CHAPTER 6
OTHER ALTERNATIVES

6.1 CEQA REQUIREMENTS FOR ALTERNATIVES EVALUATION

The California Environmental Quality Act (CEQA) Guidelines require EIRs to describe and evaluate a range of reasonable alternatives to a project, or to the location of a project, that would feasibly attain most of the basic project objectives and avoid or substantially lessen significant project impacts. The Guidelines set forth the following criteria for selecting alternatives:

1. "An EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project . . . ." An EIR must consider "a reasonable range of potentially feasible alternatives that will foster informed decision-making and public participation. An EIR is not required to consider alternatives which are infeasible. The lead agency is responsible for selecting a range of project alternatives for examination and must publicly disclose its reasoning for selecting those alternatives." (§15126.6[a])

2. "The specific alternative of 'no project' shall also be evaluated along with its impact." (§15126.6[e])

The CEQA Guidelines also state that where a previous EIR has sufficiently analyzed a range of reasonable alternatives for projects with the same basic purpose, the lead agency should review the previous document and may rely on it in assessing potential project alternatives (Section 15126.6[f]). This EIR relies on two previous EIRs: the *Local Water Supply and Distribution Final Environmental Impact Report* ("Local Projects" EIR, PVWMA, certified in May 1999), and the *Basin Management Plan Final Program Environmental Impact Report* (1993 BMP PEIR, PVWMA, certified December 1993), parts of which are incorporated herein by reference, as noted.[1]

Currently, there is no preferred alternative. The PVWMA Board of Directors could approve any of the alternatives evaluated in this chapter in lieu of either the Local-Only Alternative or BMP 2000 Alternative if they believe the alternative would be more appropriate. The Board of Directors also may select some components of one alternative and some components from another alternative, or they may select some basic project components (e.g., Water Recycling) and defer action on other components.

[1] Both EIRs are available for review at the Pajaro Valley Water Management Agency offices, 36 Brennan Street, Watsonville, CA 95076.

6.2 ALTERNATIVES FORMULATION

The draft Revised Basin Management Plan (BMP) presents a number of projects that could be undertaken by PVWMA in order to stop seawater intrusion and to balance water demand with sustainable water supplies in the agency's service area. These projects were then combined into alternative strategies to achieve the agency's objectives. Most of these projects have been considered in the two previous EIRs mentioned above: the Local Projects EIR and the 1993 BMP PEIR. **Table 6.1** lists all of the projects considered in the draft Revised BMP, indicates whether the project is evaluated in this EIR, and whether the project was evaluated in the Local Projects EIR or BMP Program EIR. The projects that comprise the Local-Only Alternative and BMP 2000 Alternative are described in detail in Chapter 2 of this document and evaluated in Chapters 4 and 5. The alternatives described and evaluated in this chapter include the following:

- **No Project Alternative.** Required by CEQA. Evaluates continuation of existing conditions and likely consequences.
- **Modified BMP 2000 Alternative.** Injection of CVP water; no Murphy Crossing project; no Inland Distribution System; smaller diameter Import Pipeline.
- **Modified Local-Only Alternative.** Supplements Local-Only Alternative with CVP water; blends recycled water prior to recharge; adds another recharge basin for recycled water.

The following projects were considered in either the draft BMP 2000 or draft Revised BMP and have been eliminated from further consideration at this time: Desalination and River Conveyance of Central Valley Project (CVP) Water. Section 6.4, at the end of this chapter, describes these projects and the reasons each was rejected, as well as other alternatives that were eliminated from consideration in this EIR.

6.2.1 NO PROJECT ALTERNATIVE

DESCRIPTION

This EIR incorporates by reference the No Project Alternative presented in the 1993 BMP EIR, summarized below.

The No Project Alternative is defined as no remedial action. By definition it includes no plans, policies, programs, or projects that would be undertaken by the PVWMA or any other party in the basin relative to the Revised BMP. Groundwater would continue to be the source of water for agricultural irrigation, industrial and commercial use, and domestic residential use. Groundwater extraction would increase to meet higher future water demand.

Given the consequences of continued pumping and failure of PVWMA to implement a BMP, it is possible that state intervention by the State Water Resources Control Board would occur or that basinwide adjudication would be initiated by a lawsuit filed by an aggrieved landowner (i.e., owner of a parcel where seawater intrusion has occurred). Without a supplemental water supply project, the options available for bringing the basin into balance and curtailing seawater intrusion

TABLE 6.1
BASIN MANAGEMENT PLAN PROJECTS CONSIDERED

	Evaluated in this EIR					
	BMP 2000 Alternative	**Local-Only Alternative**	**Discussed in this Chapter**	**Evaluated in "Local Projects" EIR**	**Evaluated in 1993 BMP Program EIR**	**Eliminated from further Consideration**
Optimizing Current Water Supplies						
Water Conservation	X	X			X	
Tiered Water Pricing		X				
Land Retirement		X				
Pumping Management	X	X	X		X	
Water Supply Projects						
Harkins Slough	X	X		X		
Murphy Crossing	X			X		
Pinto Lake, Corralitos Creek Diversions		X				
Watsonville Slough		X				
Import CVP Water (quantity varies)	X		X		X	
Recycled Water	X	X		X	X	
Seawater Desalination			X			
Supplemental Wells	X					
Water Storage Projects						
College Lake (size varies)		X		X	X	
Bolsa de San Cayetano, Corn Cob, Pescadero Reservoirs					X	X
Aquifer Storage and Recovery		X			X	
North Dunes recharge basin		X				
Southeast Dunes recharge basin			X			
Out-of-Basin Banking			X			X
Groundwater Injection of CVP Water			X			
Regional Project			X		X	

are limited to mandatory pumping controls or land fallowing in the coastal area. Under such a scenario, the state, by statutory adjudication, or the court, through litigation, might establish pumping limits. Predicting the allocation of water between agricultural users or urban users in the event of an adjudication would be speculative.

ENVIRONMENTAL IMPACTS

Under the No Project Alternative, the basin's overdraft condition would worsen. Seawater intrusion would continue to advance beneath the coastal lands at the current rate of 10,000 acre-feet per year (afy) or higher. Irrigation with groundwater would continue along the coast area until the salt content in the soils builds up to the point where existing agricultural crops typical of the area could not grow. Production of more salt-tolerant crops may occur to some degree; however, the economy of the area may change and some land may be fallowed. Over the long term, this would eventually remove 10,000 acres or 33 percent of the basin's agricultural acreage by the end of the planning period in year 2040 due to continued irrigation with salt-contaminated groundwater. A 33 percent reduction in agricultural productivity would amount to hundreds of millions of dollars in lost economic production annually and the elimination of thousands of jobs.

6.2.2 MODIFIED BMP 2000 ALTERNATIVE

DESCRIPTION

This alternative was developed based on input from local stakeholders. The Modified BMP 2000 Alternative involves the injection of CVP water into the groundwater basin for storage. This alternative includes the following components: an Import Pipeline (smaller in diameter than the pipeline proposed under the BMP 2000 Alternative), injection/extraction wells for CVP water, and modified local water supply projects, including recycled water facilities and the Harkins Slough project. The Modified BMP 2000 Alternative consists of the following:

- Coastal Distribution System;
- Conservation: Seven-year Plan (5,000 afy);
- Harkins Slough project with Harkins Slough recharge basin and supplemental wells and connection (1,100 afy);
- Recycled Water Facility (4,000 afy); and
- 54-inch Import Pipeline Project with injection/extraction wells for CVP water (11,900 afy).

The sustainable yield of the groundwater basin following implementation of the Modified BMP 2000 Alternative is estimated to be approximately 47,000 afy. With construction of the Recycled Water Facility plus the existing Harkins Slough local supplies, the estimated average annual CVP water required to balance the basin is 11,900 afy. Assuming an average CVP annual delivery of 60 percent, the PVWMA would need to secure CVP water contracts (or annual transfers) of approximately 19,800 afy to meet this need. Although 17,000 afy is the total quantity of supplemental supply required to balance the basin, approximately 18,500 afy of water must be delivered to the Coastal Distribution System in order to develop a hydrostatic barrier resulting in sustainable groundwater pumping of 47,000 afy. Therefore, on average at least 1,500 afy would

be pumped from supplemental wells east of Highway 1 and delivered to the Coastal Distribution System.

In average years, CVP deliveries plus water from the Harkins Slough extraction wells and Recycled Water Facility would provide water required to meet peak Coastal Distribution System demands. The injection/extraction wells would be available to balance peak demands. During above-normal rainfall years, CVP allotments plus supplies extracted from the Harkins Slough recharge basin and recycled water would be expected to meet or exceed demand within the Coastal Distribution System. Therefore, CVP water *above current demands* would be injected into the groundwater basin using wells located along the Import Pipeline alignment. The exact locations of the injection/extraction wells have not been identified. Recycled water would be blended with recovered water from injection/extraction wells and CVP water to create a uniform water supply for the Coastal Distribution System that meets or exceeds the water quality objectives.

This alternative would replace the Murphy Crossing and Inland Distribution System project components with injection/extraction of CVP water and avoid the environmental impacts and permitting and design issues related to Murphy Crossing.

