

Draft**Santa Cruz Water Supply Advisory Committee****Preliminary Descriptions for Alternatives 5 through 13, Selected for Recon Evaluation and MCDS Exercise**

This summary presents descriptions for nine Recon Level alternatives based on Brown and Caldwell's (BC) interpretation and evaluation of proposals submitted to the Water Supply Advisory Committee (WSAC) for the City of Santa Cruz (City). Where a proposal included two or more potential variations or where an alternative apparently had a potentially fatal flaw, BC chose a single alternative for detailed develop.

5. Bevirt North Coast: This alternative for initial comparison uses only the Liddell quarry which would hold about 650 million gallons (MG) since its construction would not require building a dam. The San Vicente site was dropped since the San Mateo Peninsula Open Space Trust and the Sempervirens Fund have acquired the site and initiated creation of a conservation easement over the site to prevent future development. If the City withdrew stored water over a 3-year drought cycle, production would be about 200 MG annually after allowing for evaporation and leakage losses.

This alternative has several outstanding issues, e.g., water rights (new diversion location from which to fill the reservoir, routing of fill pipeline), geotechnical and construction issues associated with installing a liner on steep slopes over a porous karst formation, preparation and approval of environmental documents, California Department of Fish and Wildlife (CDFW) and National Marine Fisheries Service (NMFS) approvals for water diversions from streams with salmonoid populations, and agreements with the landowner about ownership and operations .

6. SCWD McKinney Expanded Treatment Capacity: This alternative for initial comparison would add a new 14-mgd water treatment plant (WTP) (pretreatment for turbidity control and membrane filtration) near the Tait Street Diversion to produce treated water that would be piped directly into the distribution system. The write up for this alternative indicates that the alternative would allow an annual water diversion increase of about 560 MG.

The alternative has several outstanding issues, e.g., determine the final treatment train (MF would need pretreatment ahead of MF for elevated SLR turbidity concentration), preparation and approval of environmental documents, determination if water rights and diversion permits would need modifications, and development of a plan to store and use diverted water beneficially. If the City would have excess water during normal or wet years, it might transfer extra water to Soquel Creek Water District (SqCWD) and/or Scotts Valley Water District (SVWD) but doing so would require agreements with the agencies and likely would trigger water rights permit modifications since the place of use would change.

7. SCWD McKinney WSAC Ranney Collector: This alternative for initial comparison would use Ranney collectors with a 12.9-mgd capacity (maximum capacity allowed under the current City of Santa Cruz [City] diversion permit), installed near the City's Felton diversion to draw water allocated under the City's existing water rights. Water drawn through the collectors would have greatly reduced turbidity. Much higher water quality would allow continuous refilling of Loch Lomond while also operating the GHWTP. More studies would be required to project increased diversion opportunity, however the increased diversion likely would be somewhat less than about 560 MG annually as projected for Alternative 6.

The alternative has several outstanding issues, e.g., the City would need to conduct additional analyses for available flow, addressing any bypass requirements under the habitat conservation plan. The City would also need to determine its plan to store and use diverted water beneficially. If the City would have excess water during normal or wet years, the City might transfer extra water to Soquel Creek Water District (SqCWD) and/or Scotts Valley Water District (SVWD) but doing so would require agreements with the agencies and likely would trigger water rights permit modifications since the place of use would change.

8. Paul Lochquifer: This alternative would use treated water sold by the City to Soquel Creek County Water District (SqCWD) during normal and wet years. SqCWD would use the transferred water either for groundwater recharge through seven 250-gallon-per-minute (gpm) recharge wells, for conjunctive use (well field resting) recharge, or both. The City would take more water from its San Lorenzo River and/or Newell Creek diversions, about 2.5 million gallons per day (mgd) or about 915 MG annually, to match the desalination alternative. If recharge occurred continuously for five years, total transferred water would be about 4,600 MG. Facilities would include Ranney collectors at the Felton Diversion, to insure that the Graham Hill Water Treatment Plant (GHWTP) could treat the diverted water continuously. During drought years the City would receive returned water (groundwater) from SqCWD. The City also would pump its Tait Street wells year round since the recharged Purisima aquifer would yield available water without causing seawater intrusion. Potential yield would be 2 mgd from the Live Oak wells and 2.5 mgd from SqCWD; 4.5 mgd total. If the City used these sources for six months, total production, after deducting out a 1-mgd production allowance for the existing wells, would be about 640 MG annually.

