Birch Street and Pennington Road
3. Highway 99 Flooding
4. De Ree Road and Luther School
5. Ditches West of P Street and South of Pennington Road

New Storm Drain Pipe Systems were Evaluated and Sized
Cost of Storm Drains Estimated at $5.5 million

Agenda

- Background
- Existing Problems
- **RD 777 Service Area Alternatives Evaluation**
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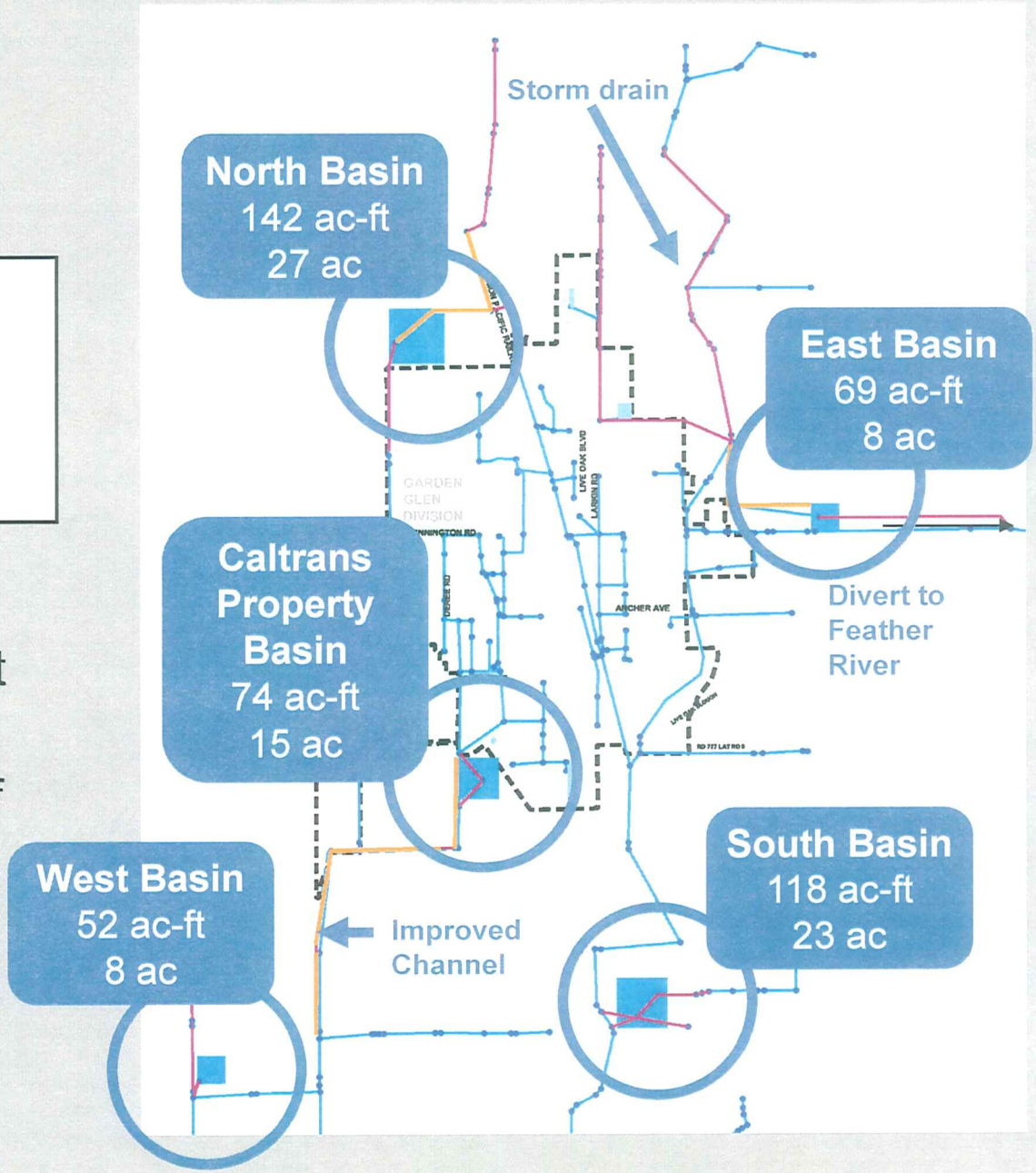
Alternative 1: Flood Control

