

8 Conclusions and Recommendations



The purpose of the *Regional Water Facilities Master Plan* is to evaluate the ability of the Authority to continue to meet its mission based on current plans for water supply and facility improvements, and to recommend new facilities or improvements to existing facilities needed to meet the Authority's mission through 2030. The *Master Plan* is intended to function as the roadmap for implementing the major capital improvements the Authority needs to serve projected water demands.

This *Master Plan* has reviewed both treated and untreated projected demands of the region and analyzed different alternatives to convey supplies to meet customer demands. The results in Chapter 5 and Chapter 7 are the basis for the recommendations of future facility needs. The focus of Chapter 5 is an analysis of the reliability of a baseline system, which assumes the use of existing facilities and the completion of the 2002-03 Capital Improvement Program. This analysis demonstrated that additional facilities should be constructed to meet reasonable expectations of reliability, both in the short term (between now and year 2010) and over the long term, 2015 and beyond. Chapters 5 and 7 provide a detailed discussion of the needs for these facilities.

The most important conclusion reached by this plan is that the Authority should aggressively pursue the West alternative

(seawater desalination) for a major portion of the Authority's supply portfolio. Seawater desalination provides many benefits, including the provision of a new supply with price certainty, new treatment capacity, and enhanced water quality. The other two alternatives reviewed (the North and East alternatives) offered relatively reduced levels of reliability, largely because neither provides a comparable independent water supply as reliable as seawater desalination. Benefits offered by the recommended seawater desalination alternative include:

- A regional seawater desalination plant provides a new regional supply source.
- The seawater desalination process produces treated water.
- With seawater desalination plants, the ocean effectively becomes a storage reservoir.
- The Pacific Ocean is a supply for which the region does not have to compete.
- The supply is always available and not subject to hydrologic cycles.
- The costs for desalinated seawater are more certain than the cost of new imported water supplies.
- The main cost uncertainty for seawater desalination is the cost of electric-

ity; however, cost variations in electricity are as likely to impact the cost of new imported supplies as seawater desalination.

- Additional advances in technology are likely to continue to push the future cost of seawater desalination downward in the same way that technology advances have caused a significant decline in unit costs over the last ten years, thereby providing less upside cost risk.
- Diversification of supply sources, similar to diversification of investments, guard against exposure to unknown and undefined future risks.

Meeting Reliability Needs

One of the major goals of the master planning process is to achieve region-wide agreement on what it means for the Authority to provide a reliable water supply. Decisions regarding reliability must encompass both near-term strategies for matters that are fairly well understood, such as the need to develop additional regional water treatment capacity, and long-term strategies that of necessity must use information that is less well understood, such as the total water demand that will actually occur in 2030. By their nature, long-term forecasts cannot precisely predict the future. But long-range analysis, as used in this plan, is useful for comparing alternatives for measures of reliability in light of varying uncertainties in the future and a quantification of the risk associated with those uncertainties.

Each of the three alternatives considered in this plan were analyzed for reliability of service. An underlying fundamental principle in the development of this plan is the acknowledgement that diversification of supply sources is a positive approach for improving reliability. The alternative with

the highest apparent degree of reliability, seawater desalination, is recommended for use as the starting point for discussing a standard of reliability for the Authority.

Establishment of a reliability standard should be based upon an analysis that includes the frequency, magnitude, and duration of estimated delivery shortages within a projected range of weather and demographic variability. As stated in previous chapters, when taking into account varying levels of uncertainty in both weather and demographics it is important to understand that a prudent standard for reliability should not seek to address potential conditions that have extremely low probabilities of occurrence, as that is not a cost-effective approach to long term facilities planning. Neither should the reliability measurement be constrained to measuring a single variable, such as weather. The recommended alternative provides a capital investment strategy that is commensurate with a realistic assessment of both the short-term and long-term risks of not meeting member agency demands.

The recommended alternative also preserves the Authority's ability to respond to changed conditions in the long term without making investments in the near term that may prove unwarranted. A reasonable timeframe to consider in making future adjustments to the recommended alternative is the first 15 years of the 30-year planning horizon. This allows the Authority to make adjustments to its facilities and water supply plans to accommodate the changing conditions..

