4.15 UTILITIES AND SERVICE SYSTEMS

This section describes potential impacts from the implementation of the proposed General Plan and Energy and Conservation Action Strategy (ECAS) on utilities and services, including water supply, wastewater, stormwater, solid waste, and energy resources. Impacts associated with hydrology (groundwater and water-related hazards) and water quality are addressed in Chapter 4.9, Hydrology and Water Quality. As noted in Chapter 3, Project Description, impacts are determined by comparing the proposed General Plan and ECAS to existing conditions, rather than to the existing General Plan. The following evaluation is based on a quantitative analysis and examines how buildout under the proposed General Plan and ECAS would affect utilities and service systems in Vacaville.

A. Water Supply

The City of Vacaville provides potable water service from three water supply sources, including the Solano Project, State Water Project (SWP), settlement water from the North Bay Aqueduct, and groundwater sources. Potable water production facilities include groundwater wells and surface water treatment plants. The potable water distribution system consists of one main pressure zone (main zone), which is capable of serving pad elevations below 222 feet in elevation, plus several higher elevation pressure zones (upper pressure zones) capable of serving pad elevations above 222 feet in elevation, in various portions of the city. Large diameter water mains form the backbone of the system and convey water from the water production facilities to the major sectors of the city.

1. Regulatory Framework

A number of federal and State agencies manage and regulate water resources for the City with the intention of safeguarding these resources for domestic and agricultural use, environmental conservation, and power generation. In general, these regulations assess and plan for a long-term water supply.

a. Federal Safe Drinking Water Act

The Safe Drinking Water Act (SDWA), adopted in 1974, is the initial federal legislation passed to ensure a minimum quality of drinking water. Under the SDWA, the US Environmental Protection Agency (EPA) sets standards for drinking water quality and oversees the water suppliers who implement those standards. The SDWA requires the US EPA to set "National Primary Drinking Water Regulations," including minimum contaminant levels and non-enforceable goals. The US EPA may fine for non-compliance. Regulatory standards established by the

SDWA include maximum allowable levels of chemicals and other substances in drinking water, protocols for monitoring drinking water quality and methods for treating drinking water.

The City monitors the quality of drinking water supplied regularly to comply with SDWA.

b. State and Regional Agencies, Regulations, and Plans

This section summarizes State and regional agencies, regulations, and plans pertaining to the water supply in the EIR Study Area.

i. California State Water Resources Control Board

The California State Water Resources Control Board (SWRCB) and the nine Regional Water Quality Control Boards (RWQCBs) have the authority in California to protect and enhance water quality. The RWQCB Region 5 office in Sacramento regulates water quality for waters that flow into the Sacramento River. Because treated wastewater discharged by Vacaville flows into the Sacramento River through a series of creeks and canals, Vacaville is under the jurisdiction of RWQCB Region 5. The RWQCB establishes water quality objectives, administrates the National Pollutant Discharge Elimination System (NPDES) permit program for stormwater and construction site runoff, and regulates infill of jurisdictional wetlands or waters of the United States under Section 404 of the Clean Water Act.

ii. California Safe Drinking Water Act

In 1976, California enacted its own Safe Drinking Water Act, requiring the California Department of Public Health (CDPH), previously called Department of Health Services, to regulate drinking water by:

- Setting and enforcing federal and State drinking water standards.
- Administering water quality testing programs.
- Administering permits for public water systems operations.

The standards established by CDPH are found in Title 22 of the California Code of Regulations.

The City performs all testing required and supplies potable water of quality consistent with Title 22. Vacaville's potable water system is permitted through CDPH.

iii. Urban Water Management Planning Act

Through the Urban Water Management Planning Act of 1983, the California Water Code requires all urban water suppliers within California to prepare and adopt an Urban Water Management Plan (UWMP) and update it every five years. The Act is intended to support conservation and efficient use of urban water supplies at the local level. The Act requires the following:

- Comparison of the total projected water use within each water authority jurisdiction to available water supply sources over the next 20 years in five-year increments.
- Planning must occur for normal, single dry and multiple dry water years.
- Plans must include a water recycling analysis that incorporates a description of the wastewater collection and treatment system within an agency's service area along with current and potential recycled water users.

The City is in compliance with the Urban Water Management Planning Act. The 2005 UWMP Update was submitted to and accepted by the State Department of Water Resources, and the City completed and filed the 2010 UWMP Update prior to the July 2011 due date.

iv. Senate Bill 610 and Senate Bill 221

Statutes of 1995, Chapters 330 and 854, require local water agencies to assess the reliability of their water supplies. Statutes of 1995, Chapter 881, requires consultation with local water agencies to determine if adequate water supply is available to accommodate pending land use planning decisions. Senate Bill (SB) 610 (Costa) and SB 221 (Kuehl) amended State law to better coordinate local water supply and land use decisions and ensure adequate water supply for new development. Both statutes require the City to provide detailed information regarding water availability to City and County decision-makers prior to approval of large development projects. Large development projects are those that include the equivalent of 500 residential units or more, or that would increase the number of existing service connections to the public water system by 10 percent.

v. Area of Origin Protections

Area of origin protections were added to the California Water Code to protect local northern California supplies from being depleted by water projects. County of origin statutes reserve water supplies for counties from which the water originates when, in the judgment of the SWRCB, transporting water out of a county would deprive that county of water necessary for its present and future development.

As described in Section A.2, Existing Conditions, the City's 9,320 acre-feet per year (AFY) allocation settlement water is through the Department of Water Resources (DWR) based on an area of origin water rights application.

vi. Groundwater Management Act of 1992

The Groundwater Management Act of California Water Code, Assembly Bill (AB) 3030 (Costa), provides guidance for applicable local agencies to develop a voluntary Groundwater Management Plan (GMP) in State-designated groundwater basins. GMPs can allow agencies to raise

revenue to pay for measures influencing the management of the basin, including extraction, recharge, conveyance, facilities' maintenance, and water quality.

The City updated the GMP in 2011 to be consistent with more recent legislation and conditions of the City groundwater system and master planning.

vii. Assembly Bill 1881

Assembly Bill (AB) 1881 (Laird), the Water Conservation in Landscaping Act of 2006, required that DWR distribute a model water efficient landscape ordinance to counties and cities by January 1, 2009. By January 1, 2010, every county and city, including charter cities, were required to adopt either DWR's model ordinance or a water efficient landscape ordinance that is at least as effective as the DWR model ordinance. If a county or city failed to adopt an ordinance, AB 1881 requires that local officials enforce DWR's model ordinance as if it had been adopted by the county or city.

The City compared its existing Water Efficient Landscape Requirements, originally adopted in 1991, with the State's Model Water Efficient Landscape Ordinance (MWELO) and found the City's Water Efficient Landscape Requirements were at least as effective as MWELO. The City is therefore in compliance with AB 1881.

viii. Senate Bill x7-7

SB x7-7 (Steinberg), the Water Conservation Act of 2009, sets a statewide goal of reducing per capita urban water use by 20 percent by December 31, 2020. The State shall make incremental progress towards this goal by reducing per capita water use by at least 10 percent by December 31, 2015. An urban retail water supplier shall include the following information in its urban water management plan:

- Baseline daily per capita water use
- 2020 water use target
- Interim (2015) water use target

Effective 2016, urban retail water suppliers who do not meet the water conservation requirements established by SB x7-7 will not be eligible for State water grants or loans.

The analysis required for the City by SB x7-7 was included in the 2010 UWMP Update.

ix. Regulations for Water Use Efficiency

The California Constitution prohibits the waste, unreasonable use, unreasonable method of use, and unreasonable method of diversion of water. It also declares that the conservation and use of water "shall be exercised with a view to the reasonable and beneficial use thereof in the public

interest and for the public welfare." Water Code Section 275 directs DWR and SWRCB to "take all appropriate proceedings or actions before executive, legislative, or judicial agencies to prevent waste or unreasonable use of water."

Through compliance with SB x7-7 and AB 1881, as well as the City's general operating practices, the City is conservative in its water use.

x. Statewide Bond Measures

In recent years, a number of statewide bond measures have been approved by California voters, establishing funding for a wide range of water-related programs and improvements aimed at protecting the State's critical water resources. Among these is the Safe Drinking Water, Clean Water, Watershed Protection, and Flood Protection Bond Act, passed in 2000. This bond authorized $1.97 billion for water-related projects throughout the State.

Passed in March 2002, Proposition 40, the California Clean Water, Clean Air, Safe Neighborhood Parks, and Coastal Protections Act, authorizes over $1 billion for a broad range of water conservation programs, including land acquisition. Later in 2002, the voters authorized an additional $3 billion in bonds as part of the Water Quality, Supply, and Safe Drinking Water Projects bond measure.

In November 2006, voters approved an initiative allowing the State to sell $5.4 billion in bonds for projects related to safe drinking water, water quality and supply, flood control, natural resource protection, and park improvements.

As of June, 2012, the City of Vacaville has not received any of this bond money.

c. Local Plans and Regulations

This section summarizes the local plans and regulations pertaining to water supply in the EIR Study Area.

i. Water Efficient Landscape Requirements

The City of Vacaville adopted water efficient landscape requirements in 1991 and most recently revised the requirements in 1998. To ensure compliance with AB 1881, which is discussed in Section A.1.b.vii, Assembly Bill 1881, the City compared the water efficient landscape requirements with the State's model water efficient landscape ordinance, and found them to be consistent.

ii. Solano Irrigation District Master Water Agreement

The City of Vacaville entered into a Master Water Agreement with the Solano Irrigation District (SID) in 1995, which was most recently amended in 2010. This agreement determines the amount of water that the City of Vacaville will receive from SID through the year 2050. In addition, it establishes a long-term urban service area boundary and restricts water delivery for non-agricultural purposes outside of that boundary. SID also provides the City with non-potable water supply. See Section A.2.a, Existing Water Supply, for additional information.

2. Existing Conditions

This section describes existing water supply, treatment and distribution system, service, and recycled water use in the EIR Study Area.

a. Existing Water Supply

Potable water is supplied within the EIR Study Area by several sources, including Solano Project water from the Lake Berryessa reservoir, State Water Project water and settlement water from the North Bay Aqueduct, and groundwater from local city wells. Because future development allowed by the proposed General Plan can only occur after annexation to the City, which includes provision of City services, this section focuses on the provision of water from the City.

Potable water is provided by the City to users within the city limits via a network of existing water mains, transmission mains, reservoirs, groundwater wells, booster pump stations, and treatments plants. Non-potable water is currently primarily used in Vacaville for non-residential landscape irrigation, and is provided by SID via an existing SID conveyance system. Water supply for the potable water needs of the city comes from two sources: surface water and groundwater. Table 4.15-1 provides a summary of the 2035 annual allocation (entitlements) from the various sources, as outlined in the 2010 UWMP; these allocations total 41,653 AFY. Each of the sources is described below in further detail.

i. Solano Project

The Solano Project was constructed by the Bureau of Reclamation in 1958, and consists of the Monticello Dam associated with Lake Berryessa, the Putah Diversion Dam associated with Lake Solano, and associated water distribution system. The main feature of the Solano Project is Monticello Dam, which provides storage for approximately 1.6 million acre-feet (AF) of water in Lake Berryessa. Water from Lake Berryessa is diverted through the Putah Diversion Dam to the 32-mile Putah South Canal, which transports water to the Solano County Water Agency (SCWA).

TABLE 4.15-1 **CITY OF VACAVILLE 2035 SUMMARY OF WATER SUPPLY**

Source	2035 Annual Allocation (AFY)
Solano Project	
Vacaville Entitlement	5,750
Solano Irrigation District Agreement	8,625
State Water Project	
Vacaville Table A	6,100
Kern County Water Agency Agreement	2,878
Settlement Water	9,320
Groundwater	8,100
Recycled Water	880
Total	**41,653**

Note: AFY = Acre-Feet per Year
Source: City of Vacaville, 2010 Urban Water Management Plan Update.

SCWA is a water wholesaler with water supply agreements with cities, districts, and State agencies to provide water from the Solano Project. The Solano Project contracting agencies are: Fairfield, Suisun City, Vacaville, Vallejo, SID, Maine Prairie Water District, University of California at Davis, and California State Prison – Solano. Vacaville is allocated 5,750 acre-feet per year (AFY) water from the Solano Project.

In addition to its entitlement from SCWA, Vacaville entered into a Master Water Agreement with SID in 1995, which was most recently amended in June 2010. SID is a supplier of irrigation and domestic water in Solano County. Pursuant to the agreement, Vacaville will receive an entitlement from SID increasing from 2,500 AFY in 2010 to 10,050 AFY in 2040. The Master Water Agreement includes a schedule specifying the entitlement increase. The following water entitlements increases were agreed:

- 2011 through 2015, the entitlement shall increase an additional 125 AFY;
- 2016 through 2020, 200 AFY;
- 2021 through 2039, 300 AFY;
- 2040, 225 acre-feet (AF), totaling 10,050 AF in 2040.

The Master Water Agreement provides a consistent entitlement of 10,050 AFY between 2040 and 2050.

ii. State Water Project (North Bay Aqueduct)

Vacaville receives water allocations from the State Water Project (SWP) through SCWA and water from a purchase agreement from Kern County Water Agency (KCWA) in 2000. Surface water received pursuant to these agreements is delivered through the North Bay Aqueduct (NBA), a SWP facility owned and operated by the Department of Water Resources (DWR). The City supply from the SWP is 8,978 AFY, including the 2,878 AFY from the KCWA Agreement.

The water supply for the NBA is less reliable than the Solano Project. Supply from the NBA comes from the SWP which provides water to a total of 29 contractors. Because the NBA is part of the entire SWP, any shortages occurring in the SWP impact the water availability from the NBA.

iii. Settlement Water (DWR Agreement)

As explained further in Section A.1.b.v, Area of Origin Protections, the California Water Code includes area-of-origin statutes, which state that an area shall not be deprived of the prior right to water reasonably required to adequately supply the beneficial needs of the area. In settlement of area-of-origin water right applications by the cities of Fairfield, Benicia, and Vacaville; DWR, which is responsible for the management and regulation of water use in the State of California, provides "settlement water" to Vacaville. Settlement water is diverted under water rights held by DWR, but is not considered SWP water. Settlement water consists of surface water from the Sacramento River and Sacramento-San Joaquin Delta Estuary. The amount of water provided in the Settlement Agreement was based on critical dry year deliveries. Vacaville is allocated 9,320 AFY as part of the Settlement Agreement.

iv. Groundwater

The City currently operates eleven municipal groundwater wells with very high quality groundwater. All eleven wells withdraw water from the deep aquifer in the basal zone of the Tehama Formation. Most City wells are located in the Elmira well field. However, new wells are being sited further north, near Interstate 80. In 2008, approximately 5,900 AFY were supplied to the City. The total capacity of the well field is currently 6,500 AFY. According to the 2010 UWMP, anticipated capacity in in 2035 is 8,100 AFY. Vacaville continues to explore well field expansion as a means of maintaining adequate water supply. A regional program is being implemented to monitor groundwater data as a means of ensuring against overdraft and/or contamination. Existing well locations are shown in Figure 4.15-1.