Legend

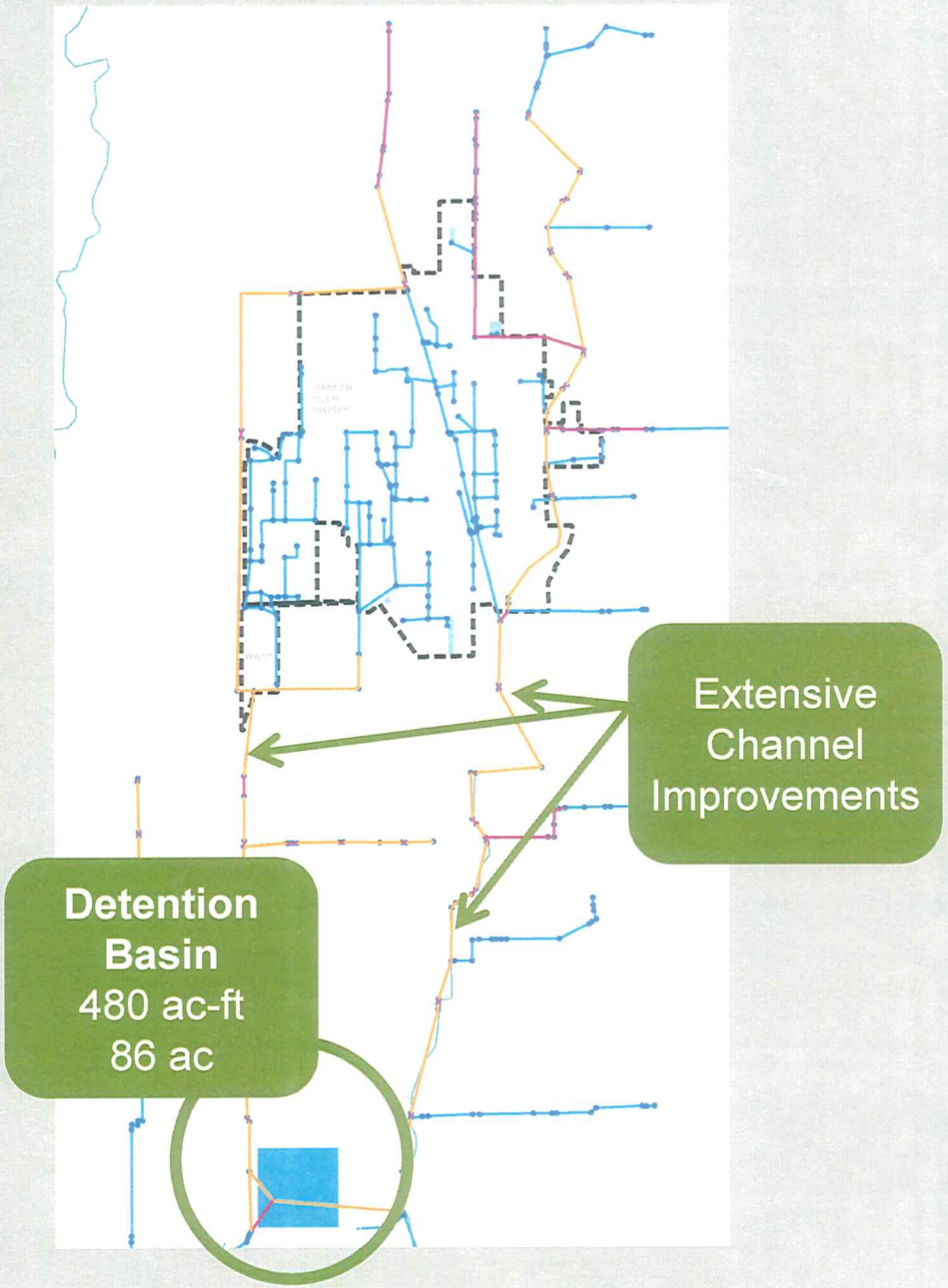
- Existing Ditch/Drain
- Proposed Storm Drain
- Proposed Open Channel