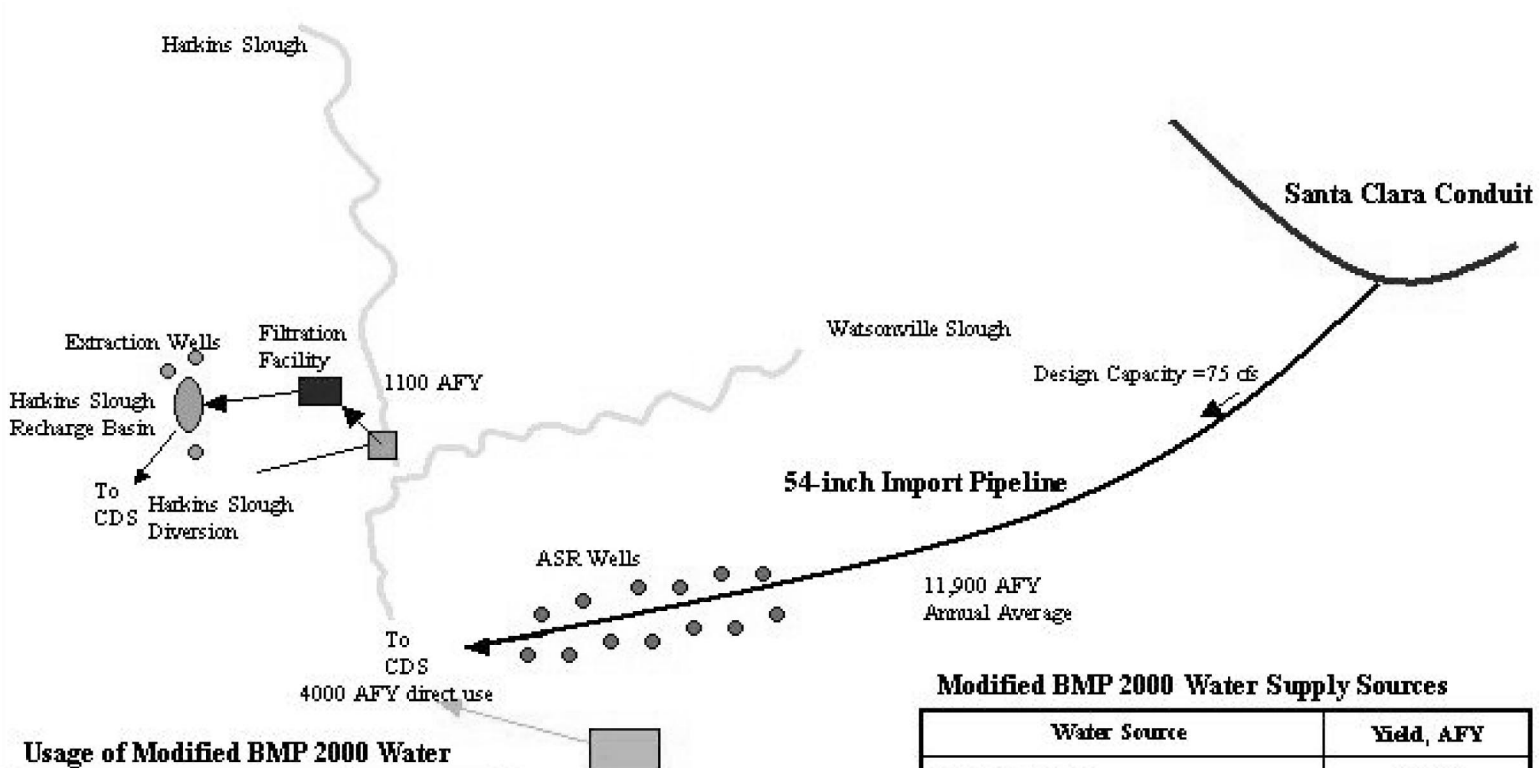
LOCATION

Figure 6.1 presents a schematic of the facilities associated with the Modified BMP 2000 Alternative. **Figure 2.5** indicates the area within which up to 17 wells to product blending water would be sited. Wells would be spaced approximately 2,000 feet apart. These wells would be located within both unincorporated Santa Cruz and unincorporated Monterey counties. The total area anticipated for each well would be approximately 30 feet by 40 feet. Lateral pipelines would connect the wells to the Import Pipeline.

ENVIRONMENTAL IMPACTS

This discussion focuses on the differences between this alternative and the BMP 2000 Alternative, which essentially is a tradeoff of impacts between the injection/extraction of CVP water and the Murphy Crossing and Inland Distribution System projects.

With one exception, all of the Modified BMP 2000 Alternative components are evaluated in Chapters 3 through 5 of this EIR or in the Local Water Supply and Distribution System EIR (PVWMA, 1999). General impacts associated with typical well construction and operation (e.g., pump noise) are described in Chapters 4 and 5. Impacts associated with the injection/extraction of CVP water are discussed below. Impacts associated with the Murphy Crossing and Inland Distribution System, which would be avoided under this alternative, also are discussed.



Usage of Modified BMP 2000 Water

Use/Storage	AFY
Direct Use or ASR Wells	15,900
Percolation ponds & Recovery	1,100
Total	**17,000**

Modified BMP 2000 Water Supply Sources

Water Source	Yield, AFY
Recycled Water	4,000
Harkins Slough	1,100
CVP – Import Water	11,900
Total	**17,000**

SOURCE: RMC

Figure 6.1
Modified BMP 2000 Alternative Flow Schematic

Hydrology and Water Quality

Like the BMP Alternative, this alternative would meet the project objectives by balancing the groundwater basin without the need to fallow land. This alternative has the highest overall source water quality among other alternatives (total amount of CVP water, for direct use and injection, would be 11,900 afy, compared with the BMP 2000 Alternative [10,300 afy]).

Mr. Martin Feeney completed an assessment of the water quality issues related to the injection of CVP water under the BMP 2000 Alternative[2]. His assumptions for the water quality evaluation were as follows:

> The alternative includes the storage of up to 10,000 af of CVP water in wet years. Storage would be achieved through the use of 12 injection/recovery wells. The proposed injection and recovery rates are 1,000 and 2,000 gallons per minute (gpm), respectively. At the proposed rates, injection period would be approximately 190 days.

Based on what is known of the Pajaro basin hydrogeology, the Aromas Red Sands aquifer appears suitable for an injection project such as the one proposed under the BMP 2000. Although the deposits are extremely heterogeneous, i.e., their composition and grain-size can vary as does their transmissivity (ability to transmit water), the Aromas Red Sands can provide adequate hydrogeologic conditions for injection considering their geologic characteristics, depth and extent. In regards to hydraulics, the aquifer must have adequate transmissivity and a sufficient depth to water. Depth to water is of particular concern. Injecting water into an already shallow aquifer can cause intolerable mounding conditions and can reduce the desired injection pressures thereby reducing the capacity of the injection project. Based on current hydrogeologic information regarding the Pajaro Valley, it appears that areas within the basin adequately satisfy minimum requirements for water injection. These areas would be characterized as those with sufficiently deep groundwater levels underlain by the Aromas sands.

Determining the location of the injection/extraction wells would be done on a regional basis rather than completing localized, site specific hydrogeologic assessment at each proposed well location. As long as the geology is known to be relatively consistent in a particular area, the injection well can be installed and once complete, the injection and extraction rates are adjusted for the individual well. Information obtained from the installed wells would assist in the design and placement of subsequent wells. Extensive groundwater modeling is not easily accessible nor would it be done in this case because (a) the existing PVIGSM does not have the sensitivity to identify local groundwater reaction caused by a single well, (b) it is not necessary considering that there is data on the formation already available and (c) the best way to test the reaction of an aquifer is to observe the response of an actual well after installation and pumping.

Groundwater injection/extraction can adversely affect groundwater levels, overlying geologic structures, groundwater flow regimes, and adjacent groundwater aquifers. Changes to the geologic and hydrogeologic conditions underlying the project area could permanently alter the

[2] Mr. Feeney assumed for his analysis an injection rate of 1,000 gpm and recovery rate of 2,000 gpm. However, the project proposes injection rates of 500 gpm and recovery rates of 1,000 gpm.

regional or local groundwater availability, recharge, and accessibility. As with other proposed groundwater extraction projects, the PVWMA would perform a feasibility and monitoring study, as described in the Mitigation Measure 5.D.3-5, to evaluate hydrogeologic issues related to implementation of the Modified BMP 2000 Alternative. The study would address issues including underlying geology, groundwater depth, groundwater well location, water conveyance, well spacing, and pumping rates.

Water quality of the CVP water was Mr. Feeney's main focus in his August 2001 evaluation of injection of CVP water. Injection well success depends of the quality of the water injected (injectate). Poor water quality will result in plugging of the injection well that will temporarily or permanently impact well performance. The maintenance of well performance can be costly and time consuming. The primary hydrologic impacts related to surface water injection is poor water quality water entering the groundwater through injection and adversely affecting the groundwater quality. Similar to requirements of Measure 5.D.3-4b, the PVWMA would prepare and implement a monitoring and treatment plan to ensure that surface water intended for injection is adequately treated and monitored and so that applicable federal and state drinking water standards are not exceeded. Proposed injectate would require treatment to meet Surface Water Treatment Rule provisions and to remove, among other potential constituents, nitrate, iron, manganese, and potentially aluminum and arsenic.

