DRAFT Technical Memorandum

City of Hollister

Subject: Phase 1 Effluent Management Project Preliminary Design TM

Prepared For: Steve Wittry (COH), Project Partners

Prepared by: Eric Evans, Marc Nakamoto (RMC)

Reviewed by: Yousra Tilden, (RMC)

Date: May 2, 2006

Reference: 144-001

This Technical Memorandum (TM) summarizes the major planning information for the City of Hollister Phase 1 Effluent Management Project. The TM is organized as follows:

1 Background

The City of Hollister (COH), San Benito County Water District (SBCWD) and San Benito County (SBC) entered into a memorandum of understanding (MOU) to jointly prepare a Hollister Urban Area Water and Wastewater Master Plan. A major driver for this planning effort was the infrastructure improvements planned for the Hollister Domestic Wastewater Treatment Plant (DWTP) and the need for expanded wastewater disposal capacity. The new treatment process at the DWTP is planned to include a membrane bioreactor (MBR) process followed by chlorine disinfection. This combination of processes will produce effluent that qualifies as disinfected tertiary recycled water (RW) according to Title 22 of the California Code of Regulations. This water is suitable for applications such as food crop irrigation, urban landscape irrigation and golf course irrigation.

Despite this suitability for many uses, the salinity of the DWTP disinfected tertiary effluent may pose problems for its widespread use and public acceptance. The expected <u>initial</u> total dissolved solids (TDS)

Item No. 17 Attachment No. 6
Sept. 7-8, 2006 Meeting
City of Hollister

concentration of the recycled water is 1,200 to 1,300 milligrams per liter (mg/L). However, by 2015 the City of Hollister is required to reduce the TDS concentration of the recycled water to below 700 mg/L, with a desired target of 500 mg/L. It is anticipated that this improvement is achieved in increments in the years leading to 2015.

1.1 Project Goals

Development of the Phase 1 Effluent Management Project off-site disposal options are guided by the goal to identify an off-site disposal project that compliments on-site percolation activities. This project should provide wastewater disposal benefits that encourage public support so that implementation of this aspect of the project coincides with the planned implementation schedule for the overall Phase 1 project.

1.2 Project Objectives

To meet this goal, objectives were identified to guide the development process.

- Provide adequate wastewater disposal for a 100-year return rainfall year (when wastewater flow is significantly higher due to inflow and infiltration (I&I)).
- Minimize impacts to existing agricultural land.

1.3 Document Objectives

Specific objectives of this TM include:

- Develop any information needed to develop project description to be used in the CEQA evaluation.
- Provide irrigation demands for the water balance evaluation being completed by Hydroscience.
- Complete a cost evaluation for the infrastructure required for the project.

2 Planning Information

This section summarizes the main planning information used to develop the water demand estimates, the site development details and the alternatives for the City of Hollister Phase 1 Effluent Management Project.

2.1 Wastewater Flows & Water Quality

Increasing wastewater influent flows to the DWTP and its limited on-site disposal capacity are the main driver for the effluent disposal needs for the facility. The water balance performed by HydroScience Engineers assumed a 2008 average daily wastewater flow of 2.75 million gallons per day (mgd), a 2008 contribution from the Sunnyslope County Water District Service area of 0.25 mgd, 5% inflow and infiltration (I&I) in December through March, 2.5% I&I in November and April, and an annual flow increase from 2008 to 2013 of 2.65%. Table 2-1 shows the monthly average wastewater influent flow rates for this planning scenario.

Table 2-1: 2013 Projected Monthly Average Influent Flow

Month	Average Influent Flow (mgd)
January	3.54
February	3.54
March	3.54
April	3.46
May	3.38
June	3.38
July	3.38
August	3.38
September	3.38
October	3.38
November	3.46
December	3.54
Annual Daily Average	**3.45**

This wastewater will be treated through an MBR process followed by chlorine disinfection. MBR processes typically produce effluent with BOD, TSS, nitrate and ammonia concentrations below 5 mg/L and turbidity values below 0.2 NTU. However, the process does not have any impact on the salinity concentration of the effluent. Table 2-2 summarizes the 2005 salinity parameters of the Hollister DWTP effluent.

Table 2-2: Hollister Domestic Wastewater Treatment Plant Effluent Water Quality

Wastewater Parameter	Minimum	Maximum	Average
Total Dissolved Solids (mg/l)	1,028	1,352	1,204
Sodium (mg/l)	227	289	253
Chloride (mg/l)	239	322	287

Notes:
1. Monthly water quality data from January 2005 to December 2005 (grab sampling).

The current DWTP effluent is projected to have an average effluent TDS concentration of 1,200 to 1,300 mg/L. Future potable water quality improvement projects are planned to reduce the base load of salts into the DWTP and reduce the additional salt contributions to the wastewater from water softeners. Future recycled water quality is expected to range between 500 mg/l to 700 mg/l.

2.2 Irrigation Demand

The approximate demands for the Hollister Airport and the Sod Farm were determined using plant evapotranspiration (ET) rates. For the Phase 1 project, three types of vegetation could potentially be irrigated with recycled water: turf grass, pasture grasses and edible food crops. To provide a conservative estimate of water use, four climatic scenarios were analyzed to determine the impact of rainfall on potential recycled water use. The four scenarios considered were a typical year, the 25-year return period rainfall year, the 50-year return period rainfall year and the 100-year return period rainfall year.

To establish the monthly distributions for each return period, monthly rainfall totals from 1875 through 2004 were analyzed. Rainfall values prior to June 1995 were taken from the City of Hollister rain gage while data after that date was collected at the California Irrigation Management Information System

(CIMIS) station at the SBCWD offices. The annual totals were based on a July to June rainfall "year". The following steps summarize the process used to determine a 100-year return period rainfall year (1% probability of exceedance) monthly rainfall distribution:

- Find the 99th percentile annual total (this corresponds to the 1 percent probability of exceedance)
- Find the 99th percentile monthly total for each month and the sum of those 99th percentile months
- Use the 99th percentile months and their sum to develop a monthly distribution percentage of total annual rainfall
- Apply this monthly percentage distribution to the 99th percentile annual total to develop the 100-year return period rainfall year.

This process was repeated for the 25 year (4% probability of exceedance, 96th percentile rainfall totals) and the 50 year (2% probability of exceedance, 98th percentile rainfall totals) return period rainfall years. The monthly rainfall distribution for each return period is summarized in Table 2-3.

Table 2-3: Design Rainfall Return Period Monthly Distributions

Month	Typical Year	25-Year Return Period	50-Year Return Period	100-Year Return Period
Jan	2.62	4.01	4.39	4.70
Feb	2.30	3.26	3.60	3.81
Mar	2.12	3.16	3.20	3.37
Apr	1.05	1.75	1.92	1.98
May	0.40	0.88	1.04	1.18
Jun	0.08	0.28	0.30	0.34
Jul	0.03	0.16	0.22	0.46
Aug	0.04	0.11	0.19	0.46
Sep	0.22	0.66	1.13	1.80
Oct	0.58	1.13	1.20	1.44
Nov	1.46	2.73	2.68	2.86
Dec	2.22	3.34	3.50	3.73
TOTAL	**13.13**	**21.46**	**23.35**	**26.12**

Table 2-4 details the net crop water requirements for each crop and rainfall scenario examined. The ET values are based on reference ET values collected for the various crops by the California Polytechnic State University at San Luis Obispo Irrigation Training and Research Center (ITRC) for a typical year in California's Zone 10, which includes San Benito County. For each return year scenario, the typical year ET was modified to account for decreased water requirements due to increased rainfall.

The crop irrigation requirements during a 100-year return period rainfall year are used in conjunction with the irrigated acreage to determine annual crop water requirements and a monthly distribution of water use for each proposed use site. Additionally, the 100-year return year demands for pasture grass were used in a water balance analysis to determine the number of RW irrigable acres that would be required to dispose of treated wastewater under multiple scenarios. The results from this water balance are summarized in Section 2.3.

To determine a monthly demand distribution, the net crop water requirement rates were used to determine what fraction of total demand occurs in each month for each rainfall scenario. Table 2-5 details the demand distributions for the typical rainfall year and the 100-year return rainfall year.