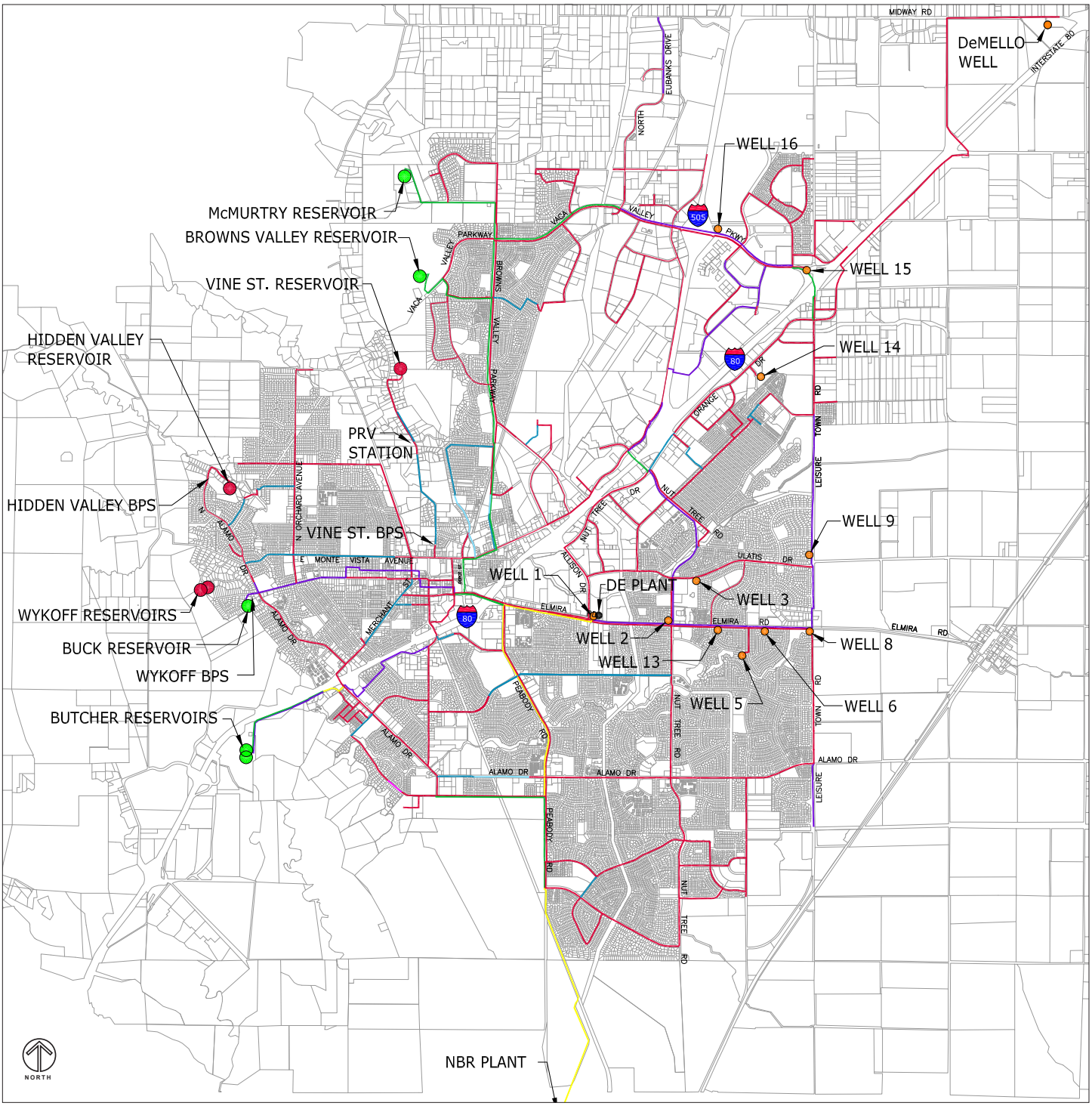


FIGURE 4.15-1

EXISTING WATER DISTRIBUTION SYSTEM

Generally, areas outside the city limits have an agricultural land use and/or rural residential land use with private groundwater wells and/or potable water service from SID.

b. Existing Water Treatment and Distribution System

In general, the City's potable water treatment and distribution system has been continuously improved and upgraded to meet the City's increasing demands. The system is comprised of the following:

- ♦ Water treatment plants
- ♦ Groundwater wells
- ♦ Storage tanks
- ♦ Booster pump stations
- ♦ Transmission and distribution water mains

i. Water Treatment Plants

Two water treatment plants produce water for the City of Vacaville and serve the main zone: the North Bay Regional Water Treatment Plant (NBR Plant) and the Diatomaceous Earth Water Treatment Plant (DE Plant).

The NBR Plant, which is located in Fairfield, provides potable water to the Cities of Fairfield and Vacaville. This plant is co-owned by both cities and is operated by the City of Fairfield. The plant can provide approximately 13.3 million gallons per day (MGD) to the City of Vacaville. The water is supplied directly to the City's distribution system via an existing 30-inch transmission water main routed along Peabody Road.

The DE Plant is a 10 MGD-capacity diatomaceous earth filtration water treatment plant owned by the City of Vacaville. The water treatment is located at the intersection of Elmira Road and Allison Parkway and conveys the treated water into a ground-level chlorine contact basin for final chlorination before it flows by gravity to the treated water pump station (TWPS) clearwell and then is pumped into the City's main zone distribution system via the TWPS. The DE Plant is not operated 24 hours per day because the filters require backwash, a process of reversing the water flow through the filters in order to clean them. Currently, the DE Plant operates for approximately 13 hours, with 12 hours of full production at a rate of 8,200 gallons per minute (gpm) and 1 hour for startup and backwash time. The 12 hours of full production at 8,200 gpm result in an estimated daily production capacity of approximately 5.90 MGD.

The TWPS consists of five vertical turbine pumps (4 duty, 1 standby), each with a capacity of approximately 2,600 gpm for a total capacity of 10,400 gpm.

ii. Groundwater Wells

Groundwater supply to the City is currently provided via eleven operating wells, eight of which supply high quality potable water directly to the main zone distribution system. The remaining three wells (Well 1, Well 6, and Well 13) supply water directly into the TWPS clearwell at the DE Plant. The groundwater from these wells is pumped to the main zone water distribution system via the TWPS. Table 4.15-2 provides a summary of the existing groundwater wells.

Table 4.15.-2 includes a total of 13 wells. Two of the wells listed are not in current operation. Well 7 is currently out of service due to a catastrophic failure and is not anticipated to be put back into service. The De Mello Well is not in continuous operation and is used by the City only in emergency conditions. The City uses this well to provide a means to turn over the water in the existing long dead end water main in the area. Thus, the City only has eleven wells in current operation.

All existing groundwater wells in service provide a total capacity of approximately 21.5 MGD (14,900 gpm).

iii. Storage Tanks

Potable water is stored by the City in various elevated storage reservoirs that maintain acceptable levels of service (pressure) in the system. The storage system is comprised of five reservoirs in the main zone and four reservoirs in the upper pressure zones. The water storage requirements for the City's main pressure zone include three components: operational, emergency, and fire storage.

- Operation storage is equal to 25 percent of the maximum day demand.
- Fire storage is equal to the most critical combination of flow rate and duration in the pressure zone.
- Emergency storage is equal to 12 hours of maximum day demand, equivalent to 50 percent of maximum day demand.

For upper pressure zones, the storage requirements are similar except the emergency storage which is 75 percent of the maximum day demand. This requirement is more stringent than that for the main zone because there is less operational control in the upper zones.

Table 4.15-3 is a summary of the existing reservoirs and their capacity.

TABLE 4.15-2 **EXISTING GROUNDWATER WELLS**

Well	Address	Capacity (gpm)	Notes
1	1001 Allison Drive	230	Pumps to TWPS clearwell
2	1099 Nut Tree Road	1,100	
3	2012 Ulatis Drive	1,530	
5	280 Christine Drive	1,300	
6	790 Elmira Road	1,140	Pumps to TWPS clearwell
7	890 Elmira Road	1,110	Not in operation
8	890 Elmira Road	1,530	
9	113 Fallen Leaf Drive	1,400	
13	710 Elmira Road	1,390	Pumps to TWPS clearwell
14	110 Auto Center Drive	1,740	
15	6700 Leisure Town Road	1,740	
16	2003 Vaca Valley Parkway	1,740	
De Mello	5458 Midway Road	150	Not in operation

Note: TWPS = Treated Water Pump Station
Source: Nolte Vertical Five, 2012.

iv. Booster Pump Stations

The main zone supplies water to several existing upper pressure zone water systems (Wykoff, Vine Street, and Hidden Valley). Booster Pump Stations (BPSs) lifts from the main zone to the respective upper pressure zone reservoirs. Currently the booster pump stations turn on when the level in the respective reservoir reaches a low water level in the respective reservoir and turn off when it reaches a high water level set point. The city has four BPSs, all of which are owned and operated by the City of Vacaville.

Table 4.15-4 contains a summary of the existing booster pump stations conveying water to the upper pressure zones (Hidden Valley, Wykoff, and Vine Street).

TABLE 4.15-3 **SUMMARY OF EXISTING STORAGE TANKS**

Tank	Address	Diameter (ft)	Capacity (MG)
Main Zone			
Buck	691 Buck Avenue	134	2
Browns Valley	757 Vaca Valley Parkway	165	5
Butcher #1	901 Butcher Road	133	2
Butcher #2	901 Butcher Road	148	4
McMurtry	McMurtry Lane	210	5.1
Upper Pressure Zones			
Wykoff East	25 Tranquility Lane	29.7	0.07
Wykoff West	25 Tranquility Lane	29.7	0.07
Hidden Valley	132 Hidden Glenn Court	25	0.07
Vine Street	6009 Vine Street	68	0.62

Notes: ft = feet; MG = million gallons
Source: Nolte Vertical Five, 2012.

TABLE 4.15-4 **SUMMARY OF EXISTING BOOSTER PUMP STATIONS**

Booster Pump Station	Address	Capacity (gpm)	Notes
Wykoff	689 Buck Avenue	1,500	Rehabilitated in 2005
Hidden Valley	391 N. Alamo Drive	500	Constructed in 1984
Vine Street	23 ½ Vine Street	580	Constructed in 1989
Tranquility Lane	25 Tranquility Lane	140	Rehabilitated in 2002

Note: gpm = gallons per minute
Source: Nolte Vertical Five, 2012.

The Tranquility Lane booster pump station included in Table 4.15-4 conveys water from the Wykoff water system to fill a hydropneumatic tank that serves approximately twelve users in Wykoff Drive and Tranquility Lane.

v. Transmission and Distribution Water Mains

The system consists of one main pressure zone and several upper pressure zones needed to serve development at higher elevations in the city. The main pressure zone is designed to serve development with building pad elevations between 82 and 222 feet in elevation. Where building pad elevations are higher than 222 feet, an upper pressure zone is required, unless it can demonstrated to the to the satisfaction of the Director of Public Works that building pads above 222 feet in elevation can be served by the main pressure zone without any modifications to the system. Three upper pressure zones (Wykoff, Vine Street, and Hidden Valley) are currently located in the city. Each upper pressure zone includes a booster pump station and reservoir to provide adequate pressure and storage in the upper pressure zone. The Vine Street upper zone is divided into upper and lower zones separated by a Pressure Reducing Valve (PRV) Station.

The City's distribution system is comprised of approximately 292 miles of distribution pipelines, mainly 18-inch, 24-inch, and 30-inch transmission mains, as well as 4-inch to 12-inch water distribution mains. Figure 4.15-1 shows the existing 8-inch and larger water mains in the city as well as the location of the existing booster pump stations, reservoirs, groundwater wells, and treatment plants.

c. Existing Water Service

The City provides its users with a level of service that includes a minimum pressure of 30 pounds per square inch (psi) during peak hour demand. Thus, the existing water distribution system has adequate capacity to supply water to the city, with the exception of a few areas: North Orchard Avenue area, the northern portion of Eubanks Drive, and Midway Road.

The North Orchard area is one of the most critical areas in Vacaville in terms of the ability of the existing distribution system to meet fire flows and peak hour demands. Several improvement alternatives were considered in the City of Vacaville 1990 Water Master Plan, but the construction cost and lack of new development in this sector of the city has put improvements in this area on hold. In the interim, low residual pressures may occur in this area during fire flow and peak hour demand conditions.

The Eubanks Drive area, located north of Aldridge Road, also has problems meeting fire flow and peak hour demands. The lack of a looped (network) system at the dead end of North Eubanks Drive and Midway Road is the reason for this deficiency in the water distribution system. In addition to the low residual pressures during fire flow and peak hour demand conditions, the area is susceptible to water quality concerns. Improvements to this area have been suggested, but all are driven by development in the northeast sector. An intermediate mitigation to this deficiency is the construction of the Pacific Gas & Electric (PG&E) towers loop. The loop would consist of a 12-inch water main from the dead end water main at Crocker Drive along the

PG&E towers easement to the existing 12-inch water main at North Eubanks Drive. The proposed North Village Development Area Plan 1 and Area Plan 2 projects are scheduled for completion within the next ten years and should include improvements to completely loop this long dead end water main along North Eubanks Drive at Midway Road.

As shown in Figure 4.15-1, the existing Midway Road and Interstate 80 corridor includes a 12-inch dead-end water main that extends from south of Interstate 80 on Leisure Town Road, east along Interstate 80, north along Meridian Road, and finally east along Midway Road to Gentile Lane, approximately 24,000 feet. System pressure is not a concern for this area, but water quality does pose a concern for City operations staff due to the limited demand and lack of looped network. The length of the dead-end water main will be minimized once the City completes the network with pipeline improvements proposed along Leisure Town Road and Midway Road.

d. Recycled Water

A preliminary planning study performed in 2003 evaluated the potential for recycled water delivery and use citywide. Potential customers were identified that may accept tertiary treated recycled water generated at the Easterly Wastewater Treatment Plant (WWTP) in the future. A recycled water distribution system does not currently exist and the planning and coordination to construct a system covering the entire city would be expensive and challenging. Furthermore, SID has a non-potable water conveyance system established within the city and has the supply and potential to deliver to portions of the city at a lesser cost than the City could provide recycled water. Finally, the SID Master Water Agreement between the City and SID, which is discussed in Section A.1.c.ii, SID Master Water Agreement, includes a non-compete clause prohibiting the City from selling non-potable water within the SID service area.