Murphy Crossing and Inland Distribution System

Under the Modified BMP 2000 Alternative, none of the impacts associated with Murphy Crossing or the Inland Distribution System would occur. These impacts are disclosed in the Local Water Supply and Distribution Project EIR (PVWMA, 1999), which is incorporated by reference. The following is a summary of those impacts:

- *Air Quality.* Installation of the pipeline would result in dust emissions from excavation and soil handling activities, which could adversely affect nearby sensitive receptors.

- *Wetlands and Special-Status Species Habitat.* Construction of facilities at the Pajaro River crossings would result in temporary impacts to up to 1.4 acres of potentially jurisdictional wetlands/waters of the U.S. that is considered habitat for special-status animal species such as California red-legged frog, western pond turtle, and central California coast steelhead.

- *Cultural Resources*. Ground-disturbing activities associated with the proposed Murphy Crossing facilities and Inland Distribution System could reveal unknown buried or otherwise obscured significant prehistoric and historic cultural resources. Potential indirect impacts to cultural resources, primarily vandalism, could result from the increased access to and use of the general area during construction. Such disturbance could result in the loss of integrity of important cultural resources, including three known cultural resources sites in the project area.

- *Geology*. Construction of the proposed pipelines would result in accelerated erosion and attendant loss of soil resources and effects on sediment discharges in water courses. Almost the entire project area is characterized by soils with slight erosion hazard.

- The proposed pipelines pass through some areas with weak soils subject to settlement and expansive soils that could damage the proposed facilities.
- Large earthquakes would be expected to damage the proposed facilities, impairing and/or disrupting their intended operations.
- *Hydrology and Water Quality*. Construction activities would increase soil erosion and may transport other contaminants to downstream receiving waters.
- Construction activities at the proposed project site could result in dewatering of shallow groundwater resources and contamination of surface water.
- The proposed pipelines would be constructed adjacent to two wells. Construction activities could damage the wells or block access to the wells.
- *Land Use*. Construction of the Inland Distribution System would result in short-term disturbance of adjacent land uses.
- *Traffic*. Traffic on area roadways would temporarily increase as a result of project-generated vehicle trips by construction workers and construction vehicular activities.
- Project construction would increase traffic delays for vehicles traveling past the construction zone.
- Project construction would affect access to adjacent land uses for both general and emergency access.
- Project construction would increase potential traffic safety hazards for vehicles and pedestrians in the construction area.
- *Visual Quality*. Installation of the Inland Distribution System lateral lines would disturb lands within the alignments, which would temporarily alter the visual landscape.
- *Recreation*. Development of the inland and Murphy Crossing facilities and the Inland Distribution System would temporarily disrupt recreational uses along Highway 129, a designated bikeway in Santa Cruz County.

As stated above, the Murphy Crossing and Inland Distribution System facilities were originally proposed as part of the PVWMA's Local Water Supply and Distribution Project, which was evaluated in 1999. Many of these impacts, such as traffic disruption, noise, and dust, would result from construction and would be temporary. Other impacts, such as disturbance of jurisdictional wetlands and waters of the U.S. at the Pajaro River crossings, would require detailed mitigation plans that would be developed in consultation with the permitting agencies (California Department of Fish and Game, National Marine Fisheries Service, and U.S. Army Corps of Engineers). The Murphy Crossing and Inland Distribution System facilities have not yet been implemented because the mitigation that would be required reduce impacts to fisheries was determined to be problematic following initial consultation with the permitting agencies.

6.2.3 MODIFIED LOCAL-ONLY ALTERNATIVE

DESCRIPTION

This alternative addresses the fundamental shortcoming of the Local-Only Alternative, that it requires fallowing a significant amount of agricultural land. This alternative adds another new recharge basin for recycled water, referred to as the Southeast Dunes recharge basin (the site is southeast of the existing Harkins Slough recharge basin). The specific water supply, transmission, and storage projects comprising this alternative are shown in **Figure 6.2** and include:

- *Harkins Slough Facilities*. Water diverted from Harkins Slough would be conveyed westward and operationally mixed with recycled water and Watsonville Slough water (described below). The Harkins Slough recharge basin would percolate recycled water, slough water, or operationally blended water.

- *Pinto Lake Diversion*. This component would be as described in Chapter 2. There would be no diversion from Corralitos Creek.

- *Watsonville Slough Diversion*. This component essentially would be as described in Chapter 2, except the water would be operationally mixed prior to recharge in the three basins (no slough water would be conveyed to College Lake). In addition, an independent 7,500-gpm filter facility would be constructed for water treatment.

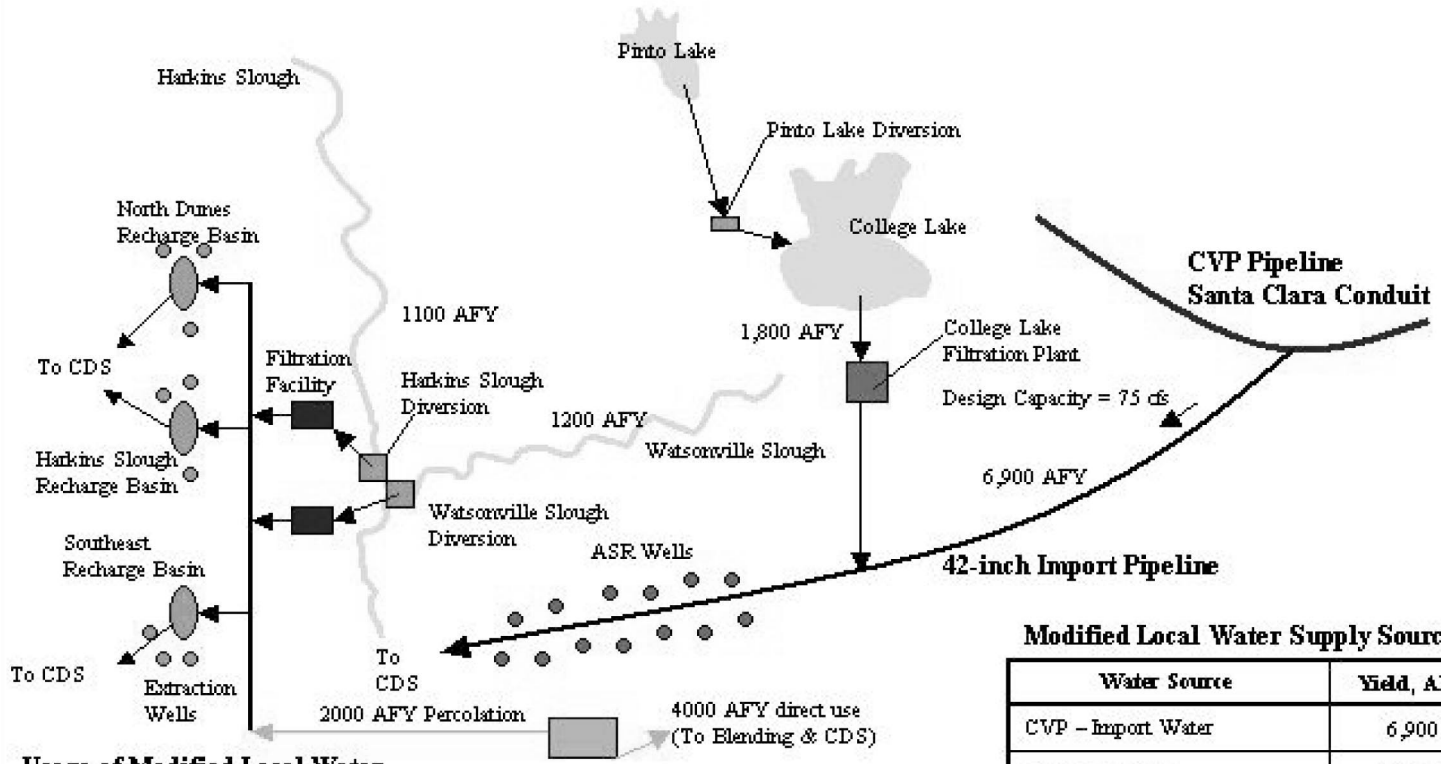
- *Import CVP Water*. This project would be as described for the BMP 2000 Alternative, except that the quantity of imported water (and, consequently, the size of the pipe diameter) would be smaller. There would be an in-line blending facility at the pipeline's terminus near Highway 1.

- *Recycled Water Facility*. Proposed facilities located adjacent to the WWTF would be as described in Chapter 2. For this alternative, there would be pipelines from the Recycled Water Facility to the Harkins Slough area and to the western terminus of the surface water pipeline (these are elements of the Local-Only and BMP 2000 alternatives, respectively). The pipelines would convey water from the slough diversion projects and the Recycled Water Facility westward to the three basins. Upon recovery, water from the basins would be conveyed eastward to an in-line blending facility at the highway 1 near the Pajaro River. Blending of all supplemental supplies would occur at this location prior to delivery in the Coastal Distribution System.

