Recycled Water Feasibility Study Update

San Benito County Water District
And
City of Hollister

November 4, 2008

Prepared under the responsible charge of

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RECYCLED WATER FEASIBILITY STUDY UPDATE

Recycled Water Feasibility Study Update *November 6, 2008*

1. Introduction

The San Benito County Water District (SBCWD) completed a Recycled Water Feasibility Study in 2005 to evaluate the use of recycled water in San Benito County (County). Since completion of the 2005 study, several developments have occurred, as discussed in the following subsection, which have necessitated an update of the original study. This update was initiated through a Memorandum of Understanding (MOU), signed in February 2008, between the City of Hollister (City) and SBCWD to develop a Recycled Water Program to implement the beneficial use of treated effluent from the City's new Domestic Wastewater Treatment Plant (DWTP).

This technical memorandum presents the updated recycled water feasibility study, including new conceptual use areas and alternatives which were developed and evaluated, as well as a strategy for implementation. The results of this study will be incorporated into the final Hollister Urban Area Water and Wastewater Master Plan (Master Plan).

1.1. Background

As described in the City's 2005 Long-Term Wastewater Management Program for the DWTP and IWTP (LTWMP), the ultimate goal for effluent management is to provide high quality wastewater effluent suitable for direct reuse on high value, quality sensitive crops. The LTWMP also established that the overall water quality, specifically the salinity content, in the region must be substantially improved to support the goal. To improve water quality and coordinate water and wastewater infrastructure improvements, the City, SBCWD and San Benito County signed an MOU (Master Plan MOU) in 2004 to develop the Hollister Urban Area Water and Wastewater Master Plan. The Master Plan MOU identifies 2015 as the target date for providing high quality (i.e., low salinity) recycled water for agricultural use.

Prior to 2015, effluent management will include continued percolation and landscape irrigation. The period before 2015, marked by high salinity content, is referred to as the Phase I Reclaimed Water Program. After 2015, the salinity content of the recycled water will be reduced to levels acceptable for agricultural use; this period is referred to as the Phase II Recycled Water Program.

The purpose of the 2005 Recycled Water Feasibility Study was to identify a cost effective water recycling project for beneficial use of recycled water beyond 2015. The study focused on recycled water use areas in the San Juan Valley due to the proximity of this area to the City's DWTP. Since the completion of the 2005 study, several significant changes have occurred which serve as drivers for this update, including:

- In 2006 an *Escherichia coli* (*E. coli*) outbreak was linked to uncooked spinach originating in San Benito County. Although the spinach was not irrigated with recycled water, the outbreak drew attention to recycled water as an irrigation supply for high value crops. As a result, irrigators in the San Juan Valley have expressed concern with

regard to using recycled water originating from the DWTP. Therefore, due to the public reaction regarding its use, the feasibility of using this source of recycled water in the San Juan Valley is in question.

- In 2007, a federal court ruled to protect the Delta smelt, which is facing extinction, by limiting the quantities of water pumped out of the Sacramento-San Joaquin River Delta. Consequently, the reliability of future Central Valley Project (CVP) water supplies to the Hollister area is in question throughout the state.
- The original study focused on areas to the west of the DWTP. Since that time, several new areas have been identified as potential locations for recycled water use.

Based upon these changes, the City and SBCWD agreed that an update was required to develop and evaluate additional recycled water alternatives.

1.2. Objectives

The primary objective of this study was to update the Recycled Water Feasibility Study completed in 2005 by including areas and regions not considered in the original study. The original study identified agricultural markets in areas located west of the Hollister Urban Area (HUA) as the primary opportunities for recycled water use; however, it was later determined that these sites should be revisited and updated to investigate additional areas of use such as areas east of the HUA. Estimated costs have been developed for evaluation of alternatives. However, these costs are at a conceptual level for the purposes of comparing alternatives. Detailed facilities studies will be part of later phases of the study work to provide more refined cost estimates. The results of this study will serve as a reference and planning document for finalizing the Master Plan.

Ongoing work by the City and the SBCWD has resulted in a plan for Phase I use of reclaimed water. The Phase I plan will convey reclaimed water from the DWTP to the Brigantino Riverside Park and to the Hollister Municipal Airport for irrigation of open space and landscaping. The focus of this study is Phase II recycled water use, and to a lesser extent, recycled water use at DWTP build-out conditions. A secondary objective was to compare and align (if possible) recommended Phase II site(s) with the two Phase I sites. The purpose of this secondary objective is to minimize recycled water program costs by using Phase I facilities insofar as practical.

It is expected that a subsequent phase of work will follow this study which will provide more detail for facilities planning, market assessment, cost estimates, and related steps for implementation of the Phase II recycled water program.

1.3. Acknowledgements

This study was completed under the terms of a Memorandum of Understanding between the SBCWD and the City. A steering committee composed of elected officials from the two agencies provided overall guidance for the study. The steering committee included Ken Perry

and John Tobias from the SBCWD and Monica Johnson and Doug Emerson from the City. Mr. Harry Blohm of the SBCWD provided day-to-day program management. Mr. Lance Johnson provided input from the SBCWD. Mr. Clint Quilter and Mr. Steve Wittry provided input from the City.

1.4. Abbreviations

AF	acre-feet
AFY	acre-feet per year
CDPH	California Department of Public Health
County	San Benito County
City	City of Hollister
CVP	Central Valley Project
DWTP	Domestic Wastewater Treatment Plant
HUA	Hollister Urban Area
lf	linear feet
Master Plan	Hollister Urban Area Water and Wastewater Master Plan
mg/l	milligrams per liter
MGD	million gallons per day
MOU	Memorandum of Understanding
psi	pounds per square inch
PVC	polyvinyl chloride
SBCWD	San Benito County Water District
SSCWD	Sunnyslope County Water District
SWRCB	State Water Resources Control Board
TDS	Total Dissolved Solids

2. Planning Assumptions

This section summarizes the basic information which was used to update the recycled water feasibility study, including the study planning period, planning assumptions with respect to the projected recycled water flows and water quality available from the City's upgraded DWTP, the general area of potential sites for recycled water use as well as the irrigation applications which will be considered, the basis for economic analyses, and other relevant assumptions.

2.1. Planning Period

The planning period for this study extends 15 years, from 2008 to 2023. The initial year of the planning period was selected to provide a common baseline date for existing data such as land use, as well as economic analysis of alternatives. The final year of the planning period coincides with the planning horizon of the Master Plan, the General Plan of the City of Hollister, and the end of Phase II as defined below.

2.2. Recycled Water Flow Rates and Phasing

DWTP recycled water production will steadily increase over time, until the build-out condition is reached, as illustrated in Figure 2-1. During Phase I, which is generally considered to be the period between now and 2015, recycled water production will increase from 0 to 772 acre-feet per year (AFY). During the Phase I period, reclaimed water will be used for irrigation at the Hollister Municipal Airport and the new Riverside Park; additionally the DWTP will continue to operate percolation ponds for additional effluent disposal.

Phase II, the focus of this study, will include a significant reduction in recycled water total dissolved solids (TDS) concentration. The precise reduction will depend upon a variety of factors including groundwater demineralization, blending using low TDS water such as CVP water, and a water softener ordinance (see section 2.3). Once this reduction is accomplished, recycled water demand is expected to dramatically increase as this resource will then be suitable for irrigation of high value crops.

Recent estimates by the City indicate that in 2017, approximately 3.75 million gallons per day (MGD) (equivalent to 4,200 AFY) of recycled water will be available for beneficial reuse, increasing up to 4.5 MGD (5,040 AFY) in 2023. There may be some opportunity to continue percolation at the DWTP up to approximately 840 AFY. Therefore, this study uses 4,200 AFY as the minimum quantity of recycled water available for beneficial reuse in identifying potential Phase II recycled water use areas. However, up to 5,040 AFY may be available in 2023 and was considered in the evaluation of potential Phase II recycled use areas.

Moreover, as the DWTP reaches capacity, it can be expanded by an additional 3 MGD resulting in an additional 3,360 AFY for a total potential ultimate recycled water quantity of 8,400 AFY. Therefore, the ability to expand potential Phase II recycled use areas to accommodate this additional flow was considered during the evaluation process.

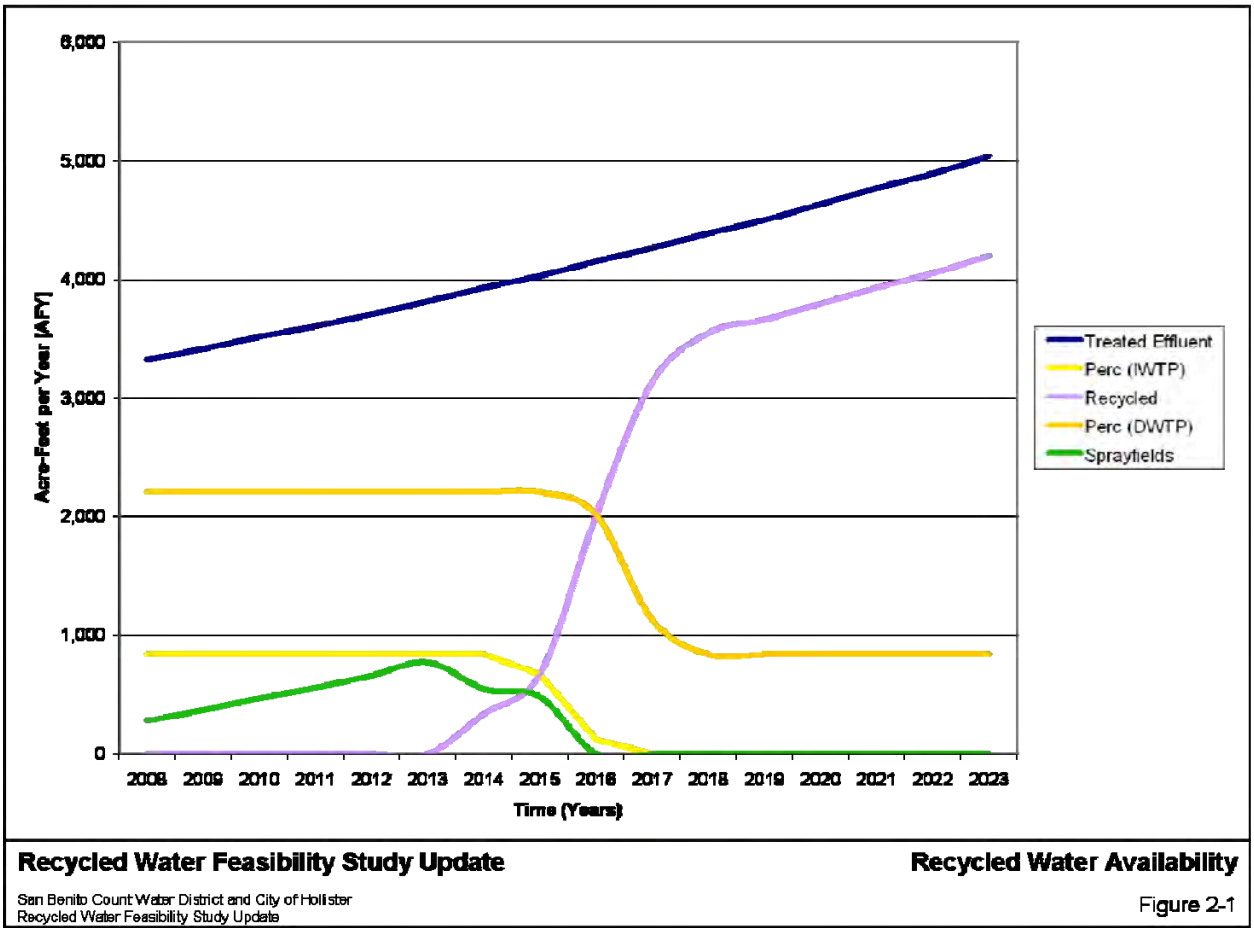


Figure 2-1 Recycled Water Availability

2.3. Water Quality

Recycled water from the DWTP will meet Title 22 requirements for tertiary treated recycled water, as described in the LTWMP.

