Chapter 7: Infrastructure and Utilities

The major infrastructure and utilities needed to serve the community are water supply, wastewater, stormwater drainage, and utilities including, natural gas, electricity, and telecommunications. This chapter is meant to provide a broad overview of the distribution, location, extent, and capacity of major infrastructure systems and the facilities that comprise the "backbone" for these systems. Therefore, details for the phasing and construction for each of the major facilities are not included in this Plan. Several unknown factors affect how the phasing is accomplished, including housing demand, changes in the economy, and when and where development will occur first.

The major infrastructure is designed to accommodate an approximate population of 5,260. Each developer will be expected to install a fair share of the needed backbone infrastructure, with additional collector systems and individual connections needed as the community further develops.

Note: Figures 7.1 through 7.4 appear at the end of the chapter. [On-line version: please see separate file named: "Chapter 7 Figures pgs 99-106"

7.1 Water System

The urban water supply for Shandon is provided by County Service Area (CSA) No. 16. The community water system, completed in 1976, included storage facilities, pump stations, transmission lines, chlorination and fire hydrants. Comprehensive water resource information is provided in the San Luis Obispo County Master Water and Sewerage Plan (1972), in the Master Water and Sewerage Plan for County Service Area No. 16 (1971), and in the County Service Area No. 16 Water System Master Plan (2004).

In 2012, the community's water supply was obtained from groundwater wells located in and around the community. The water system consisted of a storage tank (approximately 212,000 gallons), two wells with a flow of 800 gallons per minute (gpm), a 10-inch main from the storage tank to the downtown area, and a distribution network to service the individual parcels. The supply rate of 800 gpm was adequate to serve the 2012 population, but additional supply will be required in order to meet demand at plan buildout. Assuming an average annual demand of 0.5 acre-feet/year/dwelling unit, the estimated total annual consumption at buildout would be approximately 720 acre-feet/year (0.64 million gallons per day (mgd)), compared to the 2012 demand of about 180 acre-feet/year (0.16 mgd). Detailed calculations used to size the water system components are provided for reference in Appendix B. In order to serve the projected population at plan buildout, improvements to the storage facilities and distribution network are needed, including:

- A water supply capable of providing 2,300 gallons per minute (gpm) including the existing wells serving CSA-16.
- Additional storage capacity that, at a minimum, will serve the buildout population of 5,260.
- A backbone system of looped pipelines providing connection points for each proposed development area. Where practicable, the pipelines should be sized to accommodate a greater population to avoid the need to replace undersized lines in the future.
- Connection to the existing CSA-16 water system.

The proposed water system will include a backbone network of looped water mains, as shown on Figure 7.1. Looping the system provides redundancy, consistent water pressures, and increased capacity and conveyance to provide required fire flows. The backbone water infrastructure and connections to the existing water conveyance system may be phased as development occurs. Water main networks within local streets will connect to the backbone network with future development.

Additional storage capacity is needed to provide equalization, meet required fire flow, and provide emergency storage. The storage needs will be met by the placement of additional water tanks at one of two potential sites as shown in Figure 7.1. The maximum required storage would be two, 1.5-million-gallon tanks. Because of elevation difference between the proposed tank(s) and the existing 212,000 gallon tank, and considering the life expectancy of the existing tank, the feasibility and practicality of keeping the existing tank online must be assessed.

The 2004 CSA-16 Water System Master Plan found that the existing water system was adequate to provide water for average daily use, but was "gravely deficient in meeting fire-flow requirements." The proposed water system will resolve some deficiencies and will alleviate many others, but many of the existing pipes must be up-sized as outlined in the Master Plan in order to provide adequate fire protection to all existing development.

CSA 16 holds an allocation for 100 acre-feet per year (AFY) of the State Water Project supply. In order to use this allocation, a turn-out on the State Water Project, which runs north-south along the eastern edge of San Juan Road, would have to be built.

Please refer to Figure 7.1 – Water System Plan and Table 8.3.c that contains a list of required water system improvements, including the State Water turn-out.

7.1.1 Water System Policies

WSP-1 Provide adequate water resources (quantity and quality), storage and delivery system to meet the operation, emergency, and fire prevention needs of the community.

WSP-2 New development shall pay its fair share of the costs for the County to deliver State water in order to offset the impacts of new development on groundwater resources.

7.1.2 Water System Implementing Programs

WSIP-1 Identify and obtain financing for any necessary water system upgrades to serve existing neighborhoods.

