6 Revised Basin Management Plan Recommendation

The objective of this section is to identify a Recommended Alternative that meets the water supply goals of the PVWMA and the local community. In addition, this section summarizes the process used in selecting the Recommended Alternative, provides a cost estimate for the alternative, and identifies potentially viable future projects. Implementation and funding of the Recommended Alternative are discussed in Sections 7 and 8 of this document.

The Recommended Alternative is the Modified BMP 2000 Alternative with minor enhancements. The PVWMA Board of Directors identified the Modified BMP 2000 Alternative, with enhancements, as the preferred alternative after taking into account the public and stakeholder input, engineering and cost evaluations, environmental impacts, and direction from PVWMA staff. The Recommended Alternative provides a phased approach for meeting the major objectives and goals of the Pajaro Valley by eliminating seawater intrusion and balancing the basin in the most environmentally superior manner with the least amount of capital investment.

This section includes the following discussions:

- Draft BMP and Selection Process for Recommended Alternative;
- Recommended Alternative;
- Water Balance;
- Operational Strategy;
- Cost Estimate;
- Potential Future Projects; and
- Summary of Key Points.

6.1 Draft BMP and Selection Process for Recommended Alternative

The Draft Revised Basin Management Plan was completed and released for public and stakeholder review in August 2001. From August through November 2001, two public workshops were held to present projects and alternatives to the public and stakeholders. PVMWA also held two public BMP hearings, which consisted of presentations and question and comment sessions. Questions, concerns, and comments received during this period were addressed and noted for consideration in the development of the Final Revised Basin Management Plan. The Revised BMP Draft EIR was also released for public review in September 2001.

In addition to these public meetings, the projects and alternatives presented in the Draft Revised BMP were presented and discussed at public PVWMA Board of Directors meetings held from September through early December 2001. PVWMA also attended and participated in various public stakeholder meetings to present and answer questions on the Revised BMP and Revised BMP Draft EIR. The Draft EIR was utilized as a vehicle to solicit input from the various local, state and federal regulatory agencies.

Stakeholder and regulatory comments and additional evaluations played a key role in the selection process. Some of the most significant issues, comments, and developments include the following:

- Comments received from the DHS indicated that percolation of recycled water included in the Local-Only Alternative and Modified Local Alternative would not be a feasible project without

reverse osmosis treatment. The treatment is required because of the potential impact to groundwater resources whose beneficial uses include drinking water supply. Due to the expected cost of reverse osmosis treatment, percolation of recycled water was eliminated as a potential project.

- Following the release of the Draft Revised BMP, an evaluation of injection and extraction of CVP water was completed. The evaluation concluded that membrane treatment such as ultra-filtration or micro-filtration would be required prior to injection of CVP water into the groundwater basin. This was required to meet both the Surface Water Treatment Rule and to prevent plugging of the injection and extraction wells. As a result of these evaluations, the cost for the ASR wells and associated treatment, connection pipelines, and monitoring wells increased to $29.3 million including contingencies. The estimated annual O&M costs for the project is $0.9 million. Due to the increased cost, injection and extraction of CVP water is not recommended at this time. However, ASR remains a potential future option for in-basin banking.

The Recommended Alternative will be implemented using a phased approach to take into account project funding constraints, rate increases, and implementation tasks. This phased approached for implementation of the recommended capital improvement projects is discussed further in Section 7.

In addition to the specific project components included in the Recommended Alternative, it has been recognized that several local water supply projects might become viable in the future. If they become viable, they can be implemented to provide in-basin banking and meet future increases in water demand. These additional local water supply projects (described in Section 4) include the Watsonville Slough, College Lake, and Murphy Crossing Projects. They presently have issues of concern that preclude them from immediate implementation. However, they are all potentially viable future projects that could add to the diverse mix of water supplies available to the PVWMA, and are included as part of the Recommended Alternative.