Table 2-4: Net Crop Water Demands (acre-inches/acre)

	Typical Year			25-Year Rainfall Year			50-Year Rainfall Year			100-Year Rainfall Year		
	Turf Grass	Pasture Grass	Vegetables	Turf Grass	Pasture Grass	Vegetables	Turf Grass	Pasture Grass	Vegetables	Turf Grass	Pasture Grass	Vegetables
Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mar	1.9	1.3	0.6	1.1	0.0	0.4	0.0	0.0	0.4	0.0	0.0	0.3
Apr	4.1	4.8	1.5	2.6	3.3	1.1	2.5	3.1	1.0	2.5	3.1	0.9
May	5.6	7.2	3.2	5.0	6.3	2.3	4.9	6.1	2.1	4.7	5.9	2.0
Jun	5.9	8.3	3.3	5.7	8.3	2.4	5.7	8.3	2.2	5.7	8.3	2.1
Jul	6.3	8.9	3.5	6.2	8.9	2.5	6.2	8.9	2.3	6.2	8.9	2.1
Aug	5.8	8.2	3.1	5.7	8.2	2.2	5.7	8.2	2.1	5.7	8.2	1.9
Sep	3.9	6.0	2.6	3.3	5.4	1.9	2.8	4.9	1.7	2.3	4.2	1.6
Oct	2.4	3.9	1.4	1.5	2.9	1.0	1.4	2.8	0.9	1.2	2.6	0.9
Nov	0.8	1.1	0.7	0.0	0.0	0.5	0.0	0.0	0.5	0.0	0.0	0.4
Dec	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	**36.7**	**49.7**	**20.0**	**31.2**	**43.2**	**14.2**	**29.2**	**42.3**	**13.1**	**28.3**	**41.2**	**12.4**

Notes:
1. Fluctuations in demand are partially attributed to the practice of growing two or more crops over the course of a year.

Table 2-5: Monthly Demand Distribution

Month	Typical Year	100-Year Rainfall
January	0%	0%
February	0%	0%
March	3%	0%
April	10%	7%
May	14%	14%
June	17%	20%
July	18%	22%
August	16%	20%
September	12%	10%
October	8%	6%
November	2%	0%
December	0%	0%

2.3 Water Balance Results

The monthly demand distributions are the basis for the water balance analysis used to determine disposal and storage requirements for the treated wastewater. The water balance from Hollister's *Long Term Wastewater Management Program* (LTWMP), revised in April 2006 by HydroScience Engineers, Inc., demonstrated the irrigation requirements for the 2013 flow scenario, assuming different levels of wastewater percolation at the DWTP storage reservoirs and at the Industrial Wastewater Treatment Plant (IWTP). Table 2-6 summarizes the results from the water balance. The equivalent RW irrigable areas identify the number of acres of pasture grass crop that would be needed to meet the specified level of wastewater disposal. The actual alternatives developed for this Project are likely to be a combination of pasture grass and other irrigated crops.

Table 2-6: Water Balance Summary

Alternative	Scenario	Equivalent RW Irrigable Area[a]
1	No Percolation from Storage Reservoirs and No Percolation at the IWTP	700-800 acres
2	Percolation from Storage Reservoirs and No Percolation at the IWTP	125-225 acres
3	Percolation from Storage Reservoirs and Percolation at the IWTP	0 acres

Footnote:

a. The range of acreage is dependent on whether Sunnyslope County Water District connects to the City of Hollister or decides to build a local wastewater treatment and disposal project.

2.4 Irrigation Methods

The method used for the irrigation of these sites varies based on the site characteristics and the specific crop being grown. Three irrigation methods are assumed to be viable for this project: surface irrigation, hand-move sprinklers and permanent sprinklers.

Surface Irrigation

Surface irrigation is one method of water application that can be applied to a wide variety of crops. The proposed method would divide each overall site into smaller sections separated by small berms. These smaller sections would have areas less than 40-acres each to optimize water application. Each section would be graded to provide a slope of 0.5% to 5.0% in one direction with minimal cross slopes. The water would be delivered via a buried pipeline with risers and attachments for a gated distribution pipe. The gated pipe would be located at the top of the slope allowing for a relatively equal distribution of water across the section. The amount of water allowed to each portion of the field is regulated by its corresponding hand-operated gate.

An alternative to gated pipe distribution is a system in which a ditch at the uphill end of the field is filled and each potion of the field receives water via a siphon hose that is deployed by hand as needed. In both cases, as the soil at uphill end of the field is wetted and the infiltration of water decreases, the water flows down the slope until the entire field is wetted. Irrigation with this method is applicable to crops such as hay and alfalfa that is not grown in rows. Any excess water is collected in a tail-water collection system and pumped back to the top of the slope to minimize wasted water.

For the sites where this irrigation method is used, it is assumed that surface irrigation will be performed at agronomic rates, in which an ideal amount of water is used such that plant growth is optimized and tailwater is minimized. For this project, irrigation at agronomic rates would likely be a strict requirement imposed by the Regional Water Quality Control Board.

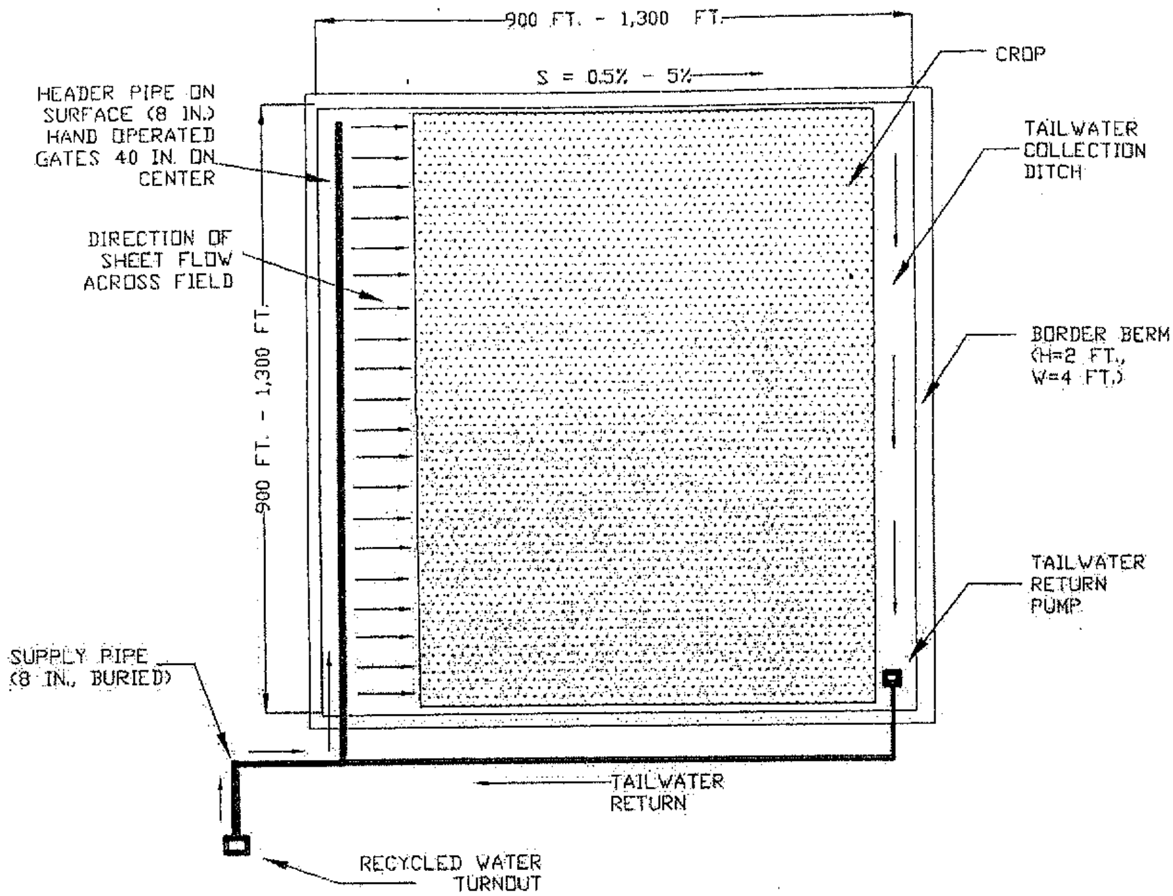
The design criteria for this type of irrigation are summarized in Table 2-7.

Table 2-7: Surface Irrigation Typical Design Criteria

Parameter	Value
Header Pipe Type	Above Ground Gated Aluminum Pipe
Header Pipe Size	8-inch
Gate Spacing	40"
Number of Gates Per Segment	15
Length of Pipe Segment	30' 6"
Design Unit Flow Rate	17 gpm/acre being irrigated
Maximum Individual Section Area	40 acres
Required Peak Flow Rate Per Section	680 gpm
Buried Distribution Pipe Size	Dependent on number of sections to be irrigated at once
Irrigation Interval (from end of last application to start of next application)	8 days
Duration of Irrigation on Each Section	4 days
12-day Alfalfa Peak Water Requirement per Section (applied in 4-days)	3.7 million gallons
Design Delivery Pressure	10 psi

Surface irrigation is presumed to be the cheapest alternative irrigation method when minimal site work is required. On parcels with steeper slopes, grading to a slope between 0.5% and 5.0% becomes cost-prohibitive and very difficult, thereby surface irrigation is generally not considered for these sites. Additionally, erosion can be a concern on sites with high slopes. Figure 2-1 shows a typical surface irrigation setup. The typical field length ranges from 900 to 1,300 feet represents field sizes from 20 acres to 40 acres. In some applications, a header ditch is used instead of a pipe, with water flowing into the field via hand-placed siphons.

