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*Final Report*

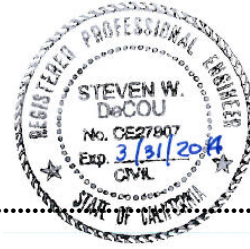
# **Tracy Wastewater Conveyance and Treatment Development Impact Fee Study**

Prepared for  
**City of Tracy, California**

January 2013

**CH2MHILL**

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# Acronyms and Abbreviations

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BOD	biochemical oxygen demand
CC	construction cost
EDU	equivalent dwelling unit
FAR	floor area ratios
TSS	total suspended solids
WWMP	Tracy Wastewater Master Plan
WWTP	Wastewater Treatment Plant

## SECTION 1

# Introduction

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As part of the Tracy Wastewater Master Plan (WWMP), CH2M HILL has been tasked with allocating the capital costs in the WWMP to those future users who will be connecting to the wastewater system. There are two general components associated with those capital costs: 1) conveyance costs for trunk sewers (pipelines that are “offsite” of individual development projects, and generally, but not always, greater than 18 inches in diameter), and 2) treatment and disposal costs associated with the main wastewater treatment plant located at Holly Drive. Development impact fee recommendations are presented in this report.

In accordance with the requirements of California Government Code Section 66000 (formerly AB 1600), the costs associated with both wastewater conveyance and treatment are allocated in proportion to the demand (e.g., amount of capacity consumed) for each future system user. The wastewater conveyance and treatment impact fees developed in this report are intended to cover the costs associated with providing treatment and conveyance facilities to the users identified herein. The estimated costs to be incurred for both conveyance and treatment are presented in this report.

The impact fees identified in this report are specifically intended to comply with the following provisions of California Government Code Section 66000. Specifics associated with compliance are as follows:

- The purpose of the proposed fees is to provide a funding mechanism for wastewater conveyance and treatment facilities that are required to provide wastewater service to those developments described in this report.
- The impact fees developed herein will be used to plan, design, and construct the wastewater facilities described in this report.
- Construction of the conveyance and treatment facilities described in this report provides direct benefit to the proposed development projects noted; that benefit is directly proportional to the proposed impact fees, and there is, therefore, a reasonable relationship between the fee’s use and the development projects upon which the fee is imposed.
- The proposed development projects require conveyance capacity to transport the wastewater generated from their properties to the wastewater treatment plant; they additionally require a treatment plant that can achieve the requirements imposed by the Regional Water Quality Control Board for disposal of effluent into the Old River. Failure to provide both conveyance and treatment for the sewage generated by the proposed development projects would make development impossible. Therefore, there is a reasonable relationship between the need for the public facilities noted in this report and the development projects upon which the proposed impact fees are imposed.

For this development impact study report, both treatment and conveyance capacity are proposed to be allocated in units associated with individual housing, or dwelling, units.

One equivalent dwelling unit (EDU) represents the flow, biochemical oxygen demand (BOD), and total suspended solids (TSS) loading that one would associate with a single family home (all constituents are considered for treatment capacity impacts, and only flow is considered for conveyance capacity). As noted in the WWMP, an EDU consists of a typical low-density, single-family home, with an average of 3.3 people, a flowrate of 264 gallons per day, a BOD loading of 0.594 pound per day, and a TSS loading of 0.693 pound per day. Flow and loading from residential, commercial, industrial, and retail users can be correlated to EDUs, and appropriate development impact fees calculated for both conveyance and treatment facilities.

Table 1-1 provides information on future users and the EDUs assigned to each category of anticipated growth. Because the expected concentrations of BOD and TSS are identical for each user group, the number of EDUs are proportional to flow.

**TABLE 1-1**  
Wastewater Flow Generation Factors  
*Tracy Wastewater Conveyance and Treatment Development Impact Fee Study*

<b>Flow Parameter</b>	<b>Tier I Master Plan Values</b>	<b>Number of EDUs per Unit (based on gross acres)</b>	<b>Number of EDUs per Unit (based on net acres)</b>
Per Capita Flow	80 gpcd		
Residential Flow – VLD	264 gpd/unit	1.0 per dwelling unit	1.0 per dwelling unit
Residential Flow – LD	264 gpd/unit	1.0 per dwelling unit	1.0 per dwelling unit
Residential Flow – MD	216 gpd/unit	0.82 per dwelling unit	0.82 per dwelling unit
Residential Flow – HD	176 gpd/unit	0.667 per dwelling unit	0.667 per dwelling unit
Industrial Flow	1,056 gal/gross acre/day	4.0 per gross acre	4.71 per net acre
Office, Retail, and Commercial Flow	1,140 gal/gross acre/day	4.32 per gross acre	5.08 per net acre

Notes:

- gal = gallons
- gpcd = gallon(s) per capita per day
- gpd = gallon(s) per day
- HD = high density (2.2 residents per unit)
- LD = low density (3.3 residents per unit)
- MD = medium density (2.7 residents per unit)
- VLD = very low density (3.3 residents per unit)

The conversion from gross acres to net acres in Table 1-1 assumes that 15 percent of the gross acres for industrial, office, retail, and commercial users is associated with roadways and other dedicated rights of way that will not support construction of facilities that will result in wastewater generation. The assumed floor area ratios (FAR) used to establish wastewater flow and loading generation factors for non-residential users were as follows:

- Commercial – assumed FAR of 0.3
- Office – assumed FAR of 0.45
- Industrial – assumed FAR of 0.5

Although special consideration can be given to users who do not reflect the “typical” loading rates associated with an EDU, any special consideration will include an assessment of actual diurnal loading conditions to the conveyance and treatment facilities, because the use of the wastewater generation factors included in the WWMP reflect actual diurnal usage in those facilities, and special cases are not necessarily compatible with those usage patterns.

The proposed method of cost allocation and development of the wastewater development impact fees are described in the following sections.

## SECTION 2

# Conveyance System, General

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As noted in the Wastewater Master Plan, the conveyance facilities are located in two distinct geographic, or catchment areas. Those two areas are the East Catchment and the West Catchment. Figure 2-1 shows the location of those two areas, and the major facilities that are included in each.

Previous conveyance cost allocations in Tracy have been made based on anticipated costs to serve individual developments, with the exception of the Corral Hollow Trunk Sewer in the 1980s. This report calculates development impact fees for conveyance facilities by assigning users to one of two major sewer sheds, or catchments.

The east catchment Future Service Areas include: Rocha, UR1 (Alvarez and others), Chrisman Road, and Eastside Industrial. The future improvements in the east catchment will serve 5,253 EDUs.