- 5 Detention Basins
  - Total Storage: 455 ac-ft
  - Total Area: 80 ac
- Divert NE Quadrant Runoff to Feather River
- Large Storm Drains & Channel Improvements
- Capital Cost: $48 million



Alternative 2: Regional Detention Storage & Increased Channel Capacity

- Detention Basin
  - Total Storage: 480 ac-ft
  - Total Area: 86 ac
- Increased Channel Conveyance
- Capital Cost: $66 million

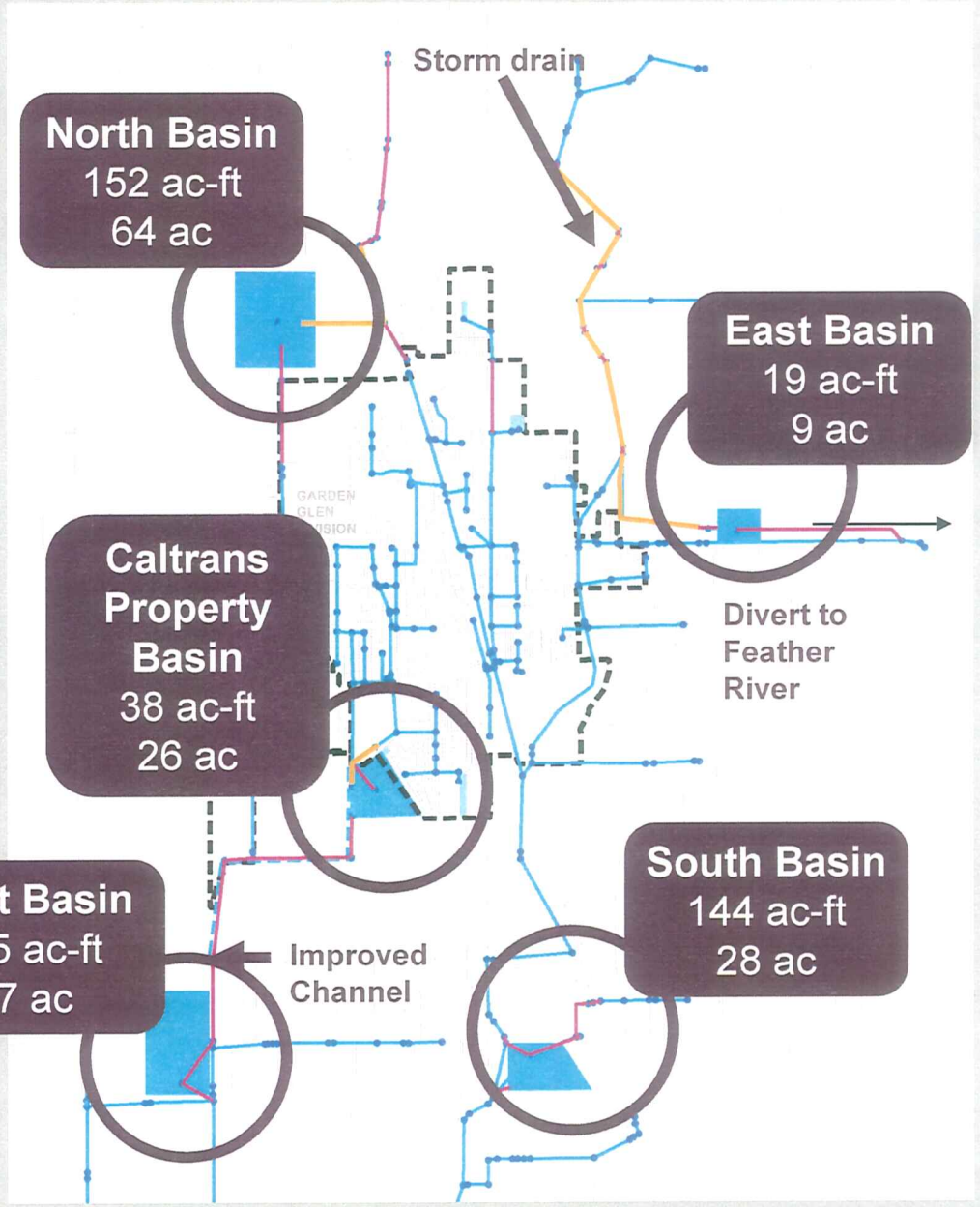