Figure 2-1: Typical Surface Irrigation Layout



Hand-Move Sprinkler Irrigation

A second alternative for water application is the hand-move sprinkler system. This system works by having a main header pipe with a series of valved connections for laterals. The laterals are left in one place for a period of time, then are moved to irrigate an adjacent section. Table 2-8 summarizes the design criteria for hand-move sprinkler systems.

Table 2-8: Hand-Move Sprinkler System Typical Design Criteria

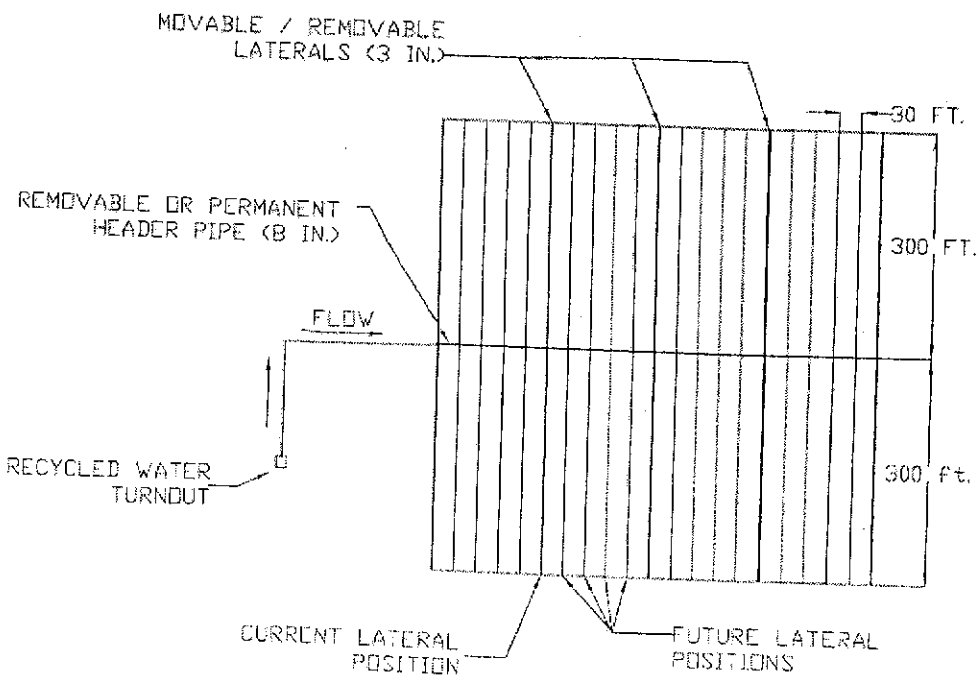
Parameter	Value
Header Pipe Type	Above Ground Aluminum Pipe
Header Pipe Size	8-inch
Lateral Pipe Diameter	3-inch
Length of Lateral Segment	30 feet
Sprinkler Radius[1]	24 feet
Design Peak Flow Rate[1]	2.44 gpm per lateral segment
Required Pressure at Sprinkler[1]	30 psi
Sprinkler Nozzle Size[1]	1/8"
Sprinkler Stream Height[1]	3 feet
Sprinkler Trajectory[1]	25 degrees
Sprinkler Overlap	8 feet
Lateral move distance	40 feet
Irrigation Frequency	7 days
Daily Irrigation Period	12.3 hours

Notes:

1. Based on RainBird ® model 20AH 1/2" full circle, aluminum arm impact sprinkler with the LAN-1-7 nozzle.

Assuming an irrigation frequency of 7 days, based on pasture grass peak evapotranspiration rates, and assuming one 40-foot horizontal move per day, each movable lateral would cover approximately 320 feet of field along the main header before being cycled back to its original position in the field. Figure 2-2 shows a typical hand-move sprinkler setup. Sprinklers along the laterals are typically spaced about 30 feet apart. A permanent sprinkler system would have permanent laterals at all positions shown.

Figure 2-2: Typical Hand Move Sprinkler Irrigation Layout



Permanent Sprinkler Irrigation

The final irrigation method identified for the Phase 1 project is a permanent, buried sprinkler system. This type of system is commonly used in locations where there is frequent access and use, such as athletic fields, or places where access is limited for operation of a hand-move irrigation system. These systems are typically installed in zones so that only a portion of the overall area is being irrigated at any one time. Changing between zones is typically done with an automated control system and valves. Table 2-9 summarizes the design criteria for this irrigation method.

Table 2-9: Permanent Sprinkler System Design Criteria

Parameter	Value
Header Pipe Type	Buried Pipe, typically PVC.
Sprinkler Radius[1]	61 feet
Design Peak Flow Rate[1]	14.3 gpm per sprinkler
Required Pressure at Sprinkler[1]	50 psi
Sprinkler Radius[2]	43.1 feet
Design Peak Flow Rate[2]	7.3 gpm per sprinkler
Required Pressure at Sprinkler[2]	50 psi
Sprinkler Overlap	10 feet
Sprinkler Spacing	112 feet
Irrigation Frequency	Daily
Daily Irrigation Period	1.8 hours

Notes:
1. Based on RainBird ® model 8005 rotor sprinkler with nozzle #16.
2. Based on Rainbird ® model 5500 rotor sprinkler with nozzle #8.

Due to the long lengths and relatively narrow spacing of the laterals, this method is estimated to be the most expensive irrigation method. It is unlikely to be used for DWTP disposal due to the high capital cost and temporary nature of the installation. Also, it is likely that grasses or hay would be grown, both of which are most easily harvested if no permanent sprinklers are present.

3 Cost Estimation Basis

The cost estimates created for this analysis are developed using the assumptions and unit costs identified in Table 3-1. Cost estimates for the site development and project alternatives are based on a set of criteria and unit costs based on April 2006 price levels. Cost estimates were developed for guidance in alternative evaluation and implementation and are based on information available at this time. The cost estimates include a construction contingency of 30%, a 20% allowance for engineering, legal, administration and separate 10% allowances for construction management and contractor overhead/profit. The costs presented herein are based on preliminary engineering and are assumed to be accurate to +30 to -20 percent of the actual cost. Final costs will depend on actual labor and material costs, competitive market conditions, actual site conditions, final project scope, implementation schedule, and other variable factors. The costs presented for each site and for each alternative do not include operations and maintenance (O&M) costs at each site. These costs are anticipated to be borne by the operator of the site and would be part of the operations agreement between the City and the operator. O&M costs for the distribution system leading up to each site are included in the each identified alternative.

Table 3-1: Cost Estimate Basis

Element	Value
Cost Estimate Date Reference	April 2006
Cost Estimate Basis – Engineering News Record (ENR) San Francisco Construction Cost Index (SF CCI)	8447.44
Annual Inflation Rate[1]	2.9%
Project Planning Horizon	5 years
Interest Rate	5%
Land Acquisition	$35,000/acre
Buried Pipe Installation <12" (Ag. land open cut)	$7.50/inch diameter/lineal foot
Buried Pipe Installation 12" and larger (Ag. land open cut)	$10.00/inch diameter/lineal foot
Pipe Installation (hung on bridge)	$15.00/in/LF
Pipe Installation (bore and jack)	$32.00/in/LF
Pipeline Appurtenances	10% of total cost
Pump Station	$2,000/horsepower
Permanent Easement Acquisition	$8,000/AC
Temporary Easement Acquisition	$2,000/AC
Permanent Easement Requirements	20 feet wide (for 50% of pipe total length)
Temporary Easement Requirements (beyond permanent)	40 feet wide (for 50% of pipe total length)
Turnout	$10,000/each
Earthwork and Berm Creation Requirements	600 cubic yards per acre
Earthwork Costs	$2.00/CY
Laser Leveling	$50/AC
Hand-Move Sprinkler Pipe (4" diameter with sprinkler)	$60 / 30' segment
Above Ground Mainline Pipe	$5.00/LF
6" Gated Pipe	$4.00/LF
8" Gated Pipe	$5.00/LF
Tailwater Return System (assumed average)	$7,500/ea
Rotor Sprinklers (purchase and install)	$125/ea
Required Pressure at Turnout	60 psi
Agricultural Customer Retrofit Costs	$25,000/site
Golf Course Customer Retrofit Costs	$50,000/site
Pipeline Annual O&M Costs	0.50% of installed cost
Pump Station Annual O&M Costs (not incl. energy)	2.50% of installed cost
Energy Costs	$0.15/kWh
Construction Contingency	30%
Engineering, Legal, and Administrative (ELA) Allowance	20%
Construction Management (CM) Allowance	10%
Contractor Overhead and Profit Allowance	10%
ELA Allowance (land acquisition)	$50,000/parcel

Notes:

1. Annual average increase in ENR SF CCI between 4/96 and 4/06.

4 Potential Use Site Identification

Figure 4-1 shows three potential irrigation use sites identified through discussions with the City of Hollister and the SBCWD. These identified irrigation use sites; the San Juan Oaks Golf Course, the Sod Farm, and the Hollister Airport; encompass approximately 770 acres of potential irrigated land and have been identified as pasture grass and turf. Some attributes that were identified as beneficial for a site to be included in the Phase 1 Effluent Management Project include: proximity to the DWTP, current ownership, topography, current land use and irrigation water quality constraints.