In-basin banking facilities may also be constructed in the future to increase operating flexibility and provide greater local control of water supplies. Implementation of complete in-basin banking facilities was not included in the next phases of the recommended alternative due to cost considerations. However, they may be included in future phases of the project as funding becomes available, and if it is considered at that time more cost effective than continued use of out of basin banking.

6.2 Recommended Alternative

The goal of the Recommended Alternative is to meet the identified objectives for eliminating seawater intrusion, balancing the basin, addressing regulatory concerns, and developing reliable supplemental water supplies. Included with the Recommended Alternative under Potential Future Phases are three local surface water supply projects and two local water-banking projects. The potentially feasible local surface water supply projects include Watsonville Slough, College Lake and Murphy Crossing Projects (described in Section 4). The potential future local water-banking projects include in-lieu recharge in an Inland Distribution System or an Aquifer Storage and Recovery System. The inclusion of these projects into the Recommended Alternative is a result of public and stakeholder comments and funding considerations. This section reiterates some of the key project elements and discussion that were previously described in Section 5.4 Modified BMP 2000 Alternative. In addition, the recommended enhancements and modifications to the alternative are also discussed.

A phased implementation approach is necessary for the Recommended Alternative due to funding constraints and other factors. The phasing of the Recommended Alternatives is shown below. A map of the Recommended Alternative is shown in Figure 6-1.

Phase 1

- Conservation: 7-year plan (5,000 AFY);
- Harkins Slough portion of the Coastal Distribution System;
- Harkins Slough with Harkins Slough Recharge Basin, Supplemental Wells, and Connections (1,100 AFY);
- CVP Contract Assignment from Mercy Springs Water District for the Import Water Project;
- Watershed Management Programs.
    - Water Metering Program; and
    - Water Resources Monitoring Program.

Phase 2

- Remaining portions of the Coastal Distributions System;
- Import Water Project with Out-of-Basin Banking (13,400 AFY);
    - Acquisition of additional CVP Water Supplies;
    - Five supplemental wells;
    - Potential sale of water to users along the pipeline alignment.
- Recycled Water Project (4,000 AFY); and
- Watershed Management Programs.
    - Nitrate Management Program;
    - Wells Management Program; and
    - Recharge Protection Plan.

Enhancements were made to the Modified BMP 2000 Alternative to meet funding objectives and identified goals. The most significant change to the Modified BMP 2000 Alternative described in Section 5.4 is the strategy for water banking. Due to the estimated cost of ASR facilities and the funding constraints outlined in Section 8, out-of-basin banking was selected as an initial water banking option for the import water project. As funding becomes available for potential future phases, the interim out-of-basin banking option will be replaced by a local ASR and/or IDS banking option. With out-of-basin banking, the PVMWA would bank surplus water available during higher water delivery years with another CVP contractor. In return, PVWMA would receive water from the CVP contractor during lower water delivery years. For additional information on out-of-basin banking see Section 4.10.4.

In addition, five supplemental wells sited along the import pipeline alignment would be constructed for reliability and to provide peaking supply. The supplemental wells will also be used in conjunction with out-of-basin banking to provide water for the PVWMA during dry-years. As potential future phases are implemented, these supplemental wells could be used as ASR facilities after injection capabilities are added.

As part of this arrangement it is recommended that importation of CVP water increase by 1,500 AFY to 13,400 AFY (as compared with the Modified BMP Alternative) to allow a reliable delivery of 18,500AFY to the coastal area. This increase in CVP water would provide the flexibility of delivering 18,500 AFY directly to the coastal areas, or selling up to 3,000 AFY to interested users along the pipeline alignment. Any water sold to these users would be replaced with an equal amount of groundwater pumped from inland areas along the pipeline alignment. In this way, 18,500 AFY could still be delivered to the coastal areas.

Enhancements of existing and development of new Watershed Management Programs are also added as part of the Recommended Alternative. Existing Watershed Management Programs include the Water Metering Program and Water Resources Monitoring Program. The development of new Watershed Management Programs will include a Nitrate Management Program, Wells Management Program, and a Recharge Area Protection Program. In response to the recognized problem of nitrate contamination within the Basin, PVWMA has worked together with other public agencies on outreach tasks. However, no formal development of a Nitrate Management Plan has been completed.