The MOU established water quality objectives for recycled water. Specifically, the MOU states that "recycled water shall have a target Total Dissolved Solids (TDS) of 500 mg/l and shall not exceed 700 mg/l." Furthermore, the MOU states that blending recycled water with CVP water is only an interim measure for achieving recycled water quality objectives. Due to the uncertainty regarding CVP availability and the high costs of demineralization, the potential use of long-term blending was considered as part of this study.

2.4. Potential Study Sites

As previously mentioned, the original study focused on areas located west of the HUA as the primary opportunities for recycled water use. The San Juan Valley service area was identified

as the most attractive agricultural reuse site; therefore, it will be included in this study to serve as a baseline and a point of comparison to the original study. The following five general areas were initially identified for further evaluation and inclusion as potential Phase II recycled water use areas (see Figure 2-2):

- Areas Adjacent to Airport
- East of Fairview Road
- San Juan Valley
- Santa Ana Valley
- Tres Pinos Area

2.5. Basis of Cost Estimates

Preliminary cost estimates were developed for each alternative, including the present worth of both capital costs and operations and maintenance costs. Allowances include contingency (30 percent) and engineering, administration and permitting (20 percent). All cost estimates are presented in current dollars and based on a discount rate of 3 percent and a 20-year analysis period. The estimates are based on the ENR Construction Cost Index for the San Francisco Bay Area for January 2008, which is 9133.

2.6. Other Assumptions

Sunnyslope County Water District (SSCWD) has recently completed an evaluation to determine whether to convey wastewater to the DWTP or to maintain separate treatment facilities in the Ridgemark community. At this time, SSCWD has decided to maintain and upgrade their existing treatment facilities. As described in the LTWMP, the estimated wastewater contribution from SSCWD is approximately 0.25 mgd in 2008, increasing to 0.46 mgd in 2023. However, since the SSCWD project is not yet complete and conditions may change in the future, the previously identified flows (including those from SSCWD) were used for this planning study.

A large vegetable processing facility in San Juan Valley is currently developing plans to produce approximately 400 AFY of recycled wash water. It is expected that this recycled wash water will be redistributed for irrigation purposes in the San Juan Valley. This value was considered in determining the appropriate water demand in the San Juan Valley.

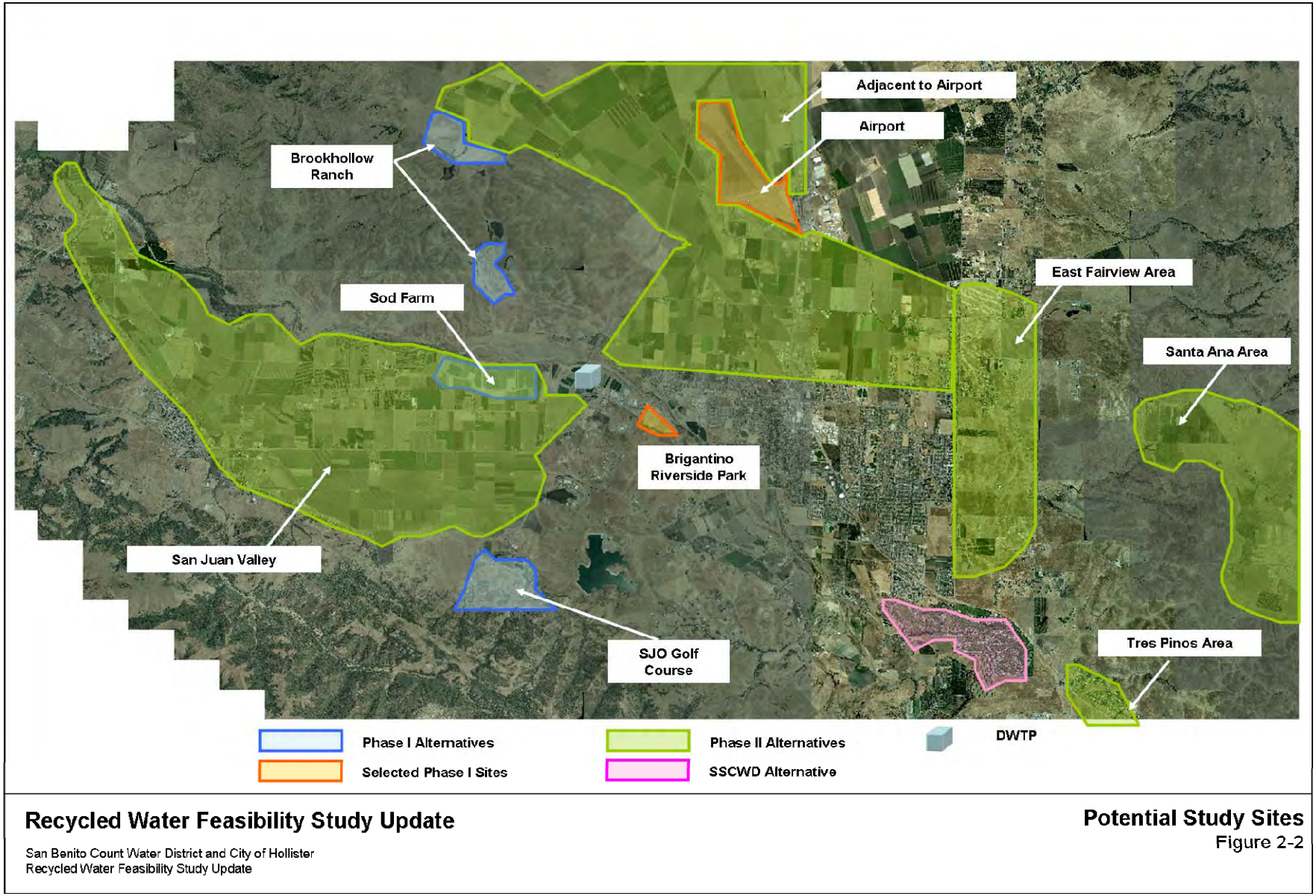


Figure 2-2 Potential Study Sites

3. Identification of Potential Recycled Water Use Areas

As described in the previous section and as shown in Figure 2-2, five general areas were originally identified as potential Phase II Alternative study sites. These areas were preliminarily evaluated and refined through a series of mapping studies and a site visit which are described in more detail below.

3.1. Mapping Studies

As previously described, the targeted uses for recycled water are agricultural irrigation and urban irrigation, to include irrigation of parks, commercial and public areas, as appropriate, in addition to new residential developments. To evaluate the suitability of the five general areas for recycled water use, the following characteristics were mapped:

- Land use
- Soil type
- Depth to groundwater
- Topography
- Known environmental constraints (i.e., location of Tiger Salamander habitats)
- Location of current CVP water users

These maps are included as Attachment 1. Analysis of these maps revealed that the general areas identified as potential study sites are viable considering most characteristics. However, several points of concern were also identified. First, the area east of Fairview Road has been identified as a habitat area for the California Tiger Salamander, a threatened species. Therefore, it is expected that additional environmental studies and permitting would be required to develop this area for recycled water use. Secondly, the San Juan Valley area is known to have high groundwater levels which was confirmed by the depth to groundwater map; furthermore, the depth to groundwater map also indicated that the area north of the airport also has high groundwater and could be problematic for agricultural recycled water use. Finally, the various maps revealed that the areas east of Fairview Road and the Santa Ana Valley are largely undeveloped with respect to agriculture, whereas the area near the airport and the San Juan Valley have extensive agricultural developments. This results in two concerns. First, to implement a recycled water project for the latter areas the land owner/operator must be willing to switch from a current water supply (e.g., CVP or groundwater) to recycled water. Second, the former sites (i.e., east of Fairview Road and Santa Ana Valley) would require the areas to be developed such that recycled water could be beneficially used for agricultural purposes. It should also be noted that the predominant use in the Tres Pinos area would be residential and urban landscape irrigation.