The west catchment Future Service Areas includes Tracy Hills, South Linne, UR10 (Ellis), UR9 (Keenan), Kagehiro, Westside Industrial, Cordes Ranch, Gateway (excluding Phase 1), UR5 (Bright), UR7 (Bright), UR8 (Fahmy), Berg/Byron, Catellus, Filios, I-205 Expansion, Larch Clover, Standard Pacific, and infill properties in this catchment. A total of 30,548 EDUs will be served by the new facilities. Conveyance facilities related to Gateway (Phase 1) are not considered herein and are assumed to be accounted for in the Hansen Sewer System as described in the *Tracy Gateway – Phase 1 Finance and Implementation Plan* (CH2M HILL, 2003).

The west catchment is served by the new Lammers Sewer System and improvements and upgrades to the Corral Hollow Sewer System. A total of 5,420 EDUs of new capacity will be provided by the future Corral Hollow improvements and upgrades, as described herein. The Lammers Sewer System will serve the remaining 25,128 EDUs.

The two catchments are described as follows.

## 2.1 East Catchment

Wastewater generated from the east catchment Future Service Areas will be conveyed to the Tracy Wastewater Treatment Plant (WWTP) via a new force main, upgrades to the MacArthur Pump Station, and new gravity sewer pipelines.

Table 2-1 presents the east catchment Future Service Area conveyance improvements.



**TABLE 2-1**

East Catchment Future Service Areas – Conveyance Improvements  
*Tracy Wastewater Conveyance and Treatment Development Impact Fee Study*

<b>Pipeline Improvements (Node #E to Node #E)</b>	<b>Pipe Diameter (inches)</b>	<b>Pipe Length (linear feet)</b>
1E to 2E (Gravity Main)	8	7,400
2E to 3E (Gravity Main)	18	7,500
3E to 4E (Gravity Main)	18	6,500
4E to 5E (Gravity Main)	21	5,000
5E to 5E.1 (Gravity Main)	27	4,900
5E.1 to Tracy WWTP (Force Main)	14	2,000

## 2.2 West Catchment

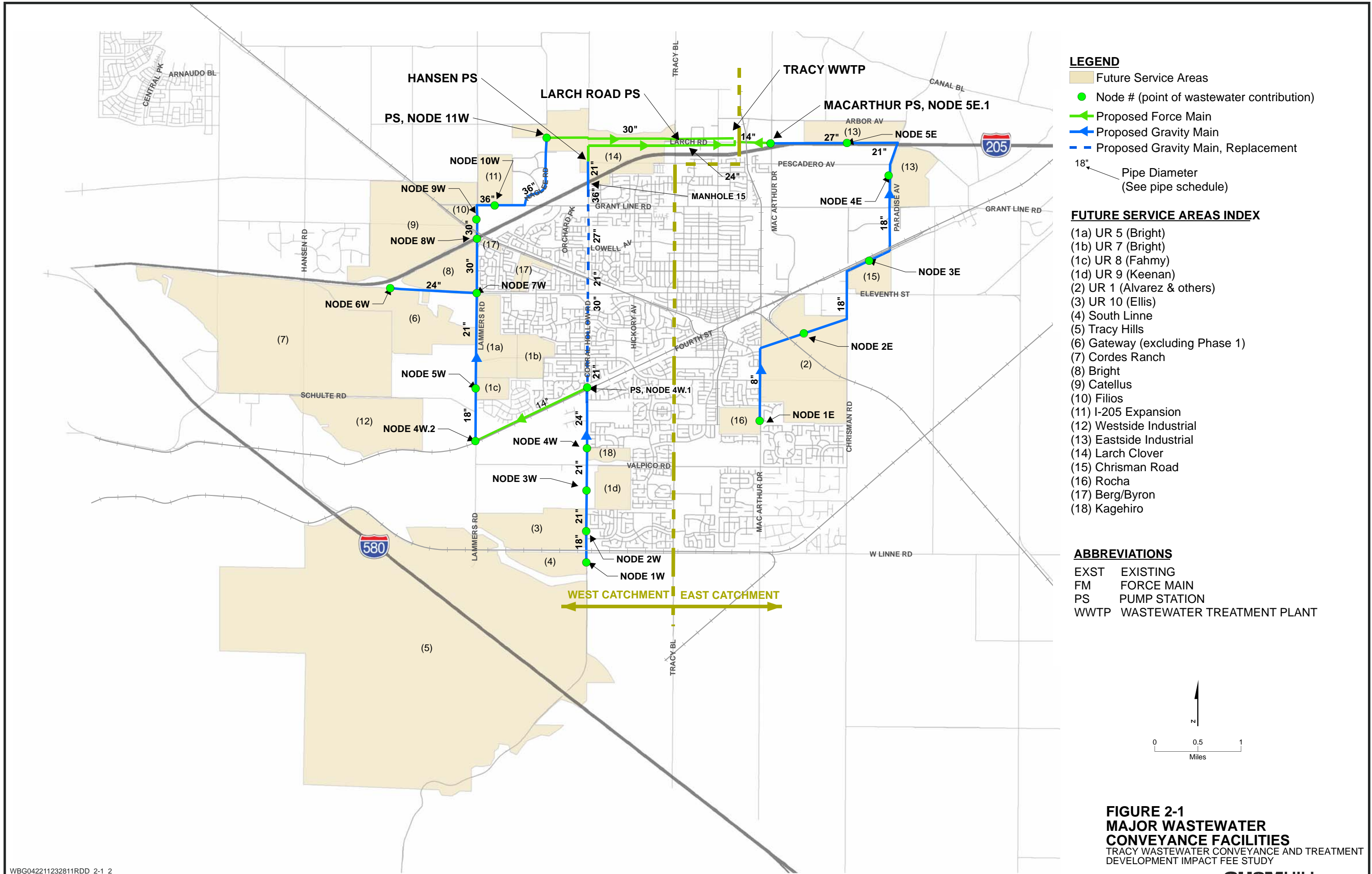
Wastewater generated from the west catchment Future Service Areas will be conveyed to the Tracy WWTP via new or upgraded force mains, pump stations, and gravity sewer pipelines. A portion of the west catchment Future Service Areas wastewater will be transmitted to the Corral Hollow Sewer System and the remainder to the proposed Lammers Sewer System. The Lammers Trunk Sewer will extend from the intersection of Naglee Road and Larch Road (location of proposed pump station, Node 11W), along Naglee Road and parallel to the Hansen Trunk Sewer, and south on Lammers Road to West Schulte Road.

Table 2-2 presents the west catchment Future Service Area conveyance improvements for the proposed Lammers Sewer System, and Table 2-3 presents the improvements for the Corral Hollow Sewer System.