Phase 1 of the Recommended Alternative has already been implemented by the PVWMA to near completion. The implementation included the initiation of the Water Conservation Plan, enhancements to the Water Metering Program, assessment of the Water Resources Monitoring Program, assignment of one CVP contract for import supply, construction of the Harkins Slough Project, and construction of a portion of the Coastal Distribution System in the vicinity of Harkins Slough and Beach Road. In addition, the PVWMA is preparing final documents for construction of the three supplemental wells at Harkins Slough scheduled for completion during the spring and summer of 2002.

Construction of Phase 1 capital projects began in 2000 and will be completed in 2002. The CVP contract assignment from Mercy Springs Water District was completed in November 1998. Conservation efforts began in 2000 and are schedule to continue through at least 2007. Enhancements to the Water Metering Program were also developed in 2000 and complete implementation of the recommended improvements is underway. The Water Resources Monitoring Program is currently undergoing assessment and is also scheduled for completion by the end of 2002.

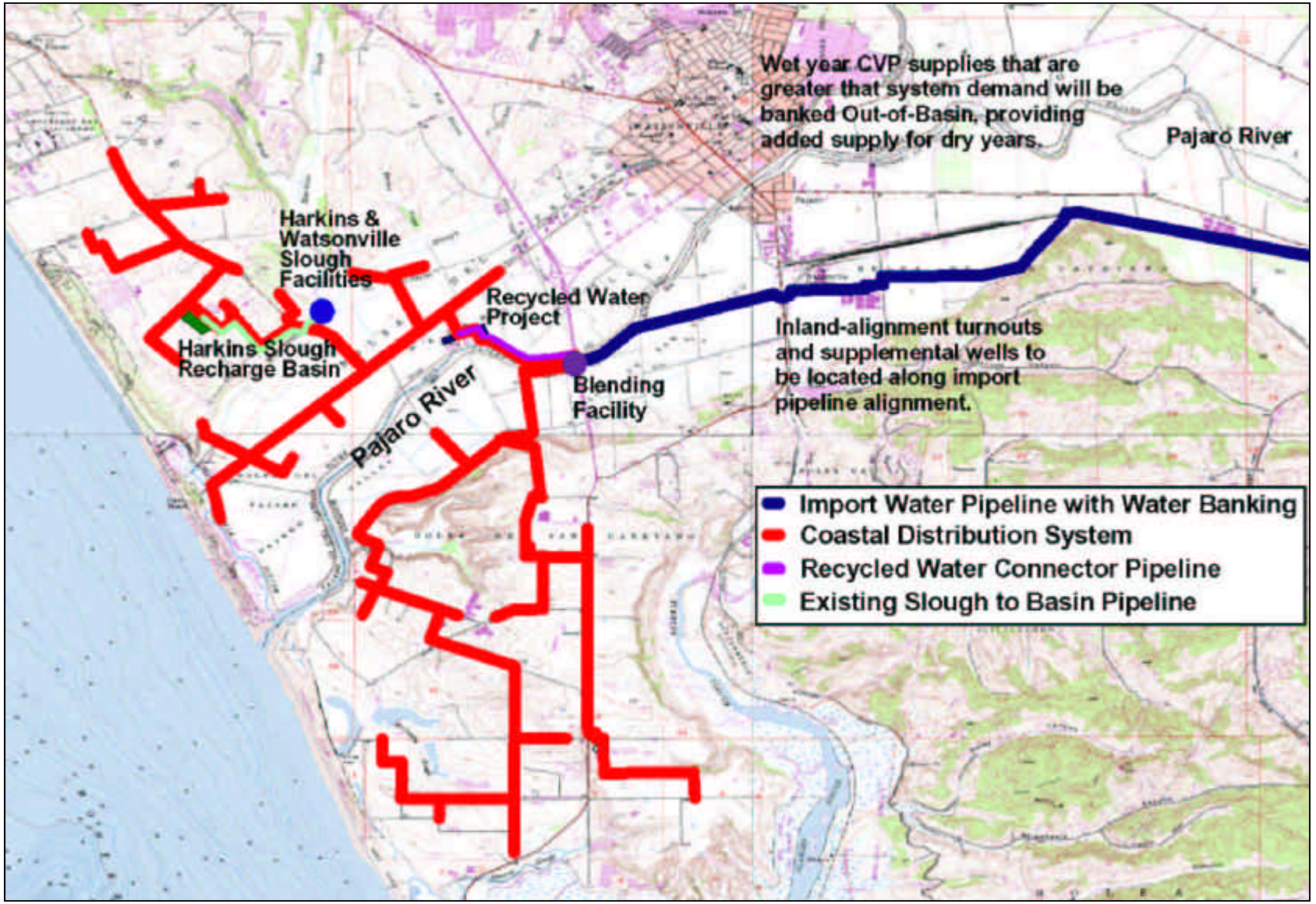
Construction of Phase 2 capital projects is scheduled to begin in 2004 with completion in 2007. Watershed management programs are continuing efforts and once enhanced, developed, or implemented, the programs would be maintained.