In summary, non-potable water is currently used in the city by a variety of non-residential users (typically landscape irrigation) and provided by SID. Any future non-potable water (non-residential landscape irrigation) can be provided by SID within their existing service areas. SID has sufficient water supply to serve the non-potable water needs of the city.

3. Standards of Significance

Implementation of the proposed General Plan and ECAS would have a significant impact on water supply if they would:

- Require or result in the construction of new water treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.
- Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed.

4. Impact Discussion

This section discusses potential impacts of the proposed General Plan on water supply. Implementation of the proposed ECAS would have minimal water supply impacts and is discussed, where relevant, in the sections below.

a. Project Impacts

The discussion of potential project impacts is organized by and responds to each of the potential impacts identified in the Standards of Significance.

i. Require or result in the construction of new water treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.

Total water demand in 2035, the horizon year of the proposed General Plan, was projected based on anticipated development in 2035 under the proposed General Plan. The projected 2035 average day water demand would be approximately 26,220,000 gallons per day (GPD) or 26.2 MGD. The maximum day demand for 2035 would be approximately 52.4 MGD.

As described in Sections A.2.a, Existing Water Supply, and A.4.a.ii, Project Impacts, the City has allocations for 41,653 acre-feet per year (AFY) in 2035, which equates to 37.2 MGD. Therefore, there is adequate water supply to meet the projected 2035 average water demand of 26.2 MGD. However, there is not adequate production capacity to meet the maximum day water demand of 52.4 MGD. The maximum production capacity by the City with current facilities is approximately 40.7 MGD. Thus, to provide a minimum production of the maximum day demand, additional production facilities will be required. The 2010 UWMP has identified preliminary production facility improvements to meet the future demand, as described below.

a) Water Treatment Plants

As explained in Section A.2.b.i, Water Treatment Plants, the NBR Plant serves both Vacaville and Fairfield, and currently provides 13.3 MGD to Vacaville. To meet Vacaville's 2035 production capacity demand, the NBR Plant would require an expansion to a treatment capacity of approximately 60 MGD by 2035. Vacaville's share of treated water from the NBR Plant is approximately 40 percent; therefore, after expanding the Plant to a treatment capacity of 60 MGB, Vacaville would receive 24 MGD from the NBR Plant.

This expansion would take effect in two phases. Under the first phase, the NBR Plant would expand to 50 MGD, and the City's share would be 20 MGD. The second phase would expand the NBR Plant to buildout capacity of 60 MGD, and the City's share would be 24 MGD.

In addition, the hours of production at the DE Plant may be increased if operationally feasible. The DE Plant could potentially produce approximately 11.3 MGD, which would offset some of

the other treatment capacity expansion needs to meet the maximum day water demand in 2035. If other treatment capacity expansions occur, this additional capacity from the DE Plant would not be needed.

b) Groundwater Wells

To meet the 2035 production capacity demand, the City would need to construct a total of three new groundwater wells (shown as Well 17, Well 19, and Well 24 in Figure 4.15-2). The exact location of these new groundwater wells is not yet finalized but it is assumed they would be sited in the northeast sector of the city (north of Interstate 80). In addition to the new groundwater wells, the City anticipates replacing five existing wells and giving them new names (Well 18, Well 20, Well 21, Well 22, and Well 23) in the process. With these new and replaced groundwater wells, groundwater supply is anticipated to increase from the current supply of 6,500 AFY to 8,100 AFY.[1] Figure 4.15-2 shows a schematic diagram of the planned new groundwater wells and replacement groundwater wells required by 2035.

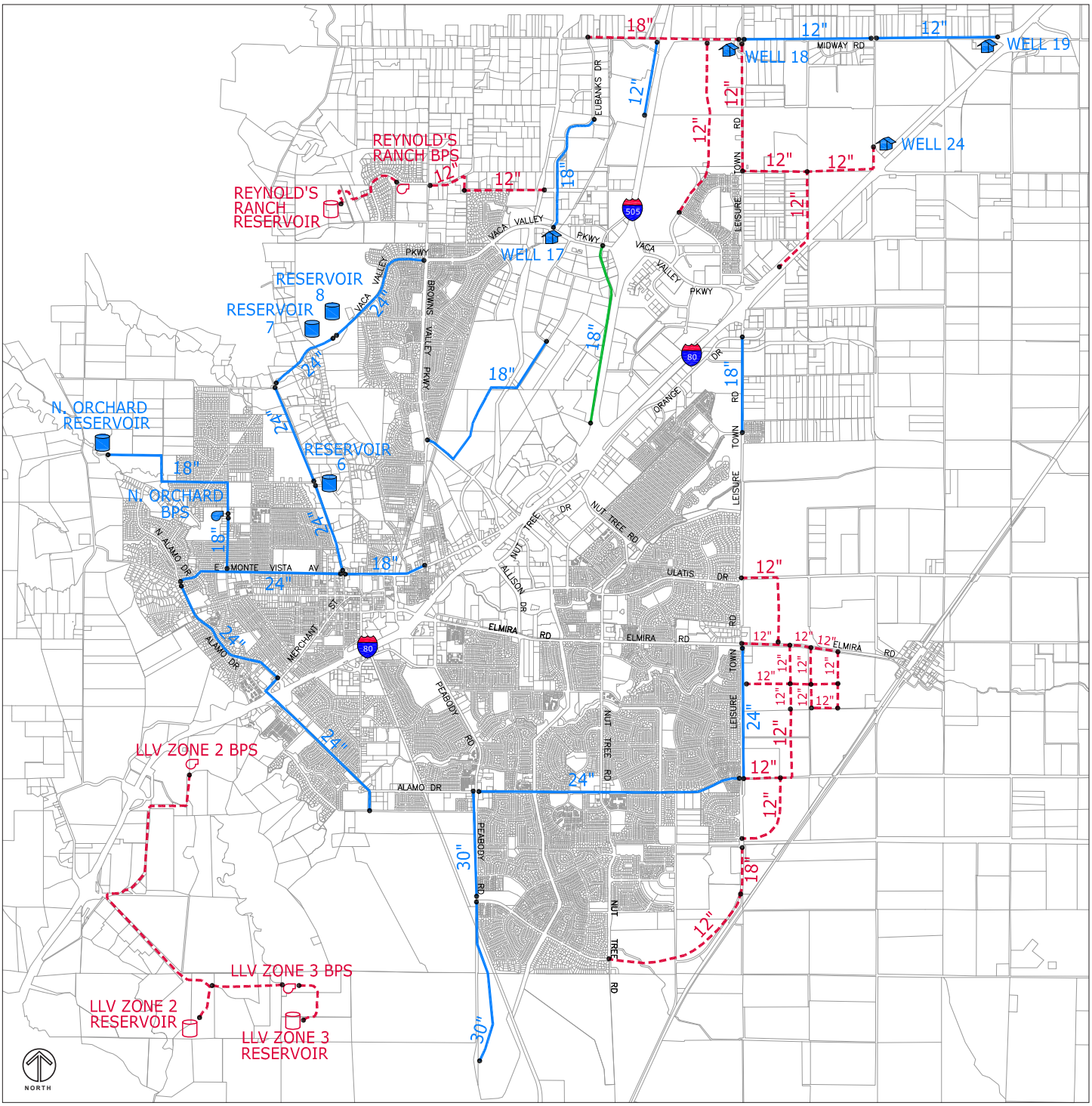
c) New Storage Reservoirs

The total 2035 demand would have a total storage requirement that the City would need to provide by adding three new main zone reservoirs (Reservoir 6, Reservoir 7, and Reservoir 8), as well as a new upper pressure zone reservoir (North Orchard). The exact location of these new reservoirs is not yet finalized but it is assumed they would be sited in the hillside of Vaca Valley Parkway (similar to Browns Valley Reservoir). Figure 4.15-2 shows a schematic diagram of the planned new reservoirs required by 2035.

d) New North Orchard Pressure Zones

The planned North Orchard Pressure Zone would alleviate the current system pressure deficiency in the North Orchard area as described above. This new upper pressure zone would ensure that existing and new development areas in the North Orchard area are properly served. The improvements would include a new North Orchard Reservoir and a new booster pump station to convey water from the main zone to the North Orchard Reservoir, along with some main zone isolation points and system connections. The exact location of the North Orchard Reservoir and booster pump station are not yet finalized but would be generally located in the northwest sector of the city to ensure they meet the design requirements of the new upper pressure zone. Figure 4.15-2 shows a schematic diagram of the planned North Orchard Reservoir and booster pump station location required by 2035.

[1] Nolte Associates, 011, 2010 Urban Water Management Plan Update.



Source: NV5, 2012.

- PLANNED WATER LINES (CITY)
- PLANNED WELLS/PLANTS (CITY)
- PLANNED RESERVOIRS (CITY)
- PLANNED BOOSTER PUMP STATIONS (CITY)
- PLANNED WATER LINES (DEVELOPER)
- PLANNED RESERVOIRS (DEVELOPER)
- PLANNED BOOSTER PUMP STATIONS (DEVELOPER)
- WATER LINES UNDER DESIGN/CONSTRUCTION (CITY)

FIGURE 4.15-2

YEAR 2035 PLANNED WATER SYSTEM IMPROVEMENTS

a) New Transmission and Distribution System Water Mains

New transmission and distribution system water mains (pipelines) are anticipated by 2035 to ensure water is conveyed throughout the city to meet the City's level of service requirements. Some of these pipeline improvements would be funded from development impact fees while others would be completely funded by developer improvements.

Some transmission water mains are necessary to convey flow from the expanded NBR Plant to the city, while others provide transmission between sectors of the city. Additionally, some distribution waters mains provide complete loops and improved network distribution.

Figure 4.15-2 shows a schematic diagram of the planned pipeline improvement required by 2035.

b) Impact Significance Determination

As described above, the maximum production capacity by the City with current facilities is approximately 40.7 MGD. Thus, to provide a minimum production of the maximum day demand (52.4 MGD), additional production facilities will be required. Improvements could include expansion of the existing NBR Plant, revised operations of the DE Plant, development of new groundwater wells, construction of new storage reservoirs and booster pump stations, and construction of new transmission and distribution system water mains.

Impacts from the construction of new or expanded water production facilities would be project-specific. A generic summary of the types of potential impacts associated with water production facilities is provided in Table 4.15-5. Any new or expanded water production facilities projects would require permitting and review in accordance with CEQA, which would ensure that any environmental impacts are disclosed and mitigated to the extent possible. This EIR is a programmatic document and does not evaluate the environmental impacts of any project-specific development.

The proposed General Plan includes the following policies to address the mitigation of potential environmental impacts of new and expanded water production facilities:

- Policy LU-P6.2 requires that infrastructure and service improvements for future annexation or growth areas do not create an undue burden on existing City infrastructure and services.
- Policy PUB-P12.5 requires buffer landscaping and multiple use, where feasible, of water utility sites and rights-of-way to harmonize with adjoining uses.

TABLE 4.15-5 POTENTIAL ENVIRONMENTAL IMPACTS FROM NEW OR EXPANDED WATER SYSTEM PROJECTS

Types of Potentially Affected Resources	Possible Impacts Unless New or Expanded Facilities are Carefully Planned and Executed
Surface Water Hydrology	Changes in the magnitude and timing of flows in affected streams; changes in the level of affected reservoirs and lakes.
Geology and Soils	Increase in erosion and sedimentation from construction activities; change in sediment transport in streams; geologic hazards could cause problems for new facilities and their operators if they are not sited carefully.
Water Quality	Changes in stream and reservoir/lake temperature, dissolved oxygen, turbidity, total suspended solids and other water quality parameters of concern during construction and operation of new facilities.
Fishery Resources including Special-status Species	Change in the amount and quality of fishery habitat in affected streams and reservoirs/lakes and potential fish entrainment at possible diversion sites in lakes and streams.
Wetlands and Riparian Habitat	Changes in the amount or functions and values of various types of wetlands from the construction of new facilities, or in riparian areas from changes in the operation of reservoir/lakes and changes in stream flows. Riparian habitat could be affected by hydrology changes or new construction and is especially important habitat for wildlife and botanical species.
Botanical Resources including Special-status Species	Disturbance to rare plants and their habitat and other types of vegetation from construction activities or changes in hydrology along streams and at reservoirs and lakes.
Wildlife Resources including Special-status Species	Changes in the amount and quality of wildlife habitat near affected reservoir/lakes, and streams and where appurtenant facilities would be located.
Recreation	Changes in the quantity or quality of recreation opportunities, including fishing, boating, hiking, and whitewater rafting in affected reservoirs/lakes and streams; some impacts could also occur during construction and operation of new conveyance, treatment, storage, and pumping facilities.
Visual Resources	The addition of new project facilities could affect the visual environment. New pipelines, pumping stations, or transmission lines near or in residential areas or scenic vistas could cause negative impacts.
Agriculture	Some irrigated land or grazing land could be taken out of production where project conveyance facilities need to be located and to accommodate growth.
Cultural Resources	Historic, prehistoric, and ethnographic resources could be affected by hydrology changes or the construction and maintenance of new facilities.
Compatibility with Existing Land Uses and Other Policies and Plans	Some new project facilities may not be compatible with surrounding land uses, or may be inconsistent with related federal, State, tribal, and local plans and policies.
Mineral Resources	New project facilities could interfere with the extraction of minerals at known or yet-to-be discovered mineral sites.
Public Utilities	The routing and siting of new project facilities could interfere with the operation or maintenance of existing or planned public utilities, including communication and energy infrastructure.
Air Quality and Noise	Air emissions from construction equipment and traffic and loud noises could occur during the construction phase of new projects. New pumping stations could

TABLE 4.15-5 **POTENTIAL ENVIRONMENTAL IMPACTS FROM NEW OR EXPANDED WATER SYSTEM PROJECTS**

Types of Potentially Affected Resources	Possible Impacts Unless New or Expanded Facilities are Carefully Planned and Executed
	cause adverse noise impacts for nearby residents and recreationists.
Transportation	Local roads would experience traffic increases during construction.
Public Health and Safety	Construction activities could create some safety hazards.
Growth-Inducing Effects	New system infrastructure and water supply projects could cause growth-inducing impacts.

Note: This table identifies examples of potential environmental impacts that could results from new or expanded water facilities necessary to support additional growth. The potential impacts listed in this table are not location specific.
Source: County of Napa, Napa County General Plan Update Draft Environmental Impact Report, February 2007.