Legend

- Existing Ditch/Drain
- Proposed Storm Drain
- Proposed Open Channel

Alternative 3: Dual Use

- Basins & Channels provide recreation, habitat, and flood protection
- 5 Detention Basins
  - Total Storage: 558 ac-ft
  - Total Area: 194 ac
- Divert Northeast Quadrant Runoff to Feather River
- Capital Cost: $49 million



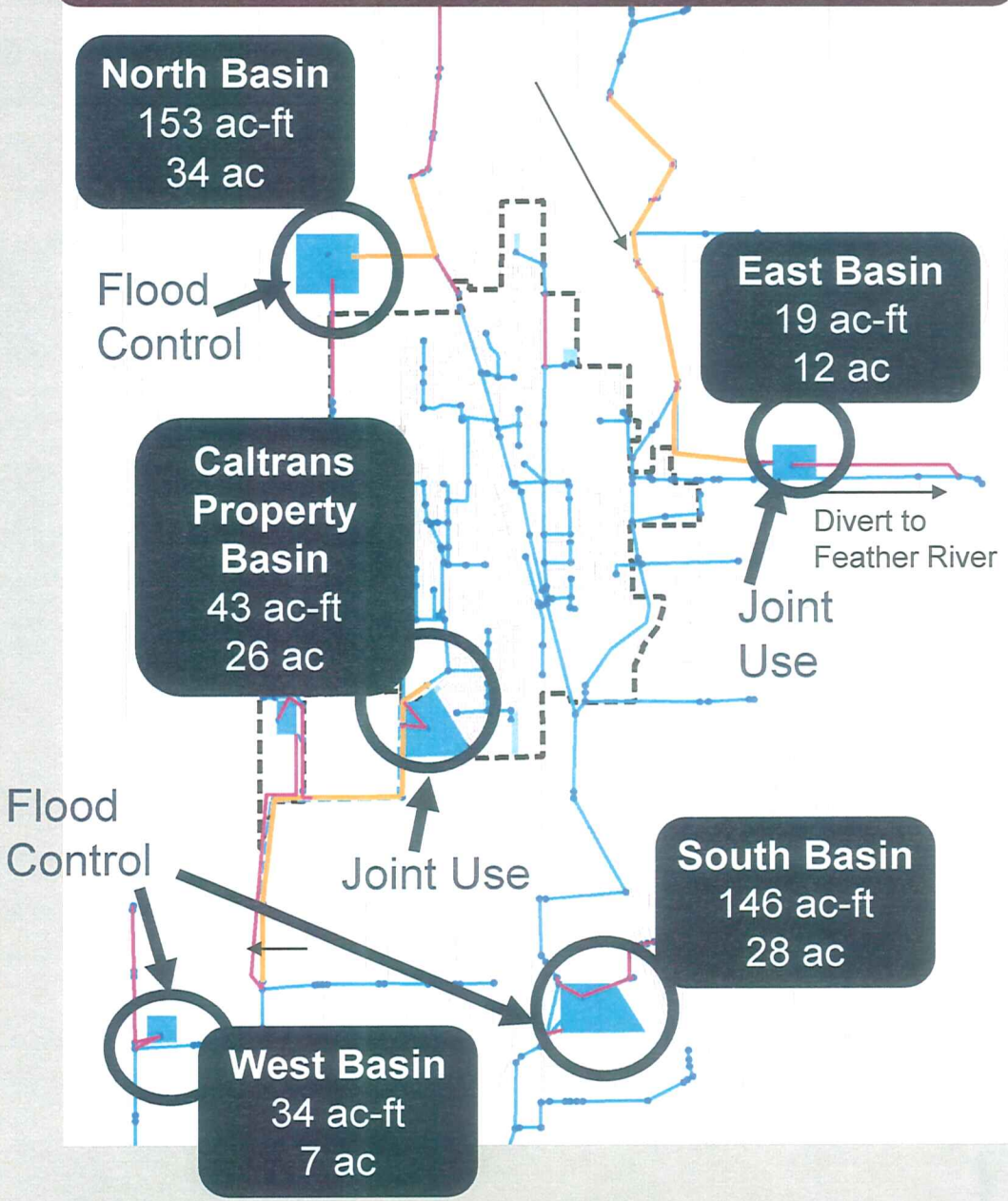
Alternative 4: Joint Use & Flood Control