Phases 1 and 2 of the Recommended Alternative are scheduled for completion in 2007 and will address the overdraft and seawater intrusion associated with current groundwater demand on an annual average basis. However, the recommended facilities would meet approximately 90 percent of the CDS peak day demand assuming an 18 hour irrigation day. Extending the irrigation day to 20 hours would allow the estimated peak day demand to be met. Hence, providing estimated peak day flows within an 18 hour irrigation day, as well as meeting future increases in water use, will require additional funding beyond the proposed rate structure in Section 8. The projects listed under the Potential Future Phases are envisioned to be the most viable future projects, which could be constructed to provide in-basin banking, and/or to meet future increases in water use.

Potential Future Phases

- Aquifer Storage and Recovery (ASR) of CVP Water;
- Inland Distribution System (IDS);
- Watsonville Slough Project and North Dunes Recharge Basin;
- Murphy Crossing Project with Murphy Crossing Recharge Basins; and
- College Lake Project in coordination with Corp of Engineers flood protection project.

Figure 6-1: Recommended Alternative (Phase 1 and 2)



6.3 Water Balance

As previously discussed in Chapter 3.3, pumping of 18,500 AFY must be eliminated in coastal areas to stop seawater intrusion. Under the Modified BMP 2000 Alternative it was assumed that new water projects would supply 17,000 AFY and 1,500 AFY of inland groundwater would be pumped to the coast.

In the course of developing the Recommended Alternative, PVWMA decided to develop 18,500 AFY of new water supply rather than 17,000 AFY. Consequently, CVP purchase was increased from 11,900 AFY to 13,400 AFY for the Recommended Alternative. Although this amount of water is more than is needed to simply balance demand and supply, it provides increased operational flexibility. As described above, this approach allows delivery of up to 18,500 AFY directly to the coast, or selling up to 3,000 AFY to interested users on the pipeline alignment. Any water sold to these users would be replaced with an equal amount of groundwater pumped from inland areas along the pipeline alignment. In this way, 18,500 AFY could still be delivered to the coastal areas.

A summary of the new water supplies developed in the Recommended Alternative is presented in Table 6-1.

Table 6-1: New Water Supplies Developed by Recommended Alternative

Water Supply to Coastal Area [b]	**AFY[a]**
Harkins Slough with Harkins Slough Recharge Basin	1,100
Recycled Water Project	4,000
Imported CVP Water	13,400
Total	**18,500**

Footnote:
a. Values rounded to two significant figures or to the nearest thousand to represent the values significant accuracy.
b. Water required to be delivered at the coast to eliminate seawater intrusion.