**TABLE 2-2**

West Catchment Future Service Areas – Lammers Sewer System Conveyance Improvements  
*Tracy Wastewater Conveyance and Treatment Development Impact Fee Study*

<b>Pipeline Improvements (Node #W to Node #W)</b>	<b>Pipe Diameter (inches)</b>	<b>Pipe Length (linear feet)</b>
4W.1 to 4W.2 (Force Main)	14	7,500
4W.2 to 5W	18	3,400
5W to 7W (Gravity Main)	21	5,800
6W to 7W (Gravity Lateral)	24	5,300
7W to 8W (Gravity Main)	30	3,400
8W to 9W (Gravity Main)	30	1,300
9W to 10W (Gravity Main)	36	2,100
10W to 11W (Gravity Main)	36	6,900
11W to Tracy WWTP (Force Main)	30	11,600



**LEGEND**

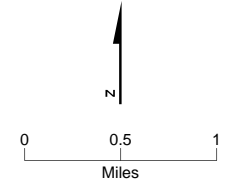
- Future Service Areas
- Node # (point of wastewater contribution)
- Proposed Force Main
- Proposed Gravity Main
- Proposed Gravity Main, Replacement
- 18" Pipe Diameter (See pipe schedule)

**FUTURE SERVICE AREAS INDEX**

- (1a) UR 5 (Bright)
- (1b) UR 7 (Bright)
- (1c) UR 8 (Fahmy)
- (1d) UR 9 (Keenan)
- (2) UR 1 (Alvarez & others)
- (3) UR 10 (Ellis)
- (4) South Linne
- (5) Tracy Hills
- (6) Gateway (excluding Phase 1)
- (7) Cordes Ranch
- (8) Bright
- (9) Catellus
- (10) Filios
- (11) I-205 Expansion
- (12) Westside Industrial
- (13) Eastside Industrial
- (14) Larch Clover
- (15) Chrisman Road
- (16) Rocha
- (17) Berg/Byron
- (18) Kagehiro

**ABBREVIATIONS**

EXST	EXISTING
FM	FORCE MAIN
PS	PUMP STATION
WWTP	WASTEWATER TREATMENT PLANT



**FIGURE 2-1  
MAJOR WASTEWATER  
CONVEYANCE FACILITIES**  
TRACY WASTEWATER CONVEYANCE AND TREATMENT  
DEVELOPMENT IMPACT FEE STUDY

**TABLE 2-3**

West Catchment Future Service Areas – Corral Hollow Sewer System Conveyance Improvements  
*Tracy Wastewater Conveyance and Treatment Development Impact Fee Study*

<b>Pipeline Improvements (Node #W to Node #W)</b>	<b>Pipe Diameter (inches)</b>	<b>Pipe Length (linear feet)</b>
1W to 2W (Gravity Main)	18	2,100
2W to 3W (Gravity Main)	21	2,600
3W to 4W (Gravity Main)	21	2,600
4W to 4W.1 (Gravity Main)	24	3,900
Relief Sewer – Manhole 15 to Hansen Pump Station (Gravity Main)	21	2,180

## SECTION 3

# Treatment System, General

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Treatment system costs are subject to future escalation as a result of currently unknown regulatory compliance requirements. It is recommended that treatment system costs be allocated on the basis of **existing** (and, therefore, known) compliance requirements. Wastewater generated within the City limits is currently treated at the WWTP, located on Holly Drive, discharged to the Old River, and regulated by discharge requirements stated in Order No. R5-2011-0012. The WWTP's industrial pretreatment pond, industrial holding ponds, sludge drying beds, and biosolids storage area are regulated by separate waste discharge requirements as defined in Order No. R5-2007-0038.

The recommended method to estimate the fee is to base the treatment plant development impact fee on the treatment requirements in place at the time the fees are calculated. The impact fees will be paid at the time of either building permit application or, in some cases, with the issuance of a bond or other funding mechanism for the individual development. At the time of payment of the then-current development impact fee for plant capacity, the individual parcels that are the subject of such payment will join the ranks of other "existing users" of the system. Costs for plant upgrades required to meet any future regulatory requirements will be spread to both existing and future users at the time that the new regulatory requirements are imposed. Costs for plant expansion will be allocated fully to new users.

Because all users within the City will send raw wastewater to the Holly Drive treatment plant, a single treatment plant development impact fee is proposed, which would be identical (based on a per EDU basis) for all future users of the system. Raw wastewater from system users contains a number of constituents that require treatment (flow, BOD, TSS, ammonia, and pathogens are typically the constituents of major concern; with flow, BOD and TSS are those constituents typically used to allocate treatment capacity, because ammonia and pathogens are related to the others). All known future users that are the subject of this treatment plant impact fee evaluation are expected to have similar concentrations of BOD and TSS. Because the proposed treatment plant has capacity to process each of these constituents based on the average concentration levels received at the plant, a user with substantially different concentrations of these constituents will consume treatment plant capacity based on the most critical of those constituents, in the event that such a future user desires to locate in the City.

As an example, consider an industrial user who discharges a relatively "clean" water to the sewer system, with little BOD or TSS. Because that industrial user has consumed hydraulic capacity in the plant, and minimal BOD or TSS capacity, the overall plant capacity has been diminished as a result of the loss of hydraulic, or flow-based, loading. Although the BOD and TSS loadings from this user are not fully proportional to the hydraulic loading in this example, the plant hydraulic capacity (and, therefore, the entire plant capacity) has been diminished as a result of the flow, and the user should be assessed the costs for full plant capacity based on hydraulic loading (in this example).

# Wastewater Facilities Capital Cost Estimates

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Capital cost estimates were developed for both conveyance and treatment requirements, based on the criteria noted below. They will require future adjustment to account for general cost increases due to inflationary impacts, and for additional cost increases associated with future regulatory requirements that are imposed on the treatment plant discharge. Cost information used in preparing the estimates included cost estimates for similar completed projects, vendor quotes, and cost-estimating database tools. The cost estimates are preliminary (that is, not based on completed engineering designs and site investigations), and include the following line items and allowances:

- **Construction Cost** – The construction cost (CC) includes directly related costs such as labor, material, and equipment. The CC was current as of March 2012.
- **Markups** – As directed by the City of Tracy, the following add-on percentages were added to the CC to develop the total capital cost:
  - Design and planning: 10 percent of CC
  - Construction management: 10 percent of CC
  - General contingency: 15 percent of CC
  - Program administration: 5 percent of CC
- **Land Acquisition** – Land acquisition is not anticipated for major wastewater conveyance facilities, because all proposed facilities are anticipated to be placed in future roadways. The City currently owns all lands required for treatment plant construction, and all future conveyance facilities are anticipated to be located within existing or future public rights of way. Therefore, no costs have been allocated for land acquisition.

## 4.1 Definition of Estimate Class

These cost estimates were prepared in accordance with the guidelines of the Association for the Advancement of Cost Engineering International. According to the definitions of Advancement of Cost Engineering International, the Class 5 Estimate is defined as follows:

**Class 5 Estimate.** This estimate is prepared based on limited information, where little more than proposed plant type, its location, and the capacity are known, where preliminary engineering is from 0 percent to 2 percent complete. Strategic planning purposes include but are not limited to, market studies, assessment of viability, evaluation of alternate schemes, project screening, location and evaluation of resource needs and budgeting, and long-range capital planning. Examples of estimating methods used would include cost/capacity curves and factors, scale-up factors, and parametric and modeling techniques. Typically, little time is expended in the development of this estimate. The expected accuracy ranges for this class of

estimate are -20 percent to -50 percent for the low range side and +30 percent to +100 percent on the high range side.