WSIP-2 County Service Area 16 should update its Water Master Plan to accommodate development needs under this Community Plan, including expansion of the CSA-16 service area. The update should be funded in part by new development and be consistent with the EIR for the Shandon Community Plan Update and San Juan Village (Fallingstar Phase I) Project mitigation measure W-2(a) [see Appendix D of this Plan]. The Water Master Plan should be updated prior to approval of new development in the Master Plan Areas identified in Chapter 3 of this Plan.

WSIP-3 CSA-16 should develop and implement a fee program that requires new development to pay its fair share of the costs for delivering State water in order to offset the impacts of new development on groundwater resources.

7.2 Wastewater

In 2012, the community was served by individual septic tank and leach field systems for wastewater disposal, with a majority located on small lots. This Plan requires a community wastewater system to be constructed with new development. Existing development, where the land uses are not intensified, may remain on their individual septic systems and will need to be connected to that system only if certain criteria are met. (Section 8.8 specifies these criteria.) The proposed wastewater system improvements consist of a backbone network of gravity sewer pipelines, lift stations, force mains, a waste water treatment facility, and percolation basins.

A preliminary wastewater treatment analysis was performed by the Wallace Group (September 2004), which weighed several wastewater treatment options and locations. Figure 7.2 identifies the preferred location on the west end of the Study Area on the Peck Ranch Master Plan site. A subsequent review was prepared by Carollo Engineers (June 2010) which updated the treatment and disposal analysis based on the expected water quality standards that will be required for the project in order to avoid degradation of groundwater quality. The preferred option is a packaged activated sludge system with nitrogen removal and disposal by percolation basins. The nitrogen removal process will provide an effluent suitable for percolation and will maximize groundwater replenishment.

The components of the wastewater system were sized assuming an average daily demand (ADD) of 80 gallons per day per person. The capacity of the wastewater treatment facility should be large enough to handle the buildout population of 5,260. The backbone components of the wastewater system may be constructed in phases that would serve the corresponding future development and connection of existing development. The subsequent local collection systems would then be connected to the backbone system on a tract-by-tract basis. Where practicable, the below-ground facilities should be sized to accommodate a population of 8,200 or greater to avoid the need to replace undersized facilities in the future. Detailed load and hydraulic calculations are provided for reference in Appendix B.

7.2.1 Wastewater Policies

WWP-1 Plan and construct a wastewater system to meet the needs of the entire community.

WWP-2 The wastewater treatment plant shall be designed with groundwater replenishment as a key component.

WWP-3 Within the parameters of the preferred wastewater treatment option design the plant to minimizes conversion of agricultural land.

7.2.2 Wastewater Implementing Programs

WWIP-1 Identify and obtain financing to extend the wastewater system to existing neighborhoods.

WWIP-2 Prepare educational materials regarding water softeners and household or commercial practices that could be detrimental to the wastewater system or harmful to groundwater quality.

WWIP- 3 Evaluate the use of solar power to operate the wastewater treatment plant.

7.3 Stormwater

Three major water courses flow through Shandon. Cholame Creek flows from the east and San Juan Creek flows from the south, converging to form the Estrella River that flows to the west. Runoff within the community generally "sheet-flows" to the north without clearly defined natural channels to the water courses. The community does not have a storm drain system, and runoff is handled primarily by roadside swales and culverts. The only streets with curbs and gutters are Calle Carmelita and Calle Arroyo. In some areas, the existing swales and culverts are inadequate to handle runoff from even moderate storm events, resulting in some localized shallow flooding (less than 2'). The lack of curbs and gutters, along with level ground, also causes minor flooding on many of the existing streets during moderate storm events. Minor flooding problems have been reported in many areas, most notably near the Cal Fire station on Centre Street, on the heights, North Second at Camatti Street, at the intersections of First Street at Centre and Cholame Streets, in front of the High School, and at the intersection of Toby Way and Centre Street.

The topography of the watershed affecting the Plan Area has moderate relief with slopes generally less than 10% with the exception of the hills to the east of San Juan Road. The majority of the existing and proposed development is located on terrain with slopes less than 2%. With the exception of the existing downtown, the watershed is lightly developed or used for agriculture.

A comprehensive stormwater plan is necessary to alleviate minor flooding problems and to facilitate future development within the URL. Major backbone facilities, that will outfall to the creeks or river, have been identified and sized as shown on the Storm Water System Plan (see Figure 7.3). These backbone facilities have been sized to convey the 50-year runoff from existing and future development. The backbone facilities will be built in phases as future development progresses and the supporting facilities such as curbs and gutters, drain inlets, storm drain pipes, ditches, bio-swales, and basins will be integrated to the back bone system for each individual development. Groundwater recharge should be a priority in designing stormwater and drainage systems.

