CHAPTER 2
Project Description

2.1 Project Overview

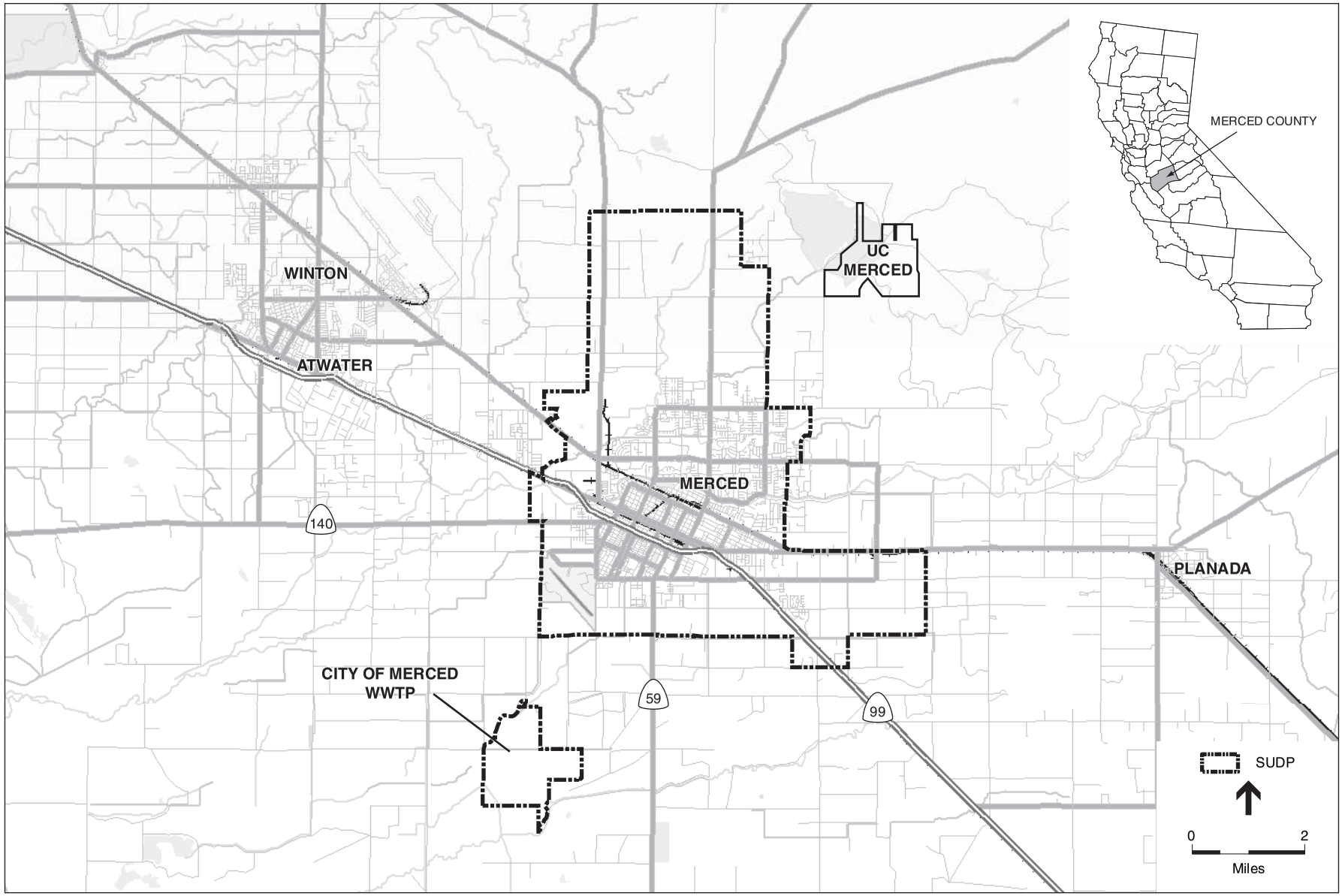
The City of Merced (City) is proposing to upgrade and expand the capacity of its wastewater treatment plant (WWTP) facilities to accommodate planned wastewater loads generated within its Specific Urban Development Plan (SUDP) area and the adjacent University of California Merced Long Range Development Plan (LRDP) area, and to comply with current and anticipated effluent quality regulatory limits. The Wastewater Treatment Plant Expansion Project (Project) would initially increase the capacity of the WWTP from the currently permitted 10 million gallons per day (mgd) to 11.5 mgd without any substantive improvements to the treatment facilities. Following this initial upgrade a series of improvements would be made to the WWTP enabling the capacity of the treatment system to be rated at either 12 or 16 mgd by adding a series of tertiary-treatment facility improvements. Ultimately, the Project would reach a capacity of 20 mgd with additional improvements as needed to meet future wastewater loads.

2.2 Project Location

The City of Merced's WWTP is located within the city limits at the south end of Gove Road and about 1.5 miles south of the main area enclosed by the city limits (U.S. Geological Survey 7.5-minute Atwater Quadrangle, T8S, R13E (MDB&M)). Figure 2-1 shows the relative location of the WWTP in relation to the City urban area. The current WWTP facilities occupy about 11.3 acres of the 1,335-acre City-owned property (see Figure 2-2).

The Merced Municipal Airport is approximately two miles north of the WWTP site (see Figure 2-1). Hartley Slough flows along the western perimeter of the WWTP property, while Miles and Owens Creeks laterally bisect the property. Duck Slough borders the southern perimeter.

The lands immediately south of the main part (mechanistic part) of the WWTP support the disposal of industrial food processing wastes, which is administered by the City but operated in accordance with a separate waste discharge permit issued by the Central Valley Regional Water Quality Control Board (RWQCB).



SOURCE: ESRI, 2005; City of Merced; and ESA, 2005

City of Merced Wastewater Treatment Plant Improvement Project . 205087

Figure 2-1
Regional Location Map

SOURCE: GlobeXplorer, 2001; and ESA, 2006

City of Merced Wastewater Treatment Plant Improvement Project . 205087

Figure 2-2
City of Merced WWTP Property and Project Area

2.3 Project Background

Major portions of the WWTP were constructed in the late 1970s. Since that time, it has undergone a series of improvements, starting in 1974, continuing through 1980, and occurring again in 1994 and 2003. The City prepared an environmental impact report (EIR) in 1994 that addressed the construction and operation of WWTP improvements and expansion of wastewater treatment capacity (City of Merced, 1994). This document analyzed the environmental consequences of discharging up to 20 mgd of treated effluent and concluded that the implementation of the WWTP improvements and expansion of treatment capacity would result in the significant and unavoidable loss of local agricultural lands. The EIR concluded that all other potential environmental impacts could be mitigated to less-than-significant levels.

Most recently, the City approved the installation of additional blowers at the WWTP to improve aeration reliability. These new facilities were addressed in separate California Environmental Quality Act (CEQA) documentation prepared in 2005 (City of Merced, 2005; Environmental Review #05-27). The City is currently permitted to discharge up to 10 mgd of secondary treated effluent from the WWTP to Hartley Slough.

2.3.1 Changes to Community Plans and Wastewater Characteristics

Several circumstances in the City and County of Merced have changed, necessitating the expansion of the WWTP. These changes include the adoption of the 1997 Specific Urban Development Plan Update (City of Merced, 1997a) and the 2001 University of California-Merced (UC-Merced) Long-Range Development Plan (LRDP) (University of California, 2001). In addition, the City is currently proceeding in preparing an update to its 1997 SUDP.