4.1 Potential Irrigation Use Sites

Annual demands for the sites identified below are for the 100-year return period rainfall year. This level of service was identified by the Hollister Urban Area Water and Wastewater Master Plan working group for use in this project. It should be recognized that water demand would be higher during other rainfall year periods. Detailed cost estimate worksheets for each of the sites can be found in Appendix A of this TM.

Site A – San Juan Oaks Golf Course

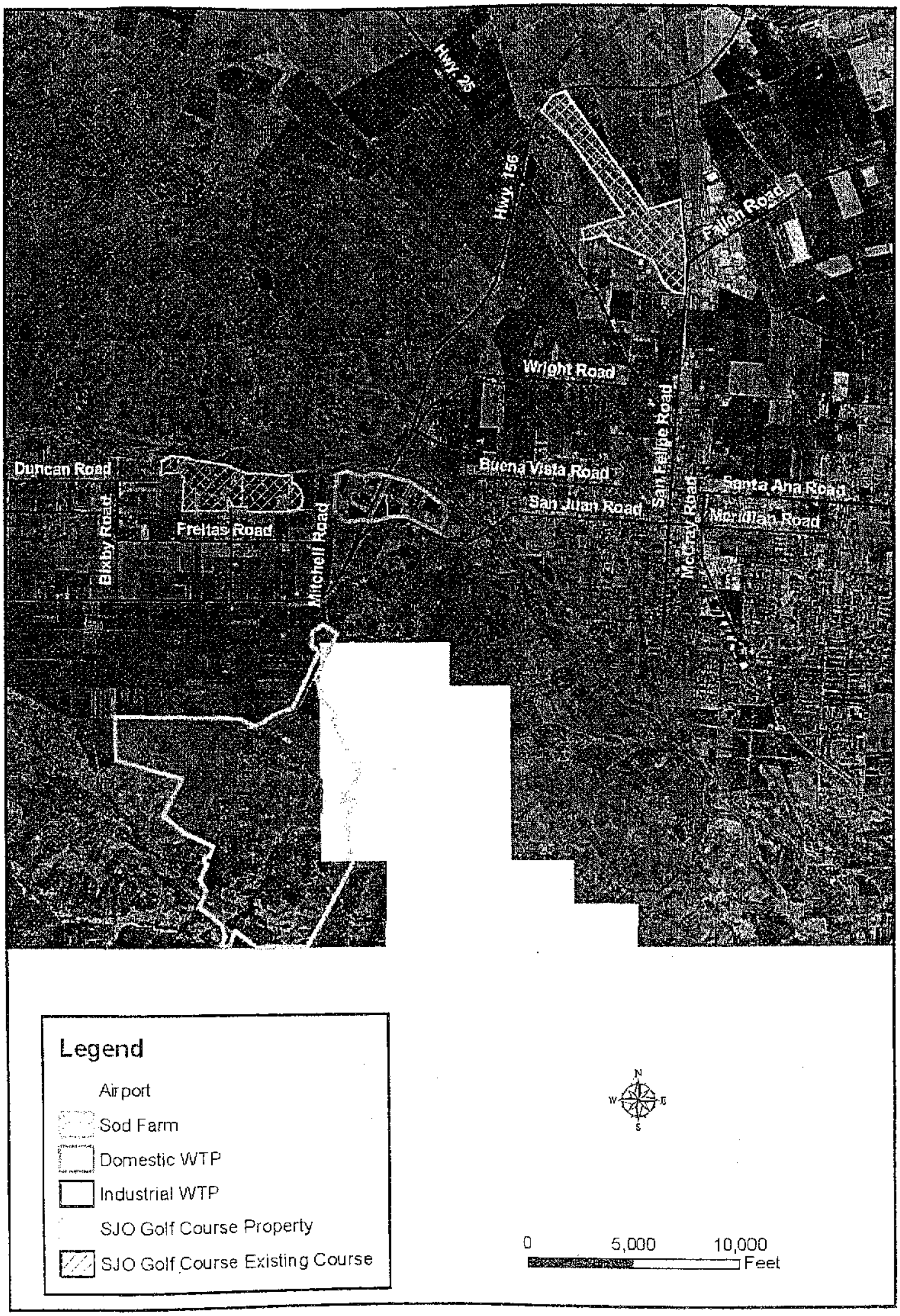
The San Juan Oaks Golf Course (SJOGC) is an existing 18-hole golf course with plans to add additional holes and residential housing in the near future. The existing 18-hole course occupies approximately 238 acres. The golf course greens are bent grass; fairways are rye grass; and maintained rough is a combination of blue/fescue/rye grasses. Based on discussion with Richard Smith and preliminary information from the golf course, a blended supply of recycled water and groundwater or CVP water with a target TDS of about 500 to 650 mg/l it thought to meet the golf course needs. Specific salt ion issues and soil conditions would need to be evaluated further to confirm the adequacy of the blended supply and identify the need for additional management measures.

The entire land area owned by the SJOGC course is approximately 1,820 acres. The majority of this area is undeveloped. The permitting for the expansion of this facility would require that the site use recycled water if readily available in the vicinity.

It has not yet been determined how many additional holes may be added, though the total is not likely to exceed 45. Nine of these additional holes may be a par-3 course consisting mostly of tees and greens without extensive fairways. Some residential development at the site is also being planned. Grading work for the construction of 57 homes is scheduled to begin in the summer of 2006, with occupancy of these homes expected in 2007. These homes are to be located along the east side and end of San Juan Oaks Road along the existing fairways. The total number of homes planned is 186. After the initial 57 homes are built, the County's growth control measures limit additional development to 29 homes per year. In addition, construction of a resort hotel is planned to begin in 2007 with occupancy scheduled for 2008.

The SJOGC currently uses approximately 365 AFY of water. The current irrigated acreage is approximately 120 acres and the planned total water use is anticipated to be 790 AFY. It is assumed that for a Phase 1 project the golf course will blend recycled water with their existing CVP water and groundwater to achieve an applied TDS concentration of 500 mg/L. This would result in a blend of 22% recycled water and 78% CVP water/groundwater. Blending at the golf course is expected to be achieved in one or more ponds located onsite. Both recycled water and CVP water would be used to fill the ponds and provide a blended supply meeting golf course needs. The golf course currently uses ponds to provide irrigation supply for the golf course. For the planned total water use and the required blend ratios the recycled water use at the site is estimated at 135 AFY. It is assumed that this user would offset CVP water use in the amount of recycled used at the site.

Figure 4-1: Potential Irrigation Use Sites



San Juan Oaks Golf Course peak demand was based on information gathered in the *San Benito County Regional Recycled Water Project Feasibility Study Report* which indicated an average day, peak month demand of 1.4 MGD. Assuming that this peak demand was delivered over a 12-hour period a peak delivery flow of 2.8 MGD (1,944 gpm) would be required. Of that total, 432 gpm would be recycled water and 1,512 gpm would be CVP water and/or groundwater from their existing supply. The quantity of recycled water would increase over time as the recycled water quality improves.

For the existing golf course area, blending of recycled water with groundwater or CVP water would take place in the existing pond near the club house. The existing pond is an unlined pond that is currently used for irrigation water storage. Water is pumped from the pond to the SJOGC irrigation system. Table 4-1 summarizes estimated retrofit costs associated with use of recycled water at the golf course.

Table 4-1: San Juan Oaks Golf Course Retrofit Costs

Element	Quantity	Unit Cost	Total Cost
Existing System Modifications	1	$50,000/site	$50,000
Turnout	1	$10,000/each	$10,000
		Raw Construction Cost	**$60,000**
Construction Contingency			$18,000
ELA Allowance			$16,000
Construction Management Allowance			$8,000
Contractor Overhead and Profit			$8,000
		Total Construction Cost	**$110,000**
Land Acquisition	0 acres	$30,000/acre	$0
Land Acquisition ELA Allowance	0 parcels	$50,000/parcel	$0
		Total Present Worth Capital Cost	**$110,000**

Site B – Sod Farm

This site is in the San Juan Valley, near Freitas Road, and would represent the conversion of groundwater to recycled water for irrigation. The total area is approximately 275 acres of which approximately 5% (14 acres) is assumed to be non-irrigated land. The remaining 261 acres of turf may be irrigated with recycled water in the Phase 1 project realizing a total of 616 AFY of water demand. The types of sod available at Pacific Sod include Medallion, Medallion Plus, Dwarf, Penn Blue, and No Mow. These sods are comprised of Tall Fescues, Dwarf Fescues, Fescue blends, Ryegrass, and Kentucky Bluegrass, which can generally tolerate the salinity levels in the recycled water supply. Salinity tolerance is contingent on the types of existing soils in the sod farm area.