7.3.1 Stormwater Drainage Policies

SDP-1 Provide comprehensive stormwater management to minimize flooding and property damage throughout the community.

SDP-2 Design and construct a stormwater system that minimizes impacts to surface and groundwater quality and helps maintain the river and creeks in a natural state.

SDP-3 Require the use of suitable low impact development techniques and best management practices in site design and development.

SDP-4 Groundwater recharge shall be a priority in stormwater and drainage system design.

7.3.2 Stormwater Drainage Implementing Programs

SDIP-1 Develop a communitywide Stormwater System Plan, consistent with Figure 7.3 that includes but is not limited to the following: identification of safe overland relief, as a precaution should storm drain systems fail; maximum recharge capabilities; and provisions to handle localized ponding throughout all neighborhoods.

SDIP-2 Identify and obtain financing to improve drainage systems throughout the community.

7.4 Flood Management

Cholame and San Juan Creeks drain a very large area and merge north of the downtown area to form the Estrella River. Both the Cholame and San Juan Creeks have similar characteristics. Upstream from the Estrella River, both water courses have vertical slope banks with sandy bottoms and minor vegetation along the main channels. Near the Estrella River, the characteristics change slightly to wider main channels with more vegetation, including trees and more gently-sloped banks.

According to the 2008 Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM), Shandon is a "Zone A" designation. Zone A is defined by FEMA as "Areas of 100-year flood; base flood elevations and flood hazard factors not determined". Figure 7.4 shows the 100-year water surface elevation. Construction within the 100-year flood boundary should be avoided. Where construction within the 100-year flood boundary cannot be avoided, projects should be designed such that finish floor elevations are one foot above the flood level.

7.4.1 Flood Management Policy

FMP-1 Develop in a manner that minimizes risks to life and property associated with flooding.

7.4.2 Flood Management Implementing Programs

FMIP-1 Process a "Letter of Map Amendment" with FEMA to incorporate the updated flood study (100-year flood elevations) into the Flood Insurance Rate Map.

7.5 Utilities

7.5.1 Gas and Electric

Pacific Gas and Electric (PG&E) provides energy utilities to Shandon, with electric services provided by overhead lines. Gas and electrical requirements will increase as the community develops, and expansion of distribution and transmission lines and related facilities will be necessary to meet this increased demand. PG&E will need to make on-site and off-site improvements to the facilities supplying gas and electric services as development occurs. The range of system improvements may include upgrading existing substations and transmission line equipment, expanding existing substations, interconnecting and undergrounding transmission lines.

7.5.2 Telecommunications

AT&T is the primary telecommunications provider for the community. Shandon is served by fiber optic cable, which can accommodate the projected growth of the community.

7.5.3 Cable Television

In 2012, cable facilities were not available within the community. Charter Communications is the nearest provider for cable services. As of 2011, there were no plans to service this area.

7.5.4 Easements

Oil and gas pipelines lie within two easements that extend through the community. There is a 6-inch natural gas line (inactive) and two active 8-inch gas/oil transmission lines. Encroachments into these pipeline easements are regulated by the California Pipeline Safety Act of 1981 which states that:

"Construction improvements, including excessive fill, and the planting of dense landscaping over the pipeline easement are prohibited."

The Safety Act also prohibits the construction or placement of structures within the pipeline easements which would impair access for maintenance or visual inspection of the pipeline. Roadways and limited surface parking may be conditionally allowed. Pipeline easements also provide an opportunity to provide community-wide easements for uses such as Class I bike/pedestrian trails.