The cost estimates shown, which do not include any resulting conclusions on project financial or economic feasibility or funding requirements, have been prepared for guidance in project evaluation and implementation from the information available at the time of the estimate. The final costs of the project and resulting feasibility will depend on actual labor and material costs, competitive market conditions, actual site conditions, final project scope, implementation schedule, continuity of personnel and engineering, and other variable factors. Therefore, the final project costs will vary from the estimate presented herein.

## 4.2 Total Capital Cost for Conveyance Facilities

The total capital cost for the East and West Catchment areas is presented in Tables 4-1 and 4-2. Those capital costs are \$12,633,000 for the East Catchment area, and \$49,193,000 for the West Catchment. As noted in the tables, the cost estimates include allowances for general contingency, engineering design, construction management, and program administration. The cost estimates are current as of March 2012, and will need to be inflation-adjusted over time. Additionally, updates based on a regular review of local conveyance construction bids should be made. Specific review should be conducted in an attempt to understand the impacts of the size of future construction projects (e.g., phasing) on the overall costs incurred.

**TABLE 4-1**

Major Wastewater Conveyance Facilities Capital Cost Estimate – East Catchment  
Tracy Wastewater Conveyance and Treatment Development Impact Fee Study

Node #E to #E	Diameter (inches)	Estimated Qty	Unit Price (\$)	Total Amount (\$)
<b>1E to 2E</b>	<b>8</b>	<b>7,400 LF</b>	<b>131</b>	<b>967,180</b>
Trenchless Crossing	8	100 LF	897	89,676
Manholes	#NA	17 EA	8,147	138,498
Miscellaneous Work	#NA	1 LS	102,142	102,142
Traffic Control	#NA	1 LS	42,727	42,727
<b>2E to 3E</b>	<b>18</b>	<b>7,500 LF</b>	<b>213</b>	<b>1,598,625</b>
Manholes	#NA	17 EA	8,147	138,498
Miscellaneous Work	#NA	1 LS	103,523	103,523
Traffic Control	#NA	1 LS	43,304	43,304
<b>3E to 4E</b>	<b>18</b>	<b>6,500 LF</b>	<b>213</b>	<b>1,385,475</b>
Trenchless Crossing	18	100 LF	1,267	126,713
Manholes	#NA	15 EA	8,147	122,204
Miscellaneous Work	#NA	1 LS	89,720	89,720
Traffic Control	#NA	1 LS	37,530	37,530

**TABLE 4-1**

Major Wastewater Conveyance Facilities Capital Cost Estimate – East Catchment  
*Tracy Wastewater Conveyance and Treatment Development Impact Fee Study*

Node #E to #E	Diameter (inches)	Estimated Qty	Unit Price (\$)	Total Amount (\$)
<b>4E to 5E</b>	<b>21</b>	<b>5,000 LF</b>	<b>236</b>	<b>1,179,417</b>
Trenchless Crossing	21	200 LF	1,052	210,435
Manholes	#NA	11 EA	8,147	89,616
Miscellaneous Work	#NA	1 LS	69,015	69,015
Traffic Control	#NA	1 LS	28,869	28,869
<b>5E to 5E.1</b>	<b>27</b>	<b>4,900 LF</b>	<b>321</b>	<b>1,570,777</b>
Manholes	#NA	10 EA	8,147	81,470
Miscellaneous Work	#NA	1 LS	67,635	67,635
Traffic Control	#NA	1 LS	28,292	28,292
<b>5E.1 to WWTP</b>	<b>14</b>	<b>2,000 LF</b>	<b>171</b>	<b>342,533</b>
Trenchless Crossing	14	100 LF	1,044	104,406
Open Cut Crossing	14	1 EA	20,125	20,125
Miscellaneous Work	#NA	1 LS	27,606	27,606
Traffic Control	#NA	1 LS	11,548	11,548
<b>MacArthur PS Upgrades</b>	<b>#NA</b>	<b>1 LS</b>	<b>203,071</b>	<b>203,071</b>
<b>Construction Cost</b>				<b>9,021,000</b>
<b>General Contingency – 15%</b>				<b>1,354,000</b>
Engineering Design – 10%				903,000
Construction Management – 10%				903,000
Program Administration – 5%				452,000
<b>Total Markups</b>				<b>3,612,000</b>
<b>Total Capital Cost</b>				<b>12,633,000</b>

Notes:

1. Ancillary costs such as excavation support systems, dewatering, and surface restoration are included in the costs noted above.
2. The costs noted above are current as of March 2012. Adjustments for phasing and inflation will need to be considered for use of these costs in the future.

**TABLE 4-2**

Major Wastewater Conveyance Facilities Capital Cost Estimate – West Catchment  
 Tracy Wastewater Conveyance and Treatment Development Impact Fee Study

<b>Node #E to #E</b>	<b>Diameter (inches)</b>	<b>Estimated Qty</b>	<b>Unit Price (\$)</b>	<b>Total Amount (\$)</b>
<b>1W to 2W</b>	<b>18</b>	<b>2,100 LF</b>	<b>213</b>	<b>447,650</b>
Manholes	#NA	5 EA	8,144	40,722
Miscellaneous Work	#NA	1 LS	31,626	31,626
Traffic Control	#NA	1 LS	23,321	23,321
<b>2W to 3W</b>	<b>21</b>	<b>2,600 LF</b>	<b>234</b>	<b>607,880</b>
Manholes	#NA	7 EA	8,144	57,011
Miscellaneous Work	#NA	1 LS	39,156	39,156
Traffic Control	#NA	1 LS	28,873	28,873
<b>3W to 4W</b>	<b>21</b>	<b>2,600 LF</b>	<b>234</b>	<b>607,880</b>
Trenchless Crossing	21	100 LF	1,276	127,604
Manholes	#NA	8 EA	8,144	65,155
Miscellaneous Work	#NA	1 LS	39,156	39,156
Traffic Control	#NA	1 LS	28,873	28,873
<b>4W to 4W.1</b>	<b>24</b>	<b>3,900 LF</b>	<b>271</b>	<b>1,058,005</b>
Manholes	#NA	10 EA	8,144	81,444
Miscellaneous Work	#NA	1 LS	58,734	58,734
Traffic Control	#NA	1 LS	43,310	43,310
<b>4W.1 to MH 15</b>	<b>21</b>	<b>6,900 LF</b>	<b>236</b>	<b>1,626,733</b>
<i>(See description above)</i>	30	1,490 LF	360	536,028
<i>(See description above)</i>	27	3,240 LF	321	1,038,582
<i>(See description above)</i>	36	690 LF	476	328,664
Manholes	#NA	27 EA	8,274	223,387
Miscellaneous Work	#NA	1 LS	229,733	229,733
Traffic Control	#NA	1 LS	170,032	170,032
<b>Relief Sewer (MH 15 to Hansen PS)</b>	<b>21</b>	<b>2,180 LF</b>	<b>263</b>	<b>573,304</b>
Manholes	#NA	10 EA	8,274	82,736
Miscellaneous Work	#NA	1 LS	40,651	40,651
Traffic Control	#NA	1 LS	30,087	30,087