This user has an existing hand-move sprinkler irrigation system and it is assumed that the current operator would continue to operate the land, avoiding the land acquisition cost for the City of Hollister. For a unit peak demand of 10 gpm/acre, a peak flow rate of 2,613 gpm would be required to irrigate this site. Discussions with the property owner with respect to their willingness to participate have not yet been initiated and will be critical to the use of this site in the Phase 1 project. Collaboration with the property owner/Sod farm operators will also be key for data collection needs including:

1. Determine the Sod Farm's current perceptions/perspectives of recycled water. Outreach/Education may be necessary to enhance their understanding of recycled water use.
2. Determine Sod Farm Operations, such as irrigation schedules, peak irrigation demand, an on-site pond storage used for irrigation, leaching, etc.

3. Identify the best locations for turnouts and type of turnout desired.
4. Identify any soil conditions of concern.
5. Inform customer of Title 22 requirements and potential on-site retrofit needs.

Existing groundwater quality data from production wells at and near the Sod Farm (GW-2 and GW-3) indicate relatively high salinity levels. Table 4-2 summarizes select water quality parameters from the two groundwater wells. Considering the existing groundwater quality, recycled water quality, and the sods that are being grown, blending does not appear necessary. This needs to be confirmed through collaboration with the Sod Farm operators. Recycled water sodium levels are a potential issue that may require management measures to be implemented such as the addition of soil amendments.

Table 4-2: Groundwater Quality Range (near Sod Farm)

Parameter	GW-2	GW-3
Total Dissolved Solids (mg/l)	1,372 – 1,692	992 – 1,436
Sodium (mg/l)	186 - 202	150 - 187
Chloride (mg/l)	194	180
Calcium (mg/l)	67 - 85	41 - 81
Magnesium (mg/l)	110 - 117	81 - 116
Nitrate (as NO3) (mg/l)	96 - 157	6 - 18
Potassium (mg/l)	2.2 – 3.9	3.1 – 3.3

Notes:
1. This table includes only select water quality parameters that were monitored.
2. GW-2 sampling on 7/21/04, 1/20/05, and 10/12/05.
3. GW-3 sampling on 7/19/04, 2/09/05, and 10/13/05.
4. Chloride data include 4 records (2 records for GW-2 and 2 records for GW-3) indicating concentrations of 31 mg/l. These records were presumed to be inaccurate measurements.

Table 4-3 summarizes the estimated costs for onsite retrofit of the site to meet Title 22 recycled water service. These costs would need to be refined during the design process as discussions with the Sod Farm operators are held.

Table 4-3: Sod Farm Retrofit Costs

Element	Quantity	Unit Cost	Total Cost
Existing System Modifications	1	$25,000/site	$25,000
Turnout	2	$10,000/each	$20,000
		Raw Construction Cost	**$45,000**
Construction Contingency			$14,000
ELA Allowance			$12,000
Construction Management Allowance			$6,000
Contractor Overhead and Profit			$6,000
		Total Construction Cost	**$83,000**
Land Acquisition	0 acres	$30,000/acre	$0
Land Acquisition ELA Allowance	0 parcels	$50,000/parcel	$0
		Total Present Worth Capital Cost	$83,000

Site C – Hollister Airport

The current City of Hollister Municipal Airport site has an area of approximately 375 acres. Of that total, 115 acres are used for buildings and runways and 40 acres are currently farmed for vegetable crops. 217 acres remain and are assumed to be available for irrigation during the Phase I project. Based on conversations with COH staff, a portion of this area would be better suited for turf (infields and area near runways) while the remainder could be used for pasture grasses. For the purposes of this evaluation, 67 total acres were assumed to be used for turf and 150 total acres to be used for pasture grasses. Each of these areas would include a 10% reduction for roads and other non-irrigated areas so that the total irrigated land would amount to 195 acres. This area represents 610 AFY of total Phase I demand.

This alternative site is desirable as the land is currently owned by the City of Hollister and is presumed not to need substantial grading prior to installation of the irrigation systems. However, consultations with the Federal Aviation Administration (FAA) will need to be undertaken to ensure that the irrigation approach proposed for this site meets their criteria for safety and security. The use of recycled water to irrigate these lands would need to be incorporated into an update of the airport's existing Airport Layout Plan for review and approval by the FAA. This process may take several months and may also require an environmental assessment under the National Environmental Policy Act (NEPA) as federal funding may have been used to construct the airport.

The area identified as pasture grass area would be irrigated using hand-move sprinklers while the turf irrigation would be accomplished with permanent sprinkler systems. The hand-move areas are divided into four sub areas to simplify irrigation activities. Assuming that all four of these areas are irrigated at the same time during the day, a peak water demand of 2,003 gpm is needed. For the turf irrigation three zones have been identified. The zones have peak demands ranging from 1,065 gpm to 1,461 gpm. It is presumed that the turf irrigation would occur during the night time and be controlled by an automatic valving system. This site will require 7 turnouts due to the shape of the site in relation to the location of the distribution pipe. Table 4-4 and Table 4-5 summarize the estimated costs for development of the irrigation systems at the airport.

Table 4-4: Airport Hand-Move Irrigation Site Development Costs

Element	Quantity	Unit Cost	Total Cost
Earth Moving/Berm Creation	0 acres	$600/acre	$0
8" AG Header Pipe	3,170 LF	$40/LF	$126,800
4" Movable Lateral	24,600 LF	$2.00/LF	$49,200
Turnout	4	$10,000/each	$40,000
		Raw Construction Cost	**$220,000**
Construction Contingency			$70,000
ELA Allowance			$60,000
Construction Management Allowance			$29,000
Contractor Overhead and Profit			$29,000
		Total Construction Cost	**$400,000**
Land Acquisition	0 acres	$30,000/acre	$0
Land Acquisition ELA Allowance	0 parcels	$50,000/parcel	$0
		Total Present Worth Capital Cost	**$400,000**

Table 4-5: Airport Permanent Sprinkler Site Development Costs

Element	Quantity	Unit Cost	Total Cost
Earth Moving/Berm Creation	0 acres	$600/acre	$0
12" Buried Mainlines	8,470 LF	$120/LF	$1,016,400
4" Buried Laterals	38,690 LF	$20/LF	$773,800
Sprinkler Heads	536	$125/each	$67,000
Valving and Controls	1	$20,000/site	$20,000
Turnout	3	$10,000/each	$30,000
		Raw Construction Cost	**$1,910,000**
Construction Contingency			$570,000
ELA Allowance			$500,000
Construction Management Allowance			$248,000
Contractor Overhead and Profit			$248,000
		Total Construction Cost	**$3,470,000**
Land Acquisition	0 acres	$30,000/acre	$0
Land Acquisition ELA Allowance	0 parcels	$50,000/parcel	$0
		Total Present Worth Capital Cost	**$3,470,000**

Potential Use Site Summary

The three use sites comprise a total of approximately 600 acres of irrigated land that could have the capacity to use 1,390 AFY of treated wastewater based on irrigation to satisfy crop ET needs during the 100-year return period rainfall year.

Additional recycled water use sites may be available in the Flint Hills area, however to date no specific sites have been identified. Table 4-6 summarizes the main characteristics of the three potential use sites.

Table 4-6: Estimated Annual Water Use at Each Proposed Site

Site	Crop Type	Site Irrigated Area (acres)	Typical Year Recycled Water Demand (AFY)	100-Year Rainfall Year Recycled Water Demand (AFY)	Peak Water Demand (gpm)	Irrigation Method	Land Purchase?
A – San Juan Oaks Golf Course[a]	Turf	120 (Current)	176 (Current) 790 (Future)	135	432	Existing System – Permanent Sprinkler	No
B – Sod Farm	Turf	261	799	616	2,613	Existing System – Hand Move Sprinkler	No
C – Airport	Turf/Pasture Grass	217	786	640	2,003	Hand-Move Sprinkler/ Permanent Sprinkler	No

Footnotes:

a. Water demand is based on the existing golf course demand and assumes a blend ratio of 22% recycled water and 78% CVP water or groundwater. As recycled water quality improves in the future addition recycled water can be used. Ultimately recycled water may be the supply for the existing and planned golf courses. Future demand is estimated to be 790 AFY.

4.2 Percolation Disposal at the Industrial Wastewater Treatment Plant (IWTP)

The City has identified the Hollister Industrial Wastewater Treatment Plant as an alternative site for disposal of wastewater generated at the Domestic Wastewater Treatment Plant. Wastewater generated at the IWTP, most of which originates from agricultural food processing, is percolated down into the groundwater. It has been determined that there is sufficient unused percolation capacity at the IWTP to accommodate excess flows from the DWTP for approximately the next five to eight years. A pipeline starting at the DWTP to deliver water to the IWTP would be approximately 6,300 feet long and would travel primarily along San Juan Road. The crossing at the San Benito River would either be hung from the existing bridge or installed beneath the bottom of the river channel. Estimated costs of this alternative are primarily for pipeline construction from the DWTP to the IWTP and are evaluated in Section 5.2.1 as Alternative 3.

