5 OTHER CEQA-REQUIRED SECTIONS

5.1 GROWTH-INDUCING IMPACTS

As required by CEQA, an EIR must discuss the ways in which the proposed project could directly or indirectly foster economic or population growth or the construction of additional housing and how that growth could, in turn, affect the environment (CEQA Guidelines Section 15126[g]). Growth can be induced in a number of ways, including by eliminating obstacles to growth and stimulating economic activity outside of the project. Potential growth inducement because of the proposed project would be related to the improvement of wastewater treatment infrastructure and whether the improvements would allow removal of infrastructure limitations and contribute to growth. Under CEQA, induced growth is not necessarily considered beneficial or detrimental. Induced growth is considered a significant impact only if it has a significant effect on the environment.

As described in Chapter 3, the proposed project would upgrade the campus WWTP to an anticipated design capacity of 3.8 mgd to meet the campus' demand for daily and peak hourly wastewater flow anticipated through 2013. This increase in demand for wastewater treatment and the need to expand the WWTP was projected in the 2003 LRDP (p. 74) and analyzed in the LRDP EIR. The proposed project would help facilitate campus growth through 2013, the year the proposed WWTP is expected to reach its capacity. Because the WWTP only serves campus facilities, the proposed project would not induce or accommodate growth beyond that which was identified in the 2003 LRDP and analyzed in the LRDP EIR.

5.2 SIGNIFICANT AND UNAVOIDABLE IMPACTS

CEQA requires that an EIR identify any significant impacts that cannot be reduced to a less-than-significant level through mitigation (CEQA Guidelines Section 15126.2[b] and Public Resources Code Section 21000[b]). The proposed project would not cause any project-level significant and unavoidable environmental impacts, but would contribute to significant and unavoidable cumulative impacts.

As described in Section 4.5 of the Tiered IS (Appendix A, p.22), the proposed project would not contribute directly to significant and unavoidable cumulative impacts identified in the LRDP EIR related to: loss of scenic vistas (Section 7.1); degradation of visual character or quality (Section 7.1); conversion of prime farmland (Section 7.2); loss of habitat for Swainson's hawks and burrowing owls (Section 7.4); loss of valley elderberry beetle habitat (Section 7.4); loss of archaeological and historical resources (Section 7.5); increased water extraction from the deep aquifers (Section 7.8); increased water extraction from the shallow/ intermediate aquifers (Section 7.8); increased ambient noise levels from vehicular sources (Section 7.11); construction of police and fire service facilities (Section 7.13); construction of school facilities (Section 7.13); development of recreation facilities (Section 7.14); degraded intersection and freeway operations (Section 7.15); and construction of regional wastewater treatment facilities (Section 7.16).

The proposed project would contribute to, but would not exceed, cumulative impacts previously identified as significant and unavoidable in the 2003 LRDP EIR. The proposed project would contribute to a significant and unavoidable cumulative impact with respect to increases in criteria air pollutant emissions, for which the region is in non-attainment status and could hinder attainment efforts (LRDP Impact 4.3-6). However, the contribution of the WWTP expansion to this cumulative impact would not be considerable. Air emissions would be well below any thresholds of significance established by the YSAQMD and, while calculable, would neither be noticeable nor measurable in the air basin. These significant and unavoidable cumulative impacts were fully addressed in the Findings and Statement of Overriding Considerations adopted by the Regents in connection with its approval of the 2003 LRDP.

5.3 SIGNIFICANT IRREVERSIBLE ENVIRONMENTAL CHANGES

The CEQA Guidelines (Section 15126.2[c]) require that an EIR discuss the extent to which a project, during its initial or continued phases (i.e., construction and operations), would commit nonrenewable resources that future generations would be unable to reverse. An impact would fall into this category if:

- The project would involve a large commitment of nonrenewable resources;
- The primary and secondary impacts of a project would generally commit future generations to similar uses (e.g., a highway provides access to a previously remote area);
- The project involves uses in which irreversible damage could result from any potential environmental accidents associated with the project; or
- The phasing of the proposed consumption of resources is not justified (e.g., the project involves the wasteful use of energy).

The proposed WWTP upgrades would occur in the existing WWTP site and the existing central campus influent pump station. The proposed project would not require the conversion of any land beyond what was previously committed for the existing WWTP, as analyzed in the 1996 WWTP Replacement Project EIR and the 2003 LRDP EIR.

Implementation of the proposed project would result in an irreversible commitment of energy resources, primarily in the form of fossil fuels, including fuel oil, natural gas, and gasoline for construction equipment and operations. The consumption or destruction of other nonrenewable and slowly renewable resources would also result during construction and operation of the proposed project. These resources include, but are not limited to, lumber, sand, gravel, asphalt, metals, and water. The irretrievable commitment of the above-listed resources is considered justified to achieve the overall goals and objectives of the proposed project.

6 ALTERNATIVES

6.1 ALTERNATIVES DESCRIPTION

6.1.1 CEQA REQUIREMENTS

Section 15126.6 of the CEQA Guidelines require an evaluation of "a range of reasonable alternatives to the project, or the location of the project, which would feasibly attain most of the basic project objectives but would avoid or substantially lessen any of the significant effects, and evaluate the comparative merits of the alternatives." The purpose of the alternatives analysis is to determine whether or not a variation of the proposed project would reduce or eliminate significant project impacts in the basic framework of the project's objectives. The alternatives analysis should also discuss the comparative merits of the alternatives. The focus and definition of the alternatives evaluated in this Draft EIR is governed by the "rule of reason" in accordance with Section 15126.6(f) of the CEQA Guidelines requiring evaluation of only those alternatives "necessary to permit a reasoned choice." Further, an EIR "need not consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative."

As described in Chapter 3, Project Description, the objectives of the proposed UC Davis WWTP expansion project include the following:

- Meet anticipated campus demands through 2013 for average annual daily and peak hourly wastewater flow.
- Increase treatment reliability.
- Improve the plant's ability to meet current and anticipated regulatory requirements.
- Expand the WWTP capacity using its original modular design which was intended for flexibility and ease in upgrades.

A two-step process was used to conduct the alternatives analysis in this Draft EIR. First, potential alternatives were examined for their feasibility and ability to meet most of the project objectives. Those that clearly were found to be infeasible were rejected without further environmental review. Alternatives that may be feasible and that would attain most of the project objectives were carried forward and analyzed with regard to whether they would reduce or avoid significant impacts of the project. The alternatives considered but rejected are discussed in Section 6.1.2. The alternatives carried forward for analysis are discussed in Section 6.1.3. The CEQA Guidelines also requires that the "environmentally superior alternative" be identified in the EIR. Section 6.1.4 identifies the environmentally superior alternative.

6.1.2 ALTERNATIVES CONSIDERED BUT REJECTED AS INFEASIBLE

This section presents an analysis of alternatives that were considered for the WWTP expansion project but were rejected because they would not meet basic project objectives, and/or or were determined to be infeasible for technological, environmental, economic, legal, social, or other reasons.