These adopted plans propose continued future population growth within the City and the adjacent UC-Merced campus. Growth projections contained in the 1997 SUDP anticipate that build-out will generate an estimated 17.1 mgd of wastewater flows, while the flow from the UC-Merced LRDP is estimated at 2.25 mgd. Additionally, new growth areas that may be identified and included in the City's ongoing SUDP Update would generate additional wastewater loads requiring treatment at the City's WWTP.

The City is also expecting that waste discharge requirements will become more stringent and further restrict the allowable contaminants in the WWTP effluent. In order to meet these anticipated requirements, additional treatment methods will need to be installed and use of other systems, such as chlorine disinfection systems, will need to be terminated. These improvements are required to comply with anticipated regulatory limits and will need to be installed regardless if any WWTP capacity improvements are implemented.

2.3.2 Description of Current WWTP Facilities

The WWTP consists of influent screens, grit removal channels, raw sewage pumps, primary clarifiers, aeration basins, secondary clarifiers, chlorine disinfection, dechlorination, and an outfall channel connecting to Hartley Slough. Biosolids-handling facilities at the WWTP include dissolved air flotation thickening, anaerobic digestion, and biosolids-drying beds. **Table 2-1** identifies the major facilities that comprise the WWTP.

Major Components of the WWTP

The WWTP has three reactor basins and three secondary clarifiers, capable of treating 15 mgd. The City assumes that only two of the three reactor basins and clarifiers would be reliably available, comprising a firm average dry weather flow capacity of 10 mgd. The full capacity of the aeration basins cannot be used until the recently approved additional aeration capacity is installed (ECO:LOGIC, 2005), and the discharge permit from the RWQCB is revised.

TABLE 2-1
MAJOR COMPONENTS OF THE CITY OF MERCED WWTP

Unit	Number of Units	Size/Comments
Primary Treatment		
Mechanical Screens	2	
Grit Removal	2	
Primary Clarifiers	1	85-foot diameter
	1	95-foot diameter
Secondary Treatment		
Reactor Basins	3	1.2-million gallons
Secondary Clarifiers	3	110-foot diameter
Aeration Blowers	4[a]	22,210 standard cubic feet per minute (total)
Effluent Disinfection		
Disinfection System	3	Hypochloride/ thiosulfide chlorination/ dechlorination system
Effluent Disposal		
Surface Discharge to Hartley Slough	1	Open channel to Hartley Slough
Organic Sludge Digestion		
Primary Digesters	2	80-foot diameter
Primary/Secondary Digester	1	80-foot diameter
Ponds/Lagoons		
Sludge Lagoons	6	42 acres
Emergency Storage Basins	2	162 million gallons
Solids Dewatering		
Dissolved Air Flotation Thickener	1	35-foot diameter

[a] There are three aeration blowers; one is scheduled for construction in summer 2006.

Although there are three secondary clarifiers, limitations on the return activated biosolids (RAS) pumping facility preclude using the full capacity of these clarifiers. The RAS pumping system was designed to serve only two of the clarifiers at a time and has a reliable capacity of 10 mgd.

Waste activated biosolids are thickened in dissolved air flotation thickeners and then combined with primary biosolids and digested in anaerobic digesters. The digested biosolids are currently

pumped to onsite unlined drying beds. These beds allow the digested biosolids to be solar-dried. One to three times per year, the solar-dried biosolids are applied to the City's 580-acre farmland site, south of the WWTP facilities. There is no mechanical biosolids dewatering system operating at the WWTP (ECO:LOGIC, 2005).

Operations

The WWTP currently provides a secondary level of wastewater treatment and discharges the treated effluent to Hartley Slough and the Merced Wildlife Management Area. The secondary wastewater treatment process consists of the following steps: (1) inflow to the WWTP is sent to the primary clarifier, where settleable solids are separated from the waste stream; (2) the wastewater is then sent to aeration basins, where microorganisms decompose organic material; and (3) the treated wastewater is then sent to a secondary clarifier, where final solids settling and clarification occurs. The treated wastewater is then disinfected with sodium hypochlorite prior to its discharge from the WWTP into Hartley Slough. Biosolids are either applied to the City's 580 industrial wastewater management area or are hauled offsite to a permitted landfill.

Current Effluent Quality

The most stringent operating conditions determine the reliable capacity of the WWTP, including peak hourly and monthly flows, loads (influent strength), and colder temperatures. A key factor considered in successful wastewater treatment is the operation of the aeration basins and their ability to reduce biological oxygen demand of the wastewater. The biological oxygen demand concentration is an important water quality parameter that is regulated by the Central Valley RWQCB. Other water quality parameters regularly monitored by the City are listed in **Table 2-2**.

TABLE 2-2
CURRENT WASTEWATER TREATMENT PLANT
EFFLUENT QUALITY

Constituent	Units	Average Daily Discharge*	Maximum Daily Discharge
Flow	mgd	8.5	11.32
Chlorine (Total Residual)	mg/L	<0.01	0.94
Biochemical Oxygen Demand	mg/L	3.54	8.0
Chemical Oxygen Demand	mg/L	31.2	106
Temperature (Winter)	degrees F	68.54	73.94
Temperature (Summer)	degrees F	79.664	82.76
Fecal Coliforms	MPN	19.4	900
Oil and Grease	mg/L	<1.0	16.0
Phosphorus (total)	mg/L	2.0	3.0
Total Kjeldahl Nitrogen	mg/L	1.2	3.1
Ammonia	mg/L	0.28	5.43
Nitrate + Nitrite (as N)	mg/L	11.3	18.0
Total Suspended Solids	mg/L	6.84	30.5
pH (Minimum)	pH units	--	7.7
pH (Maximum)	pH units	--	8.1
Dissolved Oxygen	mg/L	4.8	8.38
Total Dissolved Solids	mg/L	427	597

Source: ECO:LOGIC, 2005

* Peak Month

Note: mgd = million gallons per day; mg/L = milligrams per liter; F = Fahrenheit; MPN = Most Probable Number

Current Permits and Approvals

The WWTP is subject to the regulatory authority of Waste Discharge Requirements (WDRs) and a National Pollutant Discharge Elimination System (NPDES) permit issued by the Central Valley RWQCB. The WWTP operations are currently regulated by WDR 5-00-246 (NPDES No. CA00792198), issued in 2000. Standards imposed by WDR 5-00-246 are listed in Table 2-3.

The WWTP is also currently operating under Mandatory Penalty Complaint No. R5-2004-0537 in response to permit violations for total coliform and total residual chlorine, Group I and Group II pollutants, respectively (CVRWQCB, 2004).

TABLE 2-3
REGIONAL WATER QUALITY CONTROL BOARD EFFLUENT LIMITATIONS
UNDER WASTE DISCHARGE REQUIREMENT 5-00-246

Constituents	Units	Monthly Average	Weekly Average	4-day Average	7-day Median	Daily Maximum
Average Flow	mgd	--	--	--	--	10
Peak-Hour Wet Weather Flow	mgd	--	--	--	--	23
Biochemical Oxygen Demand[1]	mg/L	30[2]	45[2]	--	--	90[2]
	lb/day	2,501[3]	3,752[3]	--	--	7,503[3]
Total Suspended Solids	mg/L	30[2]	45[2]	--	--	90[2]
	lb/day	2,501[3]	3,752[3]	--	--	7,503[3]
Oil and Grease	mg/L	10	--	--	--	15
	lb/day	834	--	--	--	1,251
Settleable Solids	ml/L	0.2	--	--	--	1.0
Chlorine Residual	mg/L	0.1	--	--	--	0.5
Total Coliform	MPN[4]/100 ml	--	--	--	23	240
Ammonia (as N)	mg/L	2.3	--	5.0	--	20.0
	lb/day	190[3]	--	420[3]	--	1,670[3]