5 Infrastructure Concepts

The main infrastructure associated with off-site disposal of the Phase 1 Effluent Management Project includes the following elements: distribution pipelines, distribution pump station, turnouts, and an elevated storage tank (optional). These elements are identified and described in the following sections.

5.1 Distribution Pump Station

A distribution pump station located at the DWTP will supply recycled water to the selected use sites. This pump station will also supply the future recycled water project. The design of the distribution pump station should include provisions for the future recycled water project identified in the *San Benito Country Regional Recycled Water Project Feasibility Study Report*. Provisions should include upsizing electrical service, additional pump bays, and a wet well sized for future envisioned operations. Table 5-1 summarizes one concept for the potential future recycled water project pump station. The table shows a range of peak flow conditions and the number of pumps that were identified for a one concept. Final design considerations such as turndown requirements, deliver pressure, delivery schedules, and other criteria will need to be evaluated in subsequent design phases once a future recommended recycled water alternative is selected.

Table 5-1: Potential Future Recycled Water Distribution Pump Station Criteria

Element	Criteria	Units
Peak Demand Flow	6,410 to 28,200	gpm
Number of Pumps	Up to 5 (4 duty, 1 standby)	-
Design Flow per Pump	3,260	gpm
Total Duty Design Flow	13,040	gpm
Horsepower per Pump	350	hp
Total Duty Horsepower	1,400	hp
Drive Type	Variable Frequency Drives	-

The required Phase 1 pump station to supply the three use sites (Sod Farm, San Juan Oaks Golf Course, and Airport) was estimated assuming the following:

- Minimum turnout pressure of 60 psi.
- 70% overall pump efficiency.
- Pumping only at the distribution pump station. Booster pumping was not evaluated.

Table 5-2 summarizes the Phase 1 distribution pump station criteria for service to the three potential use sites that were evaluated in conjunction with the pipeline alignments described in Section 5.2. The pump station design is driven by service to the Airport which consists of the longest stretch of distribution piping.

Table 5-2: Phase 1 Distribution Pump Station Criteria

Element	Criteria	Units
Number of Pumps	4 (3 duty, 1 standby)	-
Design Flow per Pump	2,200	gpm
Total Duty Design Flow	6,600	gpm
Horsepower per Pump	300	hp
Total Duty Horsepower	900	hp
Drive Type	Variable Frequency Drives	-

Table 5-3 summarizes the estimated cost of the distribution pump station for the three Phase 1 sites. The pumps only accommodate flow for the Phase 1 sites and do not include capacity for future recycled water use.

Table 5-3: Estimated Cost of the Phase 1 Pump Station

Element	Quantity	Unit Cost	Total Cost
DWTP Pump Station	1,200 hp	$2000/hp	$2,400,000
Site Work	1	$20,000/site	$20,000
Electrical & Instrumentation/Controls	1	$50,000/site	$50,000
Yard Piping	1	$20,000/site	$20,000
		Raw Construction Cost	**$2,490,000**
Construction Contingency			$750,000
ELA Allowance			$650,000
Construction Management Allowance			$324,000
Contractor Overhead and Profit			$324,000
		Total Construction Cost	**$4,540,000**

5.2 Distribution Pipeline Concepts

To serve recycled water to these potential users, a network of dedicated distribution pipelines, laterals and turnouts will be required. It is assumed that these pipelines will follow existing roadways and will be installed just off the road surface to minimize disruption of traffic. Pipeline concepts also consider the future recycled water project identified in the *San Benito County Regional Recycled Water Project Feasibility Study Report* dated May 2005. Provisions for future reuse would result in increased pipeline sizes in the San Juan Valley. Future reuse in the San Juan Valley could be upward of 4,600 AFY depending on the recycled water project selected.

Figure 5-1 shows pipeline alignments that could be used to distribute the recycled water to the sites. A brief description of each potential pipe segment follows. All pipelines installed along roadways are assumed to be installed in easements outside of the roadway next to the existing agricultural land. A 20-foot wide permanent easement and an additional 40-foot wide temporary construction easement are assumed to be required for 50% of the length of each pipeline segment. The easements for the remaining 50% of the pipeline length are assumed to be located in existing county easements. Table 5-4 summarizes the approximate lengths of each pipeline segment and pipeline diameter.

Table 5-4: Pipeline Length Summary

Pipe Segment	Approximate Length (ft)	Size Range[a, b]
P01	840	24 to 48 inches
P02	3,800	20 to 48 inches
P03	10,500	6 to 14 inches
P04	4,700	16 to 36 inches
P05	1,600	16-inch
P06	41,740	8 to 14 inches [c]
P07	6,300	12-inch

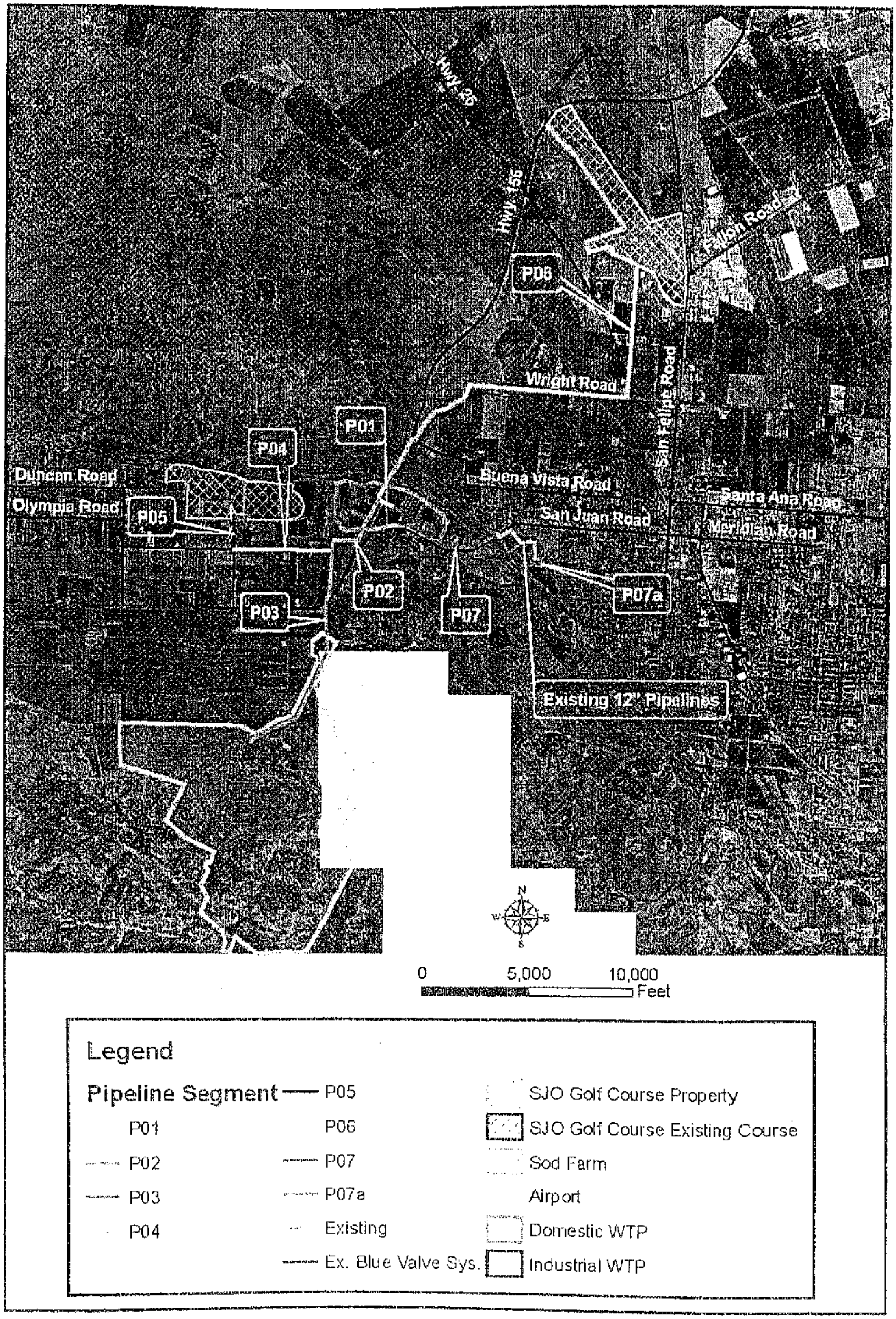
Footnote:

a. The size of the pipeline segment is dependent on provisions for the future recycled water project. Minimum sizes shown assume that all three use sites are implemented.

b. Pipelines were sized assuming a maximum velocity of 5 ft/s.

c. Shows range of sizes for pipeline running along the western boundary of the Airport site. As Airport areas are irrigated the required pipeline diameter decreases.