6.1.2.1 NO PROJECT – NO BUILD

Under the No Project – No Build alternative, UC Davis would continue to use the existing WWTP and maintain the plant with normal repairs. The campus would make no modifications to the campus sanitary sewer system, including no expansion of plant capacity. If the campus sanitary sewer system were not expanded to meet existing and 2003 LRDP anticipated future campus wastewater demands, the campus would not be able to adequately convey and treat wastewater. Flows would likely continue to increase because of the contribution of wastewater from additional facilities that are already completed or under construction. Therefore, as described in Section 3, some campus-wide wastewater production units currently (during peak wet weather flow) operate at capacity with others anticipated to operate at capacity by 2008. Inadequate wastewater treatment would lead to sewer backup issues on campus, hydraulic overloading of wastewater inflow to the WWTP, violations of the WWTP's wastewater discharge requirements, and potential adverse water quality effects in Putah Creek through the discharge of partially treated wastewater. Alternatively, occupancy of new facilities that are under construction may be restricted, or planned (in the LRDP) projects may be withheld from construction because of inadequate sewage treatment capacity.

The No Project – No Build alternative would not achieve any of the project objectives. Under this alternative, the campus sanitary sewer system would not meet anticipated campus demands through 2013 for average and peak wastewater flow. This alternative would not increase treatment reliability. Rather, as wastewater treatment demands increase, inadequate treatment capacity would lead to reduced reliability of the WWTP to provide sufficiently treated wastewater. Therefore, the No Project – No Build alternative would either result in exceedance of the capacity of the WWTP, or would require stopping the construction of planned campus facilities. The No Project – No Build alternative would avoid air quality and terrestrial biology impacts, but would increase the potential for adverse water quality and fisheries impacts.

This alternative is infeasible because it would not meet any of the project objectives, would result in insufficient wastewater treatment capacity, and could result in exceedances of regulatory water quality discharge limits.

6.1.2.2 ALTERNATIVE CAMPUS LOCATIONS

Under this alternative, new wastewater treatment plant facilities would be constructed at an alternative location on campus and the existing WWTP would either be maintained at its current capacity or abandoned. The new treatment plant facilities would be sized and

upgraded to meet existing and projected wastewater treatment demands and wastewater discharge requirements. The new facilities would have a variety of effluent routing alternatives, but would eventually discharge to Putah Creek.

The advantages of this alternative, like the proposed project, would include reducing the risk of discharge violations, modernizing equipment and improving operational reliability. However, the disadvantages of this alternative include the inefficient use of campus land and financial resources and conflicts with the original intent of the existing WWTP, which was constructed in 2000 with a flexible, modular design that could be easily expanded to accommodate future campus growth. The Draft EIR prepared for the original construction of the current campus WWTP included detailed analyses of locating the WWTP at other campus sites, including the site of the former WWTP that was in operation before 2000, a west campus site located north of the campus landfill, and a west campus site located northwest of the corner of Garrod Drive and Campbell Road. All of these alternatives were rejected because of their inability to meet the project objectives of the original WWTP or to minimize environmental impacts.

Although this alternative would meet most project objectives, this alternative is infeasible because the construction of new wastewater treatment plant facilities would not avoid or substantially lessen the significant impacts addressed in this Draft EIR and would result in the inefficient use of campus land, facilities, and finances.

6.1.2.3 ALTERNATIVE TREATMENT

This alternative would involve upgrades to the existing WWTP facilities to provide additional wastewater treatment improvements and further reduce the concentrations of wastes in WWTP effluent. Because the existing WWTP produces high quality tertiary-treated effluent, alternatives for treatment were limited to those specific measures that would substantially reduce treated wastewater pollutants that are associated with potential adverse environmental impacts. Reverse osmosis (RO) treatment technology can reduce total dissolved solids (TDS) (sometimes measured as electrical conductivity or EC) and other contaminants in municipal wastewater and could be used to further reduce the concentrations of wastes in WWTP effluent. Thus, use of RO would substantially lessen EC concentrations and loading. Because UC Davis' NPDES permit includes a Cease and Desist Order aimed at reducing EC, compliance with the NPDES permit would eliminate a significant impact of the project pertaining to compliance with waste discharge permit requirements. As noted in Section 4.1, the impact pertaining to EC is primarily related to permit compliance, not to maintenance of the beneficial uses of Putah Creek. To comply with the permit, either the RWQCB would need to alter the permit conditions to allow for the current level of EC generation, or UC Davis would need to implement substantial changes to its treatment plant processes (see measures to mitigate Impact 4.1-14). RO is one of the potential mitigation measures addressed in Impact 4.1-14, and it is also addressed here.

RO technology consists of high-pressure pumps that force wastewater through permeable membranes that effectively filter out the majority of contaminants such as TDS, pathogens,

organic matter, and dissolved ions. RO systems operate most effectively on wastewater that has passed through microfiltration to remove the majority of filterable solid material. Waste brine that cannot pass through the RO membranes must be further treated or disposed. The generation of brine in a RO systems typically ranges in volume from 10 to 20 percent of the original wastewater inflow volume. Therefore, RO systems require alternative disposal means for the relatively large volume of brine. The opportunities for brine disposal could include evaporation ponds, solar ponds coupled with power generation facilities, deep well injection, or pipeline/hauling of brine to an acceptable surface water disposal site such as an ocean disposal outfall.

This alternative would meet project objectives. It would also reduce, to a less than significant level, the impacts of EC (i.e. meeting the terms to the current permit) on Putah Creek. However, the development of RO technology for the campus WWTP is considered infeasible because of the much higher costs than conventional treatment and indirect environmental impacts associated with brine waste disposal (because of additional land conversion to evaporation ponds and the construction of power generation facilities). Additional costs associated with the construction of an RO system that produces effluent that meets the NPDES permit limit are estimated at roughly $5.3 million dollars. The long-term operation and maintenance needs, such as periodic membrane replacement, also result in substantially higher operational costs, estimated to be $380,000 annually (Phillips pers. comm.), for RO systems compared to conventional systems. In addition, the high-capacity and hi-pressure pumping systems require much larger quantities of energy than conventional wastewater treatment methods.

6.2 ALTERNATIVES EVALUATED IN DETAIL

This section presents a comparison of four alternatives to the proposed project: No Project – Holding Pond, Divert Additional Wastewater to City of Davis, Seasonal Recycled Water Irrigation, and Divert Additional WWTP Effluent to Evaporation Ponds. The discussion of each alternative includes a brief description, an impact analysis, and a comparison with the proposed project objectives.