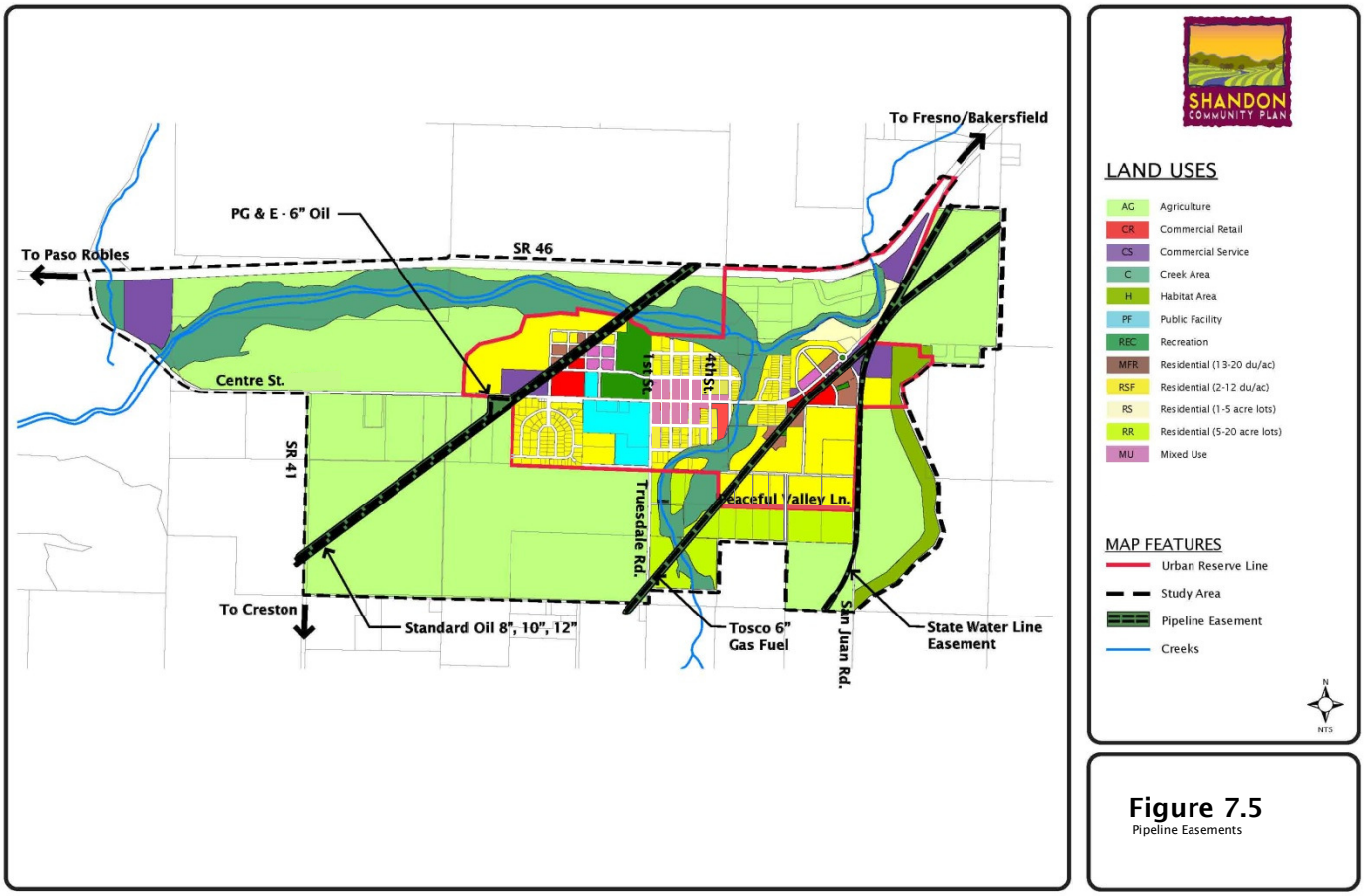

Figure 7.5
Pipeline Easements

7.5.5 Utilities Policies

UP-1 Coordinate with utility companies to provide the community with a full array of reliable utility services.

UP-2 Encourage the use of renewable energy sources, such as individual solar energy systems in development projects and the retrofitting of existing uses throughout the community.

7.5.6 Utilities Implementing Programs

UIP-1 Identify communitywide programs to reduce energy costs.

UIP-2 Coordinate with utility companies to underground existing major utility lines.

UIP-3 Work with the community to pursue a communitywide solar energy system.