Following the initial analysis of characteristics on an individual basis, a second map was developed to identify areas suitable for irrigation based on aggregated characteristics. This

map, shown in Figure 3-1, illustrates those areas which are suitable for irrigation based on an aggregation of the following characteristics:

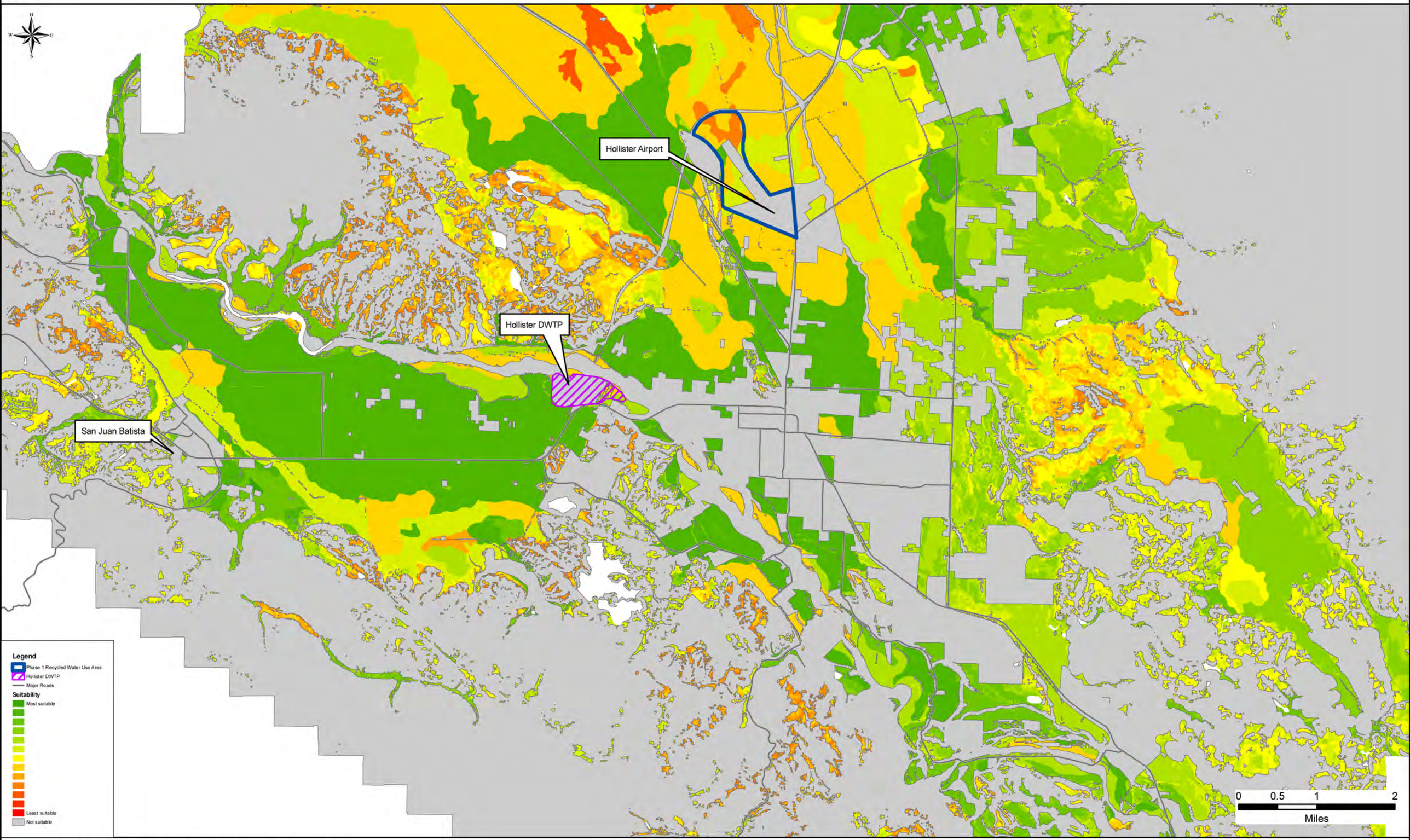
- Land slope
- National Resources Conservation Service land capability class
- Soil texture in the root zone
- Available water holding capacity
- Flood frequency
- Hydrologic group (i.e., propensity for runoff versus infiltration)
- Depth to groundwater

As indicated in Figure 3-1, there are suitable areas for irrigation within each of the originally identified potential use sites. Moreover, this figure indicates that the area near Lone Tree Road also has significant area which is suitable for agricultural irrigation. Therefore, in addition to the five originally identified potential use sites, a sixth site was added in the Lone Tree Road area.

3.2. Site Visit

To confirm the viability of each of the potential use sites, a site visit was conducted. A brief report summarizing the site visit events is included as Attachment 2. The site visit revealed the following observations:

- The areas adjacent to the airport being considered for recycled water use should be narrowed to the area south of the airport, specifically to the Wright Road / McCloskey Road (Wright/McCloskey) corridor. This is supported by the presence of high groundwater in the areas north of the airport. The Wright/McCloskey corridor is an existing agricultural area which is predominantly dependent on CVP water for irrigation, although some parcels use groundwater.
- Santa Ana Valley is a favorable site with a potentially high recycled water demand and should be further evaluated for recycled water use. There is some existing agricultural land use in the Santa Ana Valley, which is reliant upon groundwater for irrigation purposes. However, much of the low lying area and the rolling hills remain undeveloped.
- The Lone Tree area is a favorable site with a potentially high recycled water demand and should be further evaluated for recycled water use. The site visit revealed large areas south of Lone Tree Road are being developed for agricultural use. It is currently assumed that these areas will be irrigated with groundwater. Large areas north of Lone Tree Road, as well as some rolling hills remain undeveloped and appear to be suitable for development for agricultural purposes.



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Suitability for Irrigation
Figure 3-1

- The areas suitable for irrigation around Tres Pinos are piecemeal in nature, and include large residential estate lots, a future college site and possibly a golf course. Due to this piecemeal nature, the Tres Pinos area is a less favorable site for a recycled water project. However, the future college site could potentially be served separately, as a part of an east of Fairview Road project.
- The existing CVP line in McCloskey/Wright Roads should be further evaluated for recycled water use and potential phasing and blending opportunities.

4. Conceptual Use Area Alternatives

Based upon the mapping studies and site visit described in the previous section, and as identified in Figure 4-1, six conceptual use areas were developed. These six areas include the following:

- Wright Road / McCloskey Road Corridor
- East of Fairview
- Lone Tree
- Santa Ana Valley
- Tres Pinos
- San Juan Valley

The common infrastructure requirements and assumptions used to develop them, as well as a description of each alternative are provided in the following subsections.

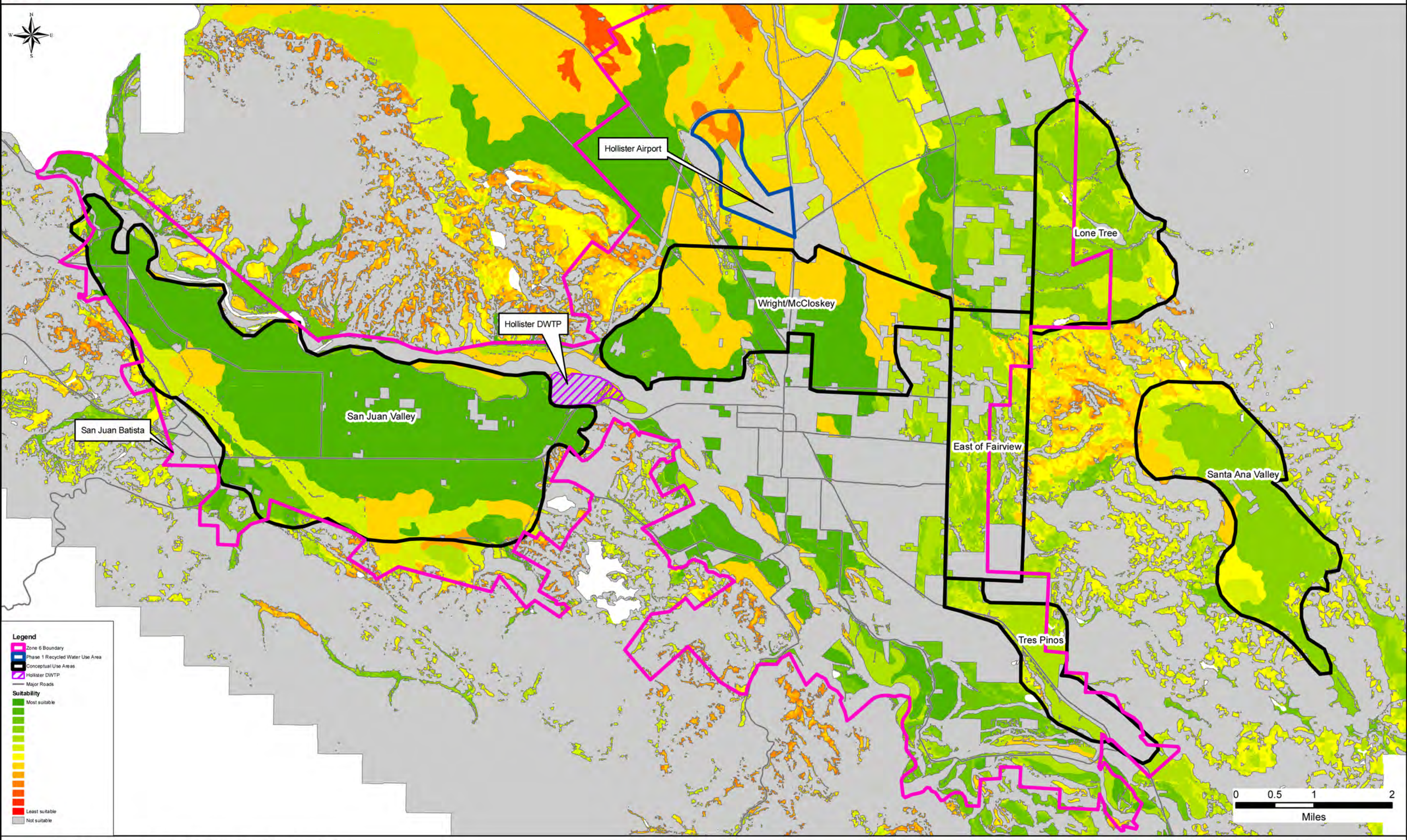
4.1. Conceptual Infrastructure Requirements

Recycled water delivery options were developed for each of the conceptual use area alternatives, including preliminary pipeline alignments and anticipated infrastructure such as booster pump stations and storage tanks. It is assumed that distribution pipelines will generally follow existing roadways and will be installed just off the road to minimize disruption of the traffic.

Figure 4-2 illustrates the preliminary pipeline alignments that could be used to distribute the recycled water to each of the conceptual use areas and which were used to develop cost estimates for service to each of the conceptual use areas.