6.2.1 ALTERNATIVE 1. NO PROJECT – HOLDING POND

CEQA Guidelines Section 15126.6 states that an EIR's "no project" analysis should discuss what would reasonably be expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services. If the proposed project were not implemented, measures would still need to be taken to ensure adequate wastewater treatment capacity and regulatory compliance for the campus in the short term. Under the No Project-Holding Pond alternative, immediate WWTP improvements could be implemented that would allow adequate treatment to occur. The necessary improvements include expanding the central campus influent pump station to convey wastewater flows to the WWTP and expanding the headworks to provide increased receiving, metering, and preliminary wastewater treatment capacity. In addition, the existing emergency storage basin on the WWTP site would be improved and used to manage peak

hourly flows of approximately 9.4 mgd that could occur on campus during either winter storm season conditions or dry weather conditions when water use is at peak levels through 2007. Under this alternative, peak flows exceeding the capacity of the rest of the plant would be temporarily diverted to the holding pond at the headworks until adequate treatment capacity becomes available during lower flow periods. Once capacity is available, untreated wastewater would be diverted back from the holding pond to the headworks facility for ultimate treatment and disposal to Putah Creek. Because both peak flows and average flows contribute to WWTP operational capacity and effluent quality, this alternative would only serve to somewhat delay the other facility expansions proposed by the project. The other facility upgrades would likely be required by 2008 or 2009.

The WWTP can currently accommodate peak hourly flows of up to 6.3 mgd; therefore, approximately 3.1 mgd would require diversion to the holding pond during peak storm events by 2007 at the projected 9.4 mgd peak hourly inflow rate. These diverted flows, at a peak rate of 3.1 mgd, would occur over a very short period in a typical day, and would require a holding pond with capacity for approximately 1 million gallons (Brown and Caldwell 2003). As the existing basin on the WWTP site can accommodate approximately 2 million gallons, only minor improvements would be required to divert flows to the basin, including lining the basin with a synthetic membrane and installing pumps to divert flows back to the WWTP's headworks as peak flows subside and treatment capacity becomes available.

The overall effect of this alternative would be to delay the construction of project facilities for a short time and to increase the operational complexity of the plant. Whereas the storage ponds currently, and under the proposed project, would only need to be used on an infrequent emergency basis, under this alternative, the storage basins would be used fairly regularly. Because flows would have to be actively monitored and diverted on an increasingly frequent basis as inflows increase over time, this alternative would require a much more intensive management effort than current and proposed plant operations. Further, because this alternative would push current treatment systems to their operational limits, it would reduce, rather than improve, the treatment plant reliability.

Impact Analysis

Hydrology & Water Quality

This alternative would not involve any changes to the quality of treated effluent; rather, it would focus on enabling the plant to divert influent to holding ponds when plant capacity is exhausted and allow for treatment to the same level as under current conditions as soon as capacity becomes available. Under "normal" operations, there would be no difference in the quality of effluent produced compared to existing conditions. However, this alternative would utilize capacity at the plant that currently provides a margin of safety in operations. By fully utilizing treatment plant capacity, plant reliability could be compromised and this would result in a potential for accidentally discharging untreated wastewater to Putah Creek. This alternative would increase the potential for significant water quality impacts in comparison to the proposed project.

Terrestrial Biological Resources

Similar to the proposed project, the No Project – Holding Pond alternative involves improvements to the existing WWTP, emergency storage basin (which would be used under the proposed project for the third solids drying bed), and central campus influent pump station. As with the proposed project, no special-status wildlife species are expected to occur in the project area because there is no suitable habitat. Also similar to the proposed project, improvement of the storage pond under this alternative would result in improvements to the 0.8-acre detention basin, which may (or may not) be subject to a permit from RWQCB or DFG. If the detention basin is determined to be subject to RWQCB or DFG regulation the project impact to the detention basin would be mitigated under the 2003 LRDP EIR Mitigation Measure 4.4-8, by consulting with these agencies and developing and implementing a mitigation plan for conversion of the basin, if deemed necessary. Therefore, the terrestrial biological resource impacts of Alternative 1 would be equivalent to the proposed project.

Fisheries and Riverine Resources

Implementation of the No Project – Holding Pond Alternative would result in Putah Creek conditions that would be similar to existing conditions initially, but likely more similar to project conditions by 2010–2013 because new treatment and additional capacity enhancement would ultimately be needed to accommodate planned campus growth. The existing basin on the WWTP site would be improved (e.g., lining the basin with a synthetic membrane and installing pumps to divert flows back to the WWTP's headworks) under this alternative. There is a potential for slightly more elevated discharge temperatures because, under some conditions, untreated wastewater would be kept in a holding pond and subjected to solar heating for a couple of hours before treatment and discharge. The overall temperature difference between this alternative and the project is expected to be minor and no significant impacts to fisheries would be expected. There is also a potential, because of reduced plant reliability, for accidental discharge of untreated wastewater to Putah Creek. Consequently, this alternative has the potential to increase impacts to fish and riverine resources compared with the project.

Air Quality

Implementation of the No Project – Holding Pond alternative would initially result in less operational emissions than the proposed project because the WWTP would not be expanded and emissions would remain at their current levels. However, in the long-term, by 2008 or 2009, additional WWTP upgrades would be required to accommodate the projected LRDP growth. Therefore, the long-term operational emissions associated with this alternative would be equivalent to the proposed project because wastewater flows through the WWTP would increase.

This alternative, similar to the proposed project, would include improving the emergency storage pond. However, this alternative would result in storing untreated wastewater in the holding pond more regularly, which could result in objectionable odors. Because the WWTP

is surrounded by agricultural uses and there are no receptors located near the plant, this would be a less-than-significant impact.

Ability to Accomplish Project Objectives

This alternative would not attain the basic objectives of the proposed project. It would only provide limited ability to handle an increase in flows as the campus implements its LRDP; rather than accommodating demands that would be generated through 2013, it is estimated that demands would only be able to be accommodated at a level of campus growth expected to occur by 2008 or 2009. Rather than increasing treatment plant reliability, this alternative would place pressure on current facilities to operate at a level that eliminates reliability margins. This alternative would not address improving the plant's ability to meet current and anticipated regulatory requirements, and would likely result in new significant impacts as described above.

6.2.2 ALTERNATIVE 2. SEASONAL RECYCLED WATER IRRIGATION

Under this alternative, in addition to expansion of WWTP facilities as in the proposed project, the campus would reuse treated effluent (recycled water) from the campus WWTP to somewhat reduce discharge to Putah Creek during the dry season. In addition to the WWTP expansion, this alternative would consist of constructing recycled water conveyance pipelines on campus and using recycled water for the irrigation of agricultural crops or urban landscaping during the growing season. The advantage of recycled water reuse is the incremental reduction of WWTP effluent discharge into Putah Creek, primarily during the summer peak growing season when demand for irrigation water is at the seasonally highest level and flows in the creek are typically approaching their lowest level. During the winter months, irrigation demand for and, therefore, use of recycled water would be negligible, and the discharge to Putah Creek would be similar to the proposed project. Use of recycled water also reduces the demand, and thus conserves, other domestic and agricultural water supplies that would otherwise be used for irrigation. The potential disadvantages of recycled water reuse include the substantial costs for infrastructure development coupled with the long-term commitment to using irrigation areas once they are established and, in this case, only limited reduction in discharges to Putah Creek during the irrigation season.