- *College Lake*. This project would be the same as that evaluated for the College Lake project in the Local Projects EIR. The project includes a pipeline from College Lake to the Import Pipeline (the CVP Import Pipeline) as evaluated under the Local Projects EIR. In addition, water from the College Lake watershed and Pinto Lake Diversion project would thus be piped southward and blended (via an in-line blending facility) with imported CVP water prior to distribution for subsequent use.

- *North Dunes recharge basin*. This component would be as described in Chapter 2, except that blended water would be percolated into the basin.

- *Southeast recharge basin*. This component is described below.



Usage of Modified Local Water

Use/Storage	AFY
Direct Use & ASR	12,700
Percolation ponds+ Recovery	4,300
Total	**17,000**

Modified Local Water Supply Sources

Water Source	Yield, AFY
CVP – Import Water	6,900
Harkins Slough	1,100
Watsonville Slough	1,200
College Lake & Pinto Lake	1,800
Recycled Water Project	6,000
Total	**17,000**

SOURCE: RMC

Figure 6.2

Modified Local-Only Alternative Flow Schematic

With the Modified Local-Only Alternative, recycled water and water from local surface supplies would be blended with CVP water prior to direct use, injection, or recharge (percolation). Consequently, the potential adverse water quality impacts associated with direct application of recycled water, injectate, and percolation of recycled water all would be less under the Modified Local-Only Alternative relative to the Local-Only Alternative. Advanced treatment (reverse osmosis) likely would not be required. However, direct use of water from College Lake may still lead to *Phytophthora* problems. Unlike the Local-Only Alternative, this alternative would have sufficient water supplies to halt seawater intrusion without requiring land fallowing.

All but two of the components of the Modified Local-Only Alternative are evaluated in Chapters 3 through 5 of this EIR. The two components are the pipeline between College Lake and the Import Pipeline (the College Lake Pipeline), and the Southeast Dunes recharge basin. These components are described below. The College Lake Pipeline was addressed in the Local Water Supply and Distribution EIR (PVWMA, 1999). Impacts associated with the two components are discussed below.

College Lake Pipeline

The College Lake Pipeline ties the College Lake pump station to the Import Pipeline. The College Lake Pipeline is comprised of the College Lake lateral and a portion of the connecting pipeline, both of which were addressed in the Local Water Supply and Distribution EIR (PVWMA, 1999). The 24-inch College Lake Pipeline extends south and west from the College Lake pump station across private property, then continues south across Corralitos Creek and Holohan Road. The pipeline extends east and south across private property, crosses Highway 152, and proceeds in a generally southeastern direction across private property to Salsipuedes Creek. The pipeline extends south along the outside of the west levee of Salsipuedes Creek, and then turns east, crossing under Salsipuedes Creek and Lakeview Road. From this point, the College Lake Pipeline continues south across private property, proceeds west along Highway 129, south to the Pajaro River, west along the outside of the north levee of the Pajaro River, and then south across the river and private property where it joins the Import Pipeline.

Southeast Dunes Recharge Basin

The Southeast Dunes recharge basin would be 17.1 acres including sideslopes of 3:1 (horizontal to vertical), a depth of 10 feet, and a 12-foot-wide service road around the perimeter. The percolation rate is assumed to be 0.6 feet per day and the required percolation area is 13.9 acres assuming 2,000 AF are percolated in an assumed eight-month period. Approximately 2,000 afy of water would be recharged. Water from Harkins Slough and Watsonville Slough would be mixed with the recycled water and then percolated into the three recharge basins (Harkins Slough, North Dunes, and Southeast Dunes recharge basins). Upon extraction of water from the recharge area water would be conveyed back via the same pipeline to a blending point at Highway 1. The blending point is assumed to be inline (in the pipeline) blending that would be within the buried pipeline south of the Pajaro River and west of Highway 1. Water would then be delivered to the Coastal Distribution System.

ENVIRONMENTAL IMPACTS

This alternative is environmentally preferable to the Local-Only Alternative in that it would reduce or eliminate several impacts associated with the latter, as follows:

- This alternative does not warrant the fallowing of agricultural land.
- Recycled water would be blended with local surface water and CVP water prior to direct application and recharge.
- Impacts to fisheries in Corralitos Creek would not occur.
- Impacts associated with surface water injection (the ASR project), including the ASR pipeline construction.
- Impacts associated with the College Lake dam would be substantially less than under the Local-Only Alternative. The Modified Local-Only Alternative would result in the conversion of up to one-half acre of agricultural land, while the Local-Only Alternative would convert up to 16 acres of agricultural land.

However, this alternative essentially combines many of the impacts attributable to the Local-Only Alternative with those of the BMP 2000 Alternative. The difference in the magnitude of impacts associated with construction of the smaller diameter Import Pipeline are incremental. Below is a discussion of the construction and operation-phase impacts associated with the College Lake Pipeline and Southeast Dunes recharge basin components.

College Lake Pipeline

The following discussion is based on analyses presented in the Local Water Supply and Distribution EIR (PVWMA, 1999).

Land Use. Construction disturbance related to the proposed pipeline could temporarily constrain access to uses along Holohan Road, Lakeview Road, and Highways 129 and 152. These uses include St. Francis Church, St. Francis School, Lakeview Middle School, farmlands, and residences. Although pipelines will be installed through bore and jack methods, construction activities within these roadways could constrain operations of St. Francis Church and nearby schools and could impede access to adjacent farmlands. School operations could be adversely affected if roadways or driveways were blocked or restricted on weekday mornings and afternoons during the school year, while church activities would be affected if construction work restricted access during services. However, this would be a temporary impact that results more in inconvenience to motorists than a substantial impact and, therefore, would not be expected to substantially impair school and church operations. Typical construction activities would be expected to last approximately one week at any given location along the pipeline alignment.

Geology and Soils. Construction of the proposed pipeline and water diversion and treatment facilities would result in accelerated erosion and attendant loss of soil resources and effects on sediment discharges in water courses. The impact would be significant on slopes over 2 percent and in areas with soils having moderate or greater erosion hazard.

The pipeline would pass through some areas with weak soils subject to settlement, expansive soils and potentially corrosive soils that could damage the proposed facilities. Soils with high organic content are subject to hazards of settlement and in some areas may be corrosive to pipe. These soils may weaken joints in the pipelines, displace them, and eventually bend or break the pipelines. Soils with high clay content are subject to shrink-swell behavior that can result in damage to pipe joints and displacements. These effects could impair operation of the facilities and result in costly repairs and their associated impacts. The proposed project includes a commitment to conformance with requirements for placement of buried pipelines in trenches with engineered soils that would reduce or eliminate the hazards for the most part. In the long term, settlement of the pipeline is an anticipated effect and design requirements can be established to allow settlement within acceptable levels.

Large earthquakes would be expected to damage the proposed facilities, impairing and/or disrupting their intended operations. The potential exists for large magnitude earthquakes to result in high intensity groundshaking and secondary earthquake effects, notably liquefaction. Intense groundshaking and high gravitational acceleration would affect the entire area of College Lake. This could cause loosening of pipeline joints resulting in leaks and possibly also breaking of a pipeline. Pumps could be rendered inoperable. The most severe impacts of this type would result from liquefaction of the soil, which could induce both vertical and lateral displacement of the soil that would bend, weaken, and break pipelines. Broken pipelines could result in soil wash-out and sinkholes.

Locating and repairing damaged pipelines and the pumps could require a substantial effort and cost, and result in cessation of operation of the facilities for a significant period of time. The loss of the water supply, in turn, could affect agricultural operations. It is assumed that under a scenario of loss of the water supply from an earthquake (or other maintenance functions), growers temporarily would increase their use of groundwater, providing that their wells are operable following an earthquake. Therefore, pumping of groundwater would mean that no significant loss in agricultural production would be expected.

Hydrology and Water Quality. Construction activities would increase soil erosion and may transport other contaminants to downstream receiving waters. Construction at the project sites would involve soil disturbing activities such as vegetation removal, grading, and excavation which would expose soils to erosion and may result in the transportation of sediment downstream where deposition would occur. Pipeline construction would require excavation of trenches and temporary stockpiling of soils. Wind and rainfall could cause erosion of stockpiles and sedimentation downstream. Although the amount of erosion at the project site is projected to be low due to the flat topography, the sediment and adhered substances are sources of pollution in receiving waters. Sediment from erosion would increase turbidity which could have adverse effects on fish and wildlife habitat, reduce the efficiency and life of pumps and pipelines conveying water for the project, increase costs for treating water for various uses, increase flood hazards from reduced channel capacities, and impair recreation and aesthetic values.

Fuels, solvents and/or other chemicals used in construction activities could be spilled, dumped, or discarded and ultimately seep or leak into waterways draining the project site.

Construction of the College Lake Pipeline could result in dewatering of shallow groundwater resources and contamination of surface water. Excavation and construction of open trenches often can intercept shallow groundwater requiring dewatering to lower local groundwater levels to dry the area for construction. The groundwater is pumped and discharged to the local drainage system. The area of groundwater reduction is generally in the immediate construction area and the effect on groundwater conditions would be expected to be temporary and minor. Depending on the quality of the groundwater, the discharge could potentially contaminate downstream surface water sources.