The proposed General Plan and ECAS also include policies, actions, and measures that promote water conservation. Specifically, the policies and actions under Goal COS-13 and the ECAS measures in the water and wastewater sector would likely reduce water demand. A significant reduction in demand would result in smaller pipelines, less production capacity required, and less storage requirement, which would reduce the potential environmental impacts from new or expanded facilities.

In addition, as specific water production capacity improvement projects are identified, additional project-specific environmental analysis would be completed pursuant to CEQA. Consequently, new or expanded water production facility improvements required to serve development allowed by the proposed General plan would have a *less-than-significant* impact.

ii. Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed.

As described in Section A.4.a.i, Project Impacts, the projected 2035 average water demand under the proposed General Plan is 26.2 MGD, or 29,350 AFY. As shown in Table 4.15-1, in 2035, the City will be allocated 41,653 AFY, as outlined in the 2010 UWMP. Therefore, the City has sufficient water supply entitlements to meet the average daily potable water demand without requiring additional water supply entitlements to meet Year 2035 water demands, and the impact would be *less than significant*. However, additional production capacity is anticipated to meet the Year 2035 maximum day water demand of 52.4 MGD. The maximum production capacity by the City with current facilities is approximately 40.7 MGD. The 2010 UWMP has identified preliminary production facility improvements to meet the future demand, as described previously in Sections A.4.a.i.a, Water Treatment Plants, and A.4.a.i.b, Groundwater Wells.

b. Cumulative Impacts

Prior to the development and use of the Solano Project, groundwater was the primary water supply in Solano County, with most groundwater wells developed in the Quarternary alluvium and the upper and middles zones of Tehama Formation; thus, groundwater levels declined significantly in those zones. After the construction of the Solano Project, most agricultural users switched to surface water supply and groundwater levels recovered. Currently, only the cities of Rio Vista and Dixon are served exclusively with groundwater supply from basins underlying the cities. There is a possibility that growth in areas outside Vacaville, specifically Rio Vista and Dixon, could impact regional groundwater supplies. However, existing well development in areas outside of Vacaville has largely been from the upper part of the aquifer system rather than the basal zone of the Tehama Formation. If unincorporated areas of Solano County were to penetrate the areas and develop groundwater wells that are deep into the Tehama Formation supply, groundwater levels in the basin may be impacted.

At current water use levels, the Solano County Water Agency (SCWA) Integrated Regional Water Management Plant and Strategic Plan (February 2008) concludes that during dry years, the region could be subjected to a supply shortage. Such shortages are driven by climatic and regulatory conditions that are difficult to predict. The shortage is usually managed with coordination efforts by all public agencies that include groundwater pumping planned during the dry years followed by surface water use in the wet years.

Public agencies that overlie this groundwater basin have developed groundwater management plans, which provide measures for the public agencies to monitor groundwater levels and storage. The SCWA, through the Solano Water Authority, prepares biannual reports on groundwater levels for the groundwater basin. Such reports show no current trend of over drafting with current levels of groundwater use. Groundwater levels tend to drop during dry years but rebound in wet years.

The Solano County General Plan addresses cooperation with regional water users to protect Solano County's water resources. In particular, County General Plan Policy PF.P-14 requires appropriate evidence of adequate water supply and recharge to support proposed development and water recharge in areas of marginal water supplies. This policy is implemented by continuing to require the preparation of SB 610 Water Supply Assessment Reports pursuant to the California Water Code.

As long as the public agencies continue to monitor the groundwater levels and storage as part of the groundwater management plans and continue to implement the requirement of SB 610 documents, development allowed by the proposed General Plan would result in a *less-than-significant* cumulative impact to the water supply.

B. Wastewater

This section describes applicable regulations, current conditions, and potential impacts of the proposed General Plan and ECAS with regard to wastewater in Vacaville.

1. Regulatory Framework

The purpose of this section is to discuss the key regulatory requirements applicable to the City of Vacaville wastewater collection and treatment facilities.

a. State and Regional Agencies, Plans, and Regulations

This section summarizes the State and regional agencies, plans, and regulations pertaining to wastewater in the EIR Study Area.

i. State Water Resources Control Board (SWRCB) and Regional Water Quality Control Board (RWQCB)

In California, the SWRCB has broad authority over water quality control issues for the State. The SWRCB is responsible for developing statewide water quality policy and exercises the powers delegated to the State by the federal government. The SWRCB has historically provided overall policy direction, organizational and technical assistance, and a communications link to the State legislature.

Regional authority for planning, permitting, and enforcement is delegated to the nine Regional Water Quality Control Boards (RWQCBs). The RWQCB's regulatory role involves the formation and implementation of basic policies for water protection. These are reflected in the RWQCB's Basin Plan in the form of guidelines, criteria, and/or prohibitions related to the siting, design, construction, and maintenance of on-site sewage disposal systems. The Central Valley RWQCB (Region 5) is the primary agency responsible for implementing State and federal water quality-related laws and regulations in the EIR Study Area.

Information on the role of the RWQCBs and permits for wastewater discharge is contained in Chapter 4.9, Hydrology and Water Quality.

ii. Wastewater Collection System Regulations

On May 2, 2006 the SWRCB adopted a Statewide General Waste Discharge Requirement (Order No. 2006-0003) for all publicly owned wastewater collection systems in California with more than 1 mile of sewer pipe. The SWRCB order is referred to as the Waste Discharge Requirements for wastewater collection systems. The order provides a consistent statewide approach to reducing sanitary sewer overflows (SSOs) by requiring public wastewater system operators (such as the City of Vacaville) to take all feasible steps to control the volume of waste discharged into the system, to prevent sanitary sewer waste from entering the storm sewer system, and to devel-

op a Sewer System Management Plan (SSMP). Each element of the SSMP describes how the City's programs and plans comply with the various provisions of the Waste Discharge Requirements. The Waste Discharge Requirement also requires that storm sewer overflows be reported to the SWRCB using an online reporting system.

The Central Valley RWQCB, as the local division of the SWRCB, is responsible for the issuance of Waste Discharge Requirements under the National Pollutant Discharge Elimination System (NPDES), in Vacaville. NPDES permits allow the RWQCB to collect information on where the waste is disposed, what type of waste is being disposed, and what entity is depositing the wastes. The RWQCB is also charged with conducting inspections of permitted discharges and monitoring permit compliance.

The Waste Discharge Requirements require several work products that can be grouped into three categories. The three categories are as follows:

- Application for statewide collection system Waste Discharge Requirements permit
- Sewer system management plan
- Reporting and monitoring program

These work products have been completed and adopted by the Vacaville City Council.

iii. Wastewater Treatment Regulations

The Central Valley RWQCB has issued Waste Discharge Requirements and time schedule orders (TSO) to the City of Vacaville to address discharges to surface water from the Easterly WWTP. These documents became effective on June 14, 2008, and the City is in compliance with these orders. The Waste Discharge Requirements Order (i.e. the discharge permit) is subject to review and renewal every five years. The TSO governs the timing of implementation of new treatment requirements.

Waste Discharge Requirements included in NPDES permits issued by the Central Valley RWQCB are based on the following guidance documents, which are described in detail below:

- Water Quality Control Plan for the Sacramento and San Joaquin River Basins (Basin Plan)
- California Toxics Rule
- Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (State Implementation Plan)
- State Title 22 Requirements
- Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta Plan)

iv. Water Quality Control Plan for the Sacramento and San Joaquin River Basins

The Basin Plan was originally adopted in 1975. Since then, the Plan has undergone many revisions. The fourth edition, adopted in August 2006, was the basis for the current Waste Discharge Requirements. The Basin Plan designates beneficial uses, establishes both numeric and narrative water quality objectives, and consists of implementation programs to achieve these objectives for the basin. The Basin Plan also addresses groundwater criteria needed to protect the beneficial uses of this water source. Most requirements of the Basin Plan have been incorporated into the City's existing NPDES permit. The SWRCB adopted amendments to the Basin Plan on November 3, 2011 establishing site specific objectives for New Alamo Creek and Ulatis Creek, which are downstream of the City's point of discharge. The action will allow the City's current effluent quality to be in compliance with water quality objectives related to disinfection byproducts without construction of an alternative means of disinfection. The new Basin Plan requirements will be incorporated into the City's NPDES permit at the time the permit is next revised.

v. California Toxics Rule and State Implementation Plan

In the mid-1990s, the US EPA adopted the National Toxics Rule (NTR), which formally identified water quality standards for a number of trace toxic compounds. Approximately 40 criteria in the NTR are applicable in California. On May 18, 2000, the US EPA adopted the California Toxics Rule (CTR), which included new toxics criteria in addition to the previously adopted criteria from the NTR. The State Implementation Plan (SIP), adopted in 2000, provides implementation provisions for CTR criteria. According to the SIP, full compliance with these criteria was required by May 18, 2010. The requirements of the CTR and the SIP have been incorporated into the City's existing NPDES permit.

vi. State Title 22 Requirements

Water recycling criteria, administered by the California Department of Public Health (CDPH), are contained in the California Administrative Code, Title 22, Division 4, Chapter 3, Sections 60301 through 60355. These criteria are known as the Title 22 requirements or standards. Title 22 contains provisions for the uses of recycled water based on the method of treatment, the use area requirements for recycled water projects, and general requirements for design, operations, and reliability. Water used for recreational uses or agricultural irrigation must meet Title 22 standards for unrestricted reuse. Title 22 requirements have been incorporated into the City's existing NPDES permit.

vii. Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary

The Bay-Delta Plan was adopted on December 13, 2006, superseding both the May 1995 and the 1991 Bay-Delta Plans. The Bay-Delta Plan identifies the beneficial uses of the estuary and includes objectives for flow, salinity, and endangered species protection. The Bay-Delta Plan

attempts to create a management plan that is acceptable to the stakeholders, while at the same time is protective of beneficial uses of the San Joaquin River and Sacramento River in the Bay Delta Estuary. The requirements of the Bay-Delta Plan have been incorporated into the City's existing NPDES permit.

b. Local Plans and Policies

This section summarizes the local plans and policies pertaining to wastewater in the EIR Study Area.

i. Municipal Code

The Vacaville Municipal Code has a number of provisions related to wastewater, including Chapter 13.08, Sewers, which contains regulations to prevent pollution and control and improve the quality and quantity of waste discharge. Another relevant section is Chapter 11.01, Development Impact Fees, which describes the Sewer System Impact Fee.

ii. Easterly Wastewater Treatment Plant Tertiary Project Facilities Plan

The Easterly Wastewater Treatment Plant Tertiary Project Facilities Plan (Tertiary Facilities Plan) was completed in April 2010. The purpose of the Tertiary Facilities Plan is to identify the Easterly WWTP upgrades needed to comply with the NPDES permit issued on April 25, 2008.

iii. Sewer System Management Plan (SSMP)

The City of Vacaville SSMP was developed in response to the Statewide General Waste Discharge Requirements for Sanitary Sewer Systems, and was completed in June 2009. The SSMP provides a general framework for collection system operation, maintenance, and overflow prevention. It includes the following elements, commensurate with the statewide Waste Discharge Requirements:

- ♦ Development plan and schedule
- ♦ Goals
- ♦ Organization
- ♦ Legal authority
- ♦ Operation and maintenance program
- ♦ Design and performance provisions
- ♦ Overflow emergency response program
- ♦ Fats, oils, and grease (FOG) control program
- ♦ System evaluation and capacity assurance plan
- ♦ Monitoring, measurement, and program modifications

- ♦ SSMP audits
- ♦ Communication program

2. Existing Conditions

The City of Vacaville provides wastewater collection and treatment (sewer) service to most developed areas within the city limit. Sewer service includes operation and maintenance of gravity sewers, lift stations, force mains (i.e. pressure sewers), and the Easterly WWTP. Because future development allowed by the proposed General Plan can only occur after annexation to the City, which includes provision of City services, this section focuses on the provision of sewer service from the City.

a. Treatment Capacity and Existing Wastewater Flows

The Easterly WWTP, located east of the city adjacent to the unincorporated town of Elmira, has a sanitary base flow (SBF) capacity of 15 MGD.[2] Previous planning documents estimated that the current capacity would be adequate through the year 2028; however, the timing of future expansions at the Easterly WWTP is highly dependent on the actual pace of growth, as well as the nature of businesses that choose to locate in Vacaville.[3] In 2011, the three-month average late summer flow was 7.5 MGD,[4] or half the rated capacity of the Easterly WWTP. Dry weather flows vary significantly from year to year, so the City periodically calculates a theoretical SBF that could occur based on actual historical flows. The most recent calculation was completed in June 2011 and determined that the theoretical SBF in 2010 was 8.36 MGD.[5] Therefore, the Easterly WWTP has capacity to accommodate growth producing an SBF of about 6.6 MGD.

The Easterly WWTP was designed to be expanded to accommodate an SBF above 15 MGD. In addition, the treatment plant is currently being upgraded to provide additional levels of treatment. Upgrades to add denitrification and equalization capabilities are scheduled for completion in 2013. Laboratory improvements and filtration will be added by 2014 and 2015, respectively. These improvements will allow the plant to maintain compliance with its NPDES discharge permit, but will not add capacity above the current 15 MGD.

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[2] Upon completion of the upgrades under design and construction in 2012, one treatment process area, the secondary clarifiers, will have a maximum day capacity of about 18.2 MGD distributed over three clarifiers, equivalent to a SBF capacity of about 12.7 MGD. A fourth clarifier will be constructed as SBFs approach the capacity of the first three clarifiers in order to achieve the full 15.0 MGD rated plant capacity. Personal communication with Jim Waters, West Yost Associates, March 13, 2012.

[3] West Yost Associates, 2010, *Easterly Wastewater Treatment Plant Tertiary Project Facilities Plan*.

[4] Calculations by West Yost Associates using influent flow data provided by the City of Vacaville Utilities Department, January 2012.