**TABLE 4-2**

Major Wastewater Conveyance Facilities Capital Cost Estimate – West Catchment  
*Tracy Wastewater Conveyance and Treatment Development Impact Fee Study*

<b>Node #E to #E</b>	<b>Diameter (inches)</b>	<b>Estimated Qty</b>	<b>Unit Price (\$)</b>	<b>Total Amount (\$)</b>
<b>Hansen Pump Station to WWTP</b>	<b>24</b>	<b>10,500 LF</b>	<b>296</b>	<b>3,108,613</b>
<b>Hansen Pump Station</b>	<b>#NA</b>	<b>1 LS</b>	<b>1,232,526</b>	<b>1,232,526</b>
Miscellaneous Work	#NA	1 LS	433,006	433,006
Traffic Control	#NA	1 LS	193,192	193,192
<b>4W.1 to 4W.2</b>	<b>14</b>	<b>7,500 LF</b>	<b>189</b>	<b>1,416,063</b>
Trenchless Crossing	14	100 LF	1,046	104,623
Miscellaneous Work	#NA	1 LS	118,973	118,973
Traffic Control	#NA	1 LS	70,358	70,358
<b>4W.2 to 5W</b>	<b>18</b>	<b>3,400 LF</b>	<b>214</b>	<b>726,297</b>
Trenchless Crossing	18	100 LF	1,274	127,412
Manholes	#NA	7 EA	8,164	57,146
Miscellaneous Work	#NA	1 LS	53,934	53,934
Traffic Control	#NA	1 LS	31,896	31,896
<b>5W to 7W</b>	<b>21</b>	<b>5,800 LF</b>	<b>234</b>	<b>1,359,037</b>
Manholes	#NA	12 EA	8,164	97,965
Miscellaneous Work	#NA	1 LS	92,005	92,005
Traffic Control	#NA	1 LS	54,410	54,410
<b>6W to 7W</b>	<b>24</b>	<b>5,300 LF</b>	<b>271</b>	<b>1,437,802</b>
Manholes	#NA	11 EA	8,164	89,801
Miscellaneous Work	#NA	1 LS	84,074	84,074
Traffic Control	#NA	1 LS	49,720	49,720
<b>7W to 8W</b>	<b>30</b>	<b>3,400 LF</b>	<b>456</b>	<b>1,549,323</b>
Trenchless Crossing	30	100 LF	1,569	156,850
Manholes	#NA	7 EA	8,164	57,146
Miscellaneous Work	#NA	1 LS	53,934	53,934
Traffic Control	#NA	1 LS	31,896	31,896
<b>8W to 9W</b>	<b>30</b>	<b>1,300 LF</b>	<b>456</b>	<b>592,388</b>
Trenchless Crossing	30	200 LF	1,358	271,587
Manholes	#NA	3 EA	8,164	24,491
Miscellaneous Work	#NA	1 LS	20,622	20,622
Traffic Control	#NA	1 LS	12,195	12,195

**TABLE 4-2**

Major Wastewater Conveyance Facilities Capital Cost Estimate – West Catchment  
 Tracy Wastewater Conveyance and Treatment Development Impact Fee Study

Node #E to #E	Diameter (inches)	Estimated Qty	Unit Price (\$)	Total Amount (\$)
<b>9W to 10W</b>	<b>36</b>	<b>2,100 LF</b>	<b>606</b>	<b>1,272,215</b>
Manholes	#NA	5 EA	8,164	40,819
Miscellaneous Work	#NA	1 LS	33,312	33,312
Traffic Control	#NA	1 LS	19,700	19,700
<b>10W to 11W</b>	<b>36</b>	<b>6,900 LF</b>	<b>606</b>	<b>4,180,135</b>
Manholes	#NA	15 EA	8,164	122,456
Miscellaneous Work	#NA	1 LS	109,455	109,455
Traffic Control	#NA	1 LS	64,729	64,729
<b>11W to WWTP</b>	<b>30</b>	<b>11,600 LF</b>	<b>442</b>	<b>5,127,683</b>
Trenchless Crossing	30	100 LF	1,655	165,486
Miscellaneous Work	#NA	1 LS	184,011	184,011
Traffic Control	#NA	1 LS	108,820	108,820
<b>W. Schulte Rd Pump Station</b>	<b>#NA</b>	<b>1 LS</b>	<b>514,249</b>	<b>514,249</b>
<b>Lammers Pump Station</b>	<b>#NA</b>	<b>1 LS</b>	<b>1,217,868</b>	<b>1,217,868</b>
<b>Construction Cost</b>				<b>35,137,000</b>
General Contingency - 15%				5,271,000
Engineering Design - 10%				3,514,000
Construction Management - 10%				3,514,000
Program Administration - 5%				1,757,000
<b>Total Markups</b>				<b>14,056,000</b>
<b>Total Capital Cost</b>				<b>49,193,000</b>

## Notes:

1. Ancillary costs such as excavation support systems, dewatering, and surface restoration are included in the costs noted above.
2. The costs noted above are current as of March 2012. Adjustments for phasing and inflation will need to be considered for use of these costs in the future.

### 4.3 Wastewater Treatment Facilities Capital Cost Estimate

Table 4-3 presents the estimated costs to expand and upgrade the existing Tracy WWTP to 21.1 mgd under the one-plant option. Expansion would occur in five or more phases as dictated by growth-driven flow (and load) increases, with a total capital cost estimate of \$278,700,000.