This alternative was evaluated and rejected as infeasible in the 1996 Wastewater Treatment Plant Replacement Project EIR because there was a lack of identified willing participants to use recycled water, and spray irrigation of most areas on campus would risk sensitive ongoing university-related scientific research activities. In addition, the long-term reliability of the limited amount of spray irrigation area on campus would be difficult to predict as a result of shifting research priorities. However, new areas of possible recycled water use have been identified since the preparation of the 1996 EIR that could use up to 0.25 mgd of recycled water during dry seasons on a long-term basis. The areas where recycled water reuse could occur include the following campus parcels:

- Recycled water could be distributed to approximately 20 acres of existing and proposed central campus recreation fields located along La Rue Road. Such distribution would occur along existing utility and road rights-of-way to reduce environmental effects associated with trenching. Assuming an annual turf irrigation rate of 4.25 feet per acre (West Yost & Associates 2000), approximately 27.7 million gallons per year of treated effluent could be reused.

- Recycled water could be distributed to the west campus to irrigate approximately 26.5 acres of turf approved as part of the Neighborhood Master Plan. Such distribution would occur along existing utility and road rights-of-way to reduce environmental effects associated with trenching. Assuming an annual turf irrigation rate of 4.25 feet per acre, approximately 36.8 million gallons per year could be reused in this manner.

During the rainy season when there is little to no demand for irrigation water, all treated effluent would be discharged to Putah Creek. Under the proposed project, average daily discharge of treated wastewater disposed in Putah Creek would increase from 1.7 mgd to 3.8 mgd. Under this alternative, daily discharge to Putah Creek would range from 3.55 mgd when irrigation demand is high to 3.8 mgd when there is no irrigation demand.

Impact Analysis

Hydrology & Water Quality

Impacts to hydrology and water quality would be virtually the same under this alternative as under the proposed project. The concentrations of various pollutants discharged to Putah Creek would be the same, although the qualities released would be 7% lower than the project. This would not avoid any of the significant impacts of the project, and the same mitigation measures would be needed as described in Section 4. 1. Although the overall mass of pollutants released would be slightly lower than under the project, the same potential for permit violations, particularly with respect to EC, would exist. Although this alternative has slight environmental benefits to the project, it would not substantially change water quality discharges to Putah Creek.

Terrestrial Biological Resources

As with the proposed project, this alternative would require upgrades to the existing WWTP and conversion of the emergency storage basin to a drying bed. Therefore, this alternative would have the same potentially significant impact on jurisdictional wetlands as the project. In addition, the distribution of recycled water would require construction of new pipelines to deliver water to fields along La Rue Road and the west campus. However, the distribution lines would be constructed in utility and road rights-of-way to minimize the temporary terrestrial biological effects of trenching. This alternative would not lessen or eliminate any potentially significant (but mitigable) terrestrial biological resource impacts identified for the proposed project.

Fisheries and Riverine Resources

Under this alternative, the small seasonal reduction in discharges of WWTP effluent to Putah Creek would result in negligible effects on Putah Creek water quality and habitat conditions during the non-precipitation season. The reduction in tertiary treated effluent discharge would provide incrementally less benefit to instream flows that maintain the fish assemblages and maintain the lower ecology of Putah Creek (Moyle et al. 1998), particularly in drought years, but would not appreciably change Putah Creek conditions. Therefore, the alternative would not change the potential effects to aquatic resources that were described for the proposed project.

Air Quality

The Seasonal Recycled Water Irrigation alternative would involve the same WWTP expansion and improvements as the proposed project. It would result in expansion of the WWTP design capacity from the existing 2.7 mgd ADWF to 3.8 mgd ADWF to meet campus demands for treatment capacity. Therefore, operational emission of criteria air pollutants would be equivalent to the proposed project.

In addition, this alternative would involve the construction of recycled water conveyance pipelines on campus to distribute treated wastewater for use on identified campus parcels. The construction of this infrastructure would generate fugitive dust, which is measured in terms of PM_{10}, from earthmoving, excavation, and grading. Therefore, this alternative would have greater short term emissions from construction activities than would occur with the proposed project. Construction emissions were determined to be a significant and unavoidable impact at the LRDP level (LRDP Impact 4.3-3) because the state 24-hour PM_{10} standards could be violated at times in the vicinity of several projects being constructed simultaneously. If this alternative is implemented, the campus would implement 2003 LRDP mitigation measures 4.3-3(a)–(c) to minimize construction emissions; however, the impact of such construction emissions would remain significant and unavoidable.

Ability to Accomplish Project Objectives

This alternative would attain all of the project objectives. It would provide sufficient treatment capacity to meet anticipated demands through 2013, would increase treatment plant reliability, would be constructed to meet current and anticipated regulatory requirements, and would expand the WWTP using its modular design.

6.2.3 ALTERNATIVE 3. DIVERT ADDITIONAL WASTEWATER TO THE CITY OF DAVIS WPCP

This alternative would consist of diverting all future increased flows to the City of Davis wastewater pollution control plant (WPCP). The existing campus WWTP would continue to be used to treat up to 2.5 mgd on an average annual basis (i.e., at a 2.7 mgd ADWF design capacity) and peak hourly flow of 6.3 mgd. The campus would pump raw wastewater inflows that exceed the current UC Davis WWTP treatment capacity to the City of Davis' sanitary

sewer system. Consequently, campus growth through 2013 would result in UC Davis conveying approximately 1.1 mgd ADWF (i.e., 2.7 mgd to 3.8 mgd) and additional peak flows to the City's wastewater treatment system by 2013. The advantage of this alternative is the elimination of additional discharges to Putah Creek and thereby elimination of the impacts associated with future exceedances of NPDES permit limits for this incremental wastewater, and reduction of less-than-significant project-related water quality and aquatic resources effects associated with the effluent discharge to Putah Creek.

The potential disadvantages of diverting all wastewater to the City WPCP include the substantial costs for infrastructure development and the possibility that the project objective to eliminate the RWQCB compliance issue associated with effluent EC permit limits would not be achieved. While the City does not currently have an effluent permit limit for EC, it is foreseeable that one may be imposed in the future. The RWQCB required the City to evaluate salt loading sources and methods to reduce EC discharges from the City WPCP (City of Davis 2004), and the study results indicate that average EC concentrations in WPCP effluent are slightly higher than EC concentrations in UC Davis WWTP effluent. Given that the RWQCB has imposed an EC permit limit on the UC Davis WWTP discharge, the transfer of effluent to the City's WPCP could be a reason for the RWQCB to consider similar application of the regulatory standards for the combined discharge. Because the City's WPCP is facing a similar effluent EC compliance issue, there is some degree of uncertainty regarding the reliability and feasibility of successfully implementing this alternative and achieving project objectives. Further, this alternative would not address the ongoing exceedance of EC limits at the existing UC Davis WWTP.