SOURCE: RWQCB, 2000

[1] Five-day biochemical oxygen demand at 20 degrees Celsius
[2] To be ascertained by a flow proportional 24-hour composite sample
[3] Value based upon a design capacity of 10 mgd (*x* mg/L x 8.34 x 10 mgd = lb/day), where *x* is the maximum concentration allowable.
[4] Most probable number

Note: mgd = million gallons per day; mg/L = milligrams per liter; lb/day = pounds per day

Other receiving water limits imposed on the WWTP are based upon water quality objectives contained in the *Water Quality Control Plan for the Sacramento and San Joaquin River Basins* (CVRWQCB, 1998). These limitations specify that the WWTP discharge shall not cause the following conditions to occur in the receiving surface water (i.e., Hartley Slough and the Merced Wildlife Mitigation Area):

- Concentrations of dissolved oxygen to fall below 5.0 milligrams per liter (mg/L)
- Oils, greases, waxes, or other materials in concentrations that cause nuisance, result in a visible film or coating on the surface of the water or on objects in the water, or otherwise adversely affect beneficial uses.
- Chlorine to be detected in concentrations equal to or greater than 0.01 mg/L

- Normal ambient pH to fall below 6.5 or exceed 8.5. The monthly average pH change shall not exceed 0.5. In calculating the monthly average pH change, the discharger may omit values of pH change recorded on days when upstream receiving water pH exceeds 8.5.

- Normal ambient temperature to increase more than 5 degrees Celsius.

- Toxic pollutants to be present in the water column, sediments, or biota in concentrations that adversely affect beneficial uses; that produce detrimental physiological response in human, plant, animal, or aquatic life; or that bioaccumulate in aquatic resources at levels that are harmful to human health.

- Where three toxicity tests result in exceeding 1.0 Chronic Toxicity Units (TUc) when TUc equals the ratio of 100/Highest Concentration with No Observable Effect, as determined in accordance with the procedures outlined in EPA 600/4-91/002 *Short-Term Methods for Estimating the Chronic Toxicity of Effluent and Receiving Water to Freshwater Organisms* and EPA 505/2-90-001 (Technical Support Document for Water Quality-Based Toxic Control). Consistent chronic toxicity is defined as three consecutive tests that exceed 1.0 TUc.

- Neither the WWTP operation nor its discharges to land or to the Merced Wildlife Mitigation Area, alone or in combination with other sources, shall cause or threaten to cause degradation of area groundwater.

2.4 Project Objectives

The City has two primary objectives for implementing the Project. The first objective is to install sufficient WWTP capacity to meet wastewater loads generated by planned population growth and development within the City's existing service area, the adjacent UC Merced campus, and new growth areas that are identified and made part of the City's SUDP area . The second objective includes installing additional levels of wastewater treatment sufficient to meet current and future effluent quality regulatory limits by replacing and adding to aged facilities and implementing improved wastewater treatment technologies and processes.

2.5 Description of the Project

2.5.1 Planned Wastewater Treatment Capacity

The WWTP currently provides secondary level treatment, disinfection, and discharge to Hartley Slough. The WWTP has a permitted capacity to discharge 10 mgd. The WWTP site can readily accommodate the addition of new treatment facilities to serve a future population capable of generating up to 20 mgd. In addition, the new National Pollution Discharge Elimination System (NPDES) permit is scheduled to be renewed by the California Regional Water Quality Control Board in December 2006. To comply with expected conditions of the new permit, several facility upgrades including tertiary filtration, UV disinfection, effluent re-aeration, as well as solids dewatering and stabilization are anticipated.

The City has completed engineering studies (ECO:LOGIC, 2005) concluding that the WWTP treatment capacity can be increased to 11.5 mgd with installation of additional blowers to enhance WWTP aeration capacity. The installation and operation of the additional blowers were addressed in a previously completed CEQA document (City of Merced 2005) and their installation is underway with a scheduled completion date set for late 2006. The 11.5 mgd of secondary treatment capacity would be available immediately upon issuance of a new NPDES permit and certification of this EIR.

While constructing treatment process upgrades, the City will also expand the treatment capacity to serve planned population growth and development in the City SUDP and UC-Merced LRDP. Full development of the City SUDP is expected to increase wastewater flow to 17.1 mgd by about 2025 and the development of the UC-Merced LRDP would generate about 2.25 mgd, resulting in a combined wastewater volume of about 19.35 mgd.

The City is currently assessing the degree and timing of near-term population growth and development in order to determine the size of the first WWTP capacity expansion increment beyond 11.5 mgd. If the City continues to experience high growth rates, it will expand treatment capacity from 11.5 to 16 mgd, followed by a subsequent phase from 16 to 20 mgd treatment capacity. If near-term population growth and development is found to be occurring at a slower rate, the City may elect to construct an initial expansion phase of 12 mgd of treatment capacity, followed by subsequent 16 and 20 mgd treatment capacity phases.

The 12, 16 and 20 mgd treatment capacities would be available with the construction of facilities described in Table 2-4.

TABLE 2-4
PROPOSED FACILITY IMPROVEMENTS

Improvements	Description
12mgd Capacity	
Tertiary pump station	New tertiary pump station for pumping secondary effluent to filters
Equalization basin	New 7-million-gallon basin to equalize peak hourly flows
Rapid mix & flocculation basin	New basin used to chemical condition the secondary effluent prior to filtration
Tertiary filters	Six cloth disk filter units
Ultraviolet disinfection	Three low pressure high intensity lamp ultra-violet channels for pathogen removal
Reaeration basin	New reaeration basin to maintain dissolved oxygen levels above 5 milligrams per liter
Outfall pipe to Hartley Slough	New 54-inch pipe directly to Hartley Slough
Stormwater drain pump station	Two stormwater pump stations that pump stormwater to first flush basin and then back to plant headworks for treatment
Chemical storage	Chemical tanks for coagulants and pH adjustment
Chemical building	New chemical building housing chemical metering pumps and electrical switchgear
Solids dewatering building	New building housing three centrifuges and a truck loading station for biosolids dewatering
Digested biosolids holding tank	New 80-foot tank for digested biosolids prior to dewatering
Active solar dryers	Nine greenhouses to dry biosolids to above 50 percent solids prior to disposal
Emergency generator	Expansion of the plant's generator system for emergency power

TABLE 2-4
PROPOSED FACILITY IMPROVEMENTS

Improvements	Description
16mgd Capacity	
Aeration basin #4	Addition of a fourth 1.25 million-gallon aeration basin
Blower building No .2	New blower building housing 3 new aeration blowers
Activated biosolids pump station	New return biosolids pump station for secondary clarifiers No. 3 and 4
Secondary clarifier No. 4	Addition of a fourth 110-foot-diameter secondary clarifier
Dissolved air flotation thickener	New dissolved air flotation thickener for thickening waste solids prior to digestion
Gas flare	New gas flare for digester gas
Primary digester	New 80-foot-diameter primary digester
Digester control building	New building for digester feed pumps and heat exchangers
Laboratory and administration building	New water/wastewater laboratory and offices for plant staff located near plant entrance
20 mgd Capacity	
Head works	Addition of one mechanical screen
Influent pump station	Addition of one submersible pump
Primary clarifier No. 4	Addition of a fourth 95-foot-diameter primary clarifier
Aeration basin No. 5	Addition of a fifth 1.25-million gallon aeration basin
Secondary clarifier No. 5	Addition of a fifth 110-foot-diameter secondary clarifier
Tertiary filtration	Construction of two additional cloth disk filter units
Ultra-violet (UV) disinfection	Construction of an additional UV channel
Effluent cooling	Use of additional surface aerators or cooling towers
Primary digester	Construction of a fourth primary digester

Note: Bolded items represent facilities included if the City elects to construct an initial upgrade and expansion project to 12 mgd.