This alternative has several outstanding issues, e.g., water rights (modification of place of use), assembling appropriate information to site injection wells, modeling the Purisima aquifer to project better potential performance, and agreement with SqCWD on how the alternative's water would be conveyed, shared and paid for.

9. Ripley Reuse for Agriculture: This alternative for initial comparison would produce filtered disinfected effluent (CA Title 22 unrestricted water) from the City Wastewater Treatment Plant (WWTP) at a rate of about 4.3 mgd. The City would pump the effluent north through a new pipeline aligned along the railroad right of way, with turnouts to irrigate up to about 1,300 acres on private land and leased land on properties owned by the California State Parks (CSP) and the United States Bureau of Land Management (BLM). This process is assumed to take place over 180 days per year and total water available for crop irrigation would be about 780 MG. The City would build 12 new 250-gpm extraction wells that discharge into new pipeline that in turn would connect to the existing City North Coast pipeline. The water would combine with diverted surface water from the City North Coast rights, for treatment at the GHWTP. To develop space for new facilities within the WWTP site, the City would need to relocate its Line Maintenance Facility from the WWTP site to a new site on the West Side.

The alternative has several outstanding issues, e.g., legal agreements with CSP, BLM, and property owners and with irrigators, securing the right of way for the new delivery and return pipelines such as along the railroad ROW, geotechnical investigations for well construction, assessment of the groundwater basin to ensure that operation would not adversely affect the groundwater basin, permitting through the California Coastal Commission, preparation and approval of CEQA/NEPA documents (NEPA is included because the project includes BLM land), and location and purchase of new Line Maintenance Facility site.

10. SCWA Regional Aquifer Restoration: This alternative would have the same components as Alternative 8 (“Paul Lochquifer”) but the recharge and return rates would be lower. This alternative would transfer about 800 MG from the City to SqCWD over an extended period but SqCWD would return only about 145 MG to the City during dry years. The City’s drought production from its Live Oak wells would increase from 1 mgd to 2 mgd, or about 365 MG. The long-term average approximate production increase appears to be $[(145+365)/6.5] = 78$ MG.

The alternative has several outstanding issues, e.g., water rights (modification of place of use), assembling appropriate information to site injection wells, modeling the Purisima aquifer to project better potential performance, and agreement with SqCWD on how the alternative’s water would be conveyed, shared and paid for.

11. SCWD Water Reuse: This alternative for initial comparison would produce complete advance treatment (CAT) water from the City Wastewater Treatment Plant (WWTP) at a rate of about 3.7 mgd. The City would pump the CAT water from the WWTP through a new pipeline to the Bay street Reservoirs site where the new pipeline would connect to the existing North Coast pipeline. The combined water would flow to the inlet end of the GHWTP, to be treated and distributed to the City. This alternative would produce up to about 1350 MG annually. The City would have the option of selling surplus treated water to either SqCWD or Scotts Valley Water District as part of either a conjunctive use (aquifer resting) or ASR project.

To develop space for new facilities within the WWTP site, the City would need to relocate its Line Maintenance Facility from the WWTP site to a new site on the West Side.

This alternative has several outstanding issues, e.g., permitting such reuse through CA Division of Drinking Water, gaining public acceptance for adding CAT water as part of its potable water supply, and possibly reaching agreements with adjacent agencies.

12. SWC Desalination: This alternative for initial comparison would use seawater desalting through a new reverse osmosis desalination facility to produce about 2.5 mgd for addition to the City potable water supply. Annual production would be about 915 MG. This alternative’s components and development would match those for the previously proposed scwd2 desalination facility. For comparison with other alternatives, BC has assumed that the City would own and operate the facility and would use the water produced year round. Excess water would allow the City to either idle the Live Oak wells for conjunctive use aquifer recover to perhaps undertake Live Oak well operation in an ASR mode to restore the aquifer more rapidly.

This alternative has several outstanding issues, e.g., environmental document completion, permitting through the California Coastal Commission, and public vote approving alternative implementation.

13. Trevi Forward Osmosis Desalination: This alternative for initial comparison would use seawater desalting through a Trevi forward osmosis (FO) system. This alternative’s other components would match those for seawater desalting.

The alternative has several outstanding issues, e.g., Trevi technology is still in its infancy and being tested at a pilot scale. As described, it would require a lower grade heat source for separately drawing the solution from the potable water but the alternative description did not designate a source for lower grade heat.

Since the Trevi FO is still at the developmental stage, BC has not developed this alternative further. If future testing and implementation by other entities prove its value, it could replace RO if the City was to select and implement Alternative 12.