The estimated implementation schedule indicates completion of Phase 2 of the Recommended Alternative by 2007. Thus, by 2007 sufficient water will be available in the coastal area to stop seawater intrusion.

As previously discussed, the peak day water delivery to the CDS will meet approximately 90 percent of the peak day demand, assuming an 18 hour irrigation day. Extending the irrigation day to 20 hours would allow the estimated peak day demand to be met. If extension of the irrigation day to 20 hours proved unacceptable to growers, additional storage, such as ASR wells, within the Pajaro Basin will be needed. These facilities would be added during future phases of the program. If additional storage is developed within the Pajaro Valley, out-of-basin banking could be phased out. Hence, out-of-basin banking may be only a temporary solution within the budgeted rate structure presented in Section 8.

Future increases in water use are expected in the PVWMA service area. Therefore, the PVWMA should continue to evaluate water use and local water supply options for maintaining basin balance. Feasible local water supply options include the development of the Watsonville Slough, College Lake, or Murphy Crossing Projects.

6.4 Operational Strategy

A flow schematic for the Recommended Alternative is shown in Figure 6-2.

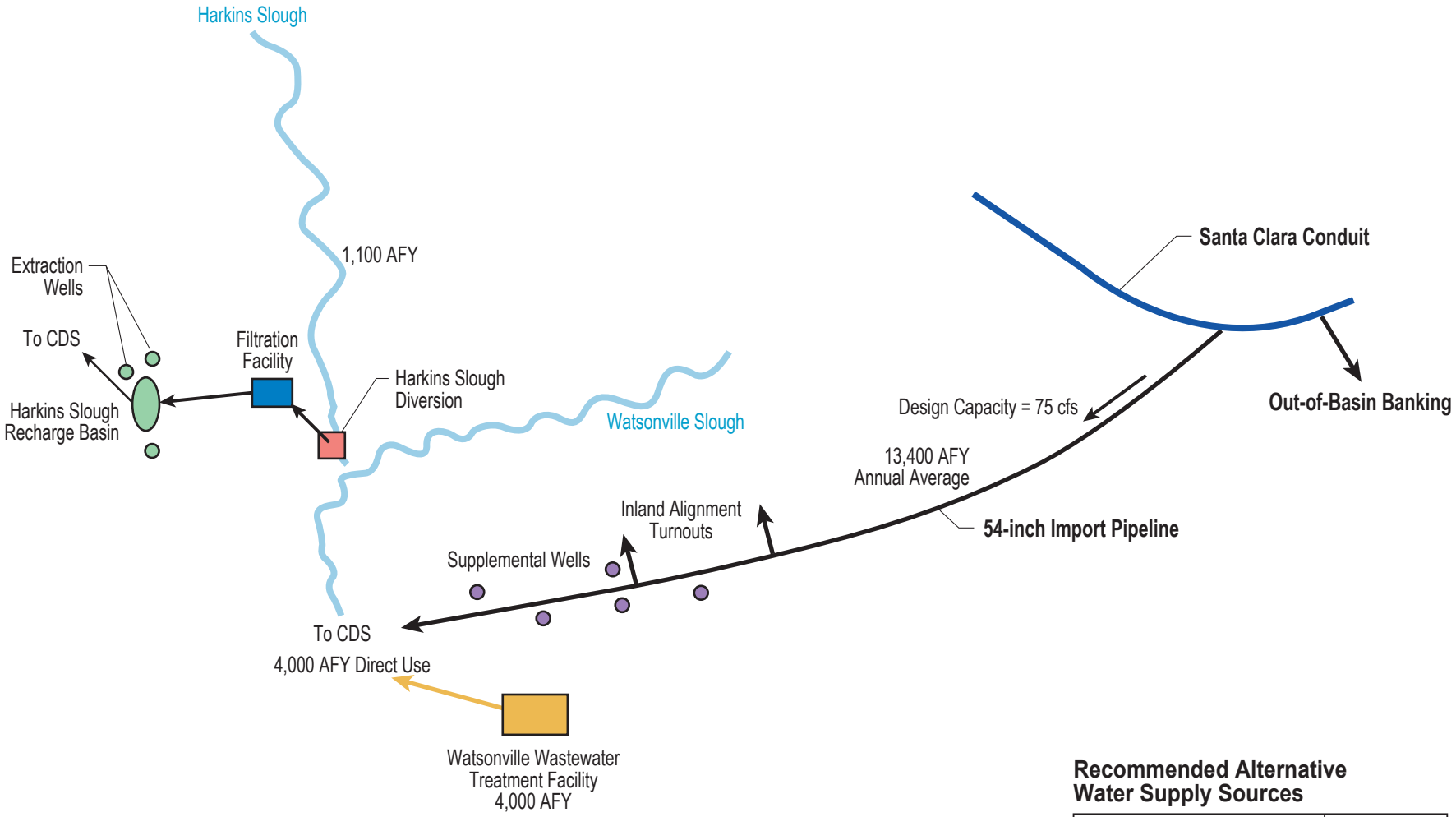
The operational strategy of the Recommended Alternative relies upon recycled and Harkins Slough water in combination with CVP water and groundwater as the major sources of supply. Recycled Water requires a source of blending water to reduce the TDS of the delivered water to 500 mg/l or less. The CVP water supply (some groundwater from inland wells would also be mixed with the CVP supply) will serve as the primary source of blend water to reduce the TDS levels of the recycled water. During years of low supply availability of CVP water, banked in-basin groundwater and out-of-basin banked supplies can be used as additional sources of dilution for the recycled water. Water provided to users on the CDS would be blended with recycled water at a blending facility, proposed to be located near the intersection of Highway 1 and the Pajaro River. Water extracted from Harkins Slough recharge basin would be delivered within the San Andreas portion of the CDS.