Source: ECO:LOGIC, 2005

2.5.2 Facility Improvements

The City is currently conducting engineering studies and preparing plans to provide reliable wastewater treatment capacity that is capable of serving planned future wastewater loads and that will meet anticipated NPDES and WDRs that will be imposed. Specifically, it is expected that the more stringent WDRs will be instituted even if the Project is not implemented. The Project would include a series of improvements to immediately achieve a rated capacity of either 12 or 16 mgd and, ultimately, a capacity of 20 mgd. Table 2-4 lists the improvements to be installed as part of the Project. Figure 2-3 depicts the proposed layout of the current and planned facilities that comprise the WWTP.

As part of the Project, the City proposes constructing facilities that will expand the WWTP's wastewater treatment capacity, including a new head works and influent pump station to replace the 30-year old pump station. The facilities would be covered to reduce potential odors. Other improvements include a new septage/debris receiving station, an additional primary clarifier and aeration basin, a secondary clarifier, a new blower building, a return biosolids pump station, and a new digester.

Wastewater treatment improvements included in the Project are: (1) denitrification sufficient to comply with a 10 mg/L nitrate-nitrogen limitation, (2) coagulation, filtration, and ultra-violet (UV) disinfection for the production of pathogen-free effluent containing no chlorine disinfection by-products, (3) effluent reaeration, and (4) centrifuge dewatering and active solar-drying for production of Class A Biosolids.[1]

To accommodate the new facilities, the Project would acquire about 46 acres of land immediately north and east of the WWTP and develop this area for installing the proposed WWTP facilities. Approximately 20-acres of the acquired land would be used specifically for the expansion of the WWTP's new head works, a combined administrative/laboratory building, and access to portions of the incoming City sewer. The remaining 22-acres would be used as an odor buffer and to enable access to adjacent facilities for maintenance purposes. Additional land to the northwest of the WWTP may be acquired or made available through agreements with existing landowners for the disposal of Class A biosolids. Two small parcels of lands, composed of about 4 acres, are needed for WWTP entrance improvements.

New levees to provide 100-year flood protection would be constructed within the expansion area around the northern end of the WWTP. These levees would be similar to the levees found at the WWTP and would range from 5 to 7 feet high with a crest width of about 15 feet to enable vehicle access. As part of the levee's construction, the Paden Drain and Hartley Laterals would be rerouted to Hartley Slough, east of the proposed access road. The proposed expansion area is illustrated in Figure 2-4.

[1] To achieve Class A certification, biosolids must undergo heating, composting, digestion or increased pH that reduces pathogens to below detectable levels. Once these goals are achieved, Class A biosolids can be land applied without any pathogen-related restrictions at the site and marketed to the public for agricultural uses including application to lawns and gardens

SOURCE: ECO:LOGIC, 2006; City of Merced; and ESA, 2006

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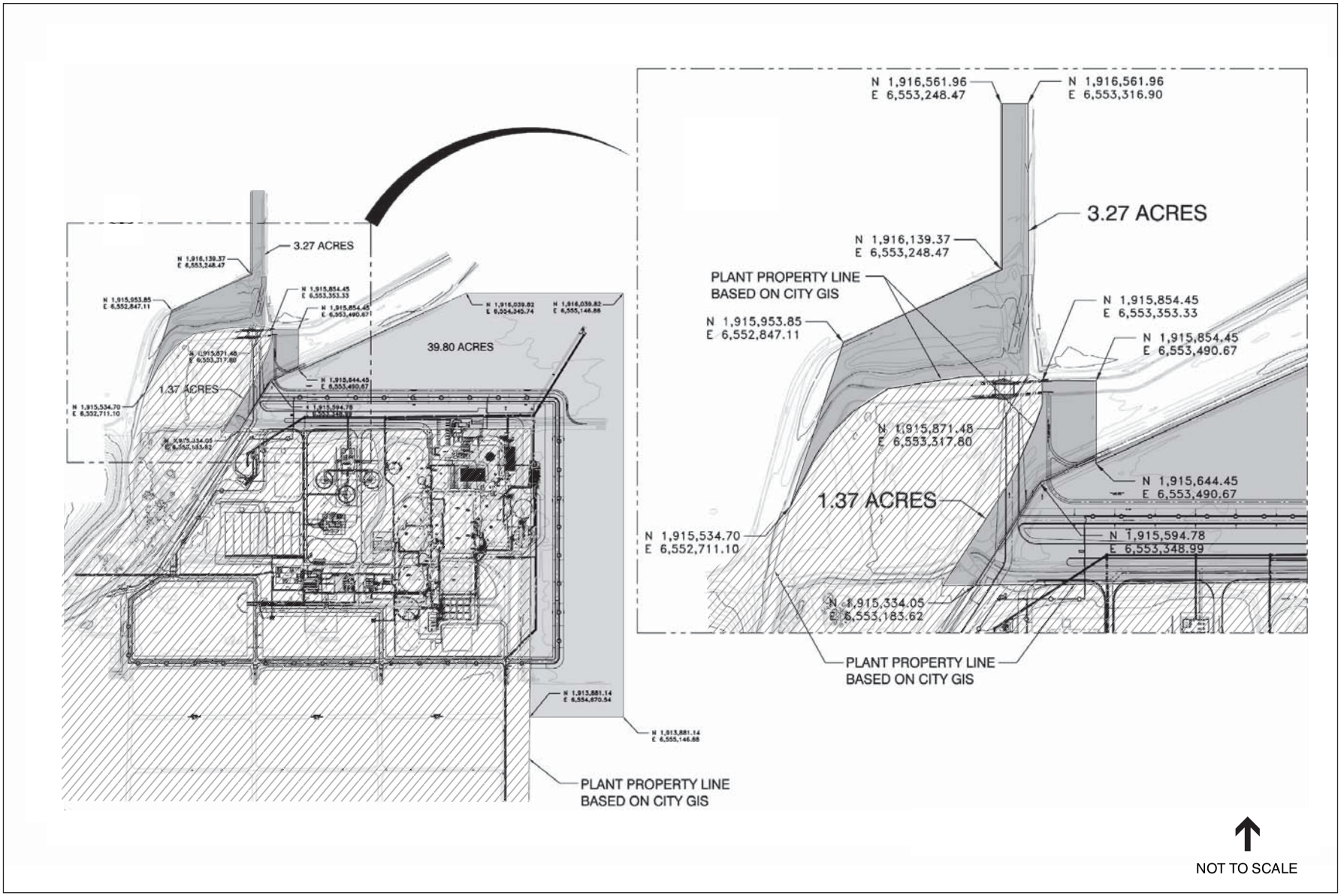
Figure 2-3

Proposed WWTP Facilities



SOURCE: ECO:LOGIC, 2006; City of Merced; and ESA, 2006

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Figure 2-4

City Land Purchase for WWTP Expansion

2.5.3 Treatment Process Improvements

Secondary Treatment Improvements

Secondary treatment improvements to the WWTP consist of possibly reconfiguring the current reactor basins, constructing Reactor Basin 4, constructing a new RAS pump station to serve Secondary Clarifiers 3 and 4, and constructing Secondary Clarifier 4. Additional aeration capacity beyond the recently approved blowers would also be installed.