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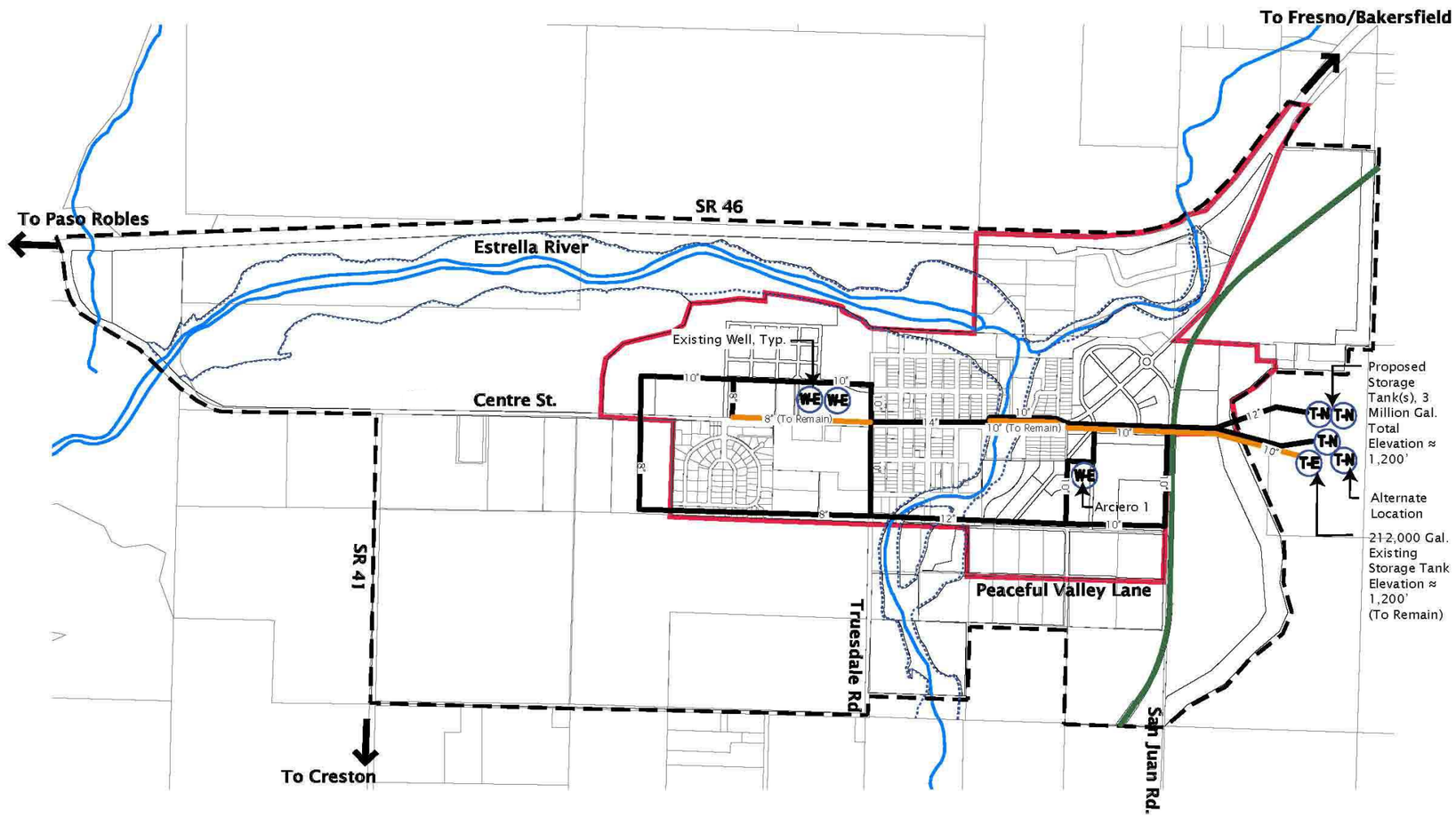

Notes:
1. The proposed water system was sized to accommodate an estimated population of 8,200 but shall be required, at a minimum, to meet plan buildout population and provide adequate fire flows, emergency and equalization storage. Where practicable, the pipelines should be sized to accommodate a greater population to avoid the need to replace undersized lines in the future.
2. An additional 3.0 million gallons of storage is needed to provide adequate fire flows, emergency and equalization storage.
3. Pipes were sized to maintain 30 psi during peak hour demand and a minimum 20 psi for maximum daily demand plus fire flow for the entire system at an assumed water elevation of 1200' in all tanks.
4. All proposed pipe sizes are estimates only. Existing deficient water lines still require upgrading to provide adequate flows to localized areas as identified in the 2004 CSA-16 Water System Master Plan.

SHANDON COMMUNITY PLAN

LEGEND

- New Water Line
- Existing Water Line
- Study Area
- 100-Year Flood Boundary
- Urban Reserve Line
- State Water Line Easement
- Creeks
- T-N Proposed Tank
- T-E Existing Tank
- W-E Existing Well

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Figure 7.1
Water System Plan