- Channels are dual use
- 5 Detention Basins
  - Total Storage: 395 ac-ft
  - Total Area: 107 ac
- Divert Northeast Quadrant Runoff to Feather River
- Capital Cost: $45 million

Legend

- Existing Ditch/Drain
- Proposed Storm Drain
- Proposed Open Channel

Recommended Alternative



Alternative Comparison Summary

Item	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Basin Volume (ac-ft)	455	480	558	395
Basin Area (acres)	80	86	197	107
Channel Area (acres)	33	90	53	54
Total Area (acres)	113	176	250	160
Pump Stations	3	0	1	2
Total Cost ($, million)	48	66	49	45

Recommended Alternative

Agenda

- Background
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- RD 777 Service Area Alternatives Evaluation
- **Recommended Project**
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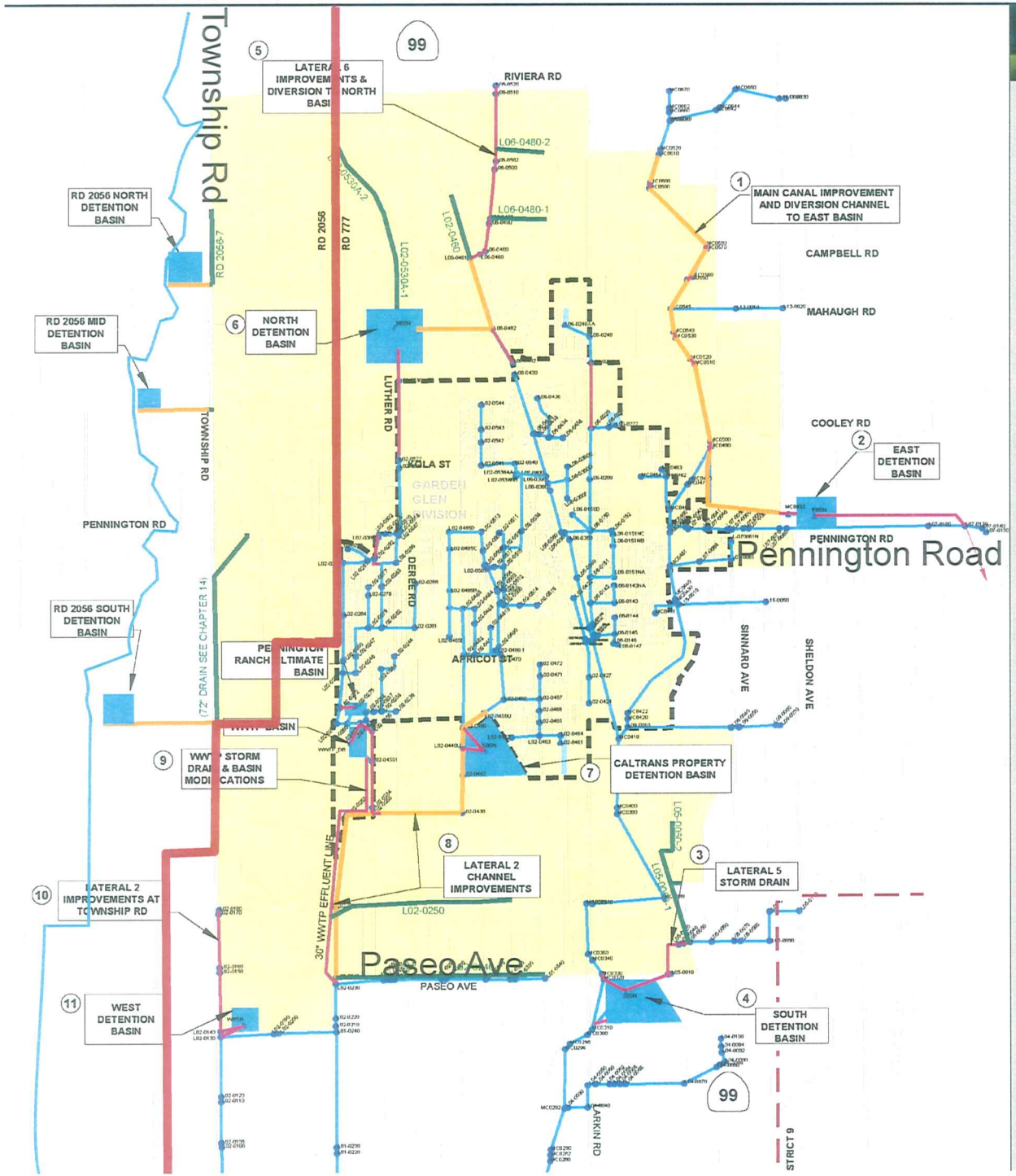
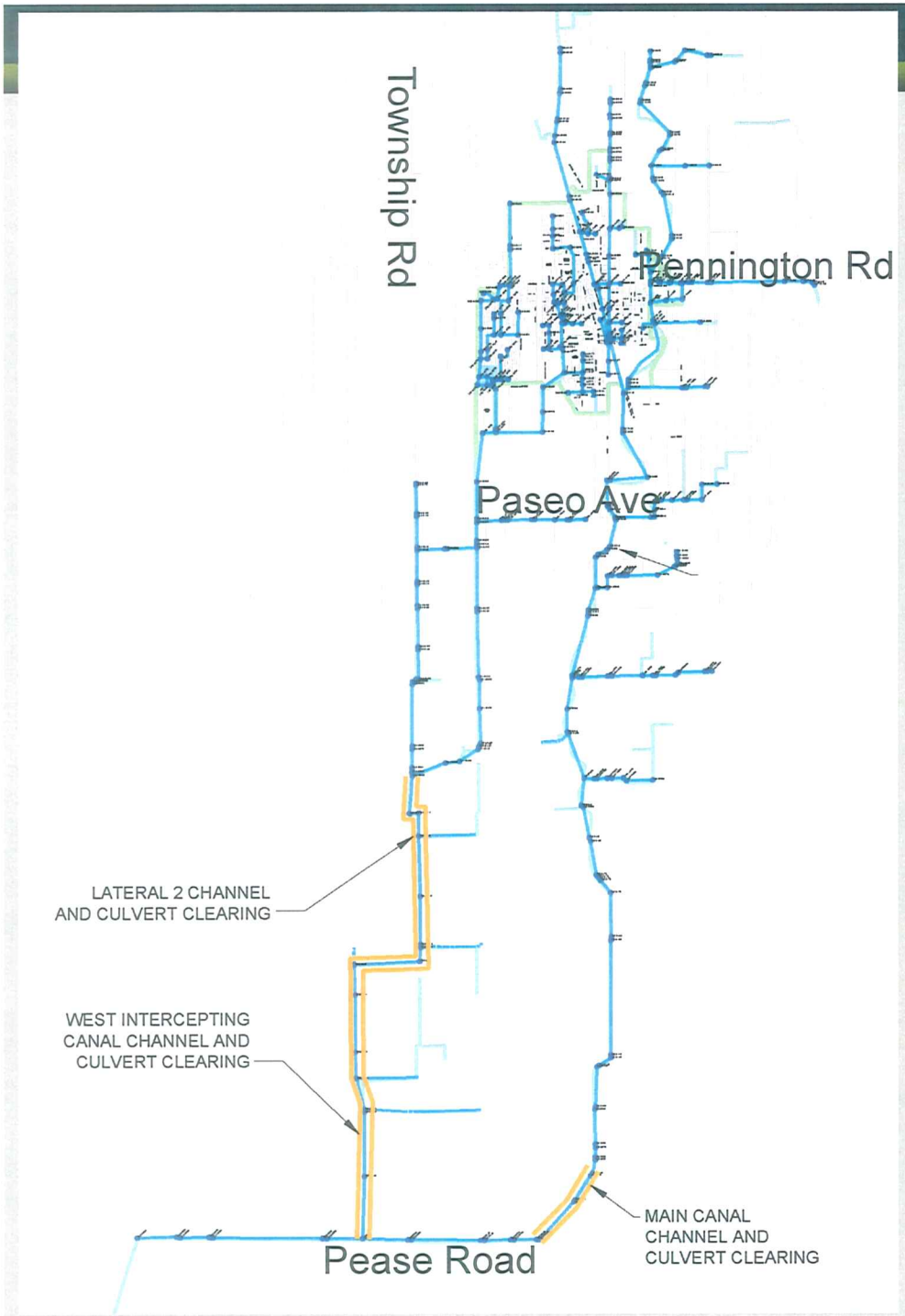