Tertiary Treatment Improvements

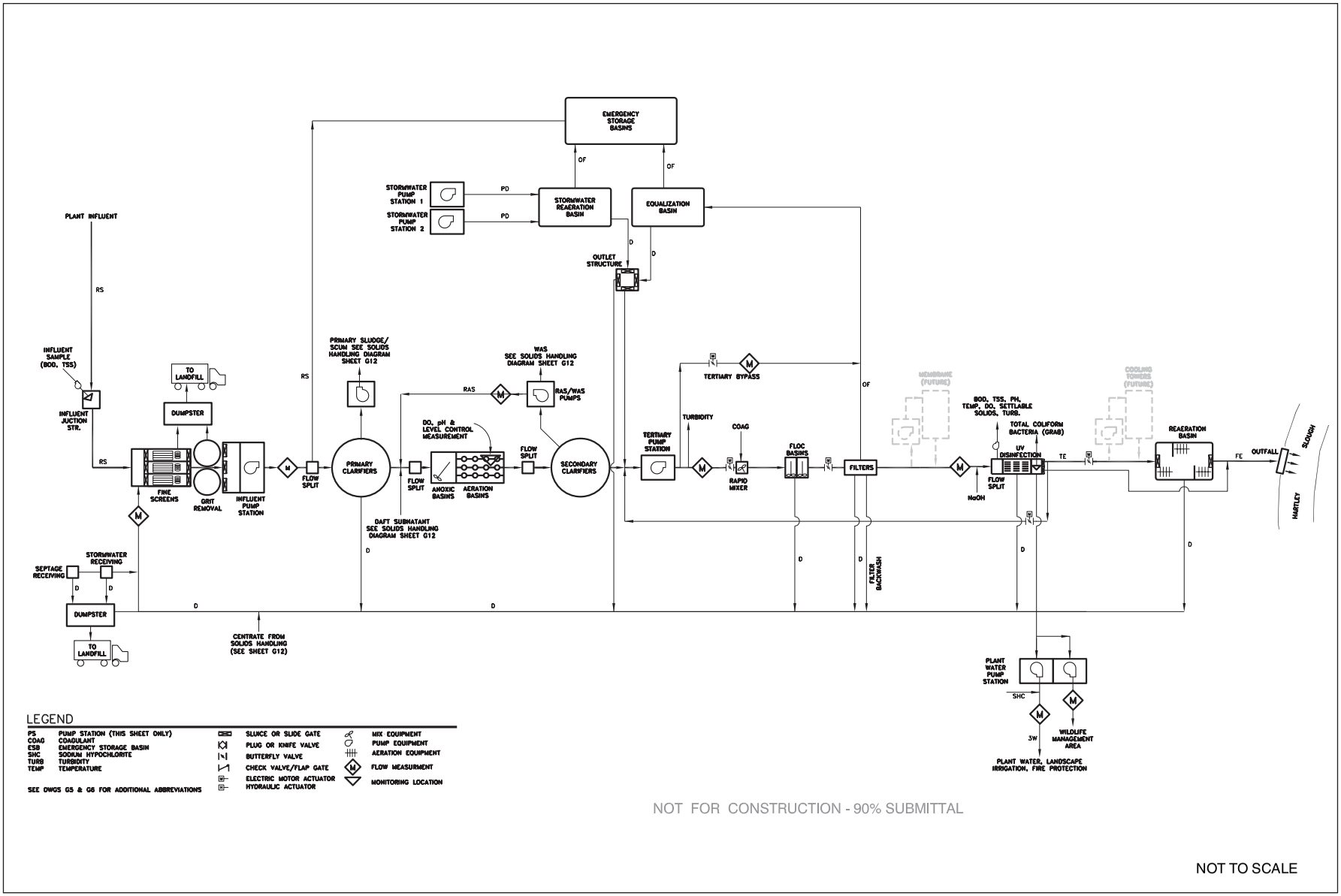
Tertiary treatment improvements to the WWTP include the addition of cloth-media "disk" filters and replacing the chlorine disinfection system with a UV light disinfection system. This filtration technology would produce acceptable quality tertiary effluent consistent with California Department of Health Services' "Title 22" pathogen-free reuse criteria. Prior to discharge, a re-aeration basin would aerate the final effluent so that its dissolved oxygen level would be maintained at or above 5 mg/L. A general treatment schematic is illustrated in Figure 2-5.

Biosolids Management and Handling Improvements

The Project would implement improved treatment and handling of biosolids at the WWTP. Such improvement would include additional biosolids thickening with a new dissolved air flotation thickener, expanded anaerobic digestion facilities, new centrifuge dewatering, and new drying and stabilization to Class A quality solids using active solar dryers. These improvements would be operational by 2008.

A general schematic showing the biosolids treatment process is presented in Figure 2-6. The active solar dryers would be used to dry, stabilize, and temporarily store biosolids prior to offsite hauling. The use of the unlined drying beds would be ended. At 12 mgd, the WWTP would produce an average 14,800 pounds per day (lb/day) of solids on an annual basis, while at 16 mgd, the WWTP would produce an average of 19,700 pounds per day (lb/day) of solids on an annual basis. At 20 mgd, the WWTP would produce an annual average of about 24,600 lb/day. Biosolids are currently applied to 580-acres of City-owned agricultural areas south of the WWTP. This operation is regulated by the RWQCB under Order No. 97-034. If solids were disposed offsite, these quantities of biosolids would generate about 214 haul trips per year at 12 mgd,284 haul trips per year at 16 mgd and about 355 haul trips per year at 20 mgd.

Approximately 580 acres of the industrial food processing waste disposal facility, located south of Miles Creek and within the City's property, would continue to be used for the application of treated biosolids. In late 2005, the food processor stopped its operations in its Merced facility. As a result, the City could apply additional biosolids on the City-owned lands and remain below loading rates stipulated in the WDR Order No. 97-034. Optionally, the biosolids could be applied as a Class A soil amendment on adjacent agricultural properties. For purposes of this document, it is assumed that biosolids could be applied to agricultural areas within two miles of the WWTP or trucked to Synagro. Application to offsite areas would be in compliance with the Merced County biosolids disposal ordinance (Merced County, 2006) and 40 Code of Federal Regulations, Part 503.