TABLE 4-3

Cost Estimate to Expand and Upgrade the City of Tracy WWTP Capacity to 21.1 mgd  
*Tracy Wastewater Conveyance and Treatment Development Impact Fee Study*

Process Improvement	Estimated Cost (\$ millions)	Phase 2	Phase 3	Phase 4	Phase 5
		(\$ millions)	(\$ millions)	(\$ millions)	(\$ millions)
		12.0 mgd	13.5 mgd	16.0 mgd	21.1 mgd
<b>Primary Treatment</b>					
Upgrade electrical for pumps	5.1	2.47			2.66
Expansion of headworks, including screening and grit removal	7.5				7.50
Domestic clarifiers (two)	9.8		4.93		4.85
<b>Advanced Secondary Treatment</b>					
4th/5th aeration basin	10.4		5.55		4.83
Upgrade plant aeration system	13.3		2.47	5.55	5.33
Secondary Clarifiers (two)	11.5		6.40		5.12
Expand PLCs and SCADA controls	3.7	1.23		1.23	1.22
Upgrade RAS/WAS pump station	2.4		1.23		1.22
Main electrical switchboard upgrade	2.3	1.23			1.09
<b>Tertiary Treatment and Disinfection</b>					
Three additional chlorine contact tanks	16.5	3.70		4.93	7.91
Upgrade filtration system	12.2		1.85	4.32	6.02
<b>Solids Handling</b>					
Upgrade DAFT to GBT	7.1	3.08		1.85	2.17
Pave drying beds	4.2	0.99	0.62	0.62	1.97
Digester cover and gas collection system upgrade	1.8	1.85			
Additional boiler for heating	3.3	0.62	1.23		1.48
Upgrade RAS/WAS system	4.5	1.23	1.48		1.78
New digester	11.5			5.55	5.96
New digester control building	5.1			3.08	1.97
<b>Miscellaneous Plant Improvements</b>					
Civil site work	3.6	0.86	0.49	0.62	1.58
Groundcover/landscaping	1.7	0.74	0.25	0.25	0.49
Emergency storage pond regrading	1.7	0.25		0.12	1.28
Expand admin building	2.4	1.23			1.20
Site security	1.1	0.37	0.12	0.25	0.39

TABLE 4-3

Cost Estimate to Expand and Upgrade the City of Tracy WWTP Capacity to 21.1 mgd  
 Tracy Wastewater Conveyance and Treatment Development Impact Fee Study

Process Improvement	Estimated Cost (\$ millions)	Phase 2	Phase 3	Phase 4	Phase 5
		12.0 mgd	13.5 mgd	16.0 mgd	21.1 mgd
Demo existing old facilities	0.8	0.25	0.25		0.30
Emergency power	4.7	0.62		1.85	2.19
Convert 53-acre pond to emergency storage with diesel pump option	0.7	0.74			
Distribution boxes/structures/yard piping	8.7	1.85	2.47	0.62	3.75
<b>Effluent Pumping and Conveyance</b>					
Post-aeration facility	5.7		3.70		2.00
Parallel line to Old River	14.0	14.00			
Effluent Pumping Plant	2.2	1.20			0.96
New junction structure and outfall within Old River	10.0	10.00			
<b>Thermal Plan Compliance</b>					
Temperature monitoring study and modeling	1.1	1.11			
Effluent cooling facilities	8.4		6.17	1.23	0.99
<b>Estimated Construction Cost (March 2012)</b>	<b>199.1</b>	<b>49.6</b>	<b>39.2</b>	<b>32.1</b>	<b>78.2</b>
General Contingency - 15%	29.9	7.4	5.9	4.8	11.7
Engineering Design - 10%	19.9	5.0	3.9	3.2	7.8
Construction Management - 10%	19.9	5.0	3.9	3.2	7.8
Program Administration - 5%	10.0	2.5	2.0	1.6	3.9
<b>Total Estimated Program Cost (M\$)</b>	<b>278.7</b>	<b>69.5</b>	<b>54.9</b>	<b>44.9</b>	<b>109.5</b>

In the event that actual treatment plant loadings vary from those projected in the Master Plan (due to conservation or changes in land use densities, or other future change), the buildout capacity of the plant can be adjusted to reflect those future changes. It is recommended that then-current flow and loading conditions be evaluated at each phase of future construction; if those future flows and loadings differ from those projected in this report, the necessary plant capacity should be adjusted to reflect the actual loading conditions encountered prior to construction of any phase of the treatment plant. Although the required capital funding will be changed as a result of any such adjustments, the overall cost per EDU is expected to remain similar to that estimated in this report if the changes are due to modifications in the number of EDUs, because the costs for construction are essentially proportional to the loading rate for this size of facility. If the changes are due to

conservation, where each EDU discharges a lesser flow or load, then the inflation-adjusted connection fees can be reduced at that future date.

A portion of the total treatment facilities cost is related to plant upgrades that are required to allow for continued wastewater treatment operations. As more fully discussed in Section 5, the treatment plant upgrade costs are equitably borne by both existing and future users of the treatment plant; costs associated with the addition of new capacity are equitably borne by the new users that solely contribute to the need for that additional capacity.

# Development Impact Fee Calculations

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## 5.1 Conveyance System

The City of Tracy has historically used a number of approaches to determine Conveyance Impact Fees, ranging from cost allocation to individual users to a cost allocation to a larger grouping of future users. It is recommended that individual cost allocations be avoided in the future, because costs to be spread among users depends on a number of factors that are outside the ability of the individual user to control. As an example, the WWMP has evaluated the potential for either a single wastewater plant or two wastewater plants for the expanded community. It was recommended that a single plant be selected for implementation. Had it been recommended that two plants be implemented, the distance required for wastewater conveyance for a particular development could have been very different than for the one-plant option. Under this alternative scenario, the costs allocated to the future users would change based on both distance and the fact that fewer users may have been in any individual sewer shed. Therefore, policy decisions regarding the placement of pipelines and just how to serve individual users on the part of the City have the potential to affect Conveyance Impact Fees; assignment of future developments to relatively large sewer sheds reduces what could be large changes in impact fees to individual developments.

It is recommended that cost allocations for conveyance system facilities be allocated to the two major sewer sheds (e.g., the East Catchment area and the West Catchment area). This approach recognizes the geographical differences between the new Sphere of Influence properties (principally in the West Catchment) and other developments within the existing City Limits (principally in the East Catchment area), while still allowing for relatively simple administration of the conveyance impact fee.

Table 5-1 describes developments for both the West and East Catchment areas that are included as part of the development impact fee evaluation.

## 5.2 Treatment System

Because all future users will consume treatment capacity on a similar basis, only a single option for allocating Treatment Impact Fees has been considered in this report. Costs for expansion (for new capacity) will be allocated to future users only on a per EDU basis, with the proviso that costs associated with plant upgrades required to meet future regulatory requirements (or to upgrade existing systems to meet ongoing treatment needs) will be allocated both to new users and to existing users proportionate to their use. Development Impact Fee Calculations will be determined by dividing the total estimated cost of required facilities by the number of anticipated new EDUs. As noted in the WWMP, the total future flow to the WWTP can be allocated to the following categories:

- Current flow to the existing WWTP
- The maximum allocated flow from Leprino Foods

- City infill and vacant land projects
- Operational discharge capacity reserve
- Development projects with “approved” wastewater capacity
- Unused allocated capacity of constructed developments
- Future Service Areas

**TABLE 5-1**

Developments included in Conveyance System Cost Allocation  
*Tracy Wastewater Conveyance and Treatment Development Impact Fee Study*