To connect to the City's sewer system, the campus would need to upgrade the existing central campus headworks to serve as a pumping station and construct a pipeline from the campus headworks to the City's wastewater system. The City's WPCP is located approximately six miles northeast of the campus. The City's sewer lines do not provide sufficient capacity to accommodate in additional wastewater from the campus. Therefore, a separate sewer main line would need to be constructed to convey flow to the City's WPCP. It is estimated that the campus would need to construct an estimated 9 miles of pipeline to connect the campus to the City's treatment plant. These pipelines would likely be constructed under existing roadways in the City of Davis.

The core of the City's WPCP is a wastewater treatment pond system constructed in the 1970s that now includes 120 acres of 8-foot-deep secondary treatment oxidation ponds. Treated effluent is discharged to either Willow Slough or the Conaway Ranch drainage ditch (i.e., both are tributary to the Yolo Bypass), which supplies water for irrigation in the summer. The plant is designed to treat an average dry weather flow of 7.5 mgd and a peak wet-weather flow of 12.6 mgd. Current inflows to the City's WPCP average 6 mgd and capacity at the plant is considered sufficient for growth planned under the City's current general plan through 2010. However, the City's WPCP currently cannot comply with agricultural EC goals, total suspended solids, ammonia reduction for toxicity and some effluent limitations for organics and metals. The City's NPDES permit requires the City to prepare a facilities plan for meeting

these compliance issues, and the City is currently evaluating alternate discharge options to meet regulatory requirements, including piping treated effluent to the Sacramento River and on-land disposal (City of Davis 2004). The capacity of the City's planned upgrades would need to be increased incrementally to accommodate the additional campus-related contribution.

The City estimates that approximately 400 to 500 acres of land per mgd of wastewater capacity would be required for on-land disposal with evaporation ponds (City of Davis 2004). Therefore, if this method for alternate treatment is selected by the City, the campus' contribution under this alternative would require 440 to 550 acres of land through 2013. If the City decides instead to pipe effluent to the Sacramento River, the discharge pipe's capacity would need to be sized to accommodate the campus' contribution.

Impact Analysis

Hydrology & Water Quality

This alternative would result in an increase of approximately 1 mgd in wastewater discharge to Putah Creek, compared to existing conditions, because flow would increase from the current level of 1.7 mgd to the permitted capacity of 2.7 mgd. Existing permit exceedances for EC would continue unless the permit limits are changed or one of the mitigation measures listed under Impact 4.1-14 is implemented. None of the conclusions regarding project impacts and the need for mitigation would change. With regard to the City of Davis, wastewater would be treated and discharged under the City's treatment processes which are currently facing a number of permit compliance issues. Sending 1.1 mgd (i.e., 2.7 mgd ADWF to 3.8 mgd ADWF) of wastewater from the campus to the City for treatment would likely exacerbate City compliance issues. While the City will ultimately need to alter its treatment process to comply with the anticipated regulatory requirements for their NPDES permit, it would be speculative to indicate how the City will ultimately comply. It would also be speculative to conclude if there are any environmental advantages or disadvantages to overall water quality associated with this alternative. However, mass loading of constituents to Putah Creek would not change compared to existing permitted capacity and would be less than the proposed project. Concentration-related water quality impacts associated with copper, cyanide, dioxin, and EC would be the same as described for the proposed project because WWTP effluent quality would not change.

Terrestrial Biological Resources

This alternative would avoid alteration of the emergency storage basin at the WWTP site, preventing the potential impact to jurisdictional wetlands and the less-than-significant impact to western pond turtle. The distribution pipelines would be constructed under existing roadways in the City of Davis, minimizing the temporary terrestrial biological effects of trenching. Construction of piping for conveyance of treated effluent to the Sacramento River and on-land disposal discharge options the City is evaluating to address regulatory compliance would cause temporary trenching-related impacts, impacts to riparian habitat and waters of the U.S., and impacts to special-status plants and wildlife. Land conversion associated with

potential construction of evaporation ponds could result in impacts to terrestrial biological resources including special-status plants, special-status wildlife including loss of Swainson's hawk foraging habitat, and wetland habitats. However, creation of large ponds would provide habitat for waterfowl and other migratory birds. Therefore, either of the City's discharge options under this alternative would result in greater biological impacts than the proposed project.

Fisheries and Riverine Resources

This alternative would consist of diverting all increased campus wastewater flows above the permitted capacity of 2.7 mgd to the City of Davis WPCP. The addition of high quality tertiary treated effluent to Putah Creek is beneficial to maintaining the lower ecology of Putah Creek, because it contributes to improving instream flows that maintain the fish assemblages (Moyle et al. 1998), particularly in drought years. The effluent discharge also reduces the potential for toxicity to aquatic life in the creek (see Impact 4.2-9, Additive and Synergistic Toxicity). Consequently, this alternative would diminish the benefits to aquatic resources in Putah Creek, which would occur under the proposed project. Moreover, the City's current facility provides secondary treatment, but not tertiary treatment like the existing campus WWTP. Therefore, this alternative would result in an incremental increase in effluent volume receiving lesser treatment before its discharge to the City's receiving waters – ultimately the Sacramento River. Finally, this alternative would not lessen or eliminate the significant impact of cyanide to aquatic resources in Putah Creek that was described for the proposed project because the WWTP effluent quality and discharge rate would not change.

Air Quality

Although this alternative would not include expansion of the campus WWTP, the City's WPCP capacity would need to be increased incrementally to accommodate the additional campus-related wastewater contribution. Therefore, operational emissions because of treatment of campus-related wastewater would occur from the City's WPCP, but would be equivalent to operational emissions associated with the proposed project.

This alternative would involve the construction of an estimated 9 miles of pipeline to connect to the City's WPCP. In addition, the City is currently evaluating discharge options to meet regulatory requirements, including piping treated effluent to the Sacramento River and on-land disposal, both of which would result in additional construction and ground disturbance. The construction of this infrastructure would generate fugitive dust, which is measured in terms of PM_{10}, from earthmoving, excavation, and grading. Therefore, this alternative would have greater short term emissions from construction activities than would occur with the proposed project. Construction emissions were determined to be a significant and unavoidable impact at the LRDP level (LRDP Impact 4.3-3) because the state 24-hour PM_{10} standards could be violated at times in the vicinity of several projects being constructed simultaneously. If this alternative is implemented, the campus would implement 2003 LRDP mitigation measures 4.3-3(a)-(c) to minimize construction emissions; however, the impact of such construction emissions would remain significant and unavoidable.

Agricultural Resources

In addition to the impacts described above, this alternative would result in the conversion of 440 to 550 acres of undeveloped land to ponds. Given that the only abundant undeveloped land in the project area is agriculture, this alternative would likely result in conversion of agriculture to treatment ponds. This would be a significant impact to agriculture.

Ability to Accomplish Project Objectives

This alternative would attain three of the four project objectives. It would provide sufficient treatment capacity to meet anticipated demands through 2013, would increase treatment plant reliability, and would allow for modular expansion of the treatment plant. However, it would place the burden of meeting water quality regulatory requirements on the City of Davis. The City is currently evaluating its operations so it can meet its current regulatory requirements. Because of this, it is not known if this objective would be met.