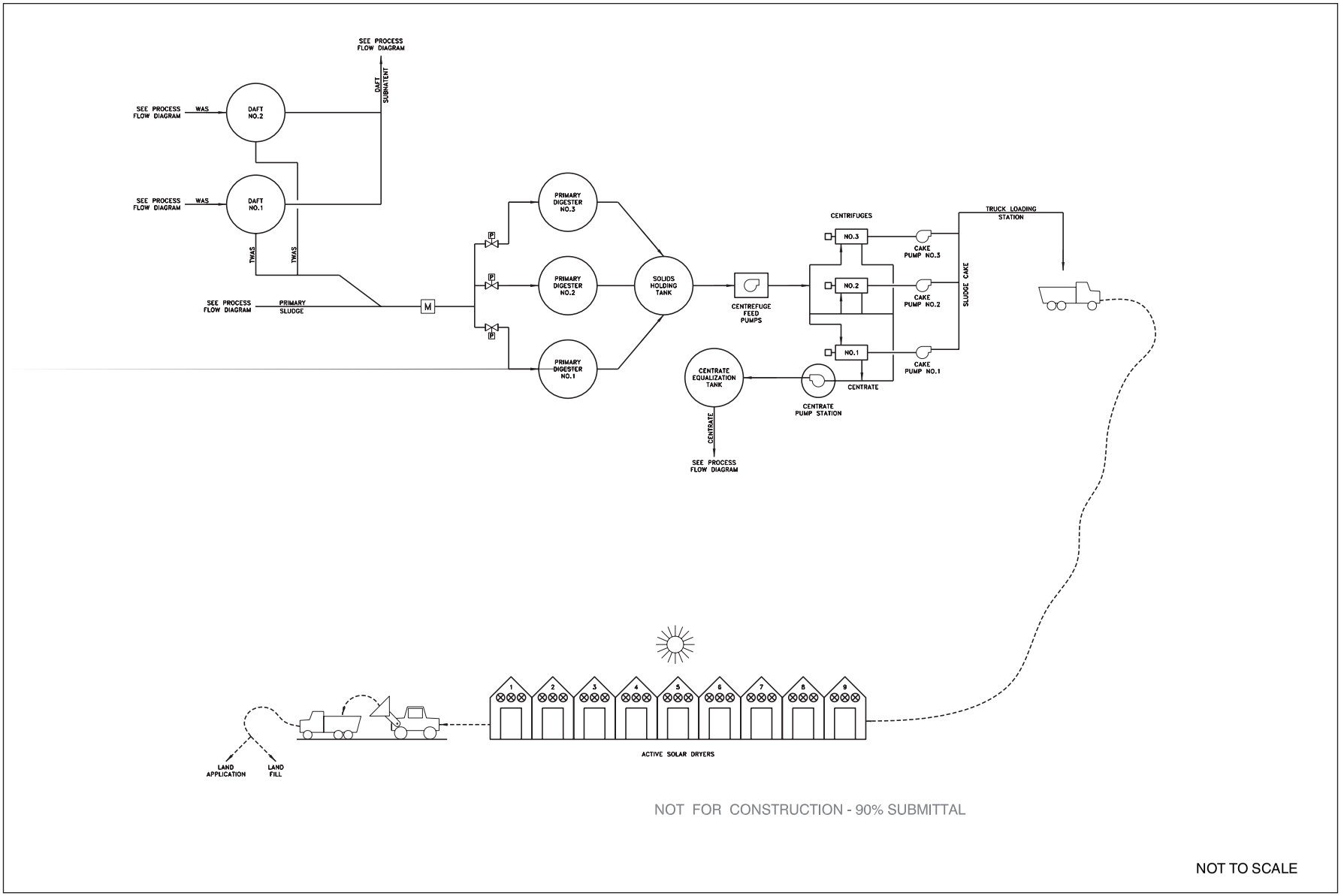


SOURCE: ECO:LOGIC, 2006; City of Merced; and ESA, 2006

City of Merced Wastewater Treatment Plant Improvement Project . 205087

Figure 2-5

Process Flow Diagram



SOURCE: ECO:LOGIC, 2006; City of Merced; and ESA, 2006

City of Merced Wastewater Treatment Plant Improvement Project . 205087

Figure 2-6

Biosolids Treatment Diagram

2.5.4 Effluent Discharge

As part of the Project, a new outfall structure would be constructed in Hartley Slough about 3,000 feet upstream of the current WWTP effluent discharge. The structure would be a 54-inch pipe with a bar screen outlet to prevent unauthorized access into the pipe. As proposed, a single pipeline would be buried roughly 8 to 10 feet below the ground surface and extend just over 1,000 feet. A general schematic of the outfall structure is provided in Figure 2-7.

2.5.5 Other Improvements

Other WWTP improvements include installing a separate gated entry for septage haulers, landscaping improvements, levee improvements to provide 100-year flood protection of WWTP facilities, rerouting agricultural drain features, expanding the emergency generator building, and adding a second standby generator to provide power to the new facilities. In addition, the Project includes constructing a new laboratory building and administration building.

As part of the Project, use of about one-half of the outfall channel would be ended and filled in place. The north-south portion of the outfall channel near the WWTP facility would continue to be used to convey treated effluent to the Merced Wildlife Management Area. The fill material is anticipated to originate from a combination of onsite and offsite locations.

No additional offsite improvements to the City sewer system would be required with the implementation of the Project. Existing sewer line capacities are sufficient to convey flows to the WWTP. Where new urban development takes place, sewer facilities will be installed to serve those areas. The installation of these new sewer lines would be discussed as part of future CEQA documents addressing these developments.

2.5.6 Proposed Effluent Quality

With the proposed improvements, the WWTP would utilize improved nitrification/denitrification processes followed by a tertiary treatment process. The Project would continue to discharge treated effluent into Hartley Slough, with a change of location as described above; however, disinfection would be accomplished by UV light exposure instead of chlorine disinfection. The Project would also produce Class A-quality biosolids. The Project would achieve an effluent quality[2] of 10 mg/L biological oxygen demand, 10 mg/L total dissolved solids, and 10 mg/L nitrate as N at the rated capacities of 12 mgd, 16 mgd, and 20 mgd .

2.5.7 Construction Methods

Construction of the proposed treatment facilities would include grading currently unimproved property, dewatering, excavation and soil removal, transporting and installing equipment, and constructing process units. The construction would occur with periodic activity peaks, requiring brief periods of significant effort followed by longer periods of reduced activities.

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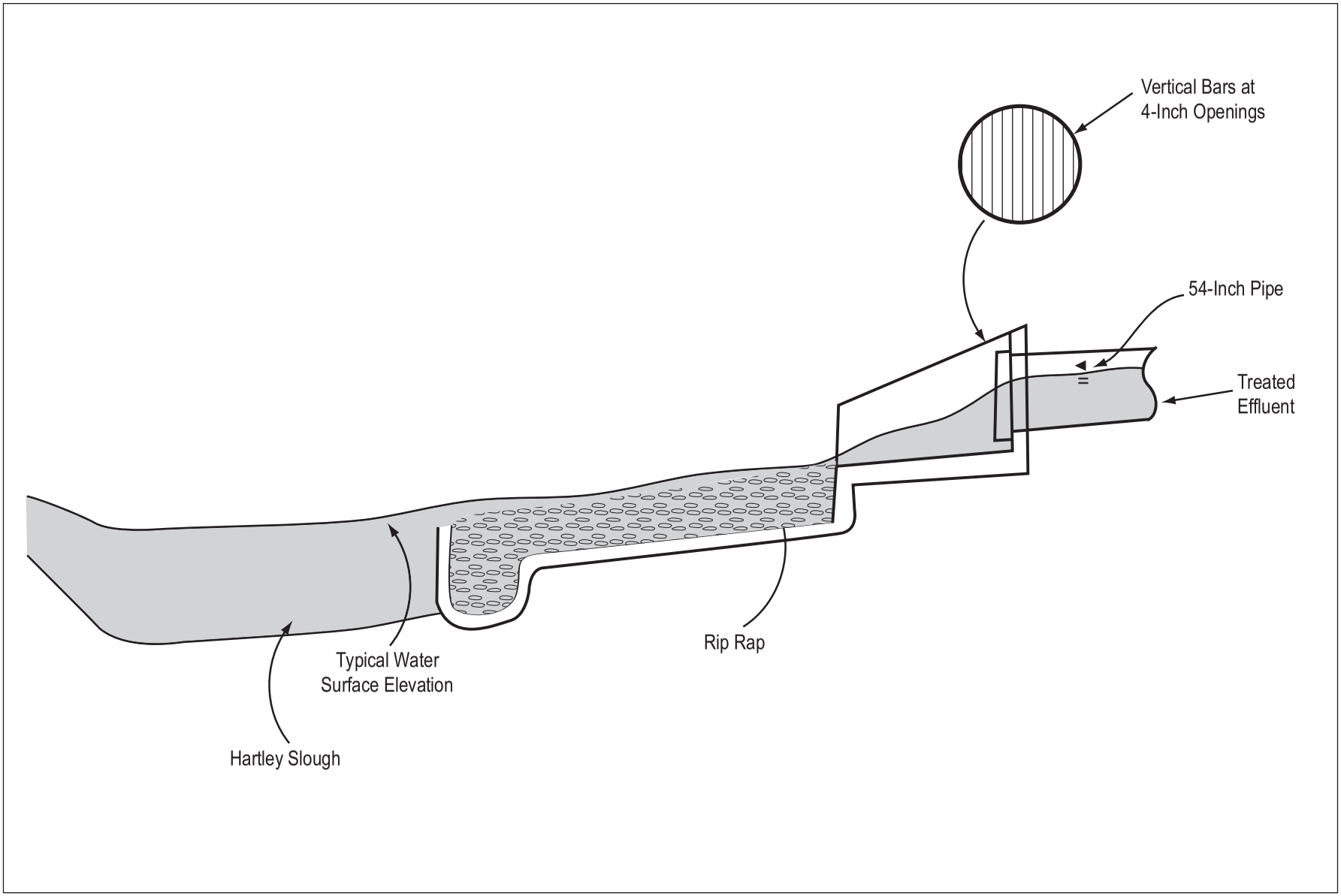
2 Effluent quality measured at the point of discharge; before mixing with receiving waters occurs.