Impacts related to construction projects are typically associated with soil erosion and subsequently, sedimentation entering surface waters. Discharge of water removed from excavations and discharged into surface water sources can also degrade otherwise unimpacted water bodies. Similar to Mitigation Measure 5.B.3-1, the agency would prepare a SWPPP as part of the construction activities associated with the National Pollutant Discharge Elimination System (NPDES) stormwater permit required by the RWQCB. At a minimum, this plan would include guidelines and requirements intended to reduce erosion, control runoff, protect surface waters and regulate dewatering activities.

The College Lake project would convey water that normally would flow to the ocean, to agricultural lands for irrigation, thereby decreasing the need to pump groundwater. The College Lake project would provide a water supply for irrigation that would replace water currently pumped from the groundwater basin. This would in part reduce overdraft of the basin and reduce seawater intrusion and therefore is a beneficial impact on groundwater quality and flow.

Vegetation and Wildlife. Pipeline crossings could result in temporary impacts on potential jurisdictional wetlands/waters of the U.S. and streambeds and banks under the jurisdiction of the CDFG. Potential impacts include sedimentation of the channels adjacent to the construction area during trenching activities, and temporary loss of wetland-associated vegetation, stream function as wildlife and fishery habitat, and loss of special-status natural communities.

Construction of facilities in and near wetlands could result in temporary impacts to special-status animal species and their habitats. Impacts could occur due to increased sedimentation in streams, dewatering of pools, habitat loss through vegetation removal, destruction of nests and burrows and construction disturbance. These impacts could be reduced to less-than-significant levels by designing facilities to avoid habitat areas, or by conducting surveys for special-status animal species and implementing protection measures identified in the 1999 Local Water Supply and Distribution EIR.

Cultural Resources. Construction activities associated with the proposed College Lake Pipeline alignment and associated facilities may result in the alteration or destruction of identified cultural resources. Two cultural resources (prehistoric and historic) were identified adjacent to and/or within the pipeline alignment.

Significant unknown cultural resources may be buried or obscured by vegetation along the pipeline alignment, and therefore construction of the proposed pipeline could result in degradation and destruction of undiscovered cultural resources.

Air Quality. Construction of the project would generate fugitive dust (including PM_{10}), and other criteria air pollutants from exhaust emissions. A large portion of the total construction dust emissions would result from trench excavation activities. Dust emissions would vary from day to day, depending on the phase of construction, the silt content of the soil, and the weather. Daily emissions would depend greatly upon whether construction of the various supply components and distribution systems would occur simultaneously. Implementation of a dust abatement program would reduce this impact to a less-than-significant level.

Traffic. The proposed alignment would follow adjacent to, or within a portion of, Highway 152, and cross Highway 152, Highway 129, Holohan Road, and Lakeview Road. The specific alignments of installation of pipeline would be identified during the design phase of the project. Assuming open trench activities proceeding at an average rate of 100 feet per day, impacts would be brief at any one location along the pipeline alignment. Special construction techniques (e.g., bore and jack) would be utilized to install pipelines under Highway 152, Holohan Road, San Juan Road, and Highway 129.

Existing transportation and circulation patterns in the vicinity of the proposed pipeline alignment would be temporarily disrupted by construction activities and heavy equipment use in the roadways. Impacts related to pipeline construction would include direct disruption of traffic flows and roadway operations. Lane blockages or roadway closures during pipeline installation would result in a reduction in travel lanes, and could result in the need for traffic rerouting. Most prominently, potential construction along Highway 152 could significantly impact traffic flow and operations at this location.

Public Services. Pipeline and/or facility construction could result in temporary, planned or accidental disruption to utility services provided by underground lines. Impacts to utilities and services involve temporary disruption, which in most cases, would not exceed one day. All utility lines and cables, which would be disrupted during pipe installation, will be identified during preliminary design. As a condition of approval for a utility excavation permit a detailed engineering and construction plan, which thoroughly describes construction techniques and protective measures for minimizing impacts to utilities would be prepared by PVWMA contractors. This plan requires review by the appropriate special service districts or utility services in the project area.

Pipeline construction could temporarily impede vehicle access to police, fire, or emergency services. Since construction will proceed at a rate of about 100 feet per day, vehicle access to an individual residence or business would be impeded for a maximum of one to two days. PVWMA will employ construction methods described in the assessment of traffic impacts which would reduce this impact to a less than significant level.

Visual Quality and Recreational Resources. Construction of the pipeline could tear up roadways and remove small areas of native vegetation and crops along the alignment. These features contribute to the scenic quality of Highway 152 and Holohan Road, both of which are City-designated scenic routes. This would be a temporary impact, since cropping would be allowed to occur on agricultural lands within the alignment following installation of the pipeline. For this reason, the construction disturbance is considered a less than significant impact. During construction, excavated trenches and stockpiled soils, pipe, and other materials within the construction easement would constitute negative aesthetic features to the pipeline alignment. This would be a temporary adverse impact and would be considered less than significant. Following construction, the proposed pipeline would be located entirely below grade and would be unobtrusive.

Construction of the College Lake Pipeline would disrupt bicycle traffic along Highway 152, Holohan Road, and Lakeview Road, all of which are included in the Santa Cruz County bikeway system. Construction activities and related truck traffic could damage the bikeways, and segments of the bikeways in active construction areas would be temporarily closed during trench excavation and pipeline installation, creating minor inconveniences to bicyclists. However, damaged roads would be repaired to preconstruction conditions, and detours would be provided for bicyclists and motorists during the construction period. Therefore, this impact would be less than significant.

Southeast Dunes Recharge Basin

Land Use. Construction of the 17.1-acre Southeast Dunes recharge basin would result in the permanent loss of approximately 4.7 acres of Prime Farmland (3.2 acres for the side slopes of the basin, and 1.5 acres for the service road extending around the basin). The basin bottom (13.9 acres) would be available for farming during the summer and fall of each year for the life for the project. This would be a significant unavoidable impact. However, it is recommended that the topsoil from areas to be excavated and graded be removed, and spread over areas within the Pajaro Valley containing agricultural soils of lesser productivity. This would allow for a partial recovery of the loss of this valuable resource.

Hydrology and Water Quality. Construction of proposed Southeast Dunes recharge basin could result in increased erosion and subsequent sedimentation, with impacts to water quality. Additionally, release of fuels or other hazardous materials associated with construction activities could degrade water quality. PVWMA would prepare and implement a Storm Water Pollution Prevention Plan to reduce this impact. Impacts related to construction projects are typically associated with soil erosion and subsequently, sedimentation entering surface waters. Similar to Mitigation Measure 5.B.3-1, the agency would prepare a SWPPP as part of the construction activities associated with the National Pollutant Discharge Elimination System (NPDES) stormwater permit required by the RWQCB. At a minimum, this plan would include guidelines and requirements intended to reduce erosion, control runoff, protect surface waters.

Groundwater recharge with recycled water would degrade water quality. The Recycled Water Facility would operate year-round, and during periods of low or no irrigation demand the

recycled water would be routed to the recharge basins for percolation to the shallow aquifer. This action could conflict with DHS policy, as described in the draft regulations. According to Title 22, Section 60320, DHS would provide "recommendations" to the RWQCB during the permitting process to ensure that a proposed project fully protects public health.

Cultural Resources. Construction activities associated with the proposed Southeast Dunes recharge basin could result in the degradation and destruction of undiscovered cultural resources.

Air Quality. Construction of the project would generate fugitive dust (including PM_{10}), and other criteria air pollutants from exhaust emissions. A large portion of the total construction dust emissions would result from trench excavation activities. Dust emissions would vary from day to day, depending on the phase of construction, the silt content of the soil, and the weather. Daily emissions would depend greatly upon whether construction of the various supply components and distribution systems would occur simultaneously. Implementation of a dust abatement program would reduce this impact to a less-than-significant level.

Visual Quality and Recreational Resources. Creation of a recharge basin would not be considered an adverse visual impact, since waterways are aesthetically pleasing to many people, and the recharge basin would not alter the rural character of the area. Additionally, no change in the visual landscape would be apparent in the summer and fall, when crops would be planted in the recharge basin. The recharge basin would not alter views from nearby San Andreas Road, which is a designated scenic road in the Santa Cruz County General Plan/Local Coastal Program and the City of Watsonville General Plan. Therefore, this would not be considered a significant visual impact.

6.2.4 REGIONAL SERVING ALTERNATIVE

DESCRIPTION

This is a discussion of the potential future development of an alternative; currently, no regional-serving project has been developed.

In its letter responding to the Notice of Preparation for this EIR, Soquel Creek Water District (SCWD) requested consideration of a joint water supply project between SCWD and PVWMA. PVWMA has since continued discussions with SCWD, and a conceptual Memorandum of Agreement (MOA) has been approved by both agencies. The purpose of this MOA is to set forth the parties' intent to work together toward developing a potential project in which PVWMA would acquire and distribute a water supply of approximately 2,000 afy to SCWD in order to meet its long-term water supply needs, and provide a net gain of water to the Pajaro Valley. If the agencies determine that a viable project may be developed between them, the agencies can enter into a binding agreement in the future.