Figure 5-1: Pipeline Alignments



Pipe P01 (From Pump Station at DWTP)

This is the main pipeline that connects the pump station at the DWTP to the rest of the distribution system. To serve all potential mid-term recycled water demand for the three proposed use sites plus future demands at these sites, the diameter of this pipe would be 24-inches. The identified ultimate recycled water project would potentially require a pipe diameter of 48-inches for this segment of pipe. The majority of the pipeline would be installed within the DWTP boundary and would end on the east side of Highway 156.

Pipe P02

This is the main pipeline serving demand to the south of the DWTP. To serve all potential demand (for the two potential sites to the south and west of the DWTP) for the Phase 1 project, the pipeline diameter would be 20-inches. Future recycled water project could require a diameter of either 24-inches or 48-inches depending on the planning horizon used. This pipeline would be installed on the east side of Highway 156 for approximately 2,250 feet, then would cross under Highway 156 (150 ft) using a trenchless technology to minimize traffic disruption. After crossing Hwy 156, the pipe would travel along an existing parcel boundary in agricultural land until the dirt road that continues to the north of Mitchell Road is reached. The pipeline will then cross the dirt road, running along the west side of the dirt road, and turn to the south to the intersection with Mitchell Road.

Pipe P03 (To SJO Golf Course Property)

The pipe would cross Freitas Road using open trench methods and would follow along the west side of Mitchell Road to the intersection with Hwy 156. A trenchless installation method would be used to cross Hwy 156 to minimize traffic disturbances and the pipeline would then follow the west side of Union Road to the intersection with Nothing Road. The pipeline along San Juan Oaks Drive would be installed on the east side of the road. All pipes would be installed adjacent to the roadway in agricultural land. This pipe would have a maximum diameter of 14 inches.

The last portion of this pipe would serve the San Juan Oaks Golf Course itself. Due to quality considerations, a Phase 1 project would only need to have a diameter of 6-inches to serve the required quantity of recycled water to the site. The pipe would follow the east side of San Juan Oaks Drive to the San Juan Oaks Golf Course. Future improvements in recycled water quality would allow for an increase in recycled water use from 22% of the demand to 100% of the demand, requiring a future pipe diameter of 14-inches.

Pipe P04 (Freitas Road)

This pipeline starts at the end of P02 at the intersection of Freitas Road and Mitchell Road and will run west along the north side of Freitas Road. This portion of pipeline would have a maximum diameter of 16-inches for the Phase 1 project or up to 36-inches to accommodate future reuse.

Pipe P05 (To Sod Farm)

This pipeline starts at the end of P04 at the intersection of Freitas Road and Flint Road and runs in the north south direction. The pipe would be installed to the east of Flint Road in agricultural land adjacent to the roadway. The Sod Farm would require a pipe diameter of 16-inches. It is envisioned that two turnouts would be constructed to serve the Sod Farm needs.

Pipe P06 (To Airport)

Service to the Hollister Airport begins with this segment of pipe connecting to the end of P01 and follows Hwy 156 to the north. The pipe will be installed on the east side of Hwy 156 out of the traveled way. Ideally, the pipe will be hung on the bridge crossing the San Benito River and this segment of pipe will end at the north end of the bridge where a turnout for the San Benito River Bench Area would be located.

However, alternative construction methods should also be considered as Caltrans permitting may be time consuming and restrictive. These alternative methods include trenchless installation under the river channel and open cut installation through the river channel.

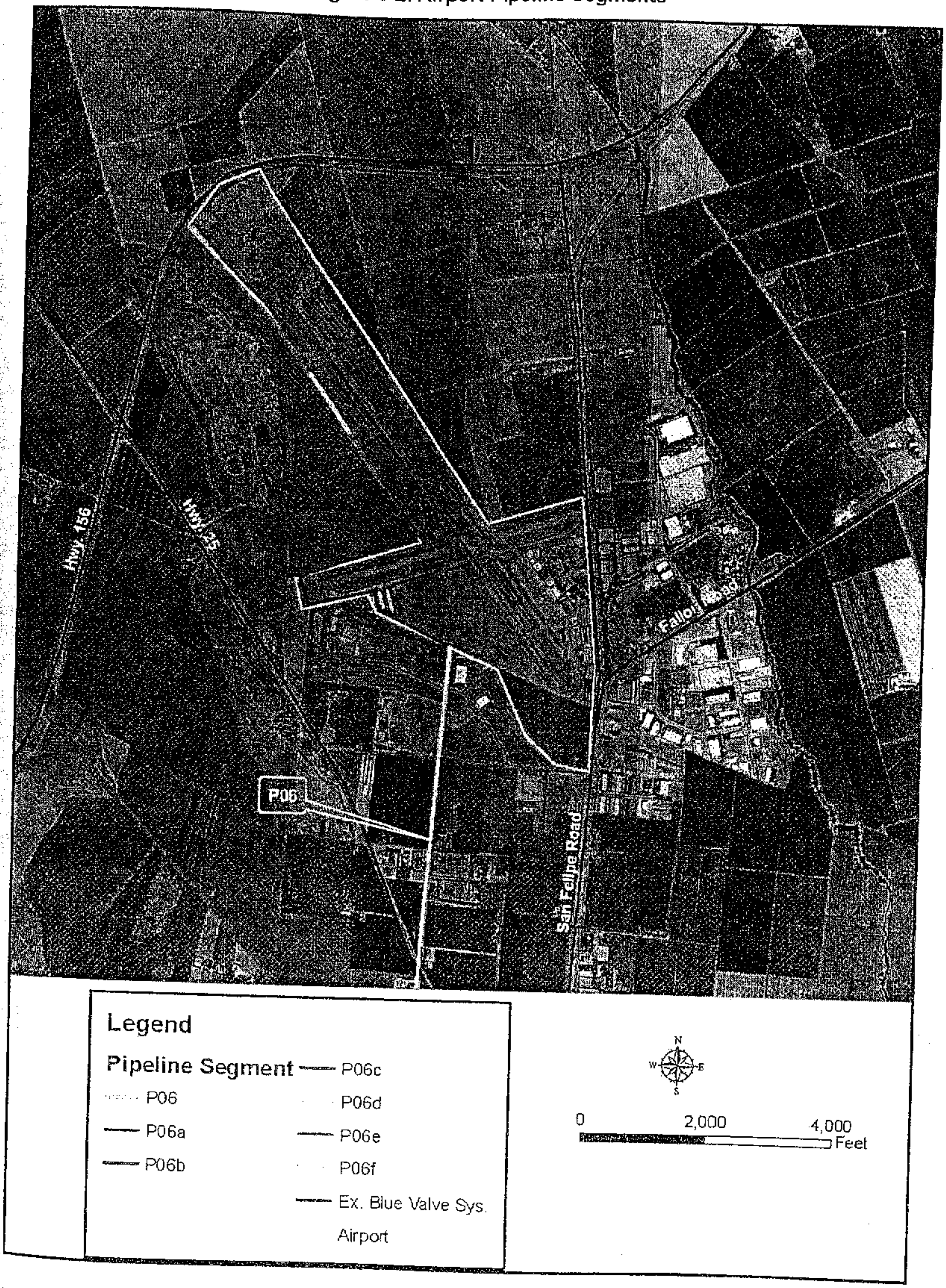
The pipe would then continue on along the east side of Highway 156 to Wright Road. After following Wright Road to its intersection with Briggs Road, the pipe will follow Briggs Road north, crossing Hwy 25 using trenchless methods. Where Briggs Road ends, the pipe will continue north through an agricultural field and then will continue north on Aerostar Drive to the Hollister Airport property line.

Pipes P06-a through P06-f, see Table 5-5 and Figure 5-2 for details, will follow the western airport property line continually decreasing in size as water is used at the Airport. The pipes will continue along the western airport property line until the intersection with Hwy 156. The maximum size for this pipe is 14-inches.

Table 5-5: Airport Pipeline Length Summary

Pipe Segment	Approximate Length (ft)	Pipeline Diameter
P06	20,900	14-inch
P06-a	5,060	12-inch
P06-b	920	10-inch
P06-c	1,030	10-inch
P06-d	1,110	8-inch
P06-e	2,340	8-inch
P06-f	680	8-inch

Figure 5-2: Airport Pipeline Segments



Pipe P07 (Disposal at the IWTP)

This pipeline would deliver treated wastewater from the DWTP to the IWTP for percolation. The average delivery flow is estimated to be 0.7 MGD according to water balance calculations provided by HydroScience Engineers, Inc. Assuming that pumping is only performed during 8 hours each day, the approximate size for this pipeline would be 12 inches. Additional information about preferred pumping schedules and other parameters will need to be obtained prior to finalizing the minimum pipe diameter.