SOURCE: ECO:LOGIC Engineering, 2006; and ESA, 2006

City of Merced Wastewater Treatment Plant Improvement Project . 205087

Figure 2-7

Site View of Proposed Effluent Outfall Facilities into Hartley Slough

Construction of the Project is scheduled to begin in the mid-2007. Upon completion of the construction of additional facilities and improvements in mid-2010, the WWTP would raise its operational capacity from 11.5 mgd to either 12 or 16 mgd. Actual rates of development will determine when the subsequent 20 mgd phase would be warranted. A general construction schedule is provided in Figure 2-8.

Final construction scheduling would be completed during engineering and contractor bidding, which may result in variations to the planned construction schedule. Typical construction activities involved in the construction of wastewater treatment plant upgrades include:

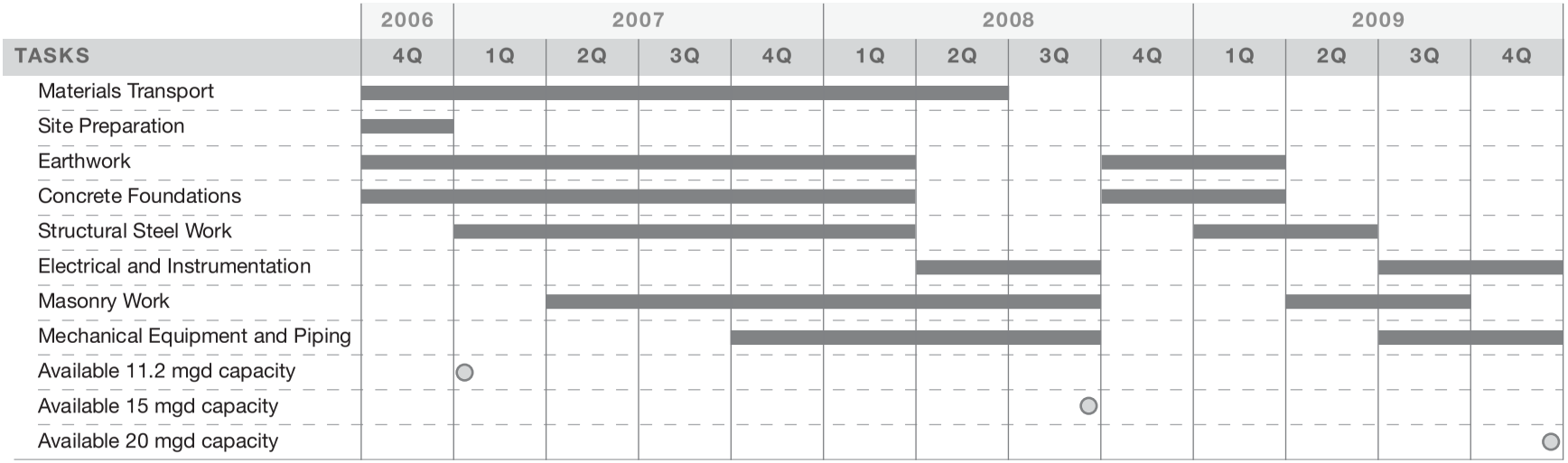
- Materials transport
- Site preparation (tree and brush removal, and structure demolition, if necessary)
- Earthwork (grading, excavation, backfill)
- Concrete foundations (forming, rebar placement, and concrete delivery and placement)
- Structural steel work (assembly and welding)
- Electrical/instrumentation work
- Masonry construction
- Installation of mechanical equipment and piping

It has been assumed that construction of the WWTP treatment upgrades could occur simultaneously with pipeline installation, with the most intense construction activities occurring during late 2007 into fall 2008. In order to characterize and analyze potential construction impacts, the City has identified maximum crew size, truck trips, and worker trips, based on expected excavation volumes and quantities of imported materials. To support these activities, the possible main pieces of equipment used during construction may include:

- track-mounted excavators
- backhoes
- graders
- crane
- scrapers
- compactors
- end and bottom dump trucks
- front-end loaders
- water trucks
- paver and roller
- flat-bed delivery trucks
- forklifts
- concrete trucks
- compressors/jack hammers

Materials Transport and Employee Trip Generation

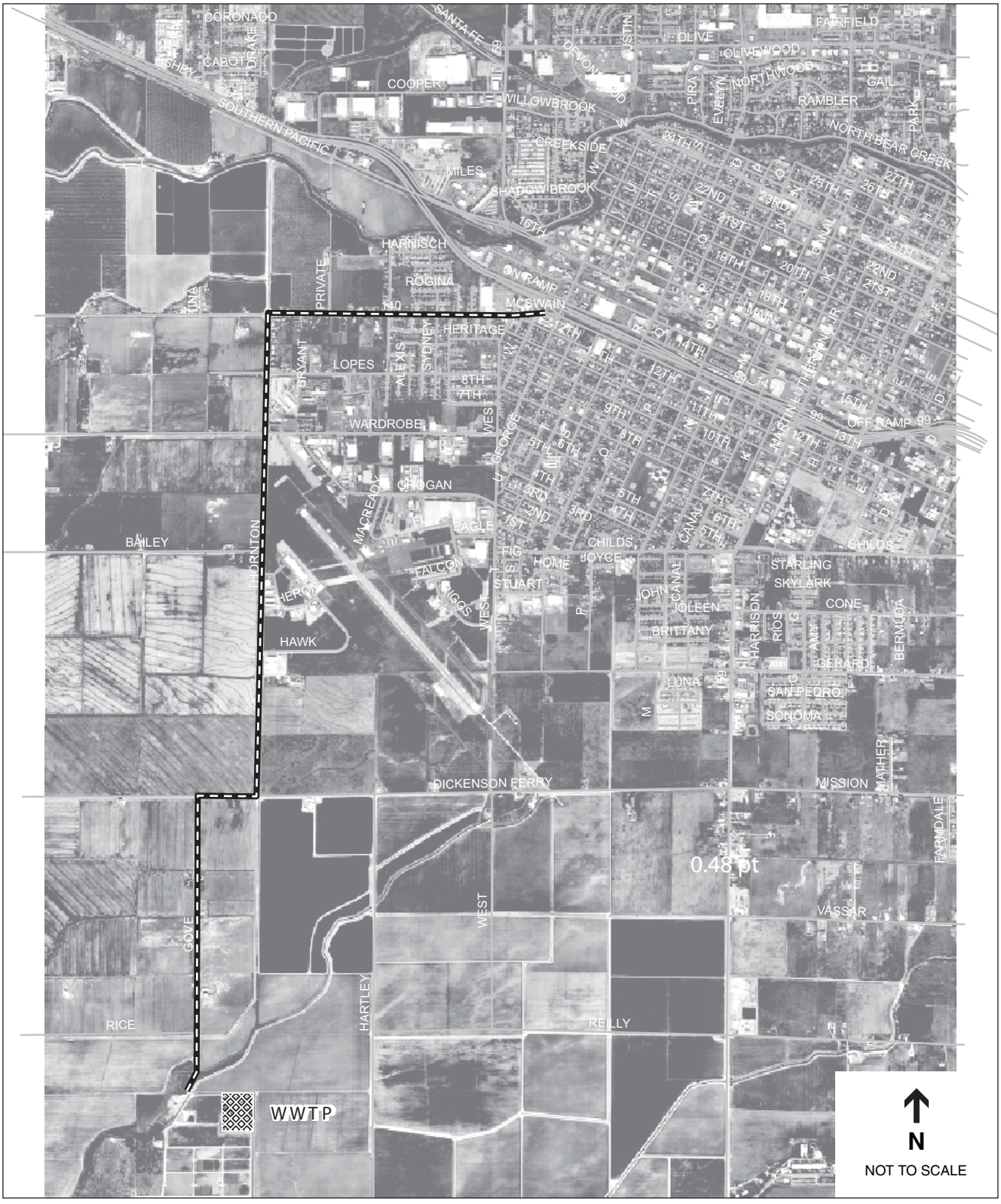
Excavated material would mostly remain onsite and would be used for backfill after process unit and yard piping installation. Additional truck trips would be necessary to deliver materials, equipment, and asphalt-concrete to the site. During peak excavation and earthwork activities, the Project could generate up to 100 round-trip truck trips per day. However, average daily truck trips would be less and range from about 30 to 50 round trips per day during much of construction. Roadways that would be used by construction traffic include Gove Road, Dickenson Ferry Road, Thornton Road, and State Routes 99 and 140. The proposed truck haul route is depicted in Figure 2-9.