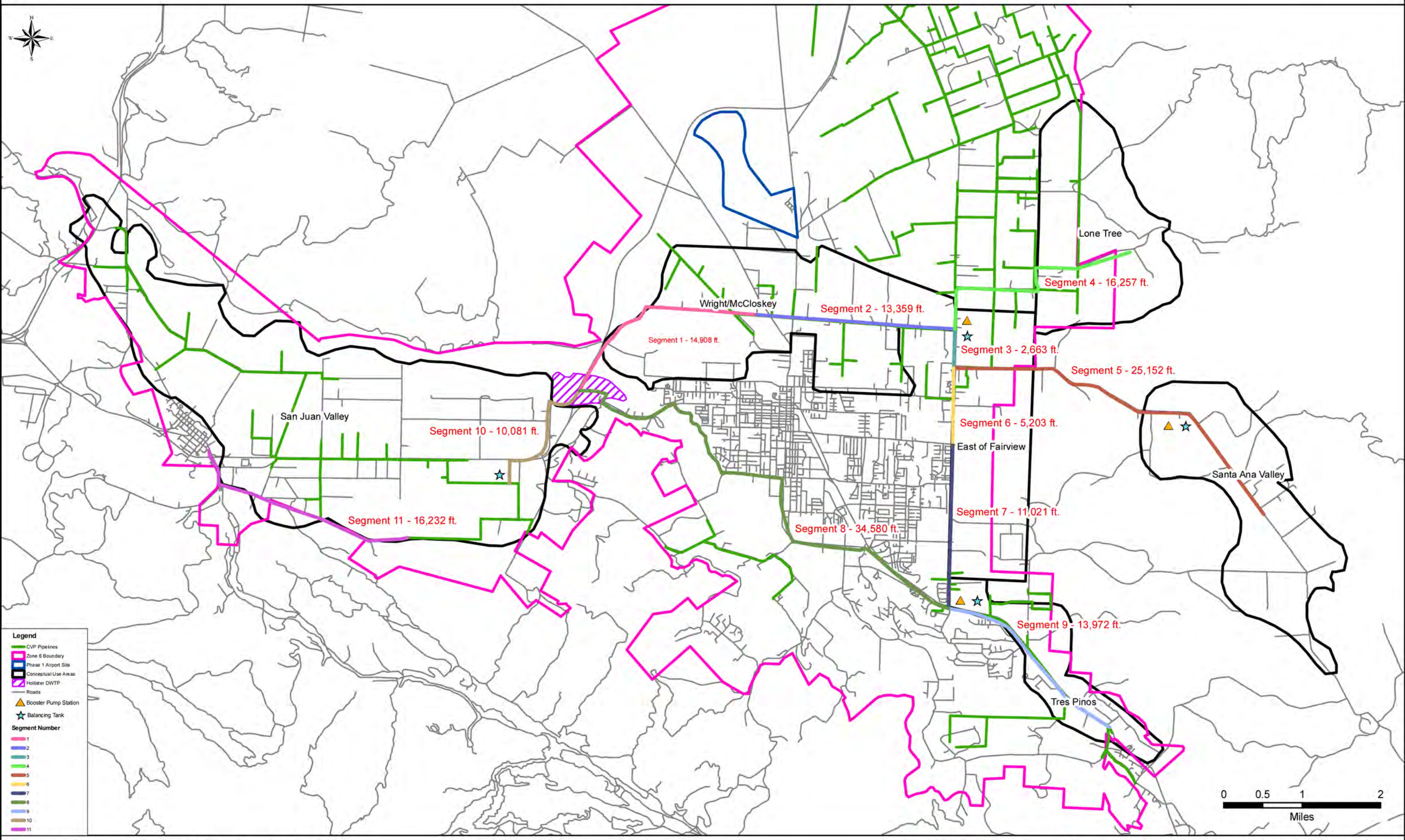
Due to the long distances between the DWTP and some of the conceptual use sites, booster pump stations may be required in addition to the pumping station at the DWTP to limit the pressure in the pipelines. The typical maximum allowable pressure in PVC pipe is approximately 140 pounds per square inch (psi). For the purposes of developing cost estimates for pumping requirements, it has been assumed that a delivery pressure of 5 psi will be provided and recycled water will be pumped 24 hours per day during the irrigation season (assumed to be six months).

All distribution pipelines are assumed to be 20-inch diameter PVC pipes. Considering an average pumping rate of 7.5 mgd, this results in a velocity of 5.3 feet per second (fps). Based upon preliminary water balance information included in the City's LTWMP, during peak demand periods, the demand for recycled water could reach 9.6 mgd, resulting in a velocity of 6.8 fps. The water balance and resulting estimates will be reevaluated during Facilities Planning, as described further in Section 6.



Recycled Water Feasibility Study Update

Conceptual Use Area Alternatives
Figure 4-1



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Preliminary Pipe Alignments and Support Infrastructure
Figure 4-2

It has been assumed that some form of terminal storage will be required for each conceptual use area to offset peak demand periods, provide some storage capacity on-site in the event that pumping stations are taken off-line, and minimize pipeline infrastructure and pumping costs through a reduction in pipeline diameter and twenty-four hour continuous pumping. For Alternatives 1 and 6, as described below, it is assumed that a 5 mg balancing tank will be required. This provides approximately 12-15 hours of capacity during average demand periods. The remaining alternatives would have a smaller balancing tank, 0.5 mg, collocated with a booster pump station. Additionally, Alternatives 2, 3, 4, and 5 would have a 50 AF earthen reservoir on-site, which would provide approximately 2 days of capacity during average demand periods. Currently, the City plans to have an 800 AF seasonal storage reservoir at the DWTP. The need for additional on-site and/or seasonal storage will be reevaluated as part of Facilities Planning.

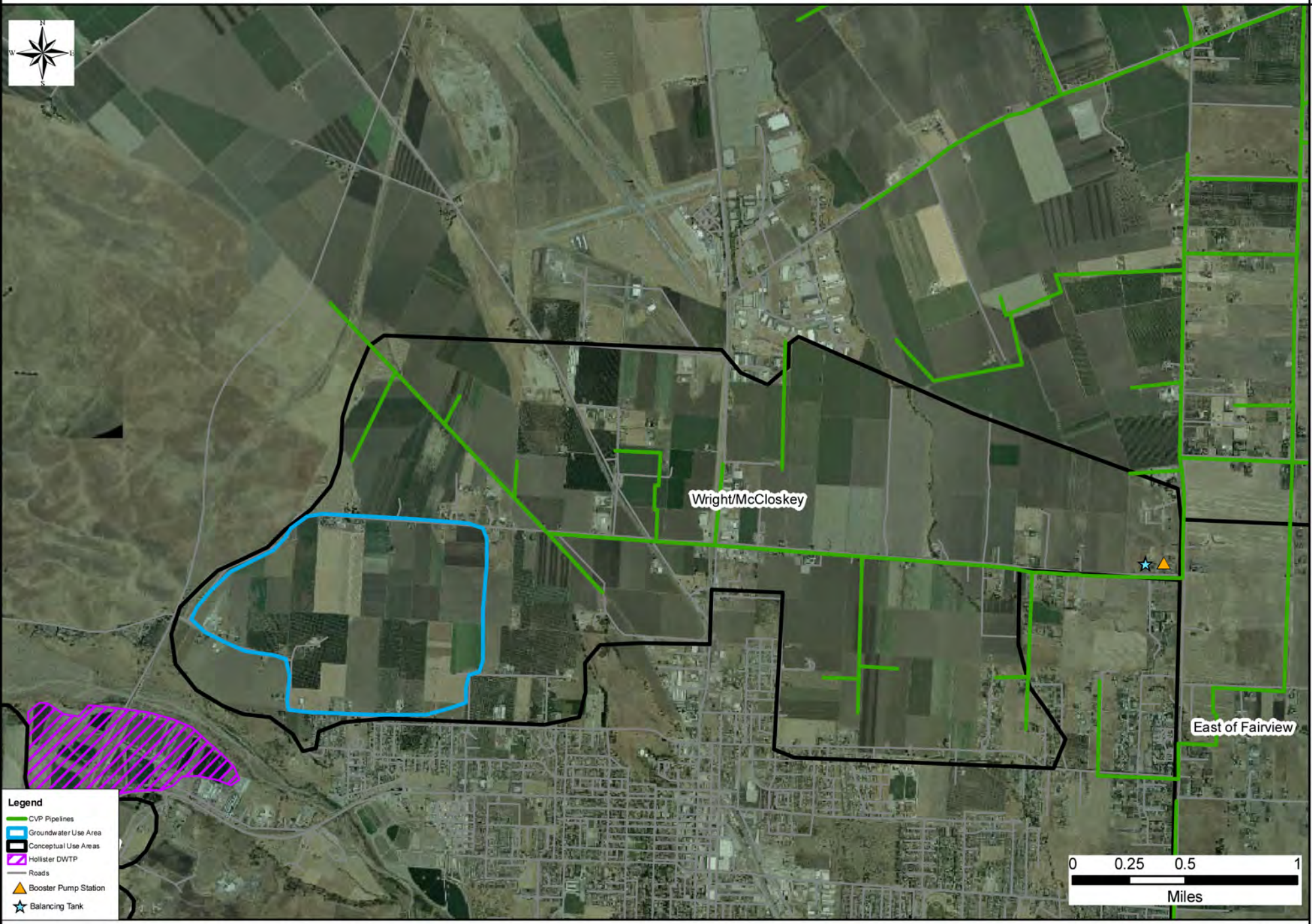
4.2. Alternative 1 – Wright / McCloskey Corridor

The areas considered in this alternative include sites north and south of the Wright Road/McCloskey Road (Wright/McCloskey) corridor. A recycled water irrigation project in this area could make use of the Phase I recycled water project conveyance infrastructure to the Hollister Municipal Airport site. The City and SBCWD agreed to construct the Phase I pipeline up to the intersection of Wright Road and Briggs Road as a 20-inch diameter pipeline, such that it would be capable of conveying expected Phase II flowrates in the future. Additionally, a tee will be installed at that intersection to facilitate the extension of the 20-inch diameter pipeline along the Wright/McCloskey corridor in the future. Including the Phase I pipeline section (approximately 12,710 lf), an estimated total 28,270 linear-feet (lf) of 20-inch diameter pipeline would be required for this alternative.

As previously noted, this area has existing agricultural land use. There is an existing CVP distribution line in McCloskey Road which distributes irrigation water to many of the parcels in the area. However, on the south side of Wright Road, as depicted in Figure 4-3, groundwater is used for irrigation purposes. The TDS content of groundwater in that area is relatively high.

At this time, specific customers have not been identified. However, since the potential customers in this area have an existing irrigation water supply, formal agreements would need to be reached to ensure the customers are willing to receive and use recycled water. As previously described, a delivery pressure of 5 psi has been assumed for the purposes of preparing preliminary cost estimates; however, the need to provide a higher delivery pressure (e.g., 70 psi for spray irrigation) will be reevaluated as part of the Facilities Plan.

Table 4-1 shows the total area suitable for irrigation in Alternative 1. Based on an average application rate of 2.25 AF/Acre for recycled water demand, the total annual water demand in the area is 7,180 AF, which is well above the Phase II recycled water availability of 4,200 AFY.



Recycled Water Feasibility Study Update

Alternative 1, Wright/ McCloskey Corridor
Figure 4-3

Table 4-1 Alternative 1 Irrigable Area and Potential Recycled Water Demand

Total Area [Acres]	Area Suitable for Irrigation [Acres]	Potential Recycled Water Demand [a] [AFY]
3,600	3,190	4,785 – 9,570

(a) – Based on a typical range of agronomic application rates for the Hollister Urban Area, 1.5 AF/Acre – 3.0 AF/Acre

A key benefit associated with this alternative is that it provides the opportunity for phasing such that recycled water distribution could begin in this area and move further east toward Alternatives 2, 3 or 4, thereby reducing the associated cost of their required infrastructure.