6.2.4 ALTERNATIVE 4. DIVERT ADDITIONAL WWTP EFFLUENT TO EVAPORATION PONDS

This alternative would consist of diverting the future increased WWTP effluent in excess of the existing permitted design capacity of 2.7 mgd to evaporation ponds. The alternative would include construction of facilities (plant upgrades, pump station upgrades) included in the proposed project to upgrade facilities to a design capacity of 3.8 mgd ADWF. Consequently, campus growth through 2013 would result in UC Davis treating approximately 1.1 mgd (i.e., 2.7 mgd to 3.8 mgd) of additional ADWF flows, as well as additional peak flows by 2013 to meet LRDP-projected growth. The evaporation ponds would be lined and as described above under the City of Davis diversion alternative and 440 to 550 acres of ponds would be required to accommodate this disposal method for the 1.1 mgd ADWF flow rate. This amount of land could not be found in a contiguous parcel on campus in the vicinity of the WWTP, so off-campus lands located within about 1 mile of the WWTP (to eliminate the need for extensive pipelines) would need to be acquired. The advantage of this alternative is the elimination of additional discharges to Putah Creek and elimination of additional impacts associated with exceeding NPDES permit limits, as well as further reduction of existing less-than-significant overall water quality and aquatic resources effects associated with the effluent discharge to Putah Creek.

Impact Analysis

Hydrology & Water Quality

This alternative would result in an increase of around 1 mgd in wastewater discharge to Putah Creek, compared to existing conditions, because flow would increase from the current level of 1.7 mgd to the permitted capacity of 2.7 mgd. Existing permit exceedances for EC would continue unless the permit limits are changed or one of the mitigation measures listed under Impact 4.1-14 is implemented. None of the conclusions regarding project impacts and the need for mitigation would change. There would be no other impacts to water quality as a

result of this alternative. Mass loading of constituents to Putah Creek would not change compared to existing permitted capacity and would be less than the proposed project Concentration-related water quality impacts associated with copper, cyanide, dioxin, and EC would be the same as described for the proposed project because WWTP effluent quality would not change.

Terrestrial Biological Resources

This alternative would alter the emergency storage basin at the WWTP site, resulting in the same potential impact to jurisdictional wetlands and the less-than-significant impact to western pond turtle as the project. The distribution pipelines would likely be constructed under existing roadways to the edge of agricultural fields, and then would likely run cross-country to the point of discharge. Construction of piping for conveyance of treated effluent to evaporation ponds would cause temporary trenching-related impacts, potential impacts to riparian habitat and jurisdictional wetlands, and potential impacts to special-status plants and wildlife. Land conversion associated with potential construction of 440 to 550 acres (presumably of agricultural land) to evaporation ponds could result in impacts to terrestrial biological resources including special-status plants, special-status wildlife including loss of Swainson's hawk foraging habitat, and wetland habitats. However, creation of large ponds would provide habitat for waterfowl and other migratory birds. This alternative would, therefore, result in greater biological impacts than the proposed project.

Fisheries and Riverine Resources

This alternative would consist of diverting all increased campus wastewater flows above 2.7 mgd to evaporative ponds. The addition of high quality tertiary treated effluent to Putah Creek is beneficial to maintaining the lower ecology of Putah Creek, because it contributes to improving instream flows that maintain the fish assemblages (Moyle et al. 1998), particularly in drought years. The effluent discharge also reduces the potential for toxicity to aquatic life in the creek (see Impact 4.2-9, Additive and Synergistic Toxicity). Consequently, this alternative would diminish the benefits to aquatic resources in Putah Creek, which would occur under the project. Finally, this alternative would not lessen or eliminate the significant impact of cyanide to aquatic resources in Putah Creek that was described for the proposed project because the WWTP effluent quality and discharge rate would not change.

Air Quality

This alternative would involve the same WWTP expansion and improvements as the proposed project; it would result in expansion of the WWTP design capacity from the existing 2.7 mgd ADWF to 3.8 mgd ADWF to meet campus demands for treatment capacity. Therefore, operational emission of criteria air pollutants would be equivalent to the proposed project.

This alternative would divert 1.1 mgd (i.e., 2.7 mgd ADWF to 3.8 mgd ADWF) of treated wastewater from the WWTP to evaporation ponds, rather than releasing the effluent to Putah Creek. The evaporation ponds would be approximately 440 to 550 acres to accommodate the

increased campus flows. The construction of the evaporation ponds would generate fugitive dust, which is measured in terms of PM10, from earthmoving, excavation, and grading. Therefore, this alternative would have greater short term emissions from construction activities than would occur with the proposed project. Construction emissions were determined to be a significant and unavoidable impact at the LRDP level (LRDP Impact 4.3-3) because the state 24-hour PM_{10} standards could be violated at times in the vicinity of several projects being constructed simultaneously. If this alternative is implemented, the campus would implement 2003 LRDP mitigation measures 4.3-3(a)-(c) to minimize construction emissions; however, the impact of such construction emissions would remain significant and unavoidable.

Agricultural Resources

In addition to the impacts described above, this alternative would result in the conversion of 440 to 550 acres of undeveloped land to ponds. Given that the only abundant undeveloped land in the project area is agriculture, this alternative would likely result in conversion of agriculture to treatment ponds. This would be a significant impact to agriculture.

Ability to Accomplish Project Objectives

This alternative would attain three of the four identified project objectives. It would provide sufficient treatment capacity to meet anticipated demands through 2013, would increase treatment plant reliability, would improve the plant's ability to meet current and anticipated regulatory requirements, and would allow for modular expansion of the treatment plant. However, it would place the burden of meeting water quality regulatory requirements on the City of Davis. The City is currently evaluating its operations so it can meet its current regulatory requirements. Because of this, it is not known if this objective would be met.

6.3 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

An EIR is required to identify the environmentally superior alternative from among the range of reasonable alternatives that are evaluated. Alternative 2, the Seasonal Recycled Water Irrigation Alternative is the environmentally superior alternative among all alternatives considered. It slightly reduces water quality impacts though seasonal reduction in mass loading of water pollutants. It does not avoid or substantially reduce any of the significant impacts of the proposed project. All other alternatives considered result in additional environmental impacts compared to the project and to this alternative, and none substantially lessen the impacts of the proposed project.

7 REFERENCES

7.1 PRINTED REFERENCES

Barnes, K.K., D.W. Koplin, M.T. Meyer, E.M. Thurman, E.T. Furlong, S.D. Zuagg, and L.B. Barber. 2002. Water-Quality Data for Pharmaceuticals, Hormones, and Other Organic Wastewater Contaminants in U.S. Streams, 1999–2000. U.S. Geological Survey Open File Report 02-94.

Batty, J. and R. Lim. 1999. Morphological and reproductive characteristics of male mosquitofish (*Gambusia affinis holbrooki*) inhabitating sewage-contaminated waters in New South Wales, Australia. Archives of *Environ. Contam. Toxic*. 36:301–307.