Alternative 4

RD 777 Service Area

Detention Basins for RD 2056 Service Area ($4.4 million)



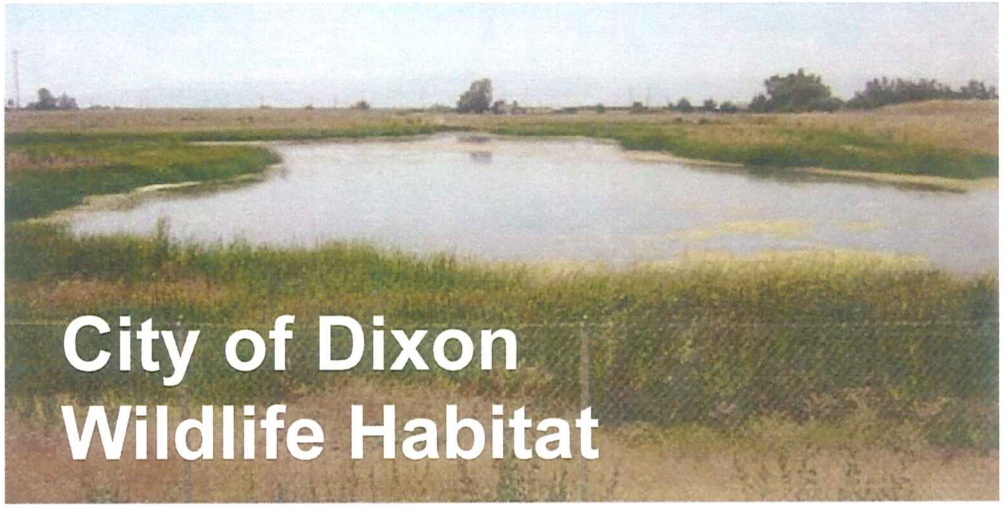
Downstream Operations and Maintenance (O&M) Requirements