In average rainfall years, CVP deliveries plus water from the Harkins Slough recovery wells, inland supplemental wells, and the Recycled Water Project would provide the water required to meet CDS demand. The Harkins Slough recovery wells and inland-alignment supplemental wells would be used to meet peak delivery requirements.

During above-normal rainfall years, CVP deliveries, plus supplies extracted from the Harkins Slough recharge basin and the Recycled Water produced at the WWTF, are expected to exceed CDS. Therefore, CVP water deliveries above current demands would be banked with a CVP contractor through an out-of-basin banking agreement. Water users at the inland-alignment turnouts would also have access to direct CVP supplies during this period.

In below-normal rainfall years, PVMWA would minimal amounts from the CVP system. However, PVWMA would receive additional CVP deliveries through out-of-basin banking agreements. The PVWMA would also withdraw water from the supplemental wells to provide additional supply to the system. The additional CVP and supplemental well supplies would augment surface water and recycled water supply and help meet CDS demand. During these dry years, inland growers would be requested to utilize their existing wells during peak demand conditions. During the most severe dry-weather years, all recycled water would still be available, but it is not anticipated that any supply would be available from Harkins Slough.

The annual yield of the Recycled Water Project is limited to about 4,000 AFY by the recycled water facility daily flow rates, blending requirements, and the irrigation demand for recycled water. Due to the absence of seasonal storage, flow not required for irrigation would be treated to the existing levels and discharged to the WWTF outfall. Water quality is also a limiting parameter. Given the desired TDS



Recommended Alternative Water Supply Sources

Water Source	Yield, AFY
Recycled Water	4,000
Harkins Slough	1,100
CVP - Import Water	13,400
Total	**18,500**

Figure 6-2: Flow Schematic for the Recommended Alternative (Phase 1 & 2)

objective of 500 mg/L, recycled water produced at the WWTF would need to be blended with CVP water (some groundwater from inland wells would also be mixed with CVP supply) to create a uniform water supply for the CDS that meets or exceeds the water quality objectives. Due to the variation of flows into the WWTF, some minor storage of recycled water via equalization basins and a clearwell will be provided at the treatment plant for the purpose of maximizing recycled water use and minimizing the treatment plant design capacity.