4.3. Alternative 2 – East of Fairview Road

The area considered in this alternative includes the 2,200 acres east of Fairview Road and south of McCloskey as depicted in Figure 4-1. Similar to Alternative 1, this alternative could make use of the Phase I distribution pipeline in Wright Road. Depending on whether or not the future college site at the intersection of Fairview Road and Airline Highway would be included in this alternative, the total pipeline length required to serve the area east of Fairview Road is estimated to be between 36,130 lf without the college to 47,150 lf with the college. In addition, a booster pump station would be required to maintain reasonable pressure in the pipelines. As was shown in Figure 4-2, a likely location for such a facility is at the intersection of McCloskey Road and Fairview. A 0.5 mg regulating tank would accompany the booster pump station.

The area considered in this alternative is largely undeveloped. However, portions of this area are included in the City's planning area for future development. If this area is developed in the future for residential, commercial or industrial purposes, the area available for an agricultural development will be limited. Thus, this area may be more suitable as an interim recycled water use area.

Since there is limited or no existing agricultural land use in the conceptual use area, potential landowners and customers would need to be identified who are interested in developing an agricultural site in the area to ensure this alternative is a viable site for a recycled water irrigation project. At the time of this report, no such landowners or customers had been identified for this alternative.

Table 4-2 shows the total area suitable for irrigation in Alternative 2. Based on an average irrigation application rate of 2.25 AF/Acre for recycled water demand, the total annual water demand in the area is 3,310AF which is below the 4,200 AFY production. Thus, this alternative would need to be combined with another alternative.

Table 4-2 Alternative 2 Irrigable Area and Potential Recycled Water Demand

Total Area [Acres]	Area Suitable for Irrigation [Acres]	Potential Recycled Water Demand [a] [AFY]
2,200	1,470	2,205-4,410

(a) – Based on a typical range of agronomic application rates for the Hollister Urban Area, 1.5 AF/Acre – 3.0 AF/Acre

The main obstacle associated with this alternative is the presence of the California Tiger Salamander, as noted in the previous section. It is expected that additional time would be required for permitting and a more extensive EIR process may be required. Any additional costs of mitigation measures due to the presence of the California Tiger Salamander have not been quantified at this time, although they are expected to be significant.

4.4. Alternative 3 – Lone Tree Road

This alternative generally consists of the areas north and south of Lone Tree Road, and east of the existing CVP-supplied agricultural developments as depicted in Figure 4-1. This alternative could make use of the Phase I transmission pipeline in Wright Road. Similar to Alternative 2, a booster pump station and balancing tank would be required to maintain suitable pressure in the distribution pipeline. The total pipeline length required to convey recycled water from the DWTP to the Lone Tree area is approximately 44,520 lf.

As previously described, a large plot of land south of Lone Tree Road has recently been developed for agricultural use. However, the north side of Lone Tree Road is undeveloped. The new agricultural development will likely use groundwater for irrigation. The groundwater quality in that particular area is expected to be relatively high due to its proximity to Arroyos de Pichacos.

Table 4-3 shows the total area suitable for irrigation in Alternative 3. Using an average irrigation application rate of 2.25AF/Acre for recycled water demand, the total annual water demand in the area is 5,150 AF, which is well above the Phase II recycled water availability of 4,200 AFY.

Table 4-3 Alternative 3 Irrigable Area and Potential Recycled Water Demand

Total Area [Acres]	Area Suitable for Irrigation [Acres]	Potential Recycled Water Demand [a] [AFY]
2,450 [b]	2,290 [b]	3,435 - 6,870

(a) Based on a typical range of agronomic application rates for the Hollister Urban Area, 1.5 AF/Acre – 3.0 AF/Acre
(b) Does not include the area to the south of the Lone Tree area which could be suitable for viticulture

Although Alternative 3 is located a relatively long distance from the DWTP, this area provides the ability to develop new agricultural lands. Moreover, the hills located to the south of the Lone Tree area could potentially be developed for viticulture, further increasing the potential recycled water demand. This opportunity will be further investigated in the Facilities Planning and Market Assessment studies discussed in Section 6.

4.5. Alternative 4 – Santa Ana Valley

Alternative 4 includes the agricultural opportunities in the Santa Ana Valley. The Santa Ana Valley is located east of Hollister and is separated from Hollister by a range of foothills. There are several plots on the valley floor which are currently cropped; however there are additional areas in the valley, including the foothills to north of the valley, which could be developed for agricultural use. Landowners in the valley have expressed interest in receiving and using recycled water for irrigation purposes. There is particular interest in using recycled water for viticulture in the northern end of Santa Ana Valley (although this has not been included in the potential recycled water demand in Table 4-4).

Similar to Alternatives 2 and 3, this alternative could make use of the Phase I distribution pipeline in Wright Road. Due to the distance and elevation change between the DWTP and Santa Ana Valley, two booster pump stations would be required to maintain suitable pressure in the distribution pipeline. The total pipeline length required to convey recycled water from the DWTP to Santa Ana Valley is approximately 56,080 lf.

The only existing water source in the valley is groundwater. Although a groundwater model of the valley is not yet developed, recent well tests indicated the depth to the groundwater is 50 to 60 feet in the valley. However, along Santa Ana Creek, the calculated groundwater elevation was close to the elevation of the nearest point on Santa Ana Creek. This suggests that the water table intersects with the ground surface at the creek and that shallow groundwater would be present in low areas near the creek. Based on this information, it is expected that a buffer zone would need to be observed in the low lying areas near Santa Ana Creek, such that recycled water does not freely enter the watercourse.

Preliminary investigations indicate the water quality in Santa Ana Valley is approximately 800 TDS, which is substantially below the Groundwater Basin Plan objective of 1,200 TDS.

Table 4-4 shows the total area suitable for irrigation in Alternative 4. Using an average irrigation application rate of 2.25 AF/Acre for recycled water demand, the total annual water demand in the area is 5,690 AF, well above the Phase II recycled water availability of 4,200 AFY.

Table 4-4 Alternative 4 Irrigable Area and Potential Recycled Water Demand

Total Area [Acres]	Area Suitable for Irrigation [Acres]	Potential Recycled Water Demand [(a)] [AFY]
2,620 [(b)]	2,530 [(b)]	3,745 - 7,590

(a) Based on a typical range of agronomic application rates for the Hollister Urban Area, 1.5 AF/Acre – 3.0 AF/Acre
(b) Does not include area to the north of the valley which could be suitable for viticulture

In addition to the suitable area indicated in Table 4-4, the rolling hills to the north of the valley could be suitable for viticulture, thereby increasing the potential demand for recycled water in this alternative.

In addition to creating new agricultural lands in the region, potential users have expressed interest in receiving and using recycled water for agricultural purposes including participating in cost sharing for some distribution facilities. Moreover, one potential user has indicated higher TDS levels may be acceptable, possibly as high as 1,200 mg/l. Further studies would be required to determine the threshold TDS limit and the higher groundwater quality in the valley should also be considered in this case due to the potential for degradation.

4.6. Alternative 5 – Tres Pinos

Alternative 5 includes areas in and near the town of Tres Pinos, including the Stonegate master-planned community and the future college site at the intersection of Fairview Road and Airport Highway. The Ridgemark Golf Course could also be included in this alternative.

Two alternative pipeline alignments have been identified to convey recycled water to the Tres Pinos area, they are 61,130 and lf 48,550 lf respectively. As illustrated in Figure 4-2, the former could take advantage of the Phase I conveyance infrastructure, passing through conceptual use area Alternatives 1 and 2 before reaching the Tres Pinos site, whereas the latter would require an independent pipeline be installed. Due to the length of the conveyance pipeline required to reach Tres Pinos, two booster pump stations would be required to provide recycled water in this area.

A recycled water irrigation project in this area could consist of residential and municipal irrigation, as well as well as irrigation of the Ridgemark Golf Course. The Stonegate community is made up of five-acre residential parcels which currently use CVP water for irrigation. It is expected that the CVP irrigation distribution network could be converted to recycled water, thereby reducing the region's dependence on CVP water. This has a secondary benefit, in that the current fiberglass pipeline in the Airport Highway is associated with frequent breaks which can be attributed, in part, to the high pressures associated with the high demand and flow rates. Replacing CVP irrigation water with recycled water would reduce the required flow rate in the fiberglass pipeline and thereby reduce the stress on the pipeline.

Table 4-5 shows the total area suitable for irrigation in Alternative 5. Based on an average irrigation application rate of 2.25 AF/Acre for recycled water demand, the total annual water demand in the area is 1,580 AF, which is well below the Phase II recycled water availability of 4,200 AFY. Therefore, this alternative would need to be considered in combination with another alternative.

Table 4-5 Alternative 5 Irrigable Area and Potential Recycled Water Demand

Total Area [Acres]	Area Suitable for Irrigation [Acres]	Potential Recycled Water Demand [(a)] [AFY]
1,120	700	1,050 - 2,100

(a) Based on a typical range of agronomic application rates for the Hollister Urban Area, 1.5 AF/Acre – 3.0 AF/Acre

4.7. Alternative 6 – San Juan Valley

Alternative 6 encompasses the existing agricultural developments in the San Juan Valley area. The original feasibility study reported that the annual demand in the San Juan Valley is 11,720 AFY over approximately 5,960 acres. There is an existing CVP distribution network in the San Juan Valley for agricultural use. This alternative assumes that the CVP distribution network would be converted to recycled water, or alternatively, a blend of recycled and CVP water. In the later case, an air separation gap would be required between the upstream CVP system and the point where recycled and CVP water are blended.

As shown in Figure 4-2, a pipeline, 10,080 lf, would be required to convey recycled water from the DWTP to a point on the existing CVP distribution network. Additionally, a second pipeline, 16,230 lf in length, would be required to convey CVP water to San Juan Bautista. San Juan Bautista may potentially use treated CVP water for municipal and industrial uses in the future; therefore, the distribution system serving San Juan Bautista must be isolated from the system distributing recycled water to the San Juan Valley.

Table 4-6 shows the total area suitable for irrigation in Alternative 6 based on the analysis described in the previous section. Based on an application rate of 2.25 AF/acre, the total irrigation water demand in the area is approximately 14,760 AF per year. Recycled water could be used to meet a portion of that demand by blending with CVP water.