Recommendations for Near-Term Actions to Maintain and Enhance Reliability

A review of near-term needs to improve reliability results in the following recommendations:

- Addition of facilities to connect to existing treatment plants with available peak capacity

- Addition of 50-100 million gallons per day (mgd) of treatment capacity within the region
- Constructing a minimum 50 mgd seawater desalination plant in Carlsbad by Year 2010, including the pump stations and pipelines sized for 100 mgd plant capacity to convey the water to the Authority's Second Aqueduct
- Completing the highest priority replacement/relining projects
- Constructing the Second Aqueduct untreated water flow regulatory structure project at Mission Trails
- Constructing other internal system projects needed to increase delivery capacity and operational efficiency
- Addition of 100,000 acre-feet of carryover storage by 2010
- Continued close coordination between MWD, Authority and member agency operation staffs to maximize the efficient use of treatment capacity and minimize simultaneous peaking
- Continued extensive public outreach concerning the need for conservation
- Developing an incentive program to encourage large treated water users to reduce peak water demand during high regional demand periods

These demand-side management actions should be considered in conjunction with the structural/facility solutions, not viewed as an alternative to these solutions.

Recommendations for Long-Term Actions to Maintain and Enhance Reliability

Analysis of the region's long-term reliability focused chiefly on the projected availability of future water supplies and the diversification of the Authority's water supply portfolio. Long-term projections used in the analysis of reliability are intended as a planning exercise to make informed judgments and decisions about potential resources alternatives. The West alternative, featuring large-scale seawater desalination, was found to offer a significant improvement in reliability at a relatively slight additional cost (approximately seven percent higher in present value costs than the least costly North alternative). This option also improves the diversification of Authority water sources by introducing a new supply that is independent of the Authority's current source of imported water.

The recommended seawater desalination plant(s) must complete the environmental permitting process before design and construction can go forward. Until the environmental permitting process on the first phase of seawater desalination is completed, there is some level of uncertainty

The additional treatment capacity is the highest priority for maintaining regional water delivery reliability. The additional treatment can be met in a variety of ways. Of the 50-100 mgd of capacity needed by 2010, approximately 50 mgd of this will be needed by 2006. Expanding existing member agency water treatment plants, construction of a new regional plant, or a combination of the two, can provide this 50 mgd. A first phase of a seawater desalination plant in Carlsbad could provide the remaining 50 mgd of treatment capacity needed, and can be online prior to year 2010. Recent action by the Authority's Board has authorized solicitation of design-build-operate (DBO) proposals from public and private entities to provide some or all of this additional treatment capacity for ownership by the Authority.

There are other initiatives, including demand-side management, which can be undertaken or continued in addition to the structural/facility solutions discussed in the preceding paragraph to help with the treated water capacity issues:

today as to what extent and what volume seawater desalination can be implemented. While it is not believed that the level of uncertainty over the feasibility of seawater desalination is as great as that for other new water supplies, it would be prudent to proceed cautiously with this alternative until the environmental review and permitting process nears completion. Therefore, it is important that all three alternatives remain in the analysis during the environmental review and permitting period. The alternatives are not mutually exclusive and combinations of the alternatives may be needed in the future. For example if there is a limitation on seawater desalination that is not seen today, Pipeline 6 may need to be built sooner than the 2030 planning horizon, if some additional certainty develops over new imported water supplies.

Reliability Standards for Planning Purposes

As stated in Chapter 1, there is a need to establish a set of reliability standards for the Authority. One of the major goals of the master planning process is to achieve region-wide agreement on what it means for the Authority to provide a reliable water supply.

Each of the three alternatives were analyzed for their reliability of service, and it is proposed that the estimated reliability of the best apparent alternative, Seawater Desalination, be used as the starting point for the discussion of reliability standards.