6.5 Estimated Costs

The estimated capital cost of the Recommended Alternative is $130.6 million, in Spring 2001 dollars. The annual O&M cost is estimated to be $4.4 million. The cost estimate includes annual administration cost and annual average water banking costs for out-of-basin banking. As discussed in Section 4.10.4, in addition to administration and banking cost, an out-of-basin banking agreement also typically entails the contractor acting as the water bank to retain approximately 10% of the total banked water supply to account for seepage, evaporation, and unaccounted losses. The costs of potential future projects such as ASR, IDS, College Lake, Watsonville Slough, and the Murphy Crossing Projects are not included in the cost estimate. The estimated costs of these project elements are discussed in Section 4. In addition, it should be noted that the estimated cost is likely to increase due to inflation and other cost escalations, which will occur between Spring 2001 and actual project construction.

Table 6-2: Recommended Alternative Cost Estimate (Phase 1 and 2)

Project Element	**Cost Estimate ($ Millions)**
Coastal Distribution System	$34.4
Conservation and Watershed Management Programs	$1.7
Harkins Slough Project with Harkins Slough Recharge Basin and Supplemental Wells and Connection[a]	$6.6
Recycled Water Project (4,000 AFY)	$19.2
54-inch Import Water Project with Out-of-Basin Banking	$87.3
Construction Cost Subtotal	**$149.1[b]**
Financial & Bond Sale Cost @ 1.0%	$1.5
Recycled Water Grant (Title XVI)	($20.0)
Total Capital Cost	**$130.6**
Annualized Capital Cost at 6% for 30 years	$9.5
Annual Operations & Maintenance Costs	$4.4
Total Annual Cost	**$13.9**

Footnotes:

a. Includes $460,000 CalFed Grant, which reduces cost to $6.6 million. This project is complete except for three supplemental wells and associated piping.
b. Subtotal reflects sum of individual project elements before rounding.

Notes:

1. Spring 2001 construction cost.
2. Capital recovery factor (A/P) for 6% at 30 years is 0.07265.
3. Cost estimates include a Construction Contingency of 20%, Engineering/Legal/Admin/Permits Contingency of 17.5%, and Environmental and Permitting Contingency of 5%.

The amount shown for Conservation and Watershed Management Programs is the recommended increase in budget for these items. The $1.7 million shown is the present worth equivalent of $290,000 per year, which is the recommended increase. Currently these programs consume approximately $340,000 per year. Therefore, in combination with the recommended increase, the total recommended expenditures for these programs would be approximately $640,000 per year. The tentative allocation of this budget is shown in Table 6-3.

Table 6-3: Resource Allocation for Conservation and Watershed Management Programs

Watershed Management Programs	Current Resource Allocation	Recommended Increase in Allocation	Recommended Future Resource Allocation
Water Conservation Plan	$100,000	$100,000	$200,000
Water Metering Program	200,000	100,000	300,000
Water Resources Monitoring Program	40,000	60,000	100,000
Nitrate Management Program	0	15,000	15,000
Wells Management Program	0	7,500	7,500
Recharge Protection Program	0	7,500	7,500
Total Resources Allocation	**$340,000**	**$290,000**	**$630,000**

6.6 Potential Future Phases

As previously discussed, completion of Phases 1 and 2 of the Recommended Alternative will address approximately 90 percent of the CDS peak demand, assuming an 18 hour irrigation day. Extension of the irrigation day to 20 hours would allow the estimated peak day demand to be met. However, if the extension is unacceptable to growers, additional storage such as ASR wells, within the Pajaro Basin will be needed.

Addressing peak demand periods as well as future increases by 2040 in water use will require the construction of an in-basin banking system and additional water supply projects. An in-basin banking system is not being implemented at this time due to funding restrictions. In consideration of near-term cost-saving, out-of-basin banking provides a storage alternative for meeting the water demand in the Pajaro Valley the majority of the time with the least amount of initial capital investment. Furthermore, it is more prudent to reserve long-term storage decisions on ASR and IDS for in-basin banking until more information and studies can be completed and evaluated. The capital projects in Phase 1 and 2 will be designed with flexibility such that future projects can be incorporated into the system to meet the remaining current and future needs.