[5] City of Vacaville, Utilities Department, 2012, *City of Vacaville Infrastructure, Facilities Status Report* – Water Supply & Treatment/Wastewater Treatment Facilities.

b. Treatment Operations

The Easterly WWTP currently provides secondary treatment and disinfection consistent with currently-applicable discharge standards. The major treatment processes and operations of the Easterly WWTP include:

- **Headworks/Preliminary Treatment:** Influent pumps, bar racks, screens, and grit tanks.
- **Primary Treatment:** Primary sedimentation basins.
- **Secondary Treatment:** Aeration basins, secondary clarifiers, and ancillary facilities.
- **Disinfection:** Chlorine injection, chlorine contact basins, and dechlorination.
- **Biosolids Handling:** Anaerobic digesters, dissolved air flotation thickeners (DAFTs), biosolids storage lagoons, belt press thickeners, and biosolids storage beds. The fully treated biosolids are currently used as alternative daily cover at an off-site landfill, in accordance with State biosolids disposal requirements.
- **Ancillary Facilities:** Storage lagoons, pump stations, monitoring equipment, laboratory facilities, administrative facilities, and storage facilities.

c. Wastewater Quality

The Easterly WWTP consistently and reliably meets all currently-applicable effluent quality standards, as defined in the current NPDES permit for the facility. Current applicable effluent limitations include the following:

- Biochemical oxygen demand (BOD)
- Total suspended solids (TSS) and settle-able solids
- Total coliform organisms
- Chlorine residual
- Effluent toxicity
- Ammonia
- Nitrate
- Electrical conductivity
- pH
- Miscellaneous toxics (chlorodibromomethane, cyanide, dichlorobromomethane, mercury, and total trihalomethanes)

In addition, water quality standards are applicable to the shallow receiving waters downstream of the Easterly WWTP discharge point. These standards include numeric limits for fecal coliform, dissolved oxygen, pH, pesticides, radioactivity, temperature, and turbidity, as well as narrative limits for biostimulatory substances (i.e. substances that "promote aquatic growths in concentra-

tions that cause nuisance or adversely affect beneficial uses"), chemical constituents, color, floating material, oil and grease, suspended sediments, settle-able substances, taste, odor, and toxicity.

Finally, groundwater standards are applicable to the groundwater in the vicinity of the Easterly WWTP. These standards include numeric limits for fecal coliform, ammonia, total dissolved solids, and pH, as well as narrative limits for taste, odor, toxicity, and color.

d. Wastewater Collection

The City owns and operates the wastewater collection system for the Easterly WWTP. The wastewater collection system consists of gravity sewers ranging in diameter from 6 inches to 54 inches, plus seven different lift stations, and associated facilities.

i. Collection System Monitoring

The City performs routine wastewater collection system flow monitoring at various permanent metering locations throughout the city and at the Easterly WWTP. Most of the sites are connected to the City's Supervisory Control and Data Acquisition (SCADA) system, and include various gravity flow metering flumes and lift station magnetic flow meters. A total of five existing permanent collection system metering manholes equipped with flow measuring flumes actively measure flow within the collection system at key locations. Two of the five metering manhole flumes have not been connected to the SCADA system yet. In addition, the three largest lift stations in the city are currently flow metered and connected to the SCADA system.

Moreover, as part of the on-going management of the wastewater collection system, the City conducts flow monitoring and sanitary sewer system capacity evaluations each year. Activities include extensive fieldwork and data analysis to characterize the relative performance of various areas of the collection system and to identify specific problems or problem areas. Activities for the 2009/2010 rainy season included:

- Flow metering and data analysis at 20 sites, including pump stations, City sewer flow metering sites, industrial flow metering sites, and influent flow metering at the Easterly WWTP.
- Field inspections of sanitary sewer manholes at various locations throughout the city.
- Sewer line surcharge monitoring.
- Installation of non-perforated manhole covers to reduce inflow during street surface flooding events.
- Continued inflow and infiltration (I&I) assessment, and development and implementation of a long-term I&I control plan.

♦ Data analysis and preparation of annual reports for each monitoring season.

These activities focus on identifying major sources of inflow and infiltration (I&I) and defining corrective measures that will help to reduce peak flows in the collection system and at the treatment plant. I&I control measures preserve pipeline and treatment capacity for residential and commercial uses, and reduce the likelihood of a system outflow caused by high flows.

In addition to flow monitoring, the City conducts routine cleaning and closed-circuit television inspections of the collection system to identify deteriorating facilities and set rehabilitation priorities. Approximately 20 percent of the system is inspected each year, so that over the course of each five-year period, the entire system is inspected.

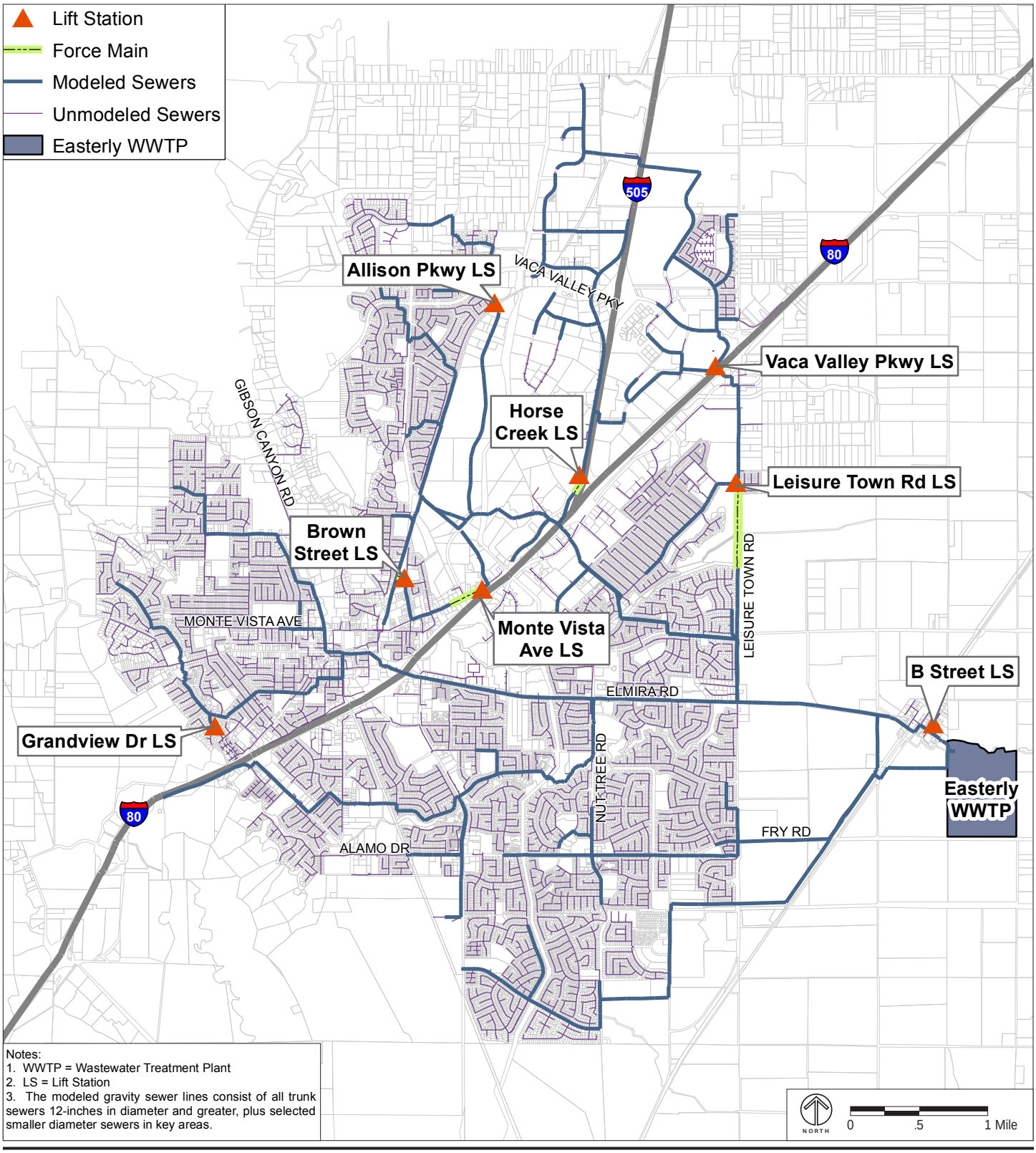
ii. Collection System Modeling and Planning

The City maintains a collection system model for the purpose of simulating peak flow conditions to determine existing and future needs for collection system improvements. All gravity trunk sewers 12 inches in diameter and greater, selected smaller diameter sewers in key areas, and all seven City lift stations with associated pressure mains, are modeled. The modeled facilities are indicated schematically in Figure 4.15-3.

The model makes use of the City's land use database and associated flow factors to calculate average sanitary flows. Peak flows are then derived using sanitary flow peaking factors and I&I patterns taken from past collection system flow data. The resultant peak flow conditions are analyzed to determine the locations and sizing of system improvements needed to accommodate the modeled peak flows.

Modeling has been used to conduct collection system planning for over 20 years. In addition to citywide planning, special attention has been paid to certain focus areas. The most important of these areas is the Northeast Sector, for which the Northeast Sector Sewer Master Plan Update (prepared by West Yost Associates) was adopted by the City Council in December 2009. In particular, this document defines the capacity available for future development in the business park areas between Putah South Canal and Interstate 505, as well as within the Vaca Valley Business Park. The master plan establishes policies to provide at least 2,000 gallons per day per acre (gpd/acre) of average flow capacity to all non-residential areas covered by the plan. It also identifies additional flow capacity above this baseline capacity that may be available for future development. Some capacity may therefore be available for dischargers who require more than 2,000 gpd/acre average flow capacity.[6]

[6] City of Vacaville, Northeast Sector Sewer Master Plan Update, 2009.



Source: West Yost Associates, 2012.

FIGURE 4.15-3

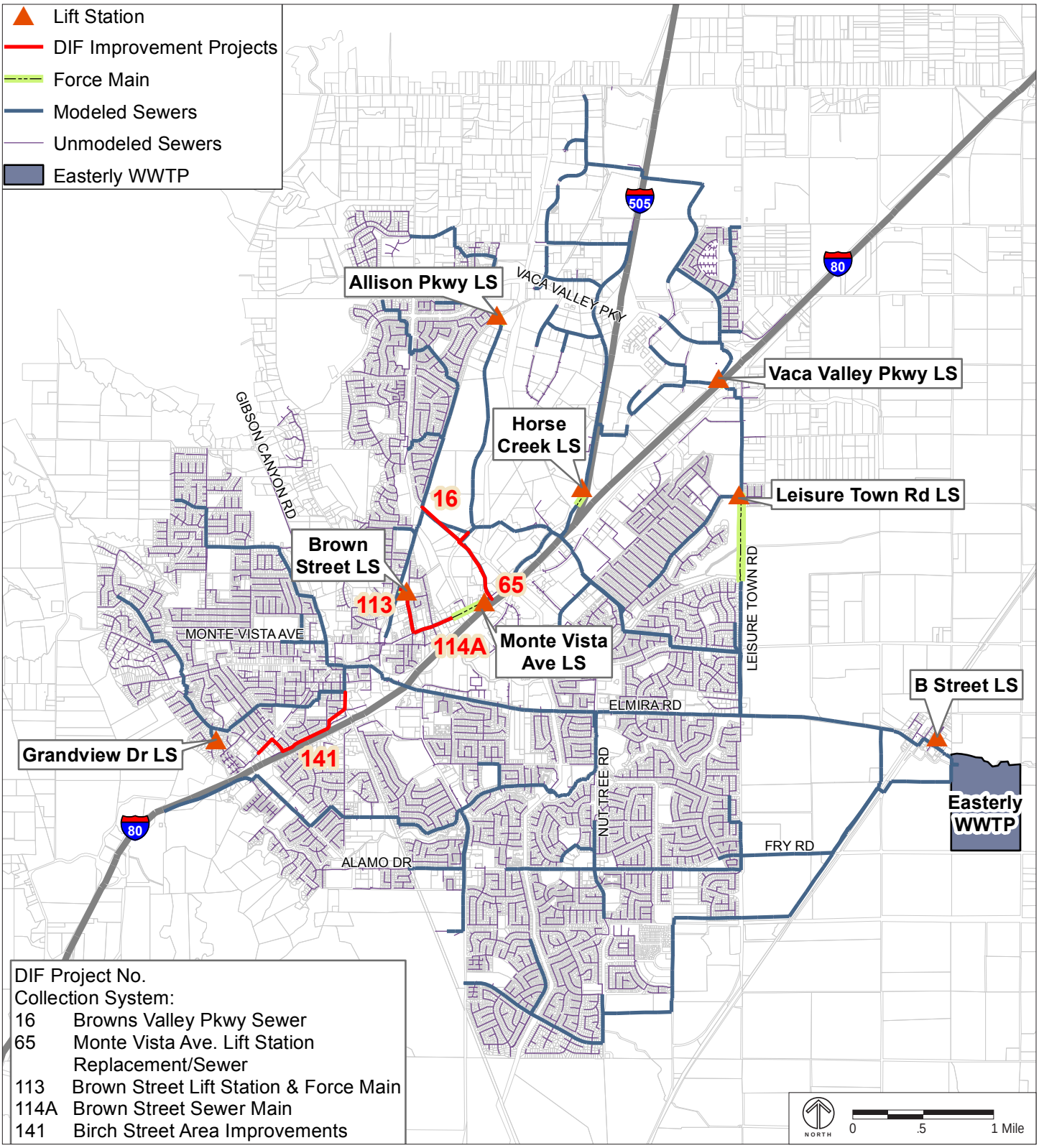
EXISTING FACILITIES IN THE WASTEWATER COLLECTION SYSTEM

iii. Collection System Improvements Needed to Address Existing Deficiencies

Based on available information, flows have reached capacity, or may in the near future reach capacity, in several wastewater collection system facilities. Preliminary results from updated computer modeling have been used to identify sewer segments that are likely to require replacement with larger facilities within a five-year time frame. Collection system facilities that are expected to approach or reach capacity within five years are described below and shown in Figure 4.15-4, with Development Impact Fee (DIF) identification numbers indicated. An estimated schedule for completion of these facilities is provided in Table 4.15-6.

Collection system facilities that are expected to require replacement within a five-year timeframe are as follows:

- **Monte Vista Avenue Lift Station Replacement (DIF #65).** Collection system modeling results indicate that the Monte Vista Avenue Lift Station is slightly undersized to handle modeled peak hour wet weather flow (PHWWF) conditions. A variety of other problems plague the lift station, including problematic access, deteriorating components, and electrical limitations. A feasibility analysis is currently in progress that examines alternatives for replacing and relocating the lift station, or eliminating it altogether through the construction of a gravity sewer connection.
- **Brown Street Lift Station (DIF #113).** During peak storm events in 2002, 2005, and 2008, the Brown Street Lift Station operated with both pumps running for prolonged periods. The simultaneous operation of two pumps at a duplex pump station suggests that the pumps are undersized. A feasibility analysis is currently in progress to identify the appropriate sizing for an upsized lift station. Moreover, station replacement at the existing location may be infeasible due to site constraints. Alternative lift station sites will be identified through the feasibility analysis.
- **Brown Street Sewer Main from Callen Street to Brown Street Lift Station (DIF #114A).** Modeled PHWWFs in an existing 8-inch and 10-inch sewer main along East Monte Vista Avenue and Brown Street indicate a potential for flow in this line to significantly exceed gravity flow capacity. Measured surcharging in the line in question has not been excessive to date, although reliable surcharge monitoring has only been performed since 2006. It has thus been concluded that the line needs to be upsized to eliminate the risk of excessive surcharging and potential outflows. A feasibility analysis is currently in progress to identify the appropriate sizing for the upsized sewer main. As part of the replacement, it is expected that an aging parallel 10-inch sewer along Brown Street will be eliminated.