<b>Specific Plan or General Plan Common Name</b>	<b>No. of EDUs</b>
<b>West Catchment Developments</b>	
UR5 (Bright)	762
UR7 (Bright)	528
UR8 (Fahmy)	427
UR9 (Keenan)	834
Ellis	2,115
UR 11 (South Linne)	480
Tracy Hills	7,565
Gateway(excluding Phase 1)	1,770
UR6 (Cordes Ranch)	6,510
UR4 (Bright Triangle)	1,126
UR3 (Catellus)	2,567
UR2 (Filius)	186
I-205 Expansion	743
West Side Industrial	1,940
Larch Clover	2,150
Berg/Byron	385
Kagehiro	250
Infill for West Catchment	141
Standard Pacific	69
<b>Total for West Catchment</b>	<b>30,548</b>
<b>East Catchment Developments</b>	
UR1 (Alvarez & Others)	2,709
East Side Industrial	1,472
Chrisman Road	488
Rocha	583
<b>Total for East Catchment</b>	<b>5,253</b>

Future users include all of those shown in Table 5-1 for conveyance, plus other non-west catchment infill properties that have yet to develop. Existing users and other projects with existing finance plan obligations are included in the existing plant capacity of 10.8 mgd, and they have either made previous Treatment Impact Fee payments, or have Development Agreements in place that dictate those payments. Developments included in the Treatment Impact Fees are shown in Table 2.

**TABLE 5-2**

Developments included in Treatment System Cost Allocation  
*Tracy Wastewater Conveyance and Treatment Development Impact Fee Study*

<b>Specific Plan or General Plan Common Name</b>	<b>EDUs</b>
All projects in Table 5-1	35,801
NEI-Phase 3	1,386
Downtown Specific Plan (LD and HD)	924
Infill/vacant lands (those not included in Table 5-1)	<u>904</u>
<b>Total New Treatment EDUs</b>	<b>39,015</b>

The new treatment EDUs (in Table 5-2) equate to an average dry weather flow rate of approximately 10.3 mgd; adding that new capacity requirement to the existing plant capacity of 10.8 mgd yields the proposed plant buildout capacity of 21.1 mgd.

## 5.3 Development Impact Fee Calculations

### 5.3.1 Conveyance System

If future users are assigned to two catchment areas, as recommended earlier in this report, then the Conveyance Impact Fee could be calculated for each catchment area as summarized in Table 5-3.

**TABLE 5-3**

Major Wastewater Conveyance Facilities Development Impact Fee Recommendation  
*Tracy Wastewater Conveyance and Treatment Development Impact Fee Study*

<b>Catchment</b>	<b>No. of EDUs</b>	<b>Conveyance System Costs (\$)</b>	<b>Cost per EDU (\$)</b>
East Catchment	5,253	12,633,000	2,405
West Catchment	30,548	49,193,000	1,610

### 5.3.2 Treatment System

As noted previously, allocation of costs for treatment is more complicated than for conveyance, due to the need to spread total capital costs of almost \$279 million between existing and future users. Table 5-4 shows the allocation between existing and future users for the various plant unit processes that are contemplated. As can be seen, most of the



allocation goes to new users, but when existing facilities are to be rehabilitated, or modified in such a way that all users benefit, then some costs are appropriately assigned to the existing user category, as noted. The costs for plant upgrades (as opposed to expansion) to be assigned to existing users is \$16.2 million, leaving a total of \$262.4 million to be allocated among the future users (equivalent to a total of 39,015 EDUs) of the treatment system.

Because the actual financing methodology is currently unknown, financing costs have been assumed to be zero. In the event that the City of Tracy issues bonds for any aspect of the treatment system construction, the costs of such issuance (and the impact of interest payments on the bonded indebtedness) should be considered as an additional cost to be included in the wastewater treatment impact fee. Although the average cost per EDU for Treatment Impact Fees is \$6,667, the cost per EDU for the first two phases of new construction (shown as Phase 2 and Phase 3 in Table 5-4) are considerably greater than the average cost for all phases of planned construction. If the average cost per EDU is used, as planned, then this discrepancy will result in cash flow shortcomings in the initial phases of expansion. Some method of developer funding for this shortfall (which is beyond the scope of this study) will be required during these early phases of construction.

**TABLE 5-4**

Cost Estimate to Expand and Upgrade the City of Tracy WWTP Capacity from 10.8 to 21.1 MGD (based on current NPDES Permit Requirements)

Note: Costs are March 2012 dollars. Costs are in millions of dollars

Process Improvement, Upgrade, or Expansion	Total Estimated Cost M\$	Costs to Existing/Committed Users M\$	Costs to New Users M\$	Phase 2 (12.0 mgd) M\$	Phase 3 (13.5 mgd) M\$	Phase 4 (16.0 mgd) M\$	Phase 5 (21.1 mgd) M\$
<b>Primary Treatment</b>							
Upgrade electrical for PE pumps/pumps	5.1		5.1	2.47			2.66
Expansion of Headworks, including screening and grit removal	7.5		7.5				7.50
Domestic clarifiers (two)	9.8		9.8		4.93		4.85
<b>Advanced Secondary Treatment</b>							
4th/5th Aeration Basin	10.4		10.4		5.55		4.83
Upgrade Plant aeration system	13.3		13.3		2.47	5.55	5.33
Secondary Clarifiers (two)	11.5		11.5		6.40		5.12
Expand PLCs and SCADA controls	3.7		3.7	1.23		1.23	1.22
Upgrade RAS/WAS pump station	2.4		2.4		1.23		1.22
Main Electrical switchboard upgrade	2.3		2.3	1.23			1.09
<b>Tertiary Treatment and Disinfection</b>							
Three additional chlorine contact tanks	16.5		16.5	3.70		4.93	7.91
Upgrade Filtration system	12.2		12.2		1.85	4.32	6.02
<b>Solids Handling</b>							
Upgrade DAFT to GBT for sludge thickening	7.1	3.4	3.7	3.08		1.85	2.17
Pave drying beds	4.2	2.2	2.0	0.99	0.62	0.62	1.97
Digester cover and gas collection system upgrade	1.8	0.9	1.0	1.85			
Additional boiler for heating	3.3		3.3	0.62	1.23		1.48
Upgrade RAS/WAS system	4.5		4.5	1.23	1.48		1.78
New Digester	11.5		11.5			5.55	5.96
New digester control building	5.1		5.1			3.08	1.97
<b>Miscellaneous Plant Improvements</b>							
Civil site work	3.6		3.6	0.86	0.49	0.62	1.58
Groundcover/landscaping	1.7		1.7	0.74	0.25	0.25	0.49
Emergency storage pond regrading	1.7		1.7	0.25		0.12	1.28
Expand Admin building	2.4		2.4	1.23			1.20
Site security	1.1	0.5	0.6	0.37	0.12	0.25	0.39
Demolish existing old facilities	0.8		0.8	0.25	0.25		0.30
Emergency power	4.7		4.7	0.62		1.85	2.19
Convert 53-acre pond to emergency storage with diesel pump option	0.7		0.7	0.74			
Distribution boxes/structures/yard piping	8.7		8.7	1.85	2.47	0.62	3.75
<b>Effluent Pumping and Conveyance</b>							
Post-aeration facility	5.7		5.7		3.70		2.00
Parallel line to Old River	14.0		14.0	14.00			
Effluent Pumping Plant	2.2		2.2	1.20			0.96
New junction structure and outfall within Old River	10.0		10.0	10.00			
<b>Thermal Plan Compliance</b>							
Temperature Monitoring study+Modeling	1.1	0.5	0.6	1.11			
Effluent cooling facilities	8.4	4.0	4.4		6.17	1.23	0.99
<b>Estimated Construction Cost (March 2012)</b>	<b>\$199.1</b>	<b>\$11.6</b>	<b>\$187.5</b>	<b>\$49.6</b>	<b>\$ 39.2</b>	<b>\$32.1</b>	<b>\$78.2</b>
Construction Contingency (15%)	29.9	1.7	28.1	7.4	5.9	4.8	11.7
Engineering and Admin (20%)	39.8	2.3	37.5	9.9	7.8	6.4	15.6
Program Management (5%)	10.0	0.6	9.4	2.5	2.0	1.6	3.9
<b>Total Estimated Program Cost (M\$)</b>	<b>\$278.7</b>	<b>\$16.2</b>	<b>\$262.4</b>	<b>\$69.5</b>	<b>\$54.9</b>	<b>\$44.9</b>	<b>\$109.5</b>
<b>Existing users portion</b>		<b>5.8%</b>		<b>\$4.0</b>	<b>\$3.2</b>	<b>\$ 2.6</b>	<b>\$ 6.4</b>
<b>New users portion</b>			<b>94.2%</b>	<b>\$65.4</b>	<b>\$51.7</b>	<b>\$42.3</b>	<b>\$103.1</b>
<b>Allocated Costs to New Users</b>							
Future Capacity (mgd)				1.2	1.5	2.5	5.10
Equivalent Number of SF homes (at 264 gpd/EDU)				4,545	5,682	9,470	19,318
Cost per EDU/phase (\$)				\$14,391	\$9,096	\$4,463	\$5,336
<b>Average Cost/EDU for new users (\$)</b>			<b>\$6,727</b>				