Starting at the pump station at the DWTP, the pipe would first travel east and then south approximately 500 feet to the frontage road along the north side of San Juan Road. It would then follow this frontage road toward the east for approximately 4,400 feet to the San Benito River. The approximate 800-foot crossing at the river would be accomplished by either hanging the pipe from the existing bridge or installing it underneath the channel. After the bridge crossing, the pipe would connect with either of two existing 12-inch pipes that run along the northeasterly perimeter of the IWTP ponds for approximately 4,000 feet to an influent pipeline. From the terminus of the chosen 12-inch line, a new pipeline (designated as P07a) would be installed to connect to the existing effluent distribution box.

The two existing 12-inch pipes currently are used for periodic diversion of domestic raw wastewater to the IWTP for treatment and percolation. Once the new DWTP is completed, all the domestic flow would be treated at the new plant, therefore the two existing 12-inch pipelines would no longer be needed for raw wastewater diversions.

5.2.1 Estimated Pipeline Cost of Phase 1 Alternatives

Pipeline cost estimates were developed for the pipeline segments using the unit costs identified Section 3. The estimated cost of the distribution pipelines vary according to the selection of use sites to implement and decisions on providing capacity for a future recycled water project. Table 5-6 summarizes the estimated costs of three of the many possible distribution alternatives. The three alternatives evaluated include:

- Alternative 1 – Services to SJOGC, Sod Farm, and Airport with no provisions for future recycled water use.
- Alternative 2 – Service to SJOGC, Sod Farm, and Airport including provision for the peak future recycled water project in the San Juan Valley.
- Alternative 3 – Conveyance pipeline from the DWTP to the IWTP for percolation disposal.

More detailed cost information is presented in Appendix B.

Table 5-6: Estimated Cost of Three Phase 1 Pipeline Alternatives

Alternative	Description	Pipe Segments	Raw Construction Cost	Construction Contingency	Easements	ELA	CM and O&P	Total Construction Cost
1	Current SJOGC, Sod Farm, and Airport	P01, P02, P03, P04, P05, P06	$7,242,000	$2,173,000	$176,000	$1,918,000	$1,882,000	$13,392,000
2	Current SJOGC, Sod Farm, and Airport with provisions for future RW supply	P01 future, P02 future, P03 future, P04 future, P05, P06	$10,895,000	$3,269,000	$176,000	$2,868,000	$2,832,000	$20,040,000
3	DWTP wastewater transfer to IWTP for percolation	P07	$832,000	$250,000	$21,000	$221,000	$216,000	$1,539,000

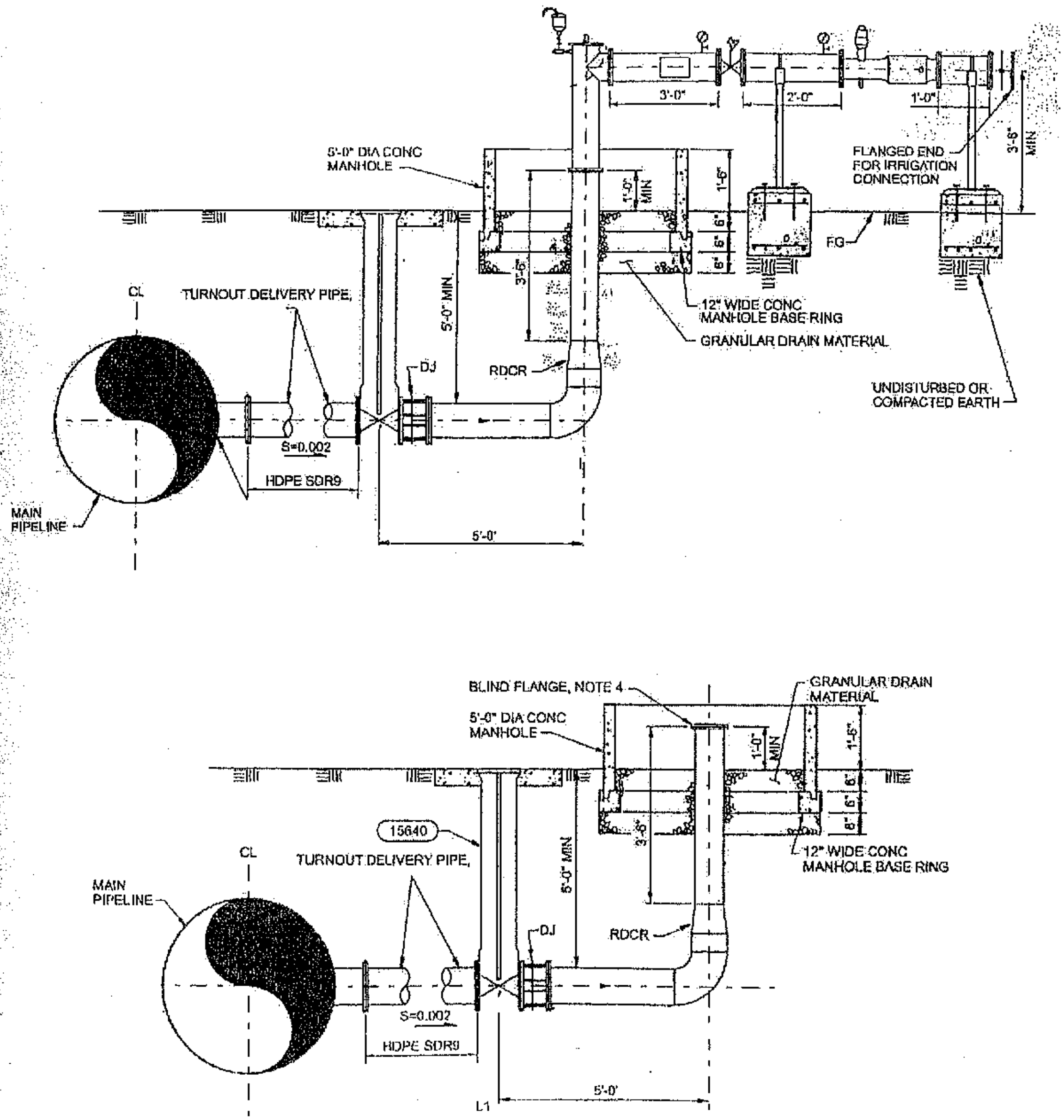
Notes:

1. ELA – Engineering, Legal, and Administration
2. CM – Construction Management
3. O&P – Overhead and Profit
4. Easements include costs for permanent and temporary easements.

5.3 Turnouts

Irrigation turnouts would be constructed at each site for operators to draw water from the distribution system. Turnout would vary by the irrigation system selected and the needs of the irrigation operator. Figure 5-3 shows two typical turnout details, one above ground the other below ground. Estimated costs for turnouts were included with cost estimates for site development in Section 4.1.

Figure 5-3: Typical Turnout Details



5.4 Storage Infrastructure (Optional)

In addition to the pipelines identified in the previous section, an elevated storage tank in the Flint Hills would provide additional value and reliability. An elevated storage tank would provide supply reliability and reduce the size of the distribution pump station as peak demands could be attenuated through variation in the tank water level. Supply reliability would be added to the system by reducing the reliance on the pumps at the DWTP to pressurize the entire system. Depending on the elevation of the tank, a booster pump station may be required to provide pressure to the customers. The need for this pump station will depend on the criteria established for delivery pressure at each service turnout. For example, a delivery pressure of 60 psi would require an elevation head of approximately 140 feet above the highest delivery point in addition to head required to overcome losses in the distribution system.

Conceptually, this storage tank would be located north of the DWTP on the west side of Hwy 156, in the Flint Hills. This location is a preferred location for the storage as the hills would provide additional water head to get the water to use sites and to assist in mitigation of pressure surge in the distribution system. Sizing, exact location, and definition of any related work to implement this aspect of the project will be further evaluated if a Phase 1 recycled water alternative is selected. Costs for this element will be developed at this stage as well.

6 Next Steps

Dependent on the need for spray field for recycled water use to assist with wastewater disposal, the key next steps in the project implementation process include:

- Collaboration with the Sod Farm on reuse opportunities. The Sod Farm has relatively poor existing groundwater quality which may present an opportunity to use recycled water at the site. Discussions with the Sod Farm would also be necessary for informing them of Title 22 requirements for recycled water use, identifying specific turnout locations, and securing an agreement for recycled water use (Market Assurance). Discussions would also include negotiations for the cost of recycled water, service reliability needs, and on site retrofit requirements.

- Airport Irrigation. For irrigation at the airport, an operator must be identified and meetings with airport operators and the FAA will be necessary to further develop the irrigation system on the airport property. The airport will likely have specific requirements for irrigation and crop harvesting. Irrigation may be required to be on a strict schedule to accommodate airport operations.

- Collaboration with the SJOGC. Correspondence with the SJO golf course has already commenced and is the basis for the information in this TM. Additional collaboration will be needed to develop a use agreement and other terms for recycled water use.