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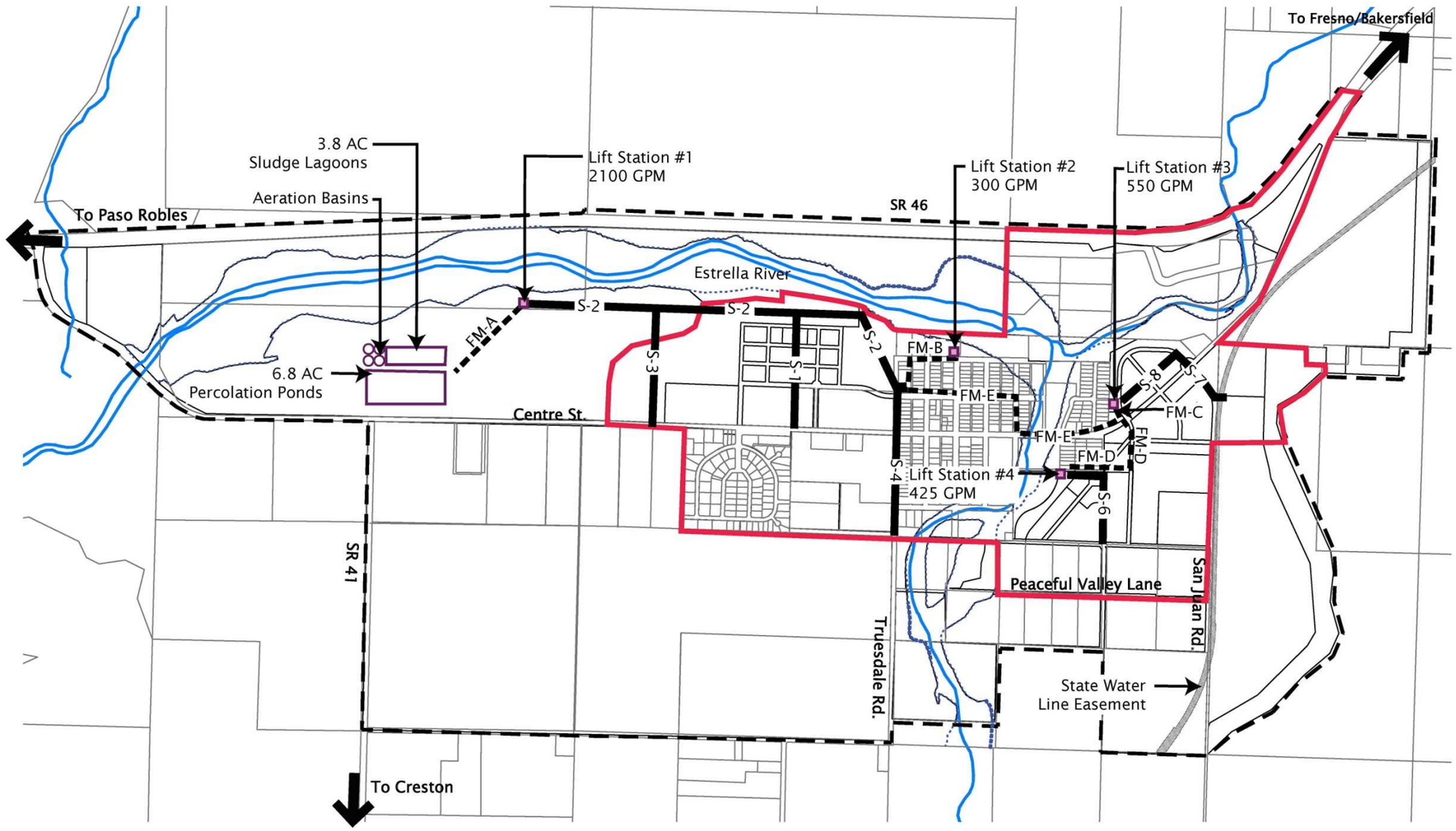

Notes:

1. All sewer facilities (pipes, lift stations, WWTP ponds) were sized to accommodate an estimated population of 8,200 but shall be required, at a minimum, to meet plan buildout population for the following demand levels:
   a. Average Daily Demand (ADD) = 80 gallons per day/person (0.056 GPM)
   b. Peak Daily Demand (PDD) = 160 gpd/person (0.125 GPM)
   c. Peak Hourly Demand (PHD) = 320 gpd/person (0.25 GPM)
   d. WWTP ponds were sized for ADD.
   e. Gravity pipes were sized to flow half full for PDD assuming N = 0.012 (PVC) and slope = 0.5%.
   f. Lift stations were sized for PHD.
   g. Force mains were sized for PDD assuming N = 0.012 (PVC), an operating pressure of 50 PSI and 30' of list.
2. All sewer facilities were sized using assumed population densities, development locations and probable slopes, and are estimates only.
3. Where practicable, the pipelines should be sized to accommodate a greater population to avoid the need to replace undersized lines in the future.