As described in Section 3.9, Public Services, SCWD serves unincorporated areas of southern Santa Cruz County and shares groundwater resources in the Aromas Red Sands aquifer with PVWMA. In order to plan for a sustainable water supply into the future, SCWD initiated the

Integrated Resource Planning (IRP) process. The IRP examined projected future water demands, potential savings from conservation, and alternatives for supplementing groundwater supplies to achieve and maintain sustainable water supply. The key conclusion of the IRP process was that without a supplemental source of water supply, the SCWD would not be able to achieve its groundwater management objectives of keeping coastal groundwater levels above sea level while meeting existing and projected water demands. Thus, the SCWD is presently conducting planning studies regarding the procurement of a supplemental source of supply of up to 2,000 afy. The SCWD is examining both local and regional alternatives, in proposed partnership with the PVWMA and/or City of Santa Cruz.

Should PVWMA and SCWD choose to pursue a regional water project in the future, supplemental environmental review pursuant to CEQA would be required.

6.2.5 ALTERNATIVE ALIGNMENTS TO THE IMPORT PIPELINE

Several pipeline local route variations were considered by the PVWMA for specific segments of the Import Pipeline. These alternative routes are represented by dotted lines on Maps A1 through A4 in the Map Appendix. The alternative routes were proposed because of engineering design considerations (e.g., availability of easements) and flexibility in final site selection, and are not complete alternatives to the project as their implementation would still involve construction of the Import Pipeline to bring water into the PVWMA service area.

A discussion of the environmental impacts associated with the alternative pipeline alignments is presented in Appendix E, Alternative Alignments. In summary, the impacts associated with the preferred alignment would either be similar to, or lesser in magnitude than, those associated with these alternative alignment segments. The environmentally superior alignment would combine the preferred alignment with the alternative alignment described in Mitigation Measure 4.B.4-3b, which requires rerouting of the pipeline to avoid mature oaks trees that provide habitat for raptor species.

6.3 ALTERNATIVES COMPARISON AND ENVIRONMENTALLY SUPERIOR ALTERNATIVE

The purpose of this section is to present a comparison of the alternatives and to identify the environmentally superior alternative. Consistent with the CEQA Guidelines (Section 15126.6[a]), the comparison of alternatives and determination of the environmentally superior alternative is based on the ability of the alternative to meet the basic objectives of the project while avoiding or substantially lessening any significant impacts. Consequently, this section presumes implementation of mitigation measures identified in the EIR. The key summary points regarding the impacts associated with the alternatives are:

- All of the four "action" alternatives—the BMP 2000 Alternative, the Local-Only Alternative, the Modified BMP 2000 Alternative, and the Modified Local-Only Alternative—are environmentally superior to the No Project Alternative. The No Project Alternative would allow for continued degradation of the groundwater basin from overdraft and seawater intrusion, and does not satisfy any of the project objectives.

- The Local-Only Alternative does not satisfy the primary objective of the project without fallowing farmland, while the other three action alternatives meet the project's basic objectives.

- Most of the impacts result from construction activities. To a great extent, these impacts can be mitigated to less-than-significant levels with measures identified in this EIR.

- The four action alternatives present different combinations of the same or similar components and, consequently, have many of the same or similar impacts.

- The alternatives that involve more construction generally result in more (greater magnitude) impact. However, traffic, air quality, and construction noise impacts do not substantially differ from one alternative to the next. Any of the action alternatives would result in a significant unavoidable temporary increase in PM10 emissions; traffic and construction noise impacts would be similar and could be mitigated to less-than-significant levels.

- The BMP 2000, Modified BMP 2000, and Modified Local-Only Alternative all include a version of the Import Pipeline. The difference in diameter would not materially affect the scope and magnitude of the impacts of constructing and operating an Import Pipeline. The construction corridors (which determines the scope of impacts to surface features—vegetation and wildlife habitat, agricultural land, stream crossings, et al) essentially would be same under any of these alternatives.

- Growth inducement potential is the same for all of the alternatives.

The distinction among the alternatives is the ability to meet the basic objectives of the project and the degree of impact relative to the following environmental issues: water quality, land use (permanent loss and fallowing of prime farm land), seismic hazards, and biological resource impacts. These issues are discussed below. **Table 6.2** presents a comparison of the distinguishing environmental effects of the alternatives. Significant and unavoidable impacts are denoted by an asterisk; all other impacts could be mitigated to a less-than-significant level.

6.3.1 GROUNDWATER HYDROLOGY AND WATER QUALITY

The primary issues that distinguish the alternatives relate to groundwater hydrology and water quality. Most notable is the inability of the Local-Only Alternative to achieve the primary objective of balancing the basin and arresting seawater intrusion without fallowing more than 2,200 acres of land. All other alternatives provide sufficient water to meet the project's objectives.

TABLE 6-2
COMPARISON OF ALTERNATIVES—IDENTIFICATION OF THE ENVIRONMENTALLY SUPERIOR ALTERNATIVE[a]

IMPACT	CHARACTERIZATION OF IMPACTS FOR EACH ALTERNATIVE			
	BMP 2000 Alternative	**Modified BMP 2000 Alternative**	**Local-Only Alternative**	**Modified Local-Only Alternative**
Groundwater Management—Balancing Supply and Demand[b]	Yes	Yes	No	Yes
Water Quality – Groundwater	Less Adverse	Least Adverse	Most Adverse	More Adverse
Permanent Conversion of Agricultural Land	Least Adverse*	Least Adverse*	Most Adverse*	More Adverse*
Land Fallowing	No Impact	No Impact	Most Adverse*	No Impact
Geology, Soils and Seismicity	Most Adverse*	Most Adverse*	Least Adverse	Most Adverse*
Aquatic Habitat	Less Adverse	No Impact	Most Adverse	More Adverse
Wetlands/Waters of the US/Riparian Habitat	Most Adverse, Temporary	Least Adverse, Temporary	More Adverse, Temporary[c]	More Adverse, Temporary
Upland Species—Plants	No Impact	No Impact	Most Adverse	Most Adverse
Upland Species—Wildlife	Most Adverse, Temporary	Most Adverse, Temporary	No Impact	Most Adverse, Temporary
Visual Quality	Least Adverse	Least Adverse	Most Adverse	More Adverse
RANKING[d,e]	**2**	**1**	**4**	**3**

[a] This comparison table considers the major environmental issues that distinguish the four alternatives. Impacts related to other environmental issues, such as traffic, air quality and noise, would be temporary construction impacts that would be similar for all the alternatives and therefore they are not presented in this table.
[b] Evaluation of alternative's ability to achieve primary project objective.
[c] Involves less than one acre of permanent impact to wetlands and waters of the U.S.
[d] This ranking considers environmental factors only; other factors, such as cost and feasibility, were not considered in this ranking. This ranking assumes that the mitigation measures identified in this EIR will be implemented.

[e] Alternative Ranking

4 – Alternative with the most adverse environmental impacts
1 – Environmentally Superior Alternative

* Denotes a significant unavoidable impact.

With respect to water quality impacts, those alternatives with more CVP water relative to local supplies have better water quality and, consequently, lesser magnitude impacts. (For an overview of source water quality, refer to Table 2.3 in Chapter 2.) The Local-Only Alternative would have the worst impacts relative to water quality because of source water quality problems for injection/extraction of surface water, and the direct use and recharge of unblended recycled water. This alternative would require advanced water treatment, the implementation of which would create additional environmental impacts (additional facilities would impact more prime agricultural land). The BMP 2000 and Modified BMP 2000 alternatives have the highest quality water (between the two, the Modified BMP Alternative would have incrementally better source water quality because it includes more CVP water and no water from the Pajaro River at Murphy Crossing).

6.3.2 LOSS OF PRIME AGRICULTURAL LAND

Each of the four alternatives would result in the loss of prime agricultural land. For the BMP 2000 Alternative, construction of the Recycled Water Facility and 17 supplemental well sites would result in the permanent conversion of up to 8.5 acres of prime farmland. The Import Pipeline and the Inland and Coastal distribution systems would disrupt agricultural operations along the alignment temporarily during construction, but would not result in a permanent conversion of agricultural land.

The Modified BMP 2000 Alternative also would permanently convert up to 8.5 acres of prime agricultural land for construction of the Recycled Water Facility and 17 supplemental wells. The Import Pipeline would not result in permanent conversion of agricultural land.

Under the Local-Only Alternative, up to 41.6 acres of prime farmland would be permanently converted due to construction of the Recycled Water Facility, Expanded College Lake, Corralitos Creek Pump Station, and Aquifer Storage and Recovery (ASR) components. The Local-Only Alternative also would require the fallowing of more than 2,200 acres of irrigable prime farmland.

For the Modified Local-Only Alternative, the Harkins Slough, Pinto Lake Diversion, Watsonville Slough Diversion, Import Pipeline, Recycled Water Facility, College Lake, North Dunes recharge basin, and Southeast Dunes recharge basin components would result in the permanent conversion of 30.7 acres of farmland. No land fallowing would be required under this alternative.