Source: West Yost Associates, 2012.

Notes:
1. WWTP = Wastewater Treatment Plant
2. LS = Lift Station
3. The modeled gravity sewer lines consist of all trunk sewers 12-inches in diameter and greater, plus selected smaller diameter sewers in key areas.
4. DIF = Developer Impact Fee

FIGURE 4.15-4

WASTEWATER COLLECTION SYSTEM IMPROVEMENTS NEEDS TO ADDRESS EXISTING DEFICIENCIES

TABLE 4.15-6 **ANTICIPATED WASTEWATER COLLECTION SYSTEM IMPROVEMENTS**

Project	Projected On-Line Year[a]
Monte Vista Avenue Lift Station Replacement/Sewer	Recently Constructed
Brown Street Lift Station	2015
Brown Street Sewer Main from Callen Street to Brown Street Lift Station	2015
Browns Valley Parkway Trunk Sewer	Recently Constructed
Birch Street Area Improvements	2015

[a] Preliminary estimates; subject to revision.
Source: West Yost Associates, 2010.

- **Browns Valley Parkway Trunk Sewer (DIF #16).** This sewer line currently runs from near the Brown Street/Browns Valley Parkway intersection a short distance along Browns Valley Parkway, and then off-pavement along Pine Tree Creek to Allison Drive at the southeast entrance to Centennial Park, where it connects to the recently-constructed Nut Tree Airport Trunk Sewer. The design for this sewer line improvement has been completed, and the replacement trunk sewer will be realigned to follow Browns Valley Parkway and Allison Drive to the connection point on the Nut Tree Airport Trunk Sewer.

- **Birch Street Area Improvements (DIF #141).** The Birch Street area is located immediately north of Interstate 80, west of Davis Street, and south of Walnut Avenue and Stevenson Street. The collection system in this area is characterized by substandard pipe slopes, inadequate capacity to accommodate anticipated development, structural defects, and frequent maintenance needs in the substandard sloped lines. The City is considering alternatives for replacing problematic pipes within the area of concern, and either redirecting flows at the downstream end or constructing a lift station.

- **Development Driven Improvement Projects.** There are two development driven improvement projects related to development within the Rice-McMurtry Area (i.e. Reynolds Ranch [also known as Cheyenne], Rogers Ranch, and Knoll Creek), located in the northwest sector of the city, and the Lagoon Valley project, located in the southwest sector of the city. These projects will require construction of the following wastewater facilities:

  - **Allison Parkway Lift Station (DIF #120).** The existing Allison Parkway Lift Station is operating at near capacity. The *Reynolds Ranch, Rogers Ranch and Knoll Creek Development Agreement* requires the developers of the Cheyenne, Rogers Ranch, and Knoll Creek Subdivisions to replace the existing lift station with a new lift station. Construction and op-

eration of the new lift station is required prior to the issuance of the 323rd single-family home building permit within the Rice McMurtry development area.

- **Pena Adobe Lift Station (DIF #143).** The Lagoon Valley development requires construction of a new lift station and force main system.

3. Standards of Significance

Implementation of the proposed General Plan and ECAS would have a significant impact on wastewater if they would:

- ♦ Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board.
- ♦ Require or result in the construction of new wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.
- ♦ Result in a determination by the wastewater treatment provider which serves or may serve the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments.

4. Impact Discussion

This section discusses potential impacts of the proposed General Plan related to wastewater. Because the proposed ECAS itself would not generate wastewater or increase the demand for wastewater treatment facilities, implementation of the proposed ECAS would not result in negative wastewater impacts, and is not discussed further in this section.

Flow to the Easterly WWTP is expected to increase as development allowed by the proposed General Plan occurs. Based on anticipated development in 2035 under the proposed General Plan and standard flow factors, it is projected that the Sanitary Base Flow (SBF) in 2035 would be 16.2 MGD. This flow would exceed the current treatment plant capacity by about 8 percent. In accordance with the City's NPDES permit, the City will be required to have in place a plan for expanding the Easterly WWTP by the time flows are expected to reach 15 MGD within four years.[7]

In addition to treatment, the City also maintains a wastewater collection system with varying amounts of capacity. The capacity of a particular gravity flow pipeline is a function of its diameter, slope, and roughness. The capacity of a lift station and force main (pressure sewer) system is a function of the size and horsepower of the installed pumps and the diameter, length, and roughness of the force main. Flow in any given collection system element is a function of the land uses and flow-generating capabilities of the area tributary to the particular facility. As de-

[7] Central Valley Regional Water Quality Control Board, *Order No. R5-2008-0055-01, Standard Provisions VI.A.2.l.*

velopment allowed by the proposed General Plan occurs, new facilities would be needed to extend service into undeveloped areas, such as the growth areas in the eastern and northeastern portions of the city. In addition, certain existing pipelines and lift stations will require additional capacity through replacement or upgrade.

a. Project Impacts

The discussion of potential project impacts is organized by and responds to each of the potential impacts identified in the Standards of Significance.

i. Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board.

The Easterly WWTP discharges treated water to Old Alamo Creek. The Easterly WWTP effluent routinely complies with all applicable treatment and effluent quality requirements,[8] including temporary requirements currently in effect[9] for disinfection byproducts and nitrate. Treatment plant improvements are under construction to provide full compliance with long-term limitations on nitrate established by the permit,[10] and the recent Basin Plan amendment will allow the RWQCB to adjust disinfection byproduct limitations such that the existing plant will fully comply. As development allowed by the proposed General Plan occurs, the quality of wastewater flowing to the Easterly WWTP is expected to remain similar to current conditions with normal variations in strength within typical ranges for municipal wastewater. In addition, proposed General Plan Policy PUB-P13.4 directs the City to plan, construct, and maintain wastewater treatment facilities to provide a level of wastewater treatment that meets State discharge requirements and to plan for expanding wastewater treatment capacity, consistent with anticipated needs. Therefore, the proposed General Plan would have a *less-than-significant* impact on the ability of the Easterly WWTP to meet wastewater treatment requirements.

ii. Require or result in the construction of new wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.

The Easterly WWTP is considered to have sufficient capacity to serve anticipated growth in the community for 16 years without the need for expansion, although upgrades are currently underway.[11] Two expansion steps would be needed to accommodate anticipated development allowed by the proposed General Plan through 2035:

- Construction of a fourth secondary clarifier system.
- Expansion of most or all process areas to add an increment of capacity beyond 15.0 MGD.

[8] Vicki Shidell, City of Vacaville Water Quality Manager. Personal communication with The Planning Center | DC&E. February 2, 2012.

[9] Central Valley Regional Water Quality Control Board, 2010, *Time Schedule Order No. R5-2008-0056-01.*

[10] Central Valley RWQCB, 2010, *Order No. R5-2008-0055-01.*

[11] Vacaville City Council, 2009, *Wastewater Rate Adjustment for EWWTP Tertiary Project.*

In addition, new or expanded wastewater collection facilities would also likely be required to serve new development allowed by the proposed General Plan. The construction of such facilities could lead to soil erosion, sedimentation, noise, air quality, and biological and cultural resource impacts during construction, as well as aesthetic and land impacts from new facilities.

Impacts from the expansion of the Easterly WWTP and new collection facilities would be project-specific, and would require permitting and review in accordance with CEQA, which would ensure that any environmental impacts are disclosed and mitigated to the extent possible. This EIR is a programmatic document and does not evaluate the environmental impacts of any project-specific development.

The proposed General Plan includes the following policies to address the mitigation of potential environmental impacts of expanding the Easterly WWTP and wastewater collection facilities:

- Policy LU-P6.2 requires that infrastructure and service improvements for future annexation or growth areas do not create an undue burden on existing City infrastructure and services.
- Policy PUB-P13.4 ensures that expansions to the Easterly WWTP will be designed to maintain compliance with State discharge requirements.
- Policy PUB-P15.1 requires buffer landscaping and multiple use, where feasible, of wastewater utility sites and rights-of-way to harmonize with adjoining uses.

Because additional project-specific environmental analysis for the Easterly WWTP expansion and new or expanded wastewater collection facilities would be completed pursuant to CEQA, and because the proposed General Plan includes policies to minimize environmental impacts of such projects, the impact would be *less than significant.*

iii. Result in a determination by the wastewater treatment provider which serves or may serve the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments.

The predicted flow for 2035 includes the City's existing commitments. The flow would exceed the capacity of the Easterly WWTP, which can be accommodated through the expansions described in Section B.4.a.ii, Project Impacts. In addition, flows collected throughout the city would exceed the capacity of certain gravity sewers and lift stations. The impacted facilities would require replacement with larger facilities or construction of new collection system routes.

The proposed General Plan includes policies and actions that address the need for and the proper planning of wastewater facilities. Specifically:

- Policy PUB-P13.4 directs the City to plan, construct, and maintain wastewater treatment facilities to provide a level of wastewater treatment that meets State discharge requirements and to plan for expanding wastewater treatment capacity, consistent with anticipated needs.
- Action PUB-A13.1 directs the City to implement and maintain the SSMP in accordance with regulatory requirements to ensure that the wastewater collection system is adequately sized, protected from deleterious substances, and maintained to minimize the risk of sanitary sewer overflows.
- Policy PUB-P14.1 directs the City to assess the adequacy of wastewater infrastructure in existing developed areas, and program any needed improvements in coordination with new infrastructure that will serve developing areas.
- Policy PUB-P14.2 directs the City to replace existing sewers, lift station pumps, and associated equipment and facilities with larger facilities as necessary to serve intensified land use in developed areas.
- Policy PUB-P14.4 prohibits any development that will not maintain adequate standards for wastewater service.
- Action PUB-A14.1 directs the City to continue to update the five-year Capital Improvement Plan to provide for needed wastewater facilities.
- Action PUB-A14.2 directs the City to develop and maintain, through regular updates, a long-range strategic capital development plan for wastewater facilities consistent with the General Plan.

The proposed General Plan policies and actions listed above would ensure sufficient wastewater treatment capacity is available to serve the project's projected demand, in addition to existing demand. Therefore, the impact to wastewater treatment would be *less than significant*.

b. Cumulative Impacts

Because the City does not provide sewer service to areas outside of the city limit, development elsewhere in Solano County would not impact the City's wastewater collection system facilities or the Easterly WWTP. Therefore, cumulative impacts would be *less than significant*.

C. Stormwater

This section describes applicable regulations, current conditions, and potential impacts of the proposed General Plan and ECAS with regard to stormwater in Vacaville.

1. Regulatory Framework

The purpose of this section is to discuss the key regulatory requirements applicable to stormwater in the EIR Study Area.

a. Stormwater Discharge Permitting Regulations

The federal Clean Water Act (CWA) of 1972 prohibits the discharge of pollutants to navigable waters from a point source unless authorized by a NPDES permit. The SWRCB is responsible for issuing NPDES permits to cities and counties through the RWQCBs. Phase 2 implementation of NPDES permitting, effective March 10, 2003, extended urban runoff discharge permitting to include cities of 50,000 to 100,000 people, and to construction sites that disturb between 1 and 5 acres. Under Phase 2, federal regulations allow two permitting options for stormwater discharges: individual permits and general permits. The SWRCB elected to adopt a statewide general permit (Water Quality Order No. 2003-0005-DWQ) for Small Municipal Separate Storm Sewer System (MS4) operators to efficiently regulate stormwater discharges under a single permit. Permittees must develop and implement a Stormwater Management Plan (SWMP) with the goal of reducing the discharge of pollutants to the maximum extent practicable. The City of Vacaville is considered a permittee under the statewide general permit.

b. Local Plans and Regulations

This section summarizes the City plans and regulations pertaining to stormwater in the EIR Study Area.

i. Storm Drainage Master Plan

The City completed a draft Storm Drainage Master Plan (SDMP) in 1996, and updated it in 2001. The SDMP evaluates the existing storm drain systems to identify existing deficiencies and required improvements. The focus of the SDMP is to identify improvements necessary to provide 100-year level flood protection to areas in Vacaville proposed for new development while maintaining, as a minimum, the existing level of protection in developed areas within the city that periodically flood. To this end, the SDMP outlined a staged capital improvements program to resolve existing storm drain deficiencies, and developed appropriate development impact fees for storm drainage facilities to ensure future development does not impact storm drainage for existing development within the city. The SDMP also provided a detailed inventory of existing storm drainage facilities.

ii. Vacaville Standard Specifications and Standard Drawings

City of Vacaville *Standard Specifications and Standard Drawings* require that detention basins be designed to the following criteria:[12]

[12] City of Vacaville, 2006, *City of Vacaville Standard Specifications and Standard Drawings.*

- New development shall mitigate the increase of the 10- and 100-year peak runoff from a project site over the predevelopment conditions (due to higher peak flows from the site, filling or building in overflow area, or altered flow paths).
- In the Alamo Creek Watershed upstream of Peabody Road, which includes Alamo Creek, Encinosa Creek, and Laguna Creek, the 10- and 100-year post-development peak flows shall be reduced to 90 percent of pre-development levels.[13] Additionally, the 5-year storm shall be evaluated in the Alamo Creek Watershed upstream of Peabody Road to ensure that drainage facilities do not increase the peak 5-year flows downstream in the open channels or to receiving waters.
- Detention facilities must be designed for the 100-year, 24-hour storm event.

2. Existing Conditions

The existing drainage systems in Vacaville include creeks, constructed channels, and an extensive network of storm drain pipes that collect and convey runoff from the streets and adjacent land.

a. Physical Environment

This section describes the physical environment that affects drainage systems in Vacaville, including the topography, soils, and climate conditions.

i. Topography

Vacaville is located within four watersheds (Gibson Canyon Creek, Horse Creek, Ulatis Creek, and Alamo Creek), all of which are part of the larger, 150-square-mile Ulatis Creek watershed. The topography across most of the city is relatively flat. The western portion of the city is in the rugged, steep Vaca Mountain Range, which defines the western boundary of the Ulatis Creek watershed. The mountain range is dominated by Mount Vaca, with a peak elevation of 2,819 feet. Alamo, Ulatis, Encinosa, and Laguna Creeks, which are discussed further below, all have their headwaters in the Vaca Mountains.