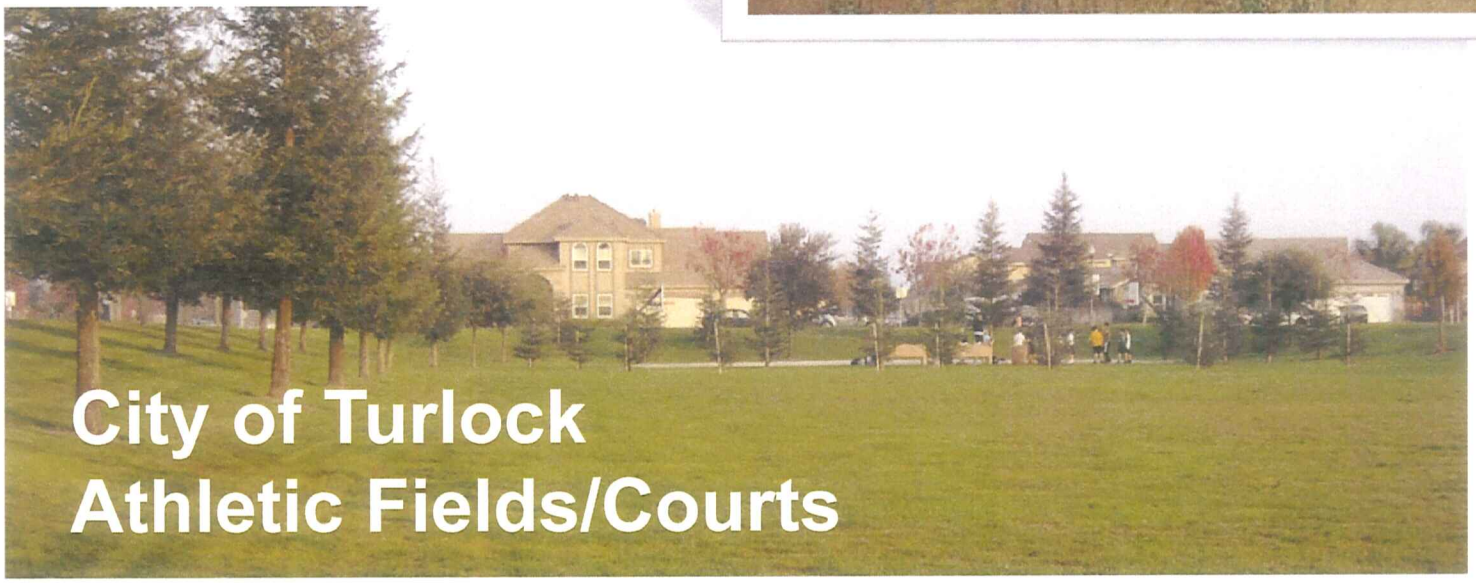
City Growth:

1. Generates About $330,000/year of Increase Fees to RD 777

2. Decreases RD 777 O&M by 6 miles of Channels

Joint Use Basins





Joint Use Channels

City of Vacaville
Ulatis Creek Walk

Joint Use Channels

City of Dixon Lateral 2

Agenda

- Background
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- Recommended Project
- **Financial Evaluation**
- Questions

Impact Fee Evaluation

Item	Proposed	Current
Low Density Residential ($/DU)	3,756	3,035
Small Lot Residential ($/DU)	2,819	3,035
Medium Density Resid. ($/DU)	2,009	3,035
Higher Density Resid. ($/acre)	23,741	30,809 (at 19.45 DU/acre)
Commercial/Downtown Mixed Use, Community Commercial, Employment ($/acre)	24,654	18,981
Neighborhood Center ($/acre)	22,097	18,981
Civic Center ($/acre)	20,271	18,981
Parks, Open Space, Civic, Buffer ($/acre)	0	

Single Family / Low Density Residential Fee Comparison

Item	Fee ($/DU)
Live Oak Proposed	3,756
Live Oak Current	3,035
Yuba City	2,874
Chico	2,328
Woodland	2,900
Lincoln	2,571
Riverbank	3,262
Ceres	969
Davis	305

Agenda

- Background
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- Financial Evaluation
- **Questions**