6.3.3 GEOLOGY, SOILS AND SEISMICITY

Portions of the Import Pipeline alignment proposed under the BMP 2000 Alternative, the Modified BMP 2000 Alternative, and the Modified Local-Only Alternative cross the active San Andreas and Sargent faults. A major displacement of either fault would result in pipeline rupture. The EIR identifies a number of measures to mitigate this impact (pipe specifications at fault crossings, special construction techniques and instrumentation, isolation valves, et al.); however, these measures cannot eliminate the chance that the pipe could rupture in a major earthquake. (Surface fault rupture hazard zones are shown on Maps A1 and A2 in the Map Appendix.)

The dam structures included in the Expanded College Lake component of the Local-Only Alternative also could be subject to damage from surface fault rupture, but this impact could be mitigated to a less-than-significant level through engineering design. The College Lake facilities proposed under the Modified Local-Only Alternative could also be damaged by large earthquakes; however, the potential flooding and erosion hazards that could potentially result from such damage would be less adverse than that which would occur under the Local-Only Alternative, which would involve dam structures and increased water storage in the lake.

6.3.4 EFFECTS ON AQUATIC HABITAT

Impacts to aquatic habitat would be more adverse under the Local-Only Alternative than under the BMP 2000 Alternative. Spawning and rearing habitat for south-central California coast steelhead is present in the upper reaches of Corralitos Creek, upstream of College Lake. Conditions for steelhead passage to and from spawning and rearing habitats are the primary fish habitat factors potentially affected. The presence of sufficient stream flows for down-migration of smolts is critical. Constructing and operating a water diversion facility in Corralitos Creek would directly affect steelhead spawning and rearing habitat. Implementation of the Expanded College Lake project would impede migration of the species. There is a cumulative effect on flows to Salsipuedes Creek for the various components of the Local-Only Alternative. The EIR identifies measures to reduce these impacts to less-than-significant levels; these measures would reduce the yield of the Local-Only Alternative.

With the Modified Local-Only Alternative, impacts to steelhead would be of lesser magnitude, since the there would be no diversion from Corralitos Creek; however, impacts associated with College Lake would still occur.

Although the Murphy Crossing component of the BMP 2000 Alternative also would adversely affect steelhead, it would affect migratory habitat (the Pajaro River), and would not affect spawning or rearing habitat.

The Modified BMP 2000 Alternative would avoid impacts to aquatic habitat and steelhead.

6.3.5 EFFECTS ON WETLANDS/WATERS OF THE US AND RIPARIAN HABITAT

There are a number of special status species in the project area that are associated with wetlands and riparian habitat, including red-legged frog, Santa Cruz long-toed salamander, western pond turtle, and a number of bird species (refer to **Table 3.4.2**).

Assuming implementation of bore and jack construction at stream and river crossing, impacts to potentially jurisdictional wetlands/water of the US and riparian habitat and wildlife would be significantly reduced under all alternatives. Implementation of the BMP 2000 Alternative potentially would result in disturbance of up to 1.4 acres (0.2 acre for the Import Pipeline, assuming that Pajaro River crossings would be constructed using bore and jack methods, and 1.4 acres for the Murphy Crossing project). Under the Local-Only Alternative, about one acre of

potentially jurisdictional wetlands/waters of the US (assuming bore and jack for crossings of Watsonville Slough, Corralitos Creek, and Harkins Slough).[3]

Under the Modified Local-Only Alternative, approximately one-half acre of potentially jurisdictional wetlands/waters of the US would be disturbed, assuming bore and jack crossings of streams.

Under the Modified BMP 2000 Alternative, construction activities would disturb up to 0.2 acre of potentially jurisdictional wetlands/waters of the U.S (Import Pipeline).

6.3.6 UPLAND SPECIES

One of the largest remaining populations of Santa Cruz tarplant, a species that has been proposed for listing as federally threatened and is currently listed by the State as endangered, occurs on the Watsonville Airport property and likely occurs on the private property to the west of the airport as well. The population at the airport may be important to the survival of the species. Under either the Local-Only Alternative or the Modified Local-Only Alternative there would be direct impacts to Santa Cruz tarplant. Relocating the pipeline alignment to Airport Boulevard would avoid impacts to tarplant, but would result in adverse impacts on traffic and circulation due to the temporary closure of traffic lanes and the subsequent increase in traffic congestion and safety hazards.

Construction of the Import Pipeline (BMP 2000, Modified BMP 2000, and Modified Local-Only alternatives) could disturb sensitive species found in annual grassland habitat. The special status animal species associated with this habitat that have the potential to occur in the study area include the San Joaquin kit fox and western burrowing owl. Direct impacts to the species would be avoided or mitigated through measures identified in the EIR, and no permanent impacts would occur. This impact would be associated with all alternatives except the Local-Only Alternative.

6.3.7 VISUAL QUALITY

The BMP 2000 Alternative and the Modified BMP 2000 Alternative would have less adverse impacts on visual quality than the other alternatives. The BMP and Modified BMP alternatives include the Import Pipeline, which would temporarily disturb lands within the pipeline alignment. Once the pipeline is buried, land within the alignment would be restored to its previous condition, and farming would continue over the pipeline easement in agricultural areas. The Recycled Water Facility, which would result in the most adverse visual quality impacts, would be constructed under all four alternatives. Both the Local-Only and Modified Local-Only alternatives would construct a larger Recycled Water Facility that would include advanced water treatment facilities, as required by Mitigation Measure 5.A.3-4a in Chapter 5. These facilities could increase adverse impacts on views from scenic roads, including Highway 1, Beach Road

[3] PVWMA has committed to implementing pipeline construction techniques (bore and jack) that avoid direct impacts to waterways for crossings of Pajaro River and Watsonville slough (thereby avoiding wetland/waters of the US-related impacts for some components).

and San Andreas Road. Additionally, both the Local-Only and Modified Local-Only alternatives would construct the North Dunes Recharge Basin, and the Modified Local-Only Alternative would construct the Southeast Dunes Recharge Basin. The Local-Only Alternative would be considered to result in more adverse visual quality impacts because it would also construct dam structures at College Lake that would be visible from Highway 152 and Holohan Road. The College Lake facilities proposed under the Modified Local-Only Alternative would be smaller in scale and therefore would be less visible.

6.3.8 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

CEQA requires that an EIR identify an environmentally superior alternative (Guidelines Section 15126.6[e][2]). For this project, all alternatives are considered environmentally superior to the No Project Alternative, which allows for continued degradation of the groundwater basin from overdraft and seawater intrusion and would result in land fallowing. Based on the comparison presented in the preceding section, the Modified BMP and BMP 2000 alternatives are environmentally superior to the Local-Only and Modified Local-Only alternatives. The Local-Only Alternative fails to meet the project's primary objective while lessening environmental impacts. The Modified BMP Alternative is environmentally preferable to the BMP 2000 Alternative in that it would reduce or eliminate impacts to aquatic habitat and steelhead, and would have least impact on wetlands/waters of the US and riparian species habitat. The Modified BMP 2000 Alternative includes fewer facilities, and would result in less construction while providing the highest quality source water.

6.4 ALTERNATIVES NOT EVALUATION IN THIS EIR

A number of potential alternatives to the project were considered by the PVWMA but are not evaluated in this EIR because initial consideration indicated one or more of the following: lack of feasibility; lack of environmental advantages; and/or inability to satisfy the basic objectives of the project. Section 2.2 of this report summarizes the PVWMA's objectives for the BMP. Refer also to the 1993 BMP EIR and Local Projects EIR for discussions of other alternatives eliminated from further consideration, as listed in **Table 6.1**.

6.4.1 RIVER CONVEYANCE OF CVP WATER

Two options exist for transmission of water from the Santa Clara Conduit to the Pajaro Valley – construction of the Import Pipeline (as described for the BMP 2000 Alternative) or use of the Pajaro River for conveyance. For Pajaro River conveyance, water would be obtained from the existing turnout located on the Santa Clara Conduit east of Gilroy. A pipeline would be constructed along the Import Pipeline alignment to a location in the vicinity of Bolsa Road (Highway 25), where water would be discharged to the Pajaro River. Water would then flow in the Pajaro River to a point within the Pajaro Valley where it would be diverted and pumped into the proposed water distribution system.

The Pajaro River discharge would include a simple structure designed to reduce the water velocity to minimize erosion in the river. The downstream diversion structure would either be an expansion of the proposed Murphy Crossing infiltration gallery, or more likely, a combination of the infiltration gallery and a small surface diversion that would be created by an inflatable structure. If the inflatable structure were utilized, it would be operated to minimize its impacts on migratory fisheries, particularly steelhead. It is anticipated that an inflatable diversion structure could not be used during any months when natural migratory flows are present, and the diversion during these migratory periods would have to be made through an infiltration gallery only. Therefore, agricultural water deliveries could begin as early as April, and would last until October.

A major concern related to this alternative is the degradation of water quality and loss of water as it flows in the Pajaro River. The Pajaro River electrical conductivity and total dissolved solids concentrations are often much higher than those acceptable for agricultural irrigation use. Through blending, the overall concentrations would be reduced during most months of the year, and the water quality could be at acceptable levels for irrigation use. However, it may not be possible to reach acceptable levels during periods when river lows are in the 50 cubic feet per second (cfs) to 100 cfs range, due to electrical conductivities during such periods, resulting in water quality that could reduce yields of strawberry and other crops in the Pajaro Valley.