Table 4-6 Alternative 6 Irrigable Area and Potential Recycled Water Demand

Total Area [Acres]	Area Suitable for Irrigation [Acres]	Potential Recycled Water Demand [(a)] [AFY]
6,860	6,560	9,840 - 19,680

(a) Based on a typical range of agronomic application rates for the Hollister Urban Area, 1.5 AF/Acre – 3.0 AF/Acre

As described in the planning assumptions, a large vegetable processing facility in San Juan Valley is currently developing plans to produce approximately 400 AFY of recycled wash water. If this recycled water is distributed for irrigation purposes in the valley, the potential recycled water demand for the Phase II project would be reduced from 14,760 AFY to 14,360 AFY, which is still significantly above that which is available. Thus, blending would still be required to meet the total demand in this alternative.

4.8. Preliminary Cost Estimates

The preliminary cost estimate for each alternative is presented in Table 4-7. Costs have been developed for pipelines, terminal storage, pump stations and balancing tanks. A construction contingency factor of 30% has been included in the cost estimate, as well as 20% for engineering and administration.

Table 4-7 Preliminary Cost Estimates

	W/M Corridor Alt 1	East of Fairview Alt 2	Lone Tree Alt 3	Santa Ana Valley Alt 4	Tres Pinos Alt 5	San Juan Valley Alt 6
Capital Costs						
Pipelines	$5,538,500	$7,079,800	$8,723,900	$10,988,500	$9,513,100	$4,414,400
Terminal Storage	0	2,273,600	2,273,600	2,273,600	2,273,600	0
Balancing Tanks	2,169,100	415,800	415,800	831,600	831,600	2,169,100
Pump Stations [a]	1,915,300	4,938,700	4,938,700	7,962,100	7,962,100	1,915,300
Construction Cost	9,622,900	14,707,900	16,352,000	22,055,800	20,580,400	8,498,800
Contingency @ 30%	2,886,900	4,412,400	4,905,600	6,492,000	6,049,400	2,549,600
Engineering and Administration @ 20%	2,502,000	3,824,000	4,251,500	5,626,400	5,242,800	2,209,700
Total Capital Cost [b]	15,012,000	22,944,000	25,509,000	34,174,000	31,873,000	13,258,000
O&M Costs						
Annual O&M Cost	$150,100	$229,400	$255,100	$341,700	$318,700	$132,600
Present Worth O&M Cost	2,233,100	3,412,900	3,795,200	5,022,600	4,680,500	1,972,800
Present Worth Energy Cost [c]	1,575,000	2,309,000	2,951,000	4,226,000	3,376,000	1,367,000
Total O&M Cost	3,808,000	5,722,000	6,746,000	9,249,000	8,057,000	3,340,000
Totals						
Total Present Worth	$18,820,000	$28,666,000	$32,255,000	$43,423,000	$39,930,000	$16,598,000
Total Annualized Cost	1,265,000	1,927,000	2,168,000	2,891,000	2,656,000	1,116,000
Potential Recycled Water Demand (AFY)	4,200	3310	4200	4200	1580	4,200
Cost per AFY [d, e]	301	582	516	688	1,681	266

Notes:

(a) Cost for pump stations includes cost to upgrade the pump station at the DWTP to pump maximum month demand requirements.

(b) Costs for alternatives 1, 2, 3 and 4 include $3,884,000 for Phase I facilities from the DWTP to the intersection of Wright and Briggs Road.

(c) Energy costs were calculated on an annual basis based on the projected recycled water availability for each year ($0.12/kW-hr).

(d) Cost per AFY is based upon the lesser of the average potential recycled water demand or the recycled water availability (4,200 AFY).

(e) Does not include the cost of wastewater treatment at DWTP or any cost for demineralization of municipal groundwater supply.

(f) Estimated costs do not include operation and maintenance of onsite facilities or costs associated with growing and harvesting crops. These costs are assumed to be the responsibility of a grower who would manage agricultural production.

(g) All cost estimates are in 2008 dollars.

The total net present values for the alternatives range between $16.6 and $43.4 million. For this preliminary planning cost estimate, it was assumed that annual operations and maintenance costs are approximately one percent of total construction costs. Alternatives 1 through 4 would benefit from the Phase I recycled water infrastructure, thus a credit in the raw construction cost could be allocated to those alternatives, although that has not been included for the costs presented in Table 4-7. The cost per AFY delivered is based upon the lesser of an alternative's average potential recycled water demand or 4,200 AFY.

4.9. Summary of Alternatives

The six alternatives described in the previous sections identify the conceptual areas to deliver Phase II recycled water for beneficial use. Table 4-8 summarizes the major characteristics of each alternative.

Table 4-8 Summary of Conceptual Use Area Alternatives

	W/M Corridor Alt 1	East of Fairview Alt 2	Lone Tree Alt 3	Santa Ana Valley Alt 4	Tres Pinos Alt 5	San Juan Valley Alt 6
Potential Demand [a]	4,200	3,310	4,200	4,200	1,580	4,200
Pipeline Length	28,270	36,130	44,520	56,080	48,552 [b]	26,310 [c]
Pump Stations [d]	1	2	2	3	3	1
Terminal Storage Volume	5 MG	50 AF	50 AF	50 AF	50 AF	5 MG
Total Present Worth	$18,820,000	$28,666,000	$32,255,000	$43,423,000	$39,930,000	$16,598,000
Cost per AFY [e]	$301	$582	$516	$688	$1,681	$266

Notes:

(a) Potential demand based on lesser of the average potential recycled water demand or the recycled water availability (4,200 AFY).

(b) Based on an independent line direct from the DWTP to Tres Pinos. An existing pipeline between the DWTP and the City's Industrial Wastewater Treatment Plant could be used, thus reducing the total pipeline length.

(c) Includes piping to CVP connection point and extension of isolated CVP line to San Juan Bautista.

(d) The number of pump stations includes the pump station located at the DWTP.

(e) Does not include the cost of wastewater treatment at DWTP or any cost for demineralization of municipal groundwater supply.

(f) All cost estimates are in 2008 dollars.

5. Evaluation of Conceptual Use Area Alternatives

This section presents the results of the alternatives analysis including a description of the criteria used to evaluate the alternatives, a summary of the evaluation of each of the alternatives, and finally the combination solution and phasing opportunity identified.

5.1. Evaluation Criteria

A preliminary set of evaluation criteria were developed based on the criteria used for the Phase I site selection. The final evaluation criteria were developed through a workshop with the Steering Committee. The criteria listed below were applied to each of the alternatives.

- Criterion 1: Minimize Cost
- Criterion 2: Creation of New Agricultural Opportunities
- Criterion 3: Long-Term Use Potential
- Criterion 4: Opportunity for Phased Development
- Criterion 5a: Minimize Impacts to Groundwater Elevation
- Criterion 5b: Minimize Impacts to Groundwater Quality
- Criterion 6: Minimize Environmental Impacts
- Criterion 7: Minimize Implementation Risk
- Criterion 8: Minimize O&M Complexity
- Criterion 9: Other Community Benefits

5.1.1. Minimize Cost

A present worth analysis was developed for each of the alternatives to compare relative life cycle costs. Present worth costs were based on estimated capital, operations and maintenance (O&M) costs. Estimated capital and O&M costs at this preliminary level were based on previously completed studies or new conceptual level estimates. The proposed ranges presented are preliminary in nature, and may be adjusted as more information is developed with respect to the costs for each alternative.

In addition to the present worth analysis, additional economic benefits may be considered and factored into the life cycle cost analysis. For example, it is expected that alternatives which can be integrated with Phase I facilities will have a reduced life cycle cost. Therefore, where applicable, these cost savings were included in the estimated capital costs.

- High
  - The alternative has a net present value of less than $20 million.

- Medium
  - The alternative has a net present value of more than $20 million and less than $30 million.
- Low
  - The alternative has a present value of greater than $30 million.

5.1.2. Creation of New Agricultural Opportunities

Conveyance of recycled water to areas which are currently undeveloped or have no existing irrigation water supply could produce new agricultural opportunities and associated economic benefits for the community.

- High
  - The alternative provides significant opportunities for new agricultural developments.
- Low
  - The alternative is an existing development and provides no opportunities for new agricultural development.

5.1.3. Long-Term Use Potential

Does this alternative provide the flexibility for expansion to accommodate future recycled water supply beyond 2023? Will future land use designations require that recycled water use at the conceptual use area be terminated at some point in the future?

- High
  - The alternative can be easily expanded to accommodate future recycled water supply beyond 2023.
  - The future land use designation is compatible with recycled water use.
- Low
  - The alternative is isolated and provides limited or no flexibility to expand.
  - The future land use designation is not compatible with recycled water use.

5.1.4. Opportunities for Phased Development

The recycled water supply will increase incrementally over time, as recycled water production increases. Does the alternative (or combination thereof) provide the ability to be cost-effectively expanded or extended, such that implementation could be completed in two or more phases?

- High

- The alternative provides the opportunity to implement a recycled water project in multiple phases.

- Low
  - The alternative has limited or no ability to be implemented in phases; all infrastructure must be installed initially for this use area.

5.1.5. Minimize Impact to Groundwater

High groundwater levels can create drainage problems for agricultural lands which can impact crop growth and agricultural production. Is the application of recycled water expected to result in high groundwater conditions in the conceptual use area? Additionally, the application of recycled water can impact groundwater quality. For example, exchanging recycled water for CVP water could lead to an increase in groundwater TDS, whereas exchanging recycled water for groundwater which already has a high TDS could actually improve the groundwater quality in that area.

- High
  - The alternative has little or no impact to high groundwater or alleviates existing high groundwater problems.
  - The alternative has no impact to groundwater quality or alleviates existing groundwater quality problems.
- Medium
  - The alternative may adversely affect existing high groundwater conditions, but managed operation approaches should be able to be developed.
  - The alternative has some negative impact on groundwater quality.
- Low
  - The alternative exacerbates high groundwater conditions or significant effort is required for mitigation.
  - The alternative is expected to intensify groundwater quality problems.

5.1.6. Minimize Environmental Impacts

Construction in urban areas is generally considered to have less of an environmental impact than construction in rural undeveloped or agricultural areas. Moreover, there are known critical habitat areas which must be considered and detrimental impacts must be avoided or mitigated.

- High
  - The alternative avoids or minimizes potential environmental impacts, minimal mitigation measures are expected.

- The environmental impact assessment, reporting and approval process is expected to be relatively smooth and short in duration.

- Medium
  - The alternative minimizes potential environmental impacts, significant mitigation measures are expected.
  - The environmental impact assessment, reporting and approval process is expected to be longer in duration.
- Low
  - A recycled water project at the alternative is likely to have adverse impacts on biological, cultural, aesthetic, or air quality resources; or may impact the preservation of agriculture and agricultural land, or other resources which cannot be mitigated.
  - The environmental impact assessment, reporting and approval process is expected to be relatively difficult and long in duration.