Boyle, E.A. 1979. Copper in natural waters. Pages 77–88. In*: J.O. Nriagu* (ed.). Copper in the environment. Part 1: ecological cycling. John Wiley, New York.

Brown and Caldwell. 2003 (October). *Detailed Project Program for the Campus Wastewater Treatment Plant Phase I Expansion*.

———. 2004. *Technical Scope and Cost Proposal – Central Heating and Cooling Plant, Evaluation of Hardness and Copper Control (February)*. Prepared for UC Davis.

California Air Resources Board. 2003 (April). Emfac2002 ONROAD Motor Vehicle Emissions Inventory Model, version 2.2.

City of Davis. 2002. *City of Davis/UC Davis Water Supply Feasibility Study*. Available <http://www.city.davis.ca.us/pw/water/watersupply/>

———. 2004. *Engineering Report on the Assessment of Effects, Sources, and Control of Dissolved Salts at the City of Davis Wastewater Treatment Plant*.

Desbrow, C., E.J. Routledge, G.C. Brighty, J.P. Sumpter, and M. Waldock. 1998. Identification of estrogenic chemicals in STW effluent. I : Chemical Fractionation and in-vitro biological screening. *Environ. Sci. Technol*. 32:1549–1558.

Diamond, J.M., D.E. Koplish, J. McMahon, and R. Rost. 1997. Evaluation of the water-effect ratio procedure for metals in a riverine system. *Environ. Tox. Chem*. 16:509–520.

EDAW. 2004. *Lower Putah Creek Watershed Management Action Plan*. Prepared for the Lower Putah Creek Coordinating Committee. Sacramento, CA.

Eisler, R. 1986. Cyanide hazards to fish, wildlife, and invertebrates: a synoptic review. U.S. Fish and Wildlife Service. *Biol. Rep. 85(1.23)* 55 pp.

———. 1987. Mercury hazards to fish, wildlife, and invertebrates: a synoptic review. U.S. Fish and Wildlife Service. *Biol. Rep. 85(1.10)* 90 pp.

———. 1997. Copper hazards to fish, wildlife, and invertebrates: a synoptic review. *U.S. Geological Survey, Biological Resources Division, Biological Science Report* USGS/BRD/BSR—1997–2002. 98 pp.

Gerhardt, M., D. Nascimento, R.A. Witzgall, and M. Fan. 2003. Enhancing Copper Removal in Secondary Treatment by Chemical Addition. Unpublished report prepared by Brown and Caldwell (Walnut Creek, CA) and UC Davis (Davis, CA).

Gus Yates Hydrologist. 2003. *Gravel and Temperature Surveys of Lower Putah Creek*. Prepared for Lower Putah Creek Coordinating Committee. Berkeley, CA.

Hall, J.C., W.T. Hall, and C. T. Simmons. 1997. Water quality criteria for copper: A need for revisions to the national standard. *Water Environment and Technology* 9:45–49.

Howells, G. (ed.). 1994. *Environmental Topics, Volume 6*: Water Quality Criteria for Freshwater Fish. Gordon & Breach Science Publishers, Switzerland, p.145–205 (Chapter 5).

Jobling S., M. Nolan, C.R. Tyler, G. Brighty, and J.P. Sumpter. 1998. Widespread sexual disruption in wild fish. *Environ. Sci. Toxicol*. 32:2498–2506.

Jones and Stokes Associates. 1996. *Draft Environmental Impact Report: Wastewater Treatment Plant Replacement Project*.

Larry Walker Associates (LWA). 2002 (June). *Toxicity Impacts Associated with Interactions of Multiple Water Quality Constituents*. Technical Memorandum. Prepared for Sacramento Regional County Sanitation District, Sacramento, CA.

Lintelmann, J., A. Katayama, N. Kurihara, L. Shore, and A. Wenzel. 2003. Endocrine disruptors in the environment (IUPAC technical report). *Pure & Applied Chemistry*. 75(5):631–681.

Luhdorff and Scalmanini Consulting Engineers. 2003. *Hydrogeologic Conceptualization of the Deep Aquifer, Davis Area, California*. Prepared for UC Davis (May). Woodland, CA.

Macek, K.J. 1975. Acute Toxicity of Pesticide Mixtures to Bluegills. *Bull. Environ. Contam. Toxicol.* 14, 648–652.

Marine, K.R. 1992. *A Background Investigation and Review of the Effects of Elevated Water Temperatures on Reproductive Performance of Adult Chinook Salmon (*Oncorhynchus tshawytscha*)*. Department of Wildlife and Fisheries Biology. University of California. Davis, CA.

McEwan, D., and T.A. Jackson. 1996 (February). *Steelhead Restoration and Management Plan for California*. California Department of Fish and Game, Inland Fisheries Division. 234 pp.

Meador, J.P. 1991. The interaction of pH, dissolved organic carbon, and total copper in the determination of ionic copper and toxicity. *Aquatic Toxicology* 19:13–32.

Moyle, P.B. 1976. *Inland Fishes of California*. University of California Press, Berkeley, CA.

———. 2002. *Inland Fishes of California*, revised and expanded. University of California Press, Berkeley, CA.

Moyle, P.B., M.P. Marchetti, J. Baldrige, and T.L. Taylor. 1998. Fish Health and Diversity: Justifying Flows for a California Stream. *Fisheries*: 23(7): 6–15.

Moyle, P.B., and P. Crain. 2003. Unpublished data: 2003 fall-run chinook salmon redd site characteristics and locations. Department of Wildlife and Fisheries Biology. University of California, Davis, CA.

Moyle, P.B., P. Crain, and K. Small. 2003 (unpublished). Analysis of lower Putah Creek fisheries data from 1991 through 2002. Department of Wildlife and Fisheries Biology, University of California, Davis, CA.

Myrick, C.A., and J.J. Cech. 2001. Temperature effects on chinook salmon and steelhead: a review focusing on California's Central Valley populations. *Bay Delta Modeling Forum, Technical Publication 01-1*.

National Institutes of Health. 2004. Factsheet: Dioxin Research at the National Institute of Environmental Health Sciences. Internet information at URL://www.niehs.nih.gov/oc/factsheets/dioxin.htm. U.S. Department of Health and Human Services.

Regional Water Quality Control Board, Central Valley Region (RWQCB). 1998 (as amended). *Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board, Central Valley Region – Sacramento River Basin and San Joaquin River Basin*. Sacramento, CA.

———. 2002 (February). *Amendments to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins for pH and Turbidity at Deer Creek, El Dorado and Sacramento Counties*. Staff Report/Functionally Equivalent Document.

———. 2003 (January). *Amendments to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins for Temperature at Deer Creek, El Dorado and Sacramento Counties*. Staff Report/Functionally Equivalent Document.

Reynolds, F., T.J. Mills, R. Benthin, and A. Low. 1993 (November). *Restoring Central Valley Streams: a Plan for Action*. California Department of Fish and Game, Inland Fisheries Division.