As more funding becomes available in the future, the potential future in-basin storage and local water supply projects discussed below could be constructed to meet the remaining current and future needs. These listed projects are envisioned to be the most viable future projects for construction to provide in-basin banking and/or increase local water supplies. Hence, the design of the recommended projects

included in the next phase of implementation and described in Section 6.2 should include provisions for future integration of the following projects.

Potential Future Phases – Envisioned Viable Projects

- Aquifer, Storage and Recovery (ASR);
- Inland Distribution System (IDS);
- College Lake Project;
- Watsonville Slough Project; and
- Murphy Crossing Project.

As previously discussed, addressing the entire overdraft and seawater intrusion impacts during peak demand periods as well as future increases in water use by 2040 will require the construction of additional capital projects such as in-basin banking facilities. An in-basin banking system would provide long-term reliability and allow more flexibility for the PVWMA. Construction of ASR facilities, an IDS, or a combination of the two, would provide in-basin banking for imported water. The banked water would then be pumped during below normal water delivery years when CVP supplies are reduced. These two banking projects were not included as part of the next phase of the Recommended Alternative due to funding constraints. However, design of the recommended projects should include provisions for future integration and connection of the ASR facilities and an IDS.

The College Lake Project was not considered a practical project at this time due to a potential ACOE flood protection project at College Lake and impacts to steelhead fisheries. Until the ACOE has completed flood protections studies, a water supply project at this location is not realistic. However, the College Lake Project may be feasible in the future. The ACOE is currently completing outreach efforts and collecting public and stakeholder inputs as a part of the initial phases of its planning study. To date, no schedule is available for the completion of ACOE flood projection evaluation.

Similar to the College Lake Project, the Watsonville Slough Project is not viable at this time. Environmental enhancement and restoration options are currently under evaluation and the Watsonville Sloughs Resource Conservation and Enhancement Plan is being developed. The viability of the Watsonville Slough Project is contingent on experience with the Harkins Slough Project and recommendations of the Resource Conservation and Enhancement Plan.

The Murphy Crossing Project faces several environmental issues and engineering challenges at this time. NMFS and DFG have requested that additional investigations be undertaken to evaluate the sediment characteristics of the proposed infiltration gallery. Therefore, pursuit of this project is currently not warranted. In addition, the most practical delivery of water supplied by the Murphy Crossing Project would be an IDS adjacent to the project. However, the project is still feasible and could be selected for implementation in the future.

6.7 Summary of Key Points

Presented below is a summary of key points of this section.

- The Recommended Alternative was selected through a rigorous process consisting of public outreach, and engagement of regulatory, jurisdictional agencies, and other stakeholders.

- The Recommended Alternative for eliminating seawater intrusion and balancing the basin is the Modified BMP 2000 Alternative with minor enhancements. The Recommended Alternative is to be implemented under a phased approach.

- Due to funding constraints, out-of-basin banking will be utilized as the near-term water banking strategy for the Recommended Alternative.

- The Recommended Alternative would provide new water supplies of 18,500 AFY. In conjunction with conservation of 5,000 AFY, seawater intrusion would be eliminated and basin balance would be achieved by 2007. Future increases in water use are expected, but the inherent flexibility of the Recommended Alternative would allow these demands to be met at a future time.

- Enhancements of existing, and development of new, Watershed Management Programs are also added as part of the Recommended Alternative,

- The estimated capital cost of the recommended alternative is $130.6 million with an annual O&M of $4.4 million.

The next steps for PVMWA are to begin the implementation process for each of the recommended projects. An implementation plan for the recommended alternative is described in Section 7. In addition, Section 8 describes the water rate structure that would be used to fund the projects.