5.1.7. Minimize Implementation Risk

In addition to standard permitting and environmental requirements, recycled water projects also require the submission of a Title 22 Engineers Report. Approval of these reports varies among project types and respective regional boards and the California Department of Public Health (CDPH) departments. Additionally, institutional agreements between various municipalities, agencies, and private entities will likely be required to implement the project.

- High
  - The alternative is likely to require minimal effort to implement due to institutional agreements.
  - The alternative is associated with a project type that is typically supported by regulatory agencies.
- Low
  - The alternative is likely to require significant effort to implement due to institutional agreements.
  - The alternative is associated with a project type that is typically not supported by regulatory agencies due to potential groundwater or surface water impacts, etc.

5.1.8. Minimize Operation and Maintenance Complexity

Multiple end users across varying terrain may complicate operations and maintenance requirements for a recycled water project. Additional operating requirements that could result in burdensome operating requirements include numerous pressure zones, multiple pumping and piping systems, or multiple storage reservoirs.

- High
  - The alternative has a reasonable number of end users.
  - The alternative has a reasonable and manageable number of pressure zones, pumping stations, and storage reservoirs.
- Medium
  - The alternative has a moderate number of end users.
  - The alternative has a moderately uncomplicated distribution system.
- Low
  - The alternative has a significant number of end users.
  - The alternative requires complex and sophisticated distribution system (e.g., multiple pressure zones, requires dual piping networks, multiple pumping systems or significant on-site storage requirements).

5.1.9. Other Community Benefits

In addition to the evaluation criteria presented above, it is expected that some alternatives will provide unique community benefits which should be given consideration. For example, providing recycled water to the proposed college site which currently has limited or no irrigation capability may enhance the campus aesthetic and benefit the community. As another example, conveying the recycled water to an up-gradient location (with respect to groundwater flow) would provide a benefit to all those located down-gradient as some of the water may infiltrate into the groundwater.

- High
  - Application of recycled water to the alternative provides significant community benefits which otherwise would not be attained.
- Medium
  - Application of recycled water to the alternative provides some community benefits or the benefits could be equally attained through the use of another available water source.
- Low
  - Application of recycled water to the alternative provides no additional community benefits.

5.2. Evaluation of Alternatives

Table 5-1 presents a summary of the alternatives evaluation. Alternatives were ranked high, medium or low based upon how they met each criterion. A discussion of the evaluation of the alternatives and the ranking rationale is included in the following subsections.

Table 5-1 Summary of Alternative Evaluation

	Alternatives	Minimize Costs	Creation of New Agricultural Opportunities	Long-Term Use Potential	Opportunity for Phased Development	Minimize Impacts to Groundwater[d]		Minimize Environmental Impacts	Minimize Implementation Risk	Minimize O&M Complexity	Other Community Benefits	Total
						Elevation	Quality					
1	Wright/McCloskey	3	1	2 [b]	3 [c]	3	2	2	2	2	2	22
2	East of Fairview	2	2	2 [b]	3 [c]	3	3	1 [e]	2	2	2	22
3	Lone Tree	1	2 [a]	3	3 [c]	3	2	2	2	3	2	23
4	Santa Ana Valley	1	3 [a]	3	3 [c]	3	2	2	2	3	2	24
5	Tres Pinos Area	1	2	2 [b]	2	3	3	2	1	1	3	20
6	San Juan Valley	3	1	3	1	3	2	2	2	3	2	22

Note: 3/2/1 = High / Medium / Low ranking of alternatives relative to criteria

(a) Parcels which have not been in production could be placed into production if recycled water source was made available in the region.

(b) Assumes some parcels in this region could be developed in the future for residential or commercial use.

(c) Assumes Phase I facilities are located at the airport.

(d) Impacts to groundwater were qualitatively assessed by Gus Yates. Groundwater modeling would be conducted for any recommended alternatives.

(e) Tiger Salamander habitats in this region.

5.2.1. Minimize Cost

As previously described, a present worth analysis was conducted for each of the alternatives to compare relative lifecycle costs. The results of this analysis were presented in Table 4-7. Net present worth costs ranged between $16.6 and $43.4 million. Alternatives 1 and 6 were ranked high because they had the lowest net present worth, each below $20 million. Alternative 2 was ranked medium and Alternatives 3, 4 and 5 were each ranked low because their respective net present worth was greater than $30 million.

5.2.2. Creation of New Agricultural Opportunities

Alternative 4 supports the development of new agricultural opportunities in areas that have traditionally not been used for agricultural purposes or have been limited to pasture and grazing lands. Therefore, this alternative has been ranked high. Alternative 5 would largely support commercial and residential irrigation, although it is possible that some new agricultural land could be developed in the area, thus a medium ranking was applied. Alternatives 2 and 3 were also ranked medium because these areas would support the development of new agricultural areas, but not on the same, large scale as Alternative 4. Finally, Alternatives 1 and 6 were ranked low because these areas have existing agricultural developments.

5.2.3. Long-Term Use Potential

Alternatives 1 and 2 were ranked medium with respect to long-term use potential because it is expected that some of the area within these alternatives will be developed for municipal use in the future. The remaining alternatives, Alternatives 3, 4 and 6, were ranked high.

5.2.4. Opportunities for Phased Development

Each of the alternatives to the east of the DWTP have the opportunity for phased development. Alternative 1 would be the first phase, serving the Wright/McCloskey area. Assuming the Phase I recycled water use area is located at the airport site, the pipeline installed to convey the recycled water could be converted for Phase II use in the Wright/McCloskey area.

As recycled water availability exceeds demand in the Wright/McCloskey area, or as water demand and/or interest in recycled water in areas further east, increases, the recycled water transmission pipeline could be extended to serve Alternatives 2, 3 and/or 4. Therefore, each of these alternatives has been ranked high. Additionally, if Alternative 2 is developed, the recycled water distribution pipeline could be extended southward to the Tres Pinos area via the alternate route identified in Figure 4-2. Thus, Alternative 4 was ranked medium.

Alternative 6 would provide recycled water to the San Juan Valley by connecting to the existing CVP distribution network. There is no opportunity for phasing this alternative, therefore it was ranked low.

5.2.5. Minimize Impact to Groundwater

Potential groundwater impacts were qualitatively assessed by Gus Yates, PG, CHg, Consulting Hydrologist. The San Juan Valley already has some problem areas with respect to high groundwater levels. Therefore, Alternative 6 could require some management of the groundwater elevation to ensure that groundwater levels are not further impacted. However, in simply replacing some volume of CVP water with an equivalent volume of recycled water, there would likely be no net impact on the groundwater elevation in the conceptual use area due to a recycled water project. Thus, this alternative was ranked high with respect to groundwater elevation. It is not expected that the remaining alternatives would have a negative impact on groundwater elevations either; all alternatives were ranked high.

In addition to impacts on groundwater elevation, the impacts to groundwater quality were also evaluated. Alternatives 2 and 5 were ranked high because it is assumed that the TDS concentration in the recycled water (500-700 mg/l) would be less than the TDS concentration in the groundwater which is greater than 1000 mg/l. The remaining alternatives were given a medium ranking. The groundwater near Alternatives 3 and 4 is high quality, so application of recycled water in those areas could have some negative impact on the quality; however, the impact would likely not be so great as to characterize it as degradation. The groundwater quality near Alternatives 1 and 6 is known to have high TDS and although the recycled water has a lower TDS concentration, it would presumably be replacing CVP water which has an even lower TDS concentration. Therefore, the total salt load applied could increase slightly. It should be noted that if recycled water is used in lieu of groundwater for agricultural irrigation in either Alternative 1 or 6, this would act to improve the groundwater quality since the TDS concentration would be significantly less.

5.2.6. Minimize Environmental Impacts

Alternative 2 is largely undeveloped land and is known to be a habitat area for the California Tiger Salamander. Developing this area for agriculture could impact the habitat of the California Tiger Salamander. This alternative was therefore ranked low. The remaining alternatives are not known to have critical habitat areas at this time; however, the CEQA process must be followed for each. It is expected that the requirements to implement any of the remaining alternatives, as well as any environmental impacts due to construction of any of the remaining alternatives, would be similar in nature. Therefore, they were ranked medium.

5.2.7. Minimize Implementation Risk

This criterion is related to the level of effort required to prepare permits, a Title 22 Engineers Report, as well as institutional agreements between the various municipalities, agencies, and private entities involved in the recycled water project. Alternative 2 was ranked low due to the additional permitting requirements expected due to the presence of the California Tiger Salamander. Alternative 5 was also ranked low due to the number of different users and user types associated with a recycled water project in this area. The remaining alternatives were ranked high.

5.2.8. Minimize Operation and Maintenance Complexity

In Alternative 6, recycled water would be blended and distributed with the existing CVP distribution system, therefore it is not expected that operation and maintenance of the system itself would change significantly. Thus, this alternative was ranked high.

Alternatives 3 and 4 were also ranked high because it is expected that the number of end users would be small and they would largely be responsible for operating and maintaining the system beyond a certain point (e.g., the last booster pump station).

5.2.9. Other Community Benefits

Each of the alternatives provides some measurable community benefit by providing an additional water resource to the region. Alternative 5 could supply irrigation water to future public facilities (e.g., proposed college and high school) that would otherwise not have an irrigation supply as well as relieve the high demand/pressure situation in the fiberglass CVP distribution pipeline to Tres Pinos. Therefore, Alternative 5 was ranked high because it provides a unique community benefit not offered by the other alternatives. The remaining alternatives were ranked medium.

5.3. Combination Solution and Phasing

Based upon the evaluation of the alternatives presented in Table 5-1 and as discussed in the previous section, the Santa Ana Valley (Alternative 3) and the Lone Tree area (Alternative 2) are the alternatives which best meet the evaluation criteria. However, the capital investment required to support infrastructure construction to provide recycled water to these alternatives is high. Therefore, some form of phasing is preferred, such that infrastructure can be constructed over a period of time and capital invested as necessary to meet demands.

As discussed in the previous section, Alternative 1 can utilize the Phase I infrastructure up to the Wright/Briggs Road intersection, from which it could be extended eastward to the McCloskey/Fairview Road intersection. Utilizing the Phase I infrastructure would reduce the pipeline length by approximately 15,000 linear feet, resulting in a reduction in the capital costs presented in Table 4-7 of approximately $4.5 million. From the McCloskey/Fairview Road intersection, the recycled water distribution system could be further extended to serve the Lone Tree area, Santa Ana Valley, or the east of Fairview area if a demand for recycled water develops in those areas. Used in this manner, Alternative 1 would be the initial facilities constructed for Phase II.