SOURCE: ESA, 2006

City of Merced Wastewater Treatment Plant Improvement Project . 205087

Figure 2-8
Construction Schedule



SOURCE: ECO:Logic Engineering, 2006; and ESA, 2006

City of Merced Wastewater Treatment Plant Improvement Project . 205087

Figure 2-9

Construction and Operational Haul Routes

The typical crew size for each construction phase would be 5 to 10 people, plus inspectors. It is expected that up to four construction crews could be present during the most intense construction periods. Work hours would be governed by permits issued by regulatory agencies, but these are not expected to be restrictive because the area contains few residences.

During Project operations, the expanded WWTP would generate up to 355 truck trips per year associated with the transfer and disposal of biosolids at the WWTP. This number of truck trips would more than double the truck trips currently associated with biosolids disposal from the WWTP. Up to three trips per day could be generated by biosolids disposal truck trips.

Additional WWTP operators would generate about six new daily commuter trips to and from the WWTP.

Installation of the Outfall Pipeline

A majority of the new outfall pipeline would be installed in an open trench using conventional cut and cover construction techniques in upland areas. The trench would be braced with a trench box, solid shoring, or speed shoring, depending on the soil conditions encountered, or trench side slopes laid back to satisfy safety requirements. The active work area along the open trench, including equipment and materials staging areas, would require a width of up to 60 feet, but may be reduced to reflect the available right-of-way. Trench width would range from 15 to 20 feet, and trench depth would average 8 to 10 feet. The rate of work is estimated to average 50 feet per day per crew along the entire route, and the overall active work zone on any given workday would average 100 to 200 feet in length. The key steps in the construction process are:

- Surface preparation
- Trench shoring
- Excavation
- Pipeline installation
- Trench backfilling
- Surface restoration

In order to reduce potential impacts to the levee and wetland margins of Hartley Slough during the installation of the outfall structure, equipment would be restricted to wide-track or amphibious equipment designed to reduce bearing weight. Alternatively, crane mats would be required if larger excavation equipment (track-mounted excavator) is required. Staging areas for storage of pipe, construction equipment, and other materials would be placed at locations that would minimize hauling distances and long-term disruption.

The pipeline would be encased in concrete in sensitive areas (such as the outfall), where it would be difficult to access the pipe to repair minor leaks, or where a leak could cause considerable damage before being repaired.

2.6 Project Approvals and Planning Considerations

As the lead agency for purposes of CEQA compliance, the City would certify completion of the EIR for the Project and, based on consideration of this document, would determine whether to approve or disapprove the Project. Other permits and approvals that may be required for the Project are listed in Table 2-5. Agencies with jurisdiction over those permits or approvals would consider the information provided in the EIR in determining under what conditions to issue permits or approvals.

TABLE 2-5
REGULATORY REQUIREMENTS, PERMITS, AND AUTHORIZATIONS FOR PROJECT FACILITIES

Agency	Type of Approval
Federal Agencies	
U.S. Army Corps of Engineers	Clean Water Act Section 404 Permit
U.S. Fish and Wildlife Service	Federal Endangered Species Act compliance (Section 7 consultation)
State	
California Department of Fish and Game	State Endangered Species Act compliance Section 1600 *et seq.* Streambed Alteration Agreement
Central Valley Regional Water Quality Control Board	Waste Discharge Requirements
	National Pollutant Discharge Elimination System General Permit for Stormwater Discharge Associated with Construction Activities
	Clean Water Act Section 401 Water Quality Certification
	General Order for Dewatering and Other Low Threat Discharge to Surface Waters Permit
State Historic Preservation Office	Historic Preservation Act Section 106
Local	
San Joaquin Valley Air Pollution Control District	Authority to Construct, San Joaquin Valley Air Pollution Control District Regulation VIII-Fugitive Dust Control, Rule 8010
	Permit to Operate
Merced County	County Lands and Right-of-Way Encroachment Permit
Merced Irrigation District	Joint Use and Construction Agreements

As part of Project construction and operation, the City is obligated to implement certain actions as required by applicable rules, standards, regulations and law. These actions will be incorporated into Project design and operations procedure because their implementation is not optional or discretionary. The implementation of these actions will act to minimize potential environmental effects and are acknowledged as part of the analysis of potential environmental impacts discussed in Chapter 4 of this document. Mitigation measures identified in this document to minimize potential environmental impacts are considered as additional measures when the mandated actions are not sufficient to reduce the impacts to a level that is less than significant.

Table 2-6 lists the actions that will be implemented as part of the Project, as mandated by current rules, standards, regulations, or law.

TABLE 2-6
ACTIONS TO BE IMPLEMENTED AS PART OF PROJECT CONSTRUCTION AND OPERATION

Action	Applicable Rule, Standard, Regulation or Law
Maintain Effluent and Receiving Water Quality	Waste Discharge Requirements assigned by the Central Valley Regional Water Quality Control Board
Compliance With Acceptable Biosolids Disposal Methods	40 Code of Federal Regulations, Part 503
Comply With Acceptable Recycled Wastewater Distribution and Reuse Requirements	California Code of Regulations Title 22, Division 4, Chapter 3
Implement Fugitive Dust Control Measures	Regulation VIII of the San Joaquin Valley Air Pollution Control District
Relocation of agricultural drain features owned and operated by the Merced Irrigation District	Comply with Joint Use and Construction Agreements entered into with Merced Irrigation District
Implement Dust Control Measures and Other Actions to Control Emissions of Nitrogen Oxides and Reactive Organic Gases	Rule 9510 Indirect Source Review of the San Joaquin Valley Air Pollution Control District