Rodgers-Gray, T.P., S. Jobling, S. Morris, C. Kelly, S. Kirby, A. Janbakhsh, J.E. Harries, M.J. Waldock, J.P. Sumpter, and C.R. Tyler. 2000. Long-term temporal changes in the

estrogenic composition of treated sewage effluent and its biological effects on fish. *Environ. Sci. Technol*. 34:1521–1528.

Spehar, R.L., and Fiandt, J.T. 1986. Acute and Chronic Effects of Water Quality Criteria-Based Metal Mixtures on Three Aquatic Species. *Environ. Tox. Chem.* 5, 917–931.

State Water Resources Control Board. 2003. 2002 Clean Water Act Section 303(d) List of Water Quality Limited Segments. URL://www.swrcb.ca.gov/tmdl/docs/2002cwa303d_listof_wqls072003.pdf. Sacramento, CA.

Tri-TAC, Air Committee. 1994 (March). *Guidance Document on Control Technology for VOC Air Emissions from POTWs*.

U.S. Environmental Protection Agency (U.S. EPA). 1986a. *Quality Criteria for Water – 1986*. EPA 440/5-86-001. Office of Water – Regulations and Standards. Washington, D.C.

———. 1986b. *Ambient Water Quality Criteria for Dissolved Oxygen*. Office of Water Regulations and Standards. Washington, D.C. EPA/440/5-86-003.

———. 1988 (August). *Ambient Water Quality Criteria for Aluminum*. Office of Water, Regulations and Standards, Criteria and Standards Division, Washington, D.C. EPA 440/5-86-008.

———. 1991a (March). *Technical Support Document for Water Quality-Based Toxics Control*. Office of Water, Washington, DC. EPA 505-2-90-001.

———. 1991b. *Technical Support Document for Water Quality-Based Toxics Control: Responsiveness Summary*. Office of Water, Washington DC. EPA 833-5-91-100.

———. 1994. *Chemical Summary for Methylene Chloride*. Office of Pollution Prevention and Toxics. EPA 749-F-94-018a. Available on internet at URL://www.epa.gov/chemfact/s_cdm.txt.

———. 1999 (April). *National Recommended Water Quality Criteria – Correction*. Office of Water. EPA 822-Z-99-001.

———. 2003a. Letter dated December 19, 2003 from Charles Delos of U.S. EPA Headquarters in Washington, D.C. to R. McHenry of the RWQCB and Dr. Bryan and RBI addressing EPA's recommendations based on its ambient water quality criteria document for aluminum.

———. 2003b (November). *Technical Summary of Information Available on the Bioaccumulation of Arsenic in Aquatic Organisms*. EPA-822-R-03-032. Available at URL://www.epa.gov/waterscience/humanhealth/. Washington, D.C.

———. 2003c (November). 2003 *Draft Update of Ambient Water Quality Criteria for Copper*. EPA-822-R-03-026. Available at URL://www.epa.gov/waterscience/criteria/copper/pdf/master.pdf. Washington, D.C.

———. 2004. *Drinking Water Consumer Factsheets*. Internet data available at URL://www.epa.gov/safewater/hfacts.html. Office of Groundwater and Drinking Water.

University of California, Davis (UC Davis). 2003a. *2003 Campus Wastewater Treatment Plant Annual Report*. UC Davis Operations and Maintenance.

———. 2003b (July). *Campus Wastewater Treatment Plant Expansion Phase 1, Project Planning Guide*. UC Davis Office of Resource Management and Planning (ORMP).

———. 2004a (July). *An Approach to Develop Site-Specific Criteria for Electrical Conductivity to Protect Agricultural Beneficial Uses that Accounts for Rainfall*. Prepared by Daniel Isidoro-Ramirez, Ph.D., Maria Jose Berenguer-Merelo, Ph.D., and Stephen R. Grattan, Ph.D.Department of Land, Air and Water Resources. Davis, CA.

———. 2004b. *Estimated VOC Emissions, Campus WWTP Expansion, University of California Davis*. UC Davis Office of Environmental Health and Safety.

U.S. Fish and Wildlife Service. 1993. Report to Congress. *Reconnaissance Planning Report: Fish and wildlife Resource Management Options for Lower Putah Creek, California*. Ecological Services Branch, Sacramento, CA.

World Health Organization (WHO). 2002. *Global Assessment of the State-of-the-Science of Endocrine Disruptors, International Programme on Chemical Safety*. eds. T. Damstra, S. Barlow, A. Bergman, R. Kavlock, and G. Van der Kraak

7.2 PERSONAL COMMUNICATIONS

Boele, Mindy. Lab director, O&M Utilities, Wastewater Division, UC Davis. August 2004. E-mail to Chris Erichsen (Larry Walker Associates) regarding interpretation of discharge monitoring report data for the campus wastewater treatment plant.

Fan, Michael. Superintendent, O&M Utilities, Wastewater Division, UC Davis. June 2004. Personal communication with Jeff Lafer (EDAW) transmitting discharge monitoring reports for the campus wastewater treatment plant.

Phillips, David. Associate director for Utilities, UC Davis. Communications with Brian Kinney on July 13, 2004 (California Department of Health Services, Sacramento Branch – District Engineer) and Kalyanpur Baliga on July 21, 2004 (California Department of Health Services, Sacramento Branch – District Engineer) confirming the status of lower Putah Creek with respect to public water drinking water supply systems.

Phillips, David. Associate director for Utilities, UC Davis. July 21, 2004 – memorandum to Sarah Mattern, "Planning-level Costs to Install Reverse Osmosis Units at the WWTP."

7.3 AGENCIES AND PERSONS CONSULTED

Michael Fan, UC Davis Operations & Maintenance – Wastewater Division

Daniel Kermoyan, UC Davis Environmental Health & Safety

Brian Oatman, UC Davis Environmental Health & Safety

David Phillips, UC Davis Operations & Maintenance – Water & Wastewater

Kurt Wengler, UC Davis Architects & Engineers

Mindy Boele, UC Davis Operations & Maintenance – Laboratory Director

8 REPORT PREPARERS

UC DAVIS

Sid England, Director of Environmental Planning
Sarah Mattern, Associate Environmental Planner
David Phillips, Associate Director for Utilities

EDAW

Gary Jakobs, Principal
Jeff Lafer, Project Manager
Suzanne Eastridge, Environmental Planner
Petra Unger, Biologist
Bob Solecki, Wildlife Biologist
Kurt Legleiter, Senior Air Quality Scientist
Cindy Davis, Senior Regulatory Specialist
Leo Edson, Senior Wildlife Biologist
Peter Carr, Editing
Amber Martin, Word Processing
Gayiety Hasbrouck, Word Processing
Lorrie Jo Williams, Graphics
Brian Perry, Graphics

ROBERTSON-BRYAN INC.

Mike Bryan, Ph. D., Principal
Michelle Brown, Water Resources Specialist

LARRY WALKER ASSOCIATES

Tom Grovhaug, Principal
Tess Dunham, Legal Counsel
Chris Erichsen, Water Quality Specialist