A second concern is the potential water losses that could occur along the river through riverbed seepage, riparian vegetation use, or adjacent landowner use. Seepage losses that occur downstream of Aromas should provide some direct recharge to the groundwater aquifer and benefit those paying for the CVP water. However, seepage that occurs upstream of where the Pajaro River crosses the San Andreas Fault Zone would benefit areas outside of the Pajaro Valley. In addition, the variability in seepage from month to month and year to year would make operating rules regarding releases to the river and diversion from the river facilities more difficult. In addition, some flow would be lost to evaporation along the river, particularly during the summer months.

The listing of steelhead as an endangered species has resulted in minimum flow requirements and a minimum flow depth of 0.75 feet is required in the Pajaro River for the passage of migrating steelhead. The migration of steelhead occurs between January 1 and May 31, which the period when the flows are higher and natural flow diversions occur. In that case, the diversion from the river could be limited to the period ranging from May to September, which is generally consistent with irrigation requirements.

There are several other concerns related to the River Conveyance Alternative, including:

- The effects of flow regime variability on instream conditions and aquatic ecology.
- The ability for steelhead to “fingerprint” the water quality of the Pajaro River for successful identification of a water body used for migration. Altering the water quality with imported water flow could affect the ability for steelhead to imprint the Pajaro River.
- The potential water quality effects, described above, on river-related biological resources.

- Introduction of non-native species into the watershed and the introduction of new diseases via water and/or organisms.

6.4.2 OUT-OF-BASIN BANKING

Out-of-basin banking is an alternative means of storing CVP water. Implementation of an Out-of-Basin Water Banking program would allow the PVWMA to partner with another CVP contractor to transfer excess CVP water supplies from the PVWMA to the CVP contractor during wet or normal years. During dry years, the CVP contractor would transfer CVP water back to PVWMA. For PVWMA, out-of-basin banking increases the reliability of the CVP supply, and minimizes the need for additional storage facilities and the size of delivery pipelines. Provisions of a water banking agreement typically require that the contractor acting as the water bank keeps a portion of this water, which is estimated to be approximately 10 percent of the total banked water supply. This 10 percent accounts for seepage, evaporation, and unaccounted for losses.

PVWMA may, in the future, investigate out-of-basin banking storage options if the BMP 2000 Alternative (or the Modified BMP 2000 Alternative) is selected for implementation.

6.4.3 DESALINATION

SEAWATER DESALINATION

Seawater desalination would provide a reliable supply of water for the Pajaro Valley by converting seawater or other high TDS water into potable water. Currently, reverse osmosis (RO) treatment is the most cost-effective and feasible treatment option for desalination. Because a desalination plant can be sized and operated to provide a continuous source of supply, this alternative requires less supplemental supply to meet the valley's needs. Additionally, the continuous nature of the desalinated water supply eliminates the need for development of the Inland Distribution System or ASR component. Therefore, only a Coastal Distribution System is required.

Because of the high TDS concentration of seawater (~35,000 mg/L), the RO membranes reject more than 50 percent of the feedwater during the treatment process. Therefore, if 10,000 afy of desalinated water is needed, the treatment plant must be sized for a flow of 20,000 afy. As such, the high feed pressure and need to "double-size" the treatment capacity results in a high electric power requirement.

The BMP evaluated the construction of a reverse osmosis desalination plant to treat Monterey Bay seawater for agricultural irrigation. The quality of the desalinated water would require blending with either recycled water or groundwater prior to irrigation. One option would be to size the plant to supply 16 to 27 million gallons per day (mgd) to the Pajaro Valley during irrigation months. Another option is a regional desalination plant that would provide irrigation as well as augmenting drinking water supplies for both Santa Cruz and Monterey Water Districts; the overall plant capacity would be 30 to 65 mgd. Two sites were evaluated: (1) adjacent to the

proposed WWTF recycled water plant; and (2) adjacent to the existing thermal electric generating facility at Moss Landing. Siting the desalination plant at the WWTF could take advantage of proposed water facilities, and the brine from the desalination facility would be discharged via the existing WWTF outfall. The advantages of the Moss Landing site result from the coupling of a desalination plant with an existing power generation facility. The existing thermal electricity facility cycles approximately 800 mgd of seawater as cooling water. Other advantages include elevated feed water temperature, which reduces energy needs; existing land and storage plants; and potential to partner with other agencies for a regional facility.

A desalination project would consist of an RO plant, as described above, an onshore pumping station and chemical treatment unit, a seawater intake structure, an onshore/offshore seawater supply pipeline between the onshore pump station and offshore seawater intake, pipelines to transport seawater and chemicals between the desalination plant and onshore pump station/chemical treatment area, and a pipeline to transport concentrated seawater brine from the desalination plant site to an ocean outfall (or use of the WWTF's existing outfall). A desalination project could also require construction of a power substation. Additional infrastructure would be required if groundwater was selected for blending with desalinated water. The infrastructure would include construction of a Recycled Water Facility, pump station, and 5,000 feet of pipeline or three groundwater extraction wells, three pump stations, and 2,500 feet of pipelines for the recycled or groundwater components, respectively.

There are a number of reasons why PVWMA has rejected desalination. There are high energy costs associated with this alternative in addition to the costs for land acquisition, seawater intake, and potentially a brine water discharge line and brine water outfall. The extremely high cost for desalination, coupled with its large dependency on large quantities of power, prevented this type of project from being carried forward. The Monterey Bay is a protected marine sanctuary. Discharge of waste brine would be dispersed by ocean currents, affecting temperature, nutrients, and turbidity and, therefore, the abundance and diversity of marine organisms. Areas of potential concern in relation to oceanography and marine water quality include potential seawater quality parameters such as temperature, dissolved oxygen, or salinity; possible localized changes in currents or in turbidity, due to the presence of intake pipes on the ocean bottom or due to the pumping/discharge of effluents from the desalination plant; and possible changes in dispersion of sewage plume effluent due to added discharge of brine effluent from the desalination plant. As such, a desalination project would require a baseline study to establish offshore conditions prior to desalination plant startup; and perform quarterly marine water quality/biological monitoring in accordance with RWQCB requirements during operational phase. Locating the desalination plant at the existing WWTF would allow brine discharge via the existing WWTF outfall, and would require water quality consistent with the WWTF's discharge permit.

DESALINATION OF NON-OCEANIC WATER

Additional water supply could be developed by desalination of non-oceanic saline water. The most likely source of this water would be perched, saline shallow groundwater in San Benito County. Since the salinity of this water would be less than oceanic water, costs associated with

the reverse osmosis treatment process would be less. PVWMA has had preliminary discussions regarding the possibility of implementing this alternative, but it has not been thoroughly studied. If this project were implemented, the treated water would still need to be transported into the Pajaro Valley. Therefore, this project could be a potential add-on or enhancement of the basic import project (the BMP 2000 Alternative or the Modified BMP 2000 Alternative).

6.4.4 OTHER

One commenter suggested that PVWMA implement the following alternative:

> SCWD and SCMU (Santa Cruz Municipal Utilities) should be included in a regional long-term water solution, in a public trust ownership of the 10,000-acre "coastal distribution area." SCWD and SCMU have each allocated funds for future water supply projects. This money should be pooled, and augmented by Prop. 12, Prop. 13, and foundation funding, to purchase the coastal distribution area. These lands could then be fallowed, which would recharge the groundwater basin and stop intrusion, and preserve critical land and aquatic habitat. SCWD participation in a pumping management program would help cumulatively increase yield of groundwater and reduce the problem of saltwater intrusion into the Pajaro basin. PVWMA should then send water to SCWD. PVWMA could then use its funding (via its augmentation charge) to pay for the Import Pipeline and Distribution System. Again, the CVP supply could support 100 percent of SCWD's water needs. Once CVP water has been brought to the Pajaro basin, conversion of lands back to agriculture could be considered where appropriate. In addition, an additional 1,000 acres of the coastal area (to the north) should be included in the coastal distribution area.

The fallowing of 10,000 acres of prime farmland, approximately one-third of farmland in the Pajaro valley, would have a substantial adverse effect on the economy in the region. This is inconsistent with PVWMA's objective "to create a reliable, long-term water supply, an important cornerstone of the long-term economic vitality of the Pajaro Valley." The provision of water to SCWD is a goal of that agency and apparently this commenter, but is not an objective of the BMP project. As discussed in this chapter, PVWMA and SCWD are considering potential future joint projects, but no projects have been developed yet. The exact meaning of "SCWD participation in a pumping management program" is unclear. The Agency is currently subject to certain restrictions on the exportation of water outside the Agency's boundaries.

REFERENCES – Other Alternatives

CEQA Guidelines, 2000.

Feeney, Martin, Memo regarding Evaluation of the injection/extraction issues associated with the CVP Import Pipeline, August 2001.

PVWMA, Local Water Supply and Distribution Final Environmental Impact Report ("Local Projects" EIR), certified in May 1999.

PVWMA, Basin Management Plan Final Program Environmental Impact Report ("1993 BMP PEIR"), certified December 1993.