One of the major benefits of Alternative 2 is its scalability. That is, it can be adjusted in size to meet whatever levels of reliability may be determined to be appropriate. The current recommendation is to implement an initial 50 mgd desalination facility, with a second phase of an additional 30 mgd. This second phase can be increased in size, and additional phases can be added by investigating other potential seawater desalination sites.

The reliability standards should establish the frequency, magnitude, and duration of estimated delivery shortages within the

projected range of weather and demographic variability.

The seawater desalination alternative provides the estimated level of reliability shown in **Table 8-1** in the years 2005, 2015 and 2020. As indicated, the probability of some level of shortage during elevated demand conditions will remain high through 2007 due to insufficient treatment capacity. This produces a lower level of reliability in 2005 than in 2015, after a number of treatment plant expansions are completed.

Recent Changes to SANDAG Forecasts

As this draft of the *Master Plan* was being prepared for release, SANDAG released revisions to its region-wide population forecast. The revised forecast projects a slower rate of population growth than the previous forecast, with the previous estimate for the 2020 population being roughly equal to the revised 2030 population estimate. At this point, it is difficult to assess the impact of this change, as population is only one of several drivers of future demand projections. For this reason, it will be necessary to evaluate any new forecast information from SANDAG to determine whether it will be necessary to revise the current water demand projections to take into account the revised SANDAG growth forecast.

Power Supplies

During the preparation of this *Master Plan* study, the availability and cost of electricity and natural gas to the San Diego region became a significant issue. The Authority has been involved in discussions seeking solutions to this complex issue. Currently there are no recommendations for the Authority to increase its role in energy production beyond the already-approved

Table 8-1 Estimated Annual Reliability for the Best Apparent Alternative – Seawater Desalination	
Frequency of Shortage ^(a)	Magnitude of Yearly Shortage (acre-feet)
2005	
93.8	100
97.1	1,000
97.8	10,000
98.3	25,000
99.8	75,000
2015	
97.8	100
98.2	1,000
99.0	10,000
99.6	25,000
99.97	75,000
2020	
93.2	100
94.0	1,000
97.0	10,000
99.1	25,000
99.7	75,000

^(a) Expressed as the probability that the shortage will not exceed the indicated magnitude.

hydroelectric projects. A regional energy office has been established to work with the various public agencies and private companies to grapple with the region’s energy needs, and a regional energy study is being prepared to address these issues. The Authority has co-funded this study along with other regional entities.

Energy availability and cost are important factors for operating seawater desalination plants. These costs have been incorporated into the projected cost of the seawater desalination alternative. Regional energy issues will continue to be monitored closely for potential impacts to the implementation of this alternative.

Financial Impacts

There are options available to the region to build facilities to meet 100 percent of any demands in the future. However, the cost of some of these options may be cost prohibitive. The approach used for the *Master Plan* has been to schedule construction of facilities as demands dictate. This allows phasing of projects to minimize increases in water rates by spreading expenditures over a longer period of time.

Finite financial resources require prioritizing projects to first invest in those projects that provide the greatest increase in

reliability for the least cost. Additional financial analyses and rate modeling will be needed further refine the prioritizing and scheduling of the various proposed projects, and to support adoption of a final *Master Plan* and a preferred alternative in the Program EIR.

Policy Issues

As discussed in Chapter 1, there are potential policy issues that the *Master Plan* study raises that will require discussion and resolution by the Board of Directors prior to certifying a Programmatic Environmental Impact Report (PEIR) and approving the final *Master Plan*. These include:

- Establishing a planning standard for reliability
- Establishing an operating standard for reliability
- Determining whether changes should be made to operational levels of service to member agencies for water deliveries and what policies or pricing structures should be established to manage those water deliveries.
- Establishing an annexation policy regarding lands generally beyond the existing boundaries of the Authority's member agencies (i.e., not considered "in-fill")
- Establishing a policy for serving demands of entities outside of the Authority's boundaries
- Establishing a policy regarding service to member agencies that do not complete capital improvements according to schedules upon which the Authority has relied for planning regional facilities

Final decisions about the size, location, and types of facilities will be affected by decisions the Board makes. The *Master Plan* report outlines a roadmap for facility

development for the future, allowing for the flexibility to respond to changing circumstances, while maintaining and enhancing water reliability for the region, meeting the Authority's mission.