# Development Impact Fee Recommendations

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## 6.1 Introduction

As noted in Section 5, Development Impact Fees for both Wastewater Conveyance and Treatment have been calculated on a per EDU basis, with the following recommendations.

The costs shown in Table 6-1 are current as of March 2012, but a review of the Engineering *News-Record* Construction Cost Index over the intervening time since the development of the cost estimates through the end of 2012 indicates that the 20 Cities Average Index has increased from 9268 to 9412 (1.6 percent increase), and the San Francisco Index has been essentially flat (10370 in March, and 10355 in December). Because the City of Tracy uses the San Francisco Construction Cost Index it is recommended that the Table 6-1 costs be adopted for immediate implementation, but monthly or quarterly updates of the Development Impact Fees are recommended so that impact fee revenue keeps pace with future inflation. Additionally, as noted previously in this report, the cost impacts of phasing should be monitored and adjustments to the development impact fees should be made as required to reflect such impacts.

**TABLE 6-1**

Wastewater Conveyance and Treatment Facilities Development Impact Fee  
*Tracy Wastewater Conveyance and Treatment Development Impact Fee Study*

<b>Wastewater Conveyance Development Impact Fee</b>	
<b>Catchment</b>	<b>Cost per EDU (\$)</b>
East Catchment Future Users	2,405
West Catchment Future Users	1,610
<b>Wastewater Treatment Development Impact Fee</b>	
All Future Users	6,727
Impact fees are based on March 2012 cost estimates	

## 6.2 Final Recommendations

Cost per EDU is as noted in Table 6-1. Additionally, however, only the residential land use category uses EDUs as its primary basis. The non-residential land uses (commercial, office, and industrial) are typically evaluated on the basis of acreage. Section 1 of this report provided information on the various land use categories assumed for both the Tracy WWMP and for this report. The Tracy WWMP used gross, rather than net, acres, but the City has requested that net acres be used for development impact fee considerations, because net acreage is typically part of any future development application.

As described in Section 1, the conversion from gross acres to net acres assumes that 15 percent of the gross acres for industrial, office, retail, and commercial users is associated with roadways and other dedicated rights of way that will not support construction of facilities that will result in wastewater generation. The assumed FARs used to establish wastewater flow and loading generation factors for non-residential users were as follows:

- Commercial – assumed FAR of 0.3
- Office – assumed FAR of 0.45
- Industrial – assumed FAR of 0.5

Changes to either the gross to net acre assumptions, or to the assumed FAR, will require adjustments to the recommended development impact fees in Table 6-2. Table 6-2 uses flow as the common wastewater constituent for the allocation of costs because, as discussed in Section 1, the other wastewater constituents of concern are assumed to be proportional to flow.

**TABLE 6-2**

Wastewater Conveyance and Treatment Facilities Development Impact Fee Recommendations  
*Tracy Wastewater Conveyance and Treatment Development Impact Fee Study*

<b>Land Use</b>	<b>Tier I Master Plan Values</b>	<b>Number of EDUs per Unit (based on gross acres)</b>	<b>Number of EDUs per Unit (based on net acres)</b>	<b>East Catchment Wastewater Conveyance Development Impact Fee (\$)</b>	<b>West Catchment Wastewater Conveyance Development Impact Fee (\$)</b>	<b>Wastewater Treatment Development Impact Fee (all areas) (\$)</b>
Residential VLD	264 gpd/unit	1.0/dwelling unit	1.0/dwelling unit	2,405/EDU	1,610/EDU	6,727/EDU
Residential LD	264 gpd/unit	1.0/dwelling unit	1.0/dwelling unit	2,405/EDU	1,610/EDU	6,727/EDU
Residential MD	216 gpd/unit	0.82/dwelling unit	0.82/dwelling unit	1,968/EDU	1,317/EDU	5,504/EDU
Residential HD	176 gpd/unit	0.667/dwelling unit	0.667/dwelling unit	1,603/EDU	1,073/EDU	4,485/EDU
Industrial	1,056 gal/gross acre/day	4.0/gross acre	4.71/net acre	11,318/net acre	7,576/net acre	31,656/net acre
Office, Retail, and Commercial	1,140 gal/gross acre/day	4.32/gross acre	5.08/net acre	12,218/net acre	8,179/net acre	34,175/net acre

**Notes:**

gal = gallons

gpcd = gallon(s) per capita per day

gpd = gallon(s) per day

HD = high density

LD = low density

MD = medium density

VLD = very low density