The northwestern portion of the city includes a series of foothills commonly referred to as the English Hills. Horse Creek and Gibson Canyon Creek have their headwaters in the English Hills. The eastern and southeastern portions of the city consist of the flat to very flat slopes of the Sacramento Valley. The natural land slope is generally downward to the east-southeast, ranging from 5 to 10 feet of descent per mile.

[13] Alamo Creek Watershed is one of four watersheds within which Vacaville is located (the others are Gibson Canyon Creek, Horse Creek, and Ulatis Creek), all of which are part of the larger, 150-square mile Ulatis Creek watershed.

ii. Soils

Soil types and characteristics have been evaluated and mapped by the US Natural Resources Conservation Service (NRCS) and documented in the Soil Survey for Solano County.[14] Soils in and around the city range from shallow loams (i.e. soil that has relatively equal proportions of sand, silt, and clay) overlaying sandstone bedrock in the mountainous areas to moderately-deep layers of sands, silts, and clays in the valley floor. The majority of soils in the Vaca Mountains and English Hills consist of Maymen-Los Gatos loam, Millsholm loam, and Dibble-Los Osos loam. These soils range in permeability from moderate to high, with very high erosion potential. Permeability of the soils influences the rate at which rainfall seeps into the ground. When soil permeability is high, rainwater will seep into the ground more easily. When the permeability is low, rain will tend to accumulate on the ground surface or flow across the ground surface.

Soils in the Vaca Valley floor and into the Sacramento Valley consist of Brentwood clay loam, Altamont clay, Capay clay and silty clay loams, Corning gravely loam, San Ysidro sandy clay loam, and Yolo silt and silty clay loams, which have permeabilities in the moderate to low range.

Please see Chapter 4.6, Geology, Soils, and Mineral Resources, for a description of existing soils as they pertain to geologic and seismic conditions.

iii. Climate Conditions and Precipitation

Vacaville's climatic conditions are consistent with the temperate conditions that dominate the Sacramento Valley. The summers are hot and dry, and the winters cool and moist. Average monthly temperatures range from lows in the 40s and highs in the 50s during the winter months, to lows in the 60s and highs in the 100s during the summer months.

The predominant rainfall season is from November through April, with the heaviest storms of record occurring from December through February. Spatial rainfall distribution over the Vacaville area consists of higher intensities and volumes in the upper elevations of the western portion of the Ulatis Creek watershed and lower intensities and volumes to the east. Mean annual precipitation varies from 45 inches at the ridgeline of the Vaca Mountains to 22 inches in the flat southeastern portion of the watershed near Elmira.[15]

Please see Chapter 4.7, Greenhouse Gas Emissions, for a description of existing climate conditions as they pertain to greenhouse gas emissions.

[14] United States Department of Agriculture, May 1977, *Soil Survey of Solano County, California.*

[15] West Yost Associates, June 1999, *Hydrology Manual*, prepared for the Solano County Water Agency.

b. Creek Systems

Vacaville's major creeks are shown in Figure 4.9-2 in Chapter 4.9, Hydrology and Water Quality. In general, the creeks flow in an east-southeasterly direction and ultimately drain into the Sacramento River via Cache Slough. The southern portion of Vacaville drains either to the Noonan Drain, which discharges ultimately to Barker Slough, or to Union Creek, which discharges to Suisun Bay.

The major stream courses within the city include:

- Alamo Creek, including its tributaries Laguna Creek and Encinosa Creek
- Ulatis Creek
- Horse Creek, including its tributary Pine Tree Creek
- Gibson Canyon Creek

The major stream courses that flow through Vacaville are largely in their natural state and alignment, except at the eastern edge of the city where flood control channels have been constructed. The natural, unaltered portions of the creeks generally do not have adequate flow capacity to convey a 100-year storm event, which is a storm that has a 1 percent chance of occurring in any given year. Maintenance for the majority of the natural streams in the city is the responsibility of adjacent property owners.

c. Constructed Channels

In the 1960s, NRCS modified natural channels in the Vacaville area to provide a 10-year level of protection and maintain a minimum freeboard[16] of 1.5 to 3.5 feet, except a few reaches along Horse Creek and Ulatis Creek that were designed by NRCS for a 50-year level of protection. The channel modifications by NRCS consisted of realigning and widening Ulatis, Alamo, Horse, Gibson Canyon, Sweeney, and McCune Creeks. The channel modifications generally extended from the eastern city limits to Cache Slough. The Alamo Creek channel modification begins just downstream of Nut Tree Road. The Ulatis Creek channel modification begins just downstream of Ulatis Drive. The Horse Creek and Gibson Canyon Creek modifications begin at Interstate 80. Horse Creek was also modified and realigned between Interstate 505 and Interstate 80 through the development of the Vaca Valley Business Park. Other improvements constructed by NRCS include stabilization structures along Ulatis, Alamo, and Horse Creeks and levees along the lower reaches of Ulatis Creek and Alamo Creek. In addition, a new diversion channel was constructed on Alamo Creek downstream of Nut Tree Road.

[16] Freeboard is the vertical distance between the design peak water surface elevation and the top of creek bank.

d. Detention Basins

Vacaville has experienced significant flooding resulting in part from the large amount of flow coming from the Vaca Mountains. Therefore, the City built several regional detention basins that reduce the flow in the creeks before reaching the city in order to reduce flooding within the city. Detention storage basins are shown in Figure 4.9-2 in Chapter 4.9, Hydrology and Water Quality. There are two types of basins within the city: natural and constructed. Natural detention basins occur in natural depressions along the creeks where obstructions within the creek, such as culverts or roads, impede the flow. Constructed detention basins reduce the downstream flow within the creeks during major storm events. Many of the constructed detention basins were built as part of development projects. Development often changes the land use from open space, which has pervious surfaces, to urban uses, which have impervious surfaces, resulting in increased runoff. The purpose of these detention basins is to store the increased runoff resulting from developing the land so that the amount of runoff is less than or equal to the amount that occurred prior to development. Thus, the development does not adversely impact downstream neighborhoods.

e. Storm Drain Systems

The City maintains a network of storm drains. The City maintains most of the channel reaches of the storm drains, keeping the channel flowlines free from debris and vegetation. The SCWA maintains Ulatis Creek, west of Nut Tree Road to the city limit line, and Alamo Creek from Nut Tree Road to the city limit. SCWA is also responsible for maintenance of the modified creeks downstream of the city.

The storm drain system is made up of a series of pipes under City streets that convey stormwater runoff to the various creeks. The storm drain pipes range in diameter from 12 to 96 inches. The capacities of these pipelines were designed for a storm event with a 10-year return frequency, which is a standard design practice. Stormwater in excess of a 10-year event would pond in the streets or be conveyed through the streets until it reaches a channel or creek. The City's existing drainage facilities are shown in Figure 4.9-2 in Chapter 4.9, Hydrology and Water Quality.

f. Surface Drainage and Overland Release

Storm drains within the city are required to convey the 10-year design flows; therefore, storm events that result in design flows greater than the 10-year storm flow over the surface. This surface drainage typically flows along streets and/or overland release paths designed into a project.

In order to accommodate surface drainage, the City of Vacaville requires that streets and other public rights-of-way be designed to provide overland release of runoff for the 100-year storm. Overland release paths must be designed to the following criteria:

- The assumption that the underground stormdrain system is plugged, all upstream areas are fully developed, and the rainfall has saturated the watershed.
- The 100-year storm flows shall be safely routed through and/or around a proposed development project to an acceptable downstream drainage facility. The overland flows shall maintain 1 foot of vertical clearance to building pads and shall not be higher than 0.5 feet above the roadway centerline elevation.

3. Standards of Significance

Implementation of the proposed General Plan and ECAS would have a significant impact with regard to stormwater if they would:

- Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.

4. Impact Discussion

This section discusses potential impacts of the proposed General Plan related to stormwater. Implementation of the proposed ECAS would have minimal stormwater impacts and is discussed, where relevant, in the sections below.

a. Project Impacts

The discussion of potential project impacts is organized by and responds to each of the potential impacts identified in the Standards of Significance.

i. Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.

The proposed General Plan would allow new development and more impervious surface coverage that would generate additional stormwater runoff. Without new or expanded storm drainage facilities, the runoff would endanger public safety and the environment.

The proposed General Plan includes policies and actions to ensure adequate stormwater facilities are provided by new development, and to reduce increases in stormwater runoff quantity resulting from new development. Specifically:

- Policy SAF-P2.2 directs the City to assess the adequacy of storm drainage utilities in existing developed areas, and program any needed improvements in coordination with new infrastructure that will serve developing areas.
- Policy SAF-P3.1 requires that the storm drainage needs for each project be evaluated and account for projected runoff volumes and flow rates once the drainage area is fully developed. In the Alamo Creek watershed upstream of Peabody Road (including Alamo,

Laguna, and Encinosa creeks), this policy requires post-development 10-year and 100-year peak flows to be reduced to 90 percent of predevelopment levels. In the remainder of Vacaville, for development involving new connections to creeks, peak flows may not exceed predevelopment levels for 10- and 100-year storm events.

- Policy SAF-P3.3 requires that Storm Drainage Master Plan be prepared for new development projects to ensure new development adequately provides for on-site drainage facilities necessary to ensure that potential off-site impacts are fully mitigated.
- Action SAF-A3.2 directs the City to revise the Land Use and Development Code to limit the amount of impervious surfaces in non-residential parking lots.

In addition, the proposed ECAS includes measures to conserve water, including by conducting public education and outreach to reduce watering of non-vegetated surfaces and promoting the use of pervious paving materials, which could also reduce runoff volumes.

Although the proposed policies, actions, and measures listed above would help to reduce runoff volume, which would reduce the size of needed storm drain pipes and detention facilities, new stormwater drainage facilities would still be needed to accommodate anticipated development. Specific environmental impacts of necessary new stormwater drainage facilities would be determined either through CEQA review of new development projects or of Public Works improvements. This EIR is a programmatic document and does not evaluate the environmental impacts of any project-specific development. Any new or expanded stormwater facilities would be considered as part of a specific project and would require environmental review in accordance with CEQA. As a result, the proposed General Plan would have a *less-than-significant* impact on stormwater drainage facilities.

b. Cumulative Impacts

As development occurs within the City of Vacaville and throughout watersheds within the Study Area, impervious surfaces would increase, thereby increasing stormwater runoff rates and quantities.

As discussed in Section C.4.a.i, Project Impacts, proposed General Plan and ECAS policies, actions, and measures would limit increases in surface runoff and ensure that new facilities are carefully planned. In addition, CEQA requires that new stormwater drainage facilities be extensively reviewed for potential environmental impacts prior to construction. These policies and regulations would combine to prevent a significant impact from the construction of new storm drainage facilities within the EIR Study Area. In addition, new storm drainage facilities constructed elsewhere in local watersheds would be subject to project-specific environmental analysis and NPDES permit and other requirements of the applicable jurisdiction. Therefore, imple-

mentation of the proposed General Plan would result in *less-than-significant* cumulative impact to storm drainage facilities.

D. Solid Waste

This section describes applicable regulations, current conditions, and potential impacts of the proposed General Plan and ECAS with regard to solid waste in Vacaville.

1. Regulatory Framework

The purpose of this section is to discuss the key regulatory requirements applicable to solid waste in the EIR Study Area.

a. State Regulations

This section describes the State regulations that pertain to solid waste and recycling services in the EIR Study Area.

i. California Integrated Waste Management Act

California's Integrated Waste Management Act of 1989, AB 939 (Sher), subsequently amended by SB 1016 (Wiggins), set a requirement for cities and counties throughout the State to divert 50 percent of all solid waste from landfills by January 1, 2000 though source reduction, recycling, and composting. To help achieve this, the Act requires that each city and county prepare and submit a Source Reduction and Recycling Element. AB 939 also established the goal for all California counties to provide at least 15 years of on-going landfill capacity. As part of the California Integrated Waste Management Board's (CIWMB) Zero Waste Campaign, regulations affect what common household items can be placed in the trash. As of February 2006, household materials including fluorescent lamps and tubes, batteries, electronic devices, and thermostats that contain mercury are no longer permitted in the trash.[17]

In 2007, SB 1016 amended AB 939 to establish a per capita disposal measurement system. The per capita disposal measurement system is based on two factors: a jurisdiction's reported total disposal of solid waste divided by a jurisdiction's population. CIWMB sets a target per capita disposal rate for each jurisdiction. Each jurisdiction must submit an annual report to CIWMB with an update of its progress in implementing diversion programs and its current per capital

[17] California Department of Resources, Recycling, and Recovery, http://www.calrecycle.ca.gov/HomeHaz Waste/info/, accessed on June 1, 2012.

disposal rate.[18] In 2010, the statewide per capita disposal rate was 4.5 pounds per resident per day.[19]

ii. California Solid Waste Reuse and Recycling Access Act of 1991

The California Solid Waste Reuse and Recycling Access Act requires areas to be set aside for collecting and loading recyclable materials in development projects. The Act required CIWMB to develop a model ordinance for adoption by any local agency relating to adequate areas for collection and loading of recyclable materials as part of development projects. Local agencies are required to adopt the model, or an ordinance of their own, governing adequate areas for collection and loading of recyclable materials in development projects. Additionally, Vacaville's Land Use and Development Code complies with the Act and requires areas for the collection of recyclable material and solid waste.

b. Vacaville Municipal Code

Division 8.08 (Solid Waste, Yard Waste, and Household Hazardous Waste) of the Vacaville Municipal Code implements the approved Source Reduction and Recycling Element required by AB 939, and regulates the collection and disposal of solid waste, yard waste, and household hazardous materials. All Vacaville residents must pay to have their solid and yard waste collected. Solid and yard waste may not be burned or buried within the city limit. Household hazardous waste must be disposed at licensed and permitted collection facilities. In addition, the Land Use and Development Code requires that residential, commercial, business, industrial, and public districts provide areas for the collection of recyclable material and solid waste.

2. Existing Conditions

This section describes the existing conditions pertaining to solid waste and recycling in the EIR Study Area.

a. Solid Waste and Recycling

The City of Vacaville currently contracts with Recology Vacaville Solano to provide weekly solid and yard waste, and recyclable material collection to Vacaville residents. In 2010, Vacaville's per capita disposal rate was 4.9 pounds per resident per day, well below the city's CIWMB target disposal rate of 6.5, but slightly above the statewide average of 4.5.[20]

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[18] California Department of Resources, Recycling, and Recovery, http://www.calrecycle.ca.gov/LGCentral/Basics/PerCapitaDsp.htm#Jurisdiction, accessed on June 1, 2012.