SHANDON COMMUNITY PLAN

LEGEND

- Gravity Sewer
- Force Main Sewer
- Study Area
- 100-Year Flood Boundary
- Urban Reserve Line
- Creeks
- Lift Station

Sewer Label	Size
S-1	8"
S-2	15"
S-3	8"
S-4	8"
S-6	8"
S-7	8"
S-8	10"

FM Label	Contributing Lift Station(s)	Size
FM-A	#1	10"
FM-B	#2	6"
FM-C	#3	6"
FM-D	#4	6"
FM-E	#3 & #4	8"

N
NTS

Figure 7.2
Waste Water System Plan

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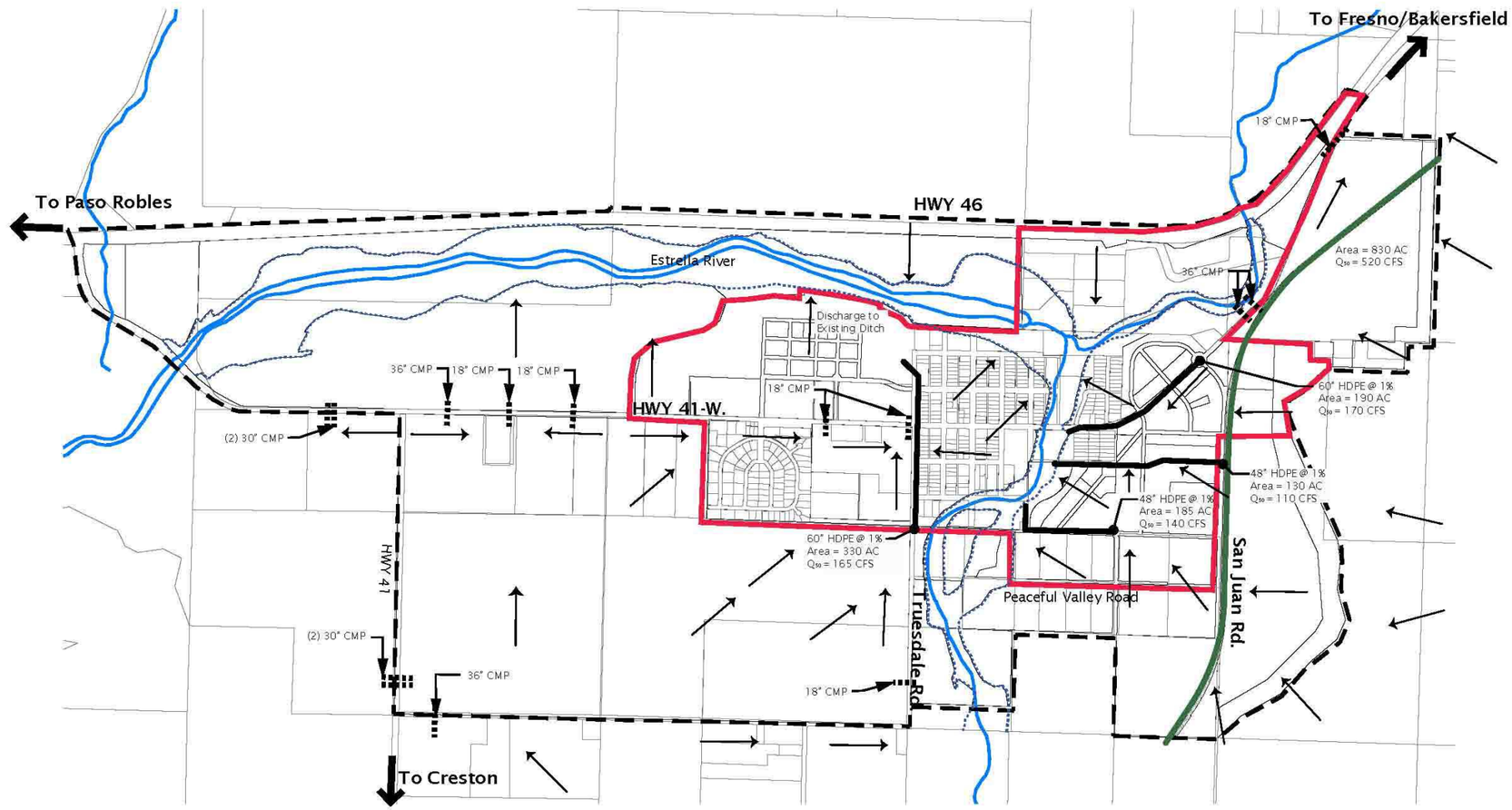

Notes:

1. All pipeline sizes based on 1.0% slope and flowing full. Pipeline sizes are preliminary and may be reduced depending on final design.
2. Runoff (Q_{50}) calculated using 50 year storm and rational method.