This phased approach would also provide the flexibility to distribute water to the San Juan Valley in the future. Since the initial investment would be relatively minimal, some or all of the long-term recycled water could be conveyed to the San Juan Valley if circumstances indicate that this would be a preferred use. If all recycled water were conveyed to the San Juan Valley in the future, the Wright/McCloskey Road pipeline could be converted to a potable water supply pipeline in the City distribution system.

6. Recommended Implementation Program

As described in the previous sections, a phased solution is recommended for the Phase II recycled water program. This phased solution would minimize initial capital investment, provide maximum long-term flexibility, and create opportunities for developing a market for the use of recycled water.

6.1 Proposed Facilities

The proposed recycled water facilities would incorporate portions of Phase I and extend those facilities in two subsequent phases (Phases IIA and IIB).

6.1.1. Phase I Facilities

The Phase I facilities will include a 20-inch diameter pipeline extending from the DWTP to the Airport. A 'tee' will be located at the intersection of Wright Road and Briggs Road. This tee will provide a connection point between the Phase I and Phase II facilities. The Phase I facilities are scheduled to be complete in 2009.

6.1.2. Phase IIA Facilities

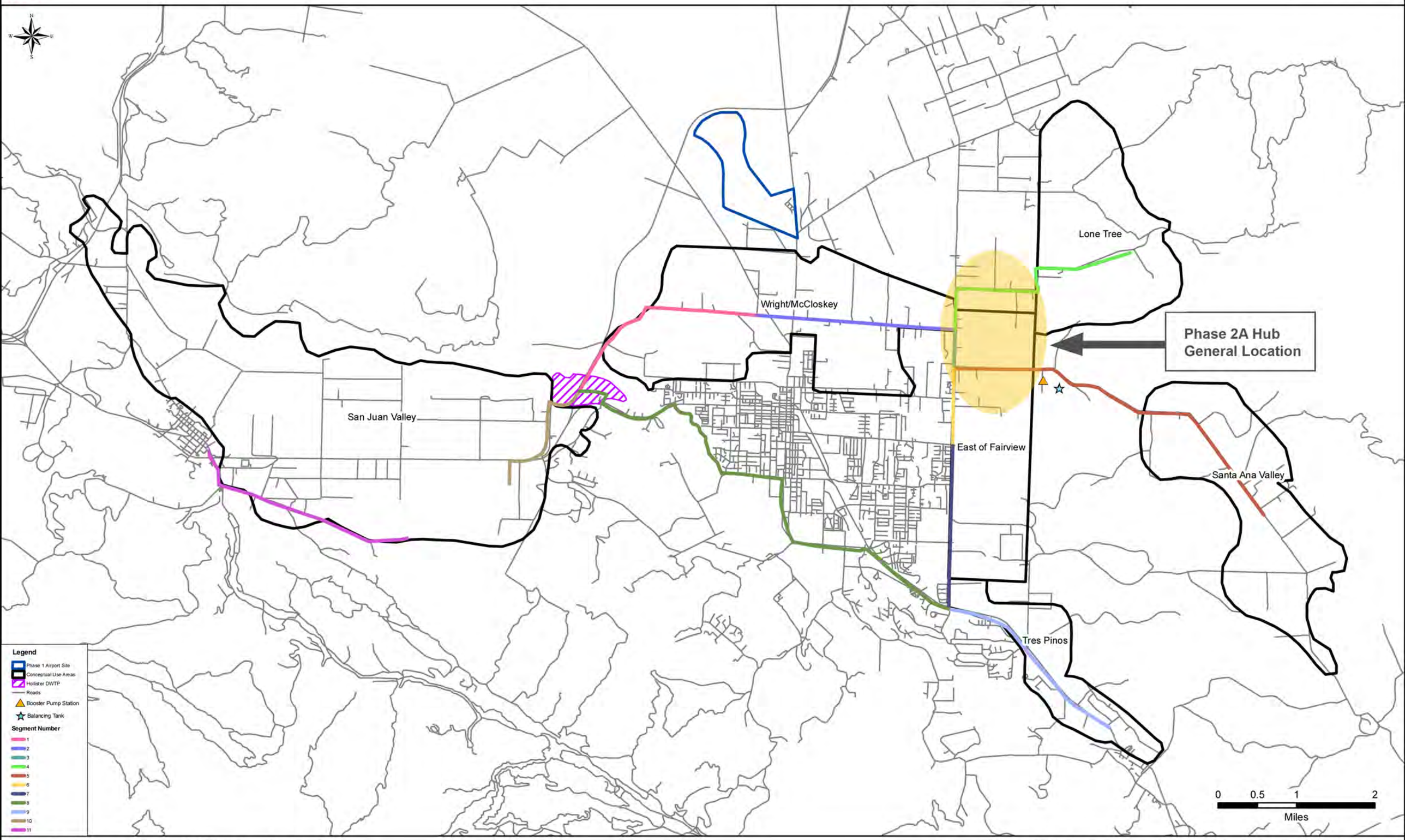
The proposed Phase IIA facilities are shown on Figure 6-1. The facilities would consist of a 20-inch diameter pipeline extending from the Phase I facilities at the intersection of Wright and Briggs Roads, along Wright and McCloskey Roads to the intersection with Fairview Road. As shown on Figure 6-1, a balancing reservoir or terminal storage reservoir would be located in the vicinity of the intersection of McCloskey and Fairview Roads. This location would provide a "hub" for future distribution of recycled water to one or more locations to the east or south. Construction of these facilities would not preclude the future use of recycled water in the San Juan Valley as part of the long-term program.

As indicated in Figure 4-2, there is also a CVP pipeline located in the Wright/McCloskey Road corridor. This CVP pipeline delivers water from east to west. There are also several large parcels in this area which rely on groundwater for irrigation, as indicated in Figure 4-3. Therefore, with multiple supplies available, this corridor provides unique opportunities for blending and creating market demand for recycled water.

6.1.3. Phase IIB Facilities

The Phase IIA facilities would be designed to provide recycled water use through the end of the planning period (2023). Beyond that time additional areas for recycled water use would be required. The flexibility in the Phase IIA facilities would provide opportunities for use in Lone Tree, Santa Ana Valley, or other areas.

There are several factors which could accelerate the timing of the Phase IIB facilities. Some of these factors include:



Recycled Water Feasibility Study Update

Phased Solution for Recycled Water Distribution
Figure 6-1

- Increased urban development in the Wright/McCloskey Road corridor leading to removal of agricultural use areas for recycled water.
- Interest by users in the Lone Tree or Santa Ana Valley for recycled water.
- Renewed interest by users in the San Juan Valley for recycled water.

6.2 Implementation Schedule

A proposed implementation schedule is presented in Figure 6-2. This schedule is based on the assumption that the Phase IIA Facilities will be operational no later than 2015, as specified in the Master Plan MOU.

6.3 Next Steps (2008-2010)

The next steps in the implementation of the recycled water program would include the following.

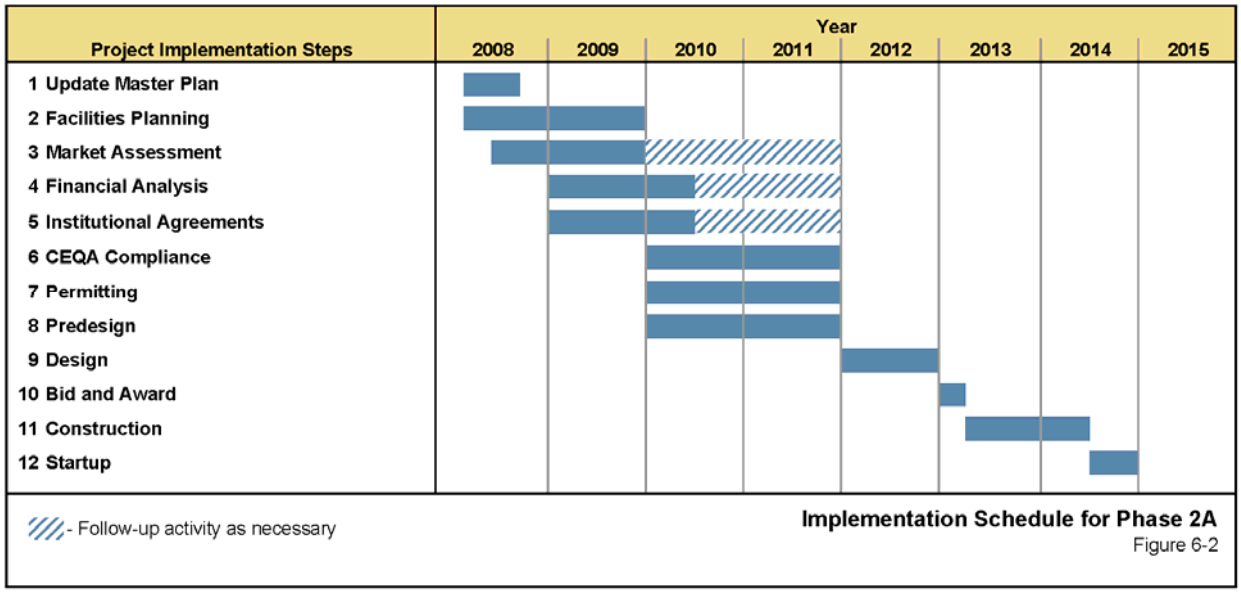
6.3.1. Update Master Plan

The updated information for the use of recycled water presented in this technical memorandum will be incorporated into the update of the Master Plan currently in progress.

6.3.2. Facilities Planning

A more detailed facilities planning study will be required to further define pipeline alignments, reservoir sizing, system operations, and estimated costs.

Figure 6-2 Implementation Schedule for Phase IIA



6.3.3. Market Assessment

Discussions need to be initiated with potential users along the Wright/McCloskey Road corridor. These discussions need to address potential blending of CVP and recycled water supplies, and the use of recycled water instead of groundwater. Discussions should also continue with potential users to the east of Fairview Road, including the Lone Tree area and Santa Anna Valley, for potential long-term use of recycled water.

6.3.4. Financial Analysis

Based upon the detailed cost estimates to be developed through facilities planning, a financial plan must be developed. This financial plan should address all costs (treatment and distribution) and allocation of those costs to the appropriate beneficiaries. Investigation of grants and loans should also be part of the financial planning.

6.3.5. Institutional Agreements

Institutional agreements must be developed for the distribution and sale of recycled water. The MOU for recycled water studies between the City and SBCWD should be amended to assign responsibilities for the next phases of work.

6.4 Future Activities (2010-2014)

As shown on Figure 6-2, activities beyond 2010 will include CEQA compliance, permitting, design, bid and award, construction, and startup.

References

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