[19] California Department of Resources, Recycling, and Recovery, http://www.calrecycle.ca.gov/LGCentral/GoalMeasure/DisposalRate/MostRecent/default.htm, accessed on June 1, 2012.

[20] California Department of Resources, Recycling, and Recovery, http://www.calrecycle.ca.gov/lgcentral/goalmeasure/DisposalRate/MostRecent/default.htm, accessed on June 1, 2012.

Recyclable material can also be taken to several drop-off recycling centers throughout the city, including the Recology Vacaville Recycling Center at 855½ Davis Street. Recyclable material collected by Recology Vacaville Solano is sent to the Recology Vallejo facility located at 2021 Broadway in Vallejo.

Although Vacaville does not have an official Construction and Demolition waste ordinance or program, Recology Vacaville Solano does offer collection of clean dirt and clean concrete at the same rate as trash, and clean lumber at a reduced rate.[21]

b. Landfills

Solid waste collected from Vacaville is deposited at the Hay Road Landfill, located at 6426 Hay Road in Vacaville. Recology Hay Road is the landfill operator. In 2010, Vacaville's per capita disposal rate was 4.9 pounds per resident per day.[22] Solid waste in Vacaville is disposed at the Recology Hay Road facility. The landfill has a permitted daily capacity of 2,400 tons[23] and receives 226,777 cubic yards and 136,066 tons of solid waste per year, of which 81,268 tons (nearly 60 percent) is from Vacaville.[24] The total capacity of the landfill is 37 million cubic yards. As of 2010, the landfill had a remaining capacity of approximately 30.4 million cubic yards—that is, it is approximately 18 percent full.[25] Projected landfill capacity is based on the maximum permitted tons per day, regardless of the origin of the waste.[26] It is projected that the landfill will reach capacity in 2069.[27]

c. Household Hazardous Waste

Vacaville residents can dispose of household hazardous waste at the Household Hazardous Waste Facility, located at 855½ Davis Street, on Saturdays between 9:00 a.m. and 3:00 p.m. This facility is operated by Recology Vacaville Solano. Household hazardous waste materials accept-

[21] Pardini, Scott, General Manager, Recology Vacaville Solano. Personal email communication with Carey Stone, The Planning Center | DC&E. April 22, 2010.

[22] California Department of Resources, Recycling, and Recovery, http://www.calrecycle.ca.gov/lgcentral/goalmeasure/DisposalRate/MostRecent/default.htm, accessed on June 1, 2012.

[23] California Department of Resources, Recycling and Recovery, 2012, http://www.calrecycle.ca.gov/SWFacilities/Directory/48-AA-0002/Detail/, accessed on June 25, 2012.

[24] Solano County, July 2011, *Countywide Integrated Waste Management Plan Countywide Siting Element First Amendment*, pages 33 and 44.

[25] California Integrated Waste Management Board, http://www.calrecycle.ca.gov/SWFacilities/Directory/48-AA-0002/Detail/, accessed on May 31, 2012.

[26] Solano County, July 2011, *Countywide Integrated Waste Management Plan Countywide Siting Element First Amendment*, page 44.

[27] Pardini, Scott, General Manager, Recology Vacaville Solano. Personal email communication with Carey Stone, The Planning Center | DC&E. April 22, 2010.

ed at the facility include oil-based paints, solvents, pesticides, herbicides, aerosols, gas, auto fluids, and other toxics.[28]

The Household Hazardous Waste Facility also accepts commercial hazardous waste for a fee. Businesses must create an inventory of the deposited material and make an appointment for disposal.[29]

3. Standards of Significance

Implementation of the proposed General Plan and ECAS would have a significant impact with regard to stormwater if they would:

- Not be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs.
- Not comply with federal, State, and local statutes and regulations related to solid waste and recycling.

4. Impact Discussion

This section discusses potential impacts of the proposed General Plan related to solid waste and recycling. Implementation of the proposed ECAS would have minimal solid waste impacts and is discussed, where relevant, in the sections below.

a. Project Impacts

The discussion of potential project impacts is organized by and responds to each of the potential impacts identified in the Standards of Significance.

i. Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs.

In 2010, Vacaville's per capita disposal rate was 4.9 pounds per resident per day.[30] Solid waste in Vacaville is disposed at the Recology Hay Road facility. The landfill has a permitted daily capacity of 2,400 tons[31] and receives 226,777 cubic yards and 136,066 tons of solid waste per year, of

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[28] Recology Vacaville Solano website, http://www.recologyvacavillesola no.com/residential HazardousWaste.htm, accessed June 1, 2012.

[29] Pardini, Scott, General Manager, Recology Vacaville Solano. Personal email communication with Carey Stone, The Planning Center | DC&E. April 22, 2010.

[30] California Department of Resources, Recycling, and Recovery, http://www.calrecycle.ca.gov/lgcentral/goalmeasure/DisposalRate/MostRecent/default.htm, accessed on June 1, 2012.

[31] California Department of Resources, Recycling and Recovery, 2012, http://www.calrecycle.ca.gov/SWFacilities/Directory/48-AA-0002/Detail/, accessed on June 25, 2012.

which 81,268 tons (nearly 60 percent) is from Vacaville.[32] The total capacity of the landfill is 37 million cubic yards. As of 2010, the landfill had a remaining capacity of approximately 30.4 million cubic yards. The landfill is approximately 18 percent full.[33]

As described in Chapter 3, Project Description, the projected development in 2035 under the proposed General Plan includes approximately 26,500 new residents. Based on the existing solid waste generation rate in Vacaville, these residents would generate approximately 129,850 pounds (65 tons) of solid waste per day,[34] or 47,395,250 pounds (26,698 tons) per year.[35]

The proposed ECAS includes measures to reduce solid waste and increase recycling; therefore, the proposed CAP would have beneficial impacts related to solid waste (i.e. SW-1A through SW-1E). However, in order to provide the most conservative possible estimate of potential impacts, this analysis does not take into account quantified reductions in solid waste from the ECAS measures.

The total solid waste generated from new development allowed by the proposed General Plan would increase Vacaville's annual solid waste by approximately 0.03 percent of the permitted daily capacity of the Recology Hay Road facility.[36] Therefore, the Recology Hay Road facility has sufficient capacity to accommodate the solid waste disposal needs of new development under the proposed General Plan, and the impact would be *less than significant*.

ii. Comply with federal, State, and local statutes and regulations related to solid waste.

The City of Vacaville's Municipal Code implements the requirements of AB 939, and the California Solid Waste Reuse and Recycling Access Act of 1991, and has enabled the City to meet or exceed the State-mandated waste diversion goals every year for the past decade. In 2010, Vacaville's per capita disposal rate was 4.9 pounds per resident per day, well below the city's CIWMB target disposal rate of 6.5.

Under SB 1016, the CIWMB sets a target per capita disposal rate for each jurisdiction. The target for Vacaville is 6.5 pounds per person per day.[37] From 2007 to 2009, due to improvements in recycling technology and education, the daily per capita solid waste generation rate decreased from 6.0 to 4.9 pounds per day, and the daily per capita rate remained at 4.9 pounds per day

[32] Solano County, July 2011, *Countywide Integrated Waste Management Plan Countywide Siting Element First Amendment*, pages 33 and 44.

[33] California Integrated Waste Management Board, http://www.calrecycle.ca.gov/SWFacilities/Directory/48-AA-0002/Detail/, accessed on May 31, 2012.

[34] 4.9 pounds per resident x 26,500 new residents = 129,850 pounds.

[35] 129,850 pounds /2,000 pounds per ton = 64.9 tons. 129,850 pounds per day x 365 days per year = 47,395,250 pounds per year. 47,395,250 pounds / 2,000 pounds per ton = 26,697.6 tons.

[36] 2,400 tons of permitted daily capacity / 65 additional tons per day = 0.027

[37] Solano County, July 2011, *Countywide Integrated Waste Management Plan Countywide Siting Element First Amendment*, page 32.

from 2009 to 2010.[38] Based on this recent trend and the expectation that recycling options will continue and potentially increase, it can be expected that per capita solid waste will decrease or remain the same in future years.

In addition, the proposed General Plan includes policies and actions under Goal PUB-9 to reduce per capita solid waste and increase recycling, and the proposed ECAS includes measures that would similarly divert waste and reduce per capita solid waste, ensuring that the City can continue to meet State waste diversion requirements.

Therefore, the proposed General Plan and ECAS would comply with applicable statutes and regulations and the impact would be *less than significant*.

b. Cumulative Impacts

This section considers solid waste impacts under the proposed General Plan in conjunction with future growth in Solano County. In 2010, Solano County generated 327,993 tons of solid waste. The countywide daily per capita solid waste generation rate was 4.3 pounds per person in 2010. Based on 2010 solid waste generation rates and projected development trends, the county would generate 411,921 tons of solid waste per year in 2035, an approximate 26 percent increase above 2010 levels.[39] From 2007 to 2010, the Solano County and its incorporated cities have successfully diverted more than the State-mandated diversion rate of 50 percent each year. Based on recent solid waste generation trends, it can be expected that jurisdictions in Solano County will continue to meet diversion goals as the population grows in the future.

In addition, as indicated in Section D.2.b, Landfills, the Hay Road Landfill is projected to have adequate capacity through the year 2069, so it can be concluded that there is adequate capacity to serve development allowed by the proposed General Plan, in conjunction with development allowed by other jurisdictions in Solano County, through 2035.

Therefore, the cumulative solid waste impact would be *less than significant*.

E. Energy Resources

This section describes applicable regulations, current conditions, and potential impacts of the proposed General Plan and ECAS with regard to energy resources in Vacaville.

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[38] Solano County, July 2011, *Countywide Integrated Waste Management Plan Countywide Siting Element First Amendment*, page 32.

[39] 2010 solid waste figures and rates calculated based on information in Solano County, July 2011, *Countywide Integrated Waste Management Plan Countywide Siting Element First Amendment*, pages 17 to 39.

1. Regulatory Framework

Energy conservation standards for new residential and nonresidential buildings were adopted by the California Energy Resources Conservation and Development Commission in June 1977 and most recently revised in 2008 (Title 24, Part 6 of the California Code of Regulations [CCR]). Title 24 requires that the design of building shells and building components conserve energy. The standards are updated periodically to allow for consideration and possible incorporation of new energy efficiency technologies and methods.

In May 2012, the California Energy Commission adopted the 2013 Building and Energy Efficiency Standards, which will become effective on January 1, 2013. These standards are approximately 24 percent more energy efficient for residential buildings and 30 percent more energy efficient for non-residential buildings compared to the 2008 Building and Energy Efficiency Standards.

2. Existing Conditions

Residential demand for electricity and natural gas are most strongly influenced by the size of the residential unit, the type of dwelling (detached single-family or multi-family building), the number of major appliances, and the construction and siting of the structure. Space heating with either electricity or natural gas is typically the highest energy-consuming activity in California residences.

Non-residential demand for energy resources in Vacaville includes some of the large biotech facilities and the Kaiser Hospital along Interstates 505 and 80.

Based on the average energy use between years 2006 and 2008, Vacaville residential consumers typically comprise 46 percent of the city's electricity demand, at 254 gigawatts, and 53 percent of its natural gas demand, at 13 million therms. During the same period of 2006 to 2008, non-residential users in Vacaville comprised 54 percent of the city's electricity demand, at 303 gigawats, and 47 percent of its natural gas usage, at 11.4 million therms.[40]

3. Standards of Significance

Implementation of the proposed General Plan and ECAS would have a significant impact on energy consumption if they would:

- Result in the wasteful, inefficient, and unnecessary consumption of energy during construction or operation.

[40] May 11, 2012, *Community Wide Inventory Report for Cities in Solano County 2003 to 2010.*

4. Impact Discussion

This section discusses potential impacts of the proposed General Plan and ECAS on energy consumption.

a. Project Impacts

The discussion of potential project impacts is organized by and responds to each of the potential impacts identified in the Standards of Significance.

i. Result in the wasteful, inefficient, and unnecessary consumption of energy during construction or operation.

The proposed General Plan would allow new development in Vacaville with varying energy needs. To prevent the wasteful, inefficient, and unnecessary consumption of energy during the construction and operation of new residential and non-residential buildings, the City of Vacaville enforces the State Building Standard Code, Title 24. The State Building Standard Code applies to any new structures, additions to existing structures, changes to the footprint of a structure, or changes to water and heating systems. Further, proposed General Plan Policy COS-P11.1 requires new commercial and residential buildings to exceed Title 24, Part 6 standards for HVAC, lighting, and insulation.

In addition, the proposed General Plan includes policies and actions to prevent energy waste and encourage renewable energy generation:

- Policies COS-P10.3 and COS-P10.4 specifically encourage the use of solar voltaic panels, solar water heaters, and solar pool heaters.
- Policies COS-P10.2 and COS-P11.2 take a performance-based approach by encouraging grid-neutral development and requiring new development be designed to promote energy efficiency.
- Policy COS-P10.1 and Action COS-A11.2 allow for innovative energy efficiency technologies and renewable energy generation in the City, provided they do not conflict with General Plan goals or have a significantly adverse impact on the environment.
- Action COS-A11.1 commits the City to take the lead as a role model in pursuing grants to retrofit Vacaville public facilities.
- Policy COS-P11.3 promotes energy conservation by the private sector by establishing a recognition program for local businesses that pursue energy efficiency.

In addition, the proposed ECAS includes an array of measures in the Green Building, Renewable Energy and Low Carbon Fuels, and Energy Conservation sectors to promote energy conservation and the development of renewable energy in Vacaville.

These proposed policies, actions, and measures, along with Title 24 requirements, would prevent the wasteful, inefficient, and unnecessary consumption of energy, resulting in a *less-than-significant* impact.

b. Cumulative Impacts

As developed allowed by the proposed General Plan occurs in Vacaville, there will be an increased demand for electricity and natural gas. As discussed in Section E.4.a.i, Project Impacts, the proposed General Plan would avoid a significant project-level impact associated with the wasteful use of energy by implementing General Plan policies and actions which not only meet but exceed State energy efficiency standards in Title 24. Similarly, other jurisdictions in the region are required to meet State Title 24 regulations regarding energy conservation. As a result, the proposed General Plan would contribute to a *less-than-significant* cumulative impact to the wasteful, inefficient, or unnecessary use of energy.

F. Full Buildout

The full buildout anticipated under the proposed General Plan would include significantly more development than the 2035 horizon-year development projection analyzed in the impact discussion sections in terms of both the amount and the extent of development. Therefore, the potential for impacts related to utilities would increase. However, as discussed in Chapter 3, Project Description, it is extremely unlikely that full buildout would ever occur under the proposed General Plan. Therefore, an analysis of full buildout is not required by CEQA.