SHANDON COMMUNITY PLAN

LEGEND

- Proposed Storm Drain
- Existing Culvert
- Direction of Flow
- Study Area
- 100-Year Flood Boundary
- Urban Reserve Line
- State Water Line Easement
- Creeks

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Figure 7.3

Storm Water System Plan

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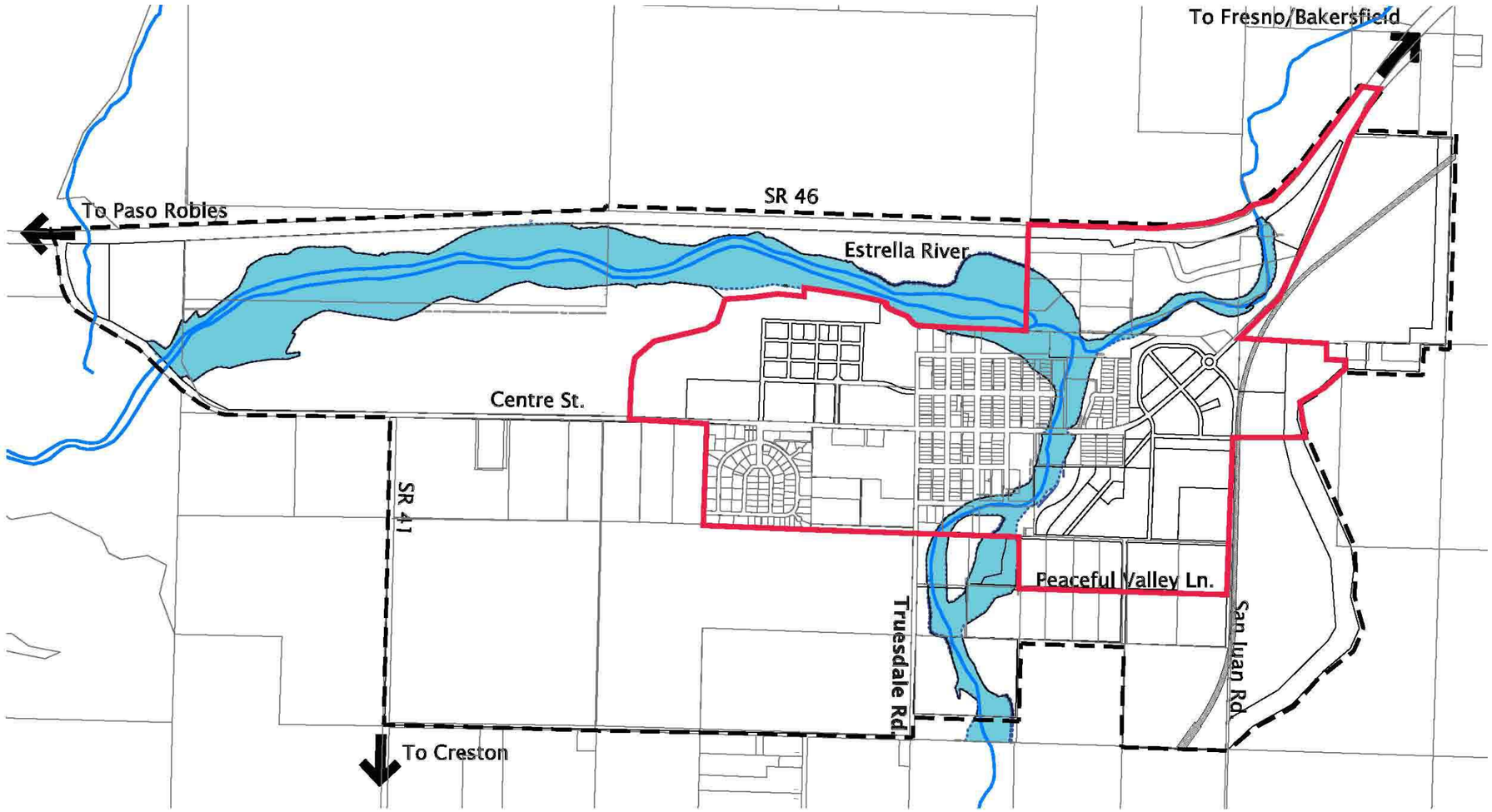

SHANDON COMMUNITY PLAN

LEGEND

- Urban Reserve Line
- Study Area
- Proposed 100-Year Flood Boundary
- Creeks

N

NTS

Figure 7.4

Flood Plain Limits Plan