Summary of Recommendations

A summary of the *Master Plan* recommendations for facilities and policies is given below.

Facilities

Rehabilitation of Existing Facilities

- These projects are the replacement and relining projects needed to rehabilitate the existing Authority pipelines. These projects are described in Chapter 6 of the report. The schedule for relining is being further refined as part of the Replacement and Relining PCCP project.

Internal System Improvements

- The recommended internal system improvement projects are described in Chapter 7. These projects provide additional operating flexibility and capacity to the existing Authority system. Further discussion with the member agencies affected by these facilities is required. For instance, the Mission Trails Flow Regulatory Structure and Mission Trails Tunnel are required to provide additional untreated-water conveyance capacity to the existing reservoirs and water treatment plants south of Lake Miramar. Currently the Authority does not provide 100 percent of water treatment capacity to all the plants simultaneously. The agencies that own these plants supply some water from local storage to meet the needs of the plants. The *Master Plan*

analysis did not provide this level of conveyance capacity. Further discussions with the treatment agencies is required to determine if a higher level of delivery capacity will be needed in the future.

Increase Regional Water Treatment Capacity

- As stated earlier in this section, this is the highest priority for maintaining regional water delivery reliability. The Authority Board of Directors recently adopted new policies allowing the Authority to be more involved in the treatment business. The Authority in conjunction with Metropolitan and Member Agency treatment capacity will provide for sufficient capacity in the region. The Authority's approach will be to review the possibility of meeting the future treatment capacity need with connections to existing member agency facilities, expansion of existing member agency owned water treatment plants, and construction of an Authority owned plant. These options individually or in combination will be investigated in studies subsequent to the *Master Plan*. Additional meetings with the Authority member agencies will be held once options to meet the treated water capacity need are analyzed.

Addition of 100,000 acre-feet of Carryover Storage

- Carryover storage provides a number of benefits described in Chapter 6. A specific environmental impact report will be prepared for this potential facility and will analyze alternatives for locating this storage.

Seawater Desalination

- The Board of Directors has authorized Authority staff to investigate

the development of 50 million gallons a day of seawater desalination capacity at the Encina power plant site in Carlsbad. The Board has also directed staff to investigate additional development of seawater desalination at other sites along the San Diego County coastline. The *Master Plan* recommendation calls for the implementation of seawater desalination to meet demands in the future. This is based on the assumption that seawater desalination will be permitted and that operating costs are in the range currently projected. If seawater desalination is not as viable as assumed today, the Authority Board of Directors has committed to the Pipeline 6 project. This pipeline could be built sooner if additional supplies are needed beyond the full implementation of seawater desalination.

The *Master Plan* has not attempted to describe every project in detail but rather describe the types of projects needed to meet the needs of the region in the future. There are follow-on studies in the permitting and EIR stages for each of these projects to further define them. The *Master Plan* is the first step in determining the facilities needed to provide a reliable supply of water to San Diego County.

Policies

- Establish a planning standard for reliability consistent with the results indicated in Table 8-1, which are equivalent to the estimated reliability expected from implementing Alternative 2, Seawater Desalination.
- Direct staff to continue to explore methods of managing water deliveries through peak demand management policies and pricing structures

that provide a facilities benefit to the Authority.

- Establish a policy that no allowance for additional annexations will be included in any water supply or facility planning, other than for infill within the current general boundaries of the Authority.
- Establish a policy that the Authority will not plan for the facilities needed to serve water outside of its boundaries unless the entity being served pays the full cost for the use of existing Authority facilities and the construction of any new facilities that may be required.
- Establish a policy that member agencies shall be served on a capacity available basis when such agencies:
1) fail to place into operation facilities assumed to be in place by the Authority according to the schedules indicated in the member agencies' facilities plans or have otherwise provided information to the Authority regarding their plans, and 2) at any time request service from the Authority which would have otherwise been unnecessary had their planned facilities been in operation.