APPENDIX A

Water Supply Assessment

Water Supply Assessment for the RiverPark Specific Plan

24 April 2002

City of Oxnard
Water Division
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Section 1: Introduction

1.1 Background

The proposed RiverPark Project (RiverPark) is a new mixed-use community containing residential, commercial, open space, and public facilities on a 701-acre site located immediately north of the Ventura Freeway (U.S. 101) between the Santa Clara River and Vineyard Avenue. The southern portion of the proposed RiverPark Specific Plan Area is within the City of Oxnard (City). This portion of the site is within the existing adopted Oxnard Town Center Specific Plan Area. The City is developing a new specific plan (RiverPark Specific Plan) that would allow for the annexation of the remainder of the RiverPark site and permit the planned development of the proposed uses. The new RiverPark Specific Plan Area would include the existing Oxnard Town Center Specific Plan Area.

SB 610 requires cities and counties that determine a project is subject to California Environmental Quality Act to identify any public water system that may supply water for the project and to request those public water systems to prepare a specified water supply assessment to be included in any environmental document prepared for the project. The assessment includes, among other information, an identification of existing water supply entitlements, water rights, or water service contracts relevant to the identified water supply for the proposed project and water received in prior years pursuant to those entitlements, rights, and contracts. If the assessment concludes that water supplies are or will be insufficient, the public water system would be asked to submit plans for acquiring additional water supplies.

SB 221 requires written verification, from the applicable public water system, that sufficient water supply is available for a subdivision of property of more than 500 dwelling units prior to approval of a tentative or parcel map.

1.2 Purpose

The purpose of this Water Supply Assessment is to demonstrate that the City's future water supplies are sufficient to meet the City's projected build out water demands, inclusive of the RiverPark Specific Plan. This assessment has been prepared in accordance with the requirements of both SB610 and SB 221.

1.3 Assessment Organization

The remainder of this Water Supply Assessment is organized as follows:

Section 2 - Existing Water Sources and Supplies

Section 3 - Past Water Use and Trends

Section 4 - Urban Water Management Plan

Section 5 - Projected Water Demands and Sources

Section 6 – Planned Water Facilities

Section 7 – Related Information on Water Use

Section 8 - Conclusions

Section 2: Existing Water Sources and Supplies

The City's current water supply consists of imported surface water and local groundwater sources. The City blends these two sources to achieve a balance between water quality, quantity, and cost. Although the blend ratio has varied historically, the City's current practice is a 1:1 blend ratio of surface water to groundwater. Each of these sources is described in the following paragraphs.

2.1 Surface Water

To provide for long-range improvement of its water quality, the City annexed to Calleguas Municipal Water District (CMWD) in February of 1961. CMWD is a member agency of the Metropolitan Water District (MWD) of Southern California from which it purchases State Project Water. Imported water supply originates in Northern California and is conveyed over 500 miles to Southern California through the State Water Project's (SWP) system of reservoirs, aqueducts and pump stations. Water is filtered and disinfected at MWD's Joseph Jensen Filtration Facility in Granada Hills. CMWD receives the treated water from MWD via the MWD West Valley Feeder and either stores the treated water in Lake Bard to be treated later or feeds the water directly to the Springville Reservoir near Camarillo. The City receives water from Springville Reservoir through the City's Oxnard and Del Norte Conduits that feed the City's four water blending stations. Figure 2-1 presents an overview of City and regional water facilities.

The City purchased approximately 13,215 acre-feet of water from CMWD in 2001. Existing agreements the City has with CMWD do not guarantee the quantity of water the City may purchase. As discussed in Section 5.2.1 below, both MWD and CMWD are undertaking a variety of programs to increase the reliability of imported water deliveries.

2.2 Groundwater

2.2.1 Groundwater Basins

Local groundwater is generally extracted from the aquifers of the Oxnard Plain Groundwater Basin. The Oxnard Plain Groundwater Basin is generally made up of two aquifer systems known as the Upper Aquifer System (UAS) and the Lower Aquifer System (LAS). The UAS consists of the semiperched zone, the Oxnard Aquifer, and the Mugu Aquifer. The LAS is comprised of the Hueneme, Fox Canyon, and Grimes Canyon Aquifers.

2.2.1.1 Semiperched Zone

The semiperched zone is the uppermost water-bearing unit in the area. It is composed of fine to medium-grained sand with interbedded silty clay lenses, with an average thickness of about 30 feet ranging to a maximum of 80 feet. Immediately below the semiperched zone and overlying the Oxnard Aquifer is a confining bed, or clay cap, consisting primarily of silty and sandy clays with a maximum thickness of 150 feet and an average thickness of approximately 35 feet.

2.2.1.2 Oxnard Aquifer

The Oxnard Aquifer, the most important water source in the Oxnard Basin, is composed of fine to coarse-grained sand, gravel, and boulder deposits. Within the areas, the aquifer is a single unit of high permeability with no prominent silt or clay lens interruptions and has an average and maximum thickness of about 91 and 150 feet, respectively, at an average depth of 100 to 180 feet below grade. Permeability, or the ability to transmit water, of this aquifer ranges from 1,700 to 2,000 gallons per day per square foot (gpd/ft^2). Transmissivity of this aquifer is significant, and typically ranges from 100,000 to over 400,000 gpd/ft^2.

2.2.1.3 Mugu Aquifer

Immediately below the Oxnard Aquifer, and separating it from the Mugu Aquifer, is an aquitard that is composed of silty clay with some interbedded sandy clay lenses. The average thickness of this aquitard in the project area is approximately 30 feet although the maximum thickness has been reported to be 150 feet. The material that forms the Mugu Aquifer is fine to coarse-grained sand and gravel with some interbedded silty clay. Within the project area, this aquifer attains a maximum thickness of 250 feet, although the average thickness of this water-bearing zone is approximately 110 feet. Permeability at the Mugu Aquifer ranges between 1,900 and 2,200 gpd/ft^2. In the forebay area where the Santa Clara River enters the Oxnard Plain near Saticoy and near the Mugu Lagoon, the Mugu Aquifer merges with the Oxnard Aquifer. The Mugu Aquifer is reported to be in hydraulic continuity with the ocean, although there is no evidence of seawater moving laterally within the zone.

2.2.1.4 Hueneme Aquifer

Underlying the Mugu Aquifer, is an aquitard composed of silty clay that reaches a maximum thickness of 80 feet within the Oxnard Basin. This aquitard is continuous except in the forebay area, where the Hueneme Aquifer merges with the other groundwaters. The Hueneme Aquifer is composed of irregularly interbedded sand, silt and clay, with some gravel, ranging in thickness from 100 feet within the City of Port Hueneme to about 300 feet north of City of Oxnard. Permeability for this water-bearing zone is estimated to be 400 to 600 gpd/ft^2. This aquifer is reported to be in hydraulic continuity with the ocean. The Hueneme aquifer is separated from the underlying Fox Canyon aquifer by an aquitard that is composed of silt and clay and which is absent only where the Fox Canyon Aquifer merges with the Hueneme Aquifer in the northern portion of the forebay area. Although the thickness of the aquitard in the project area is not known, the maximum thickness in the basin is approximately 170 feet.

2.2.1.5 Fox Canyon Aquifer

Composed of fine to coarse-grained sand with gravel stringers and interbedded silt and clay, the Fox Canyon Aquifer is the second most important water source in the project area. With a maximum thickness of approximately 550 feet in the Oxnard Basin, permeability of this water-bearing zone range from 200 to 400 gpd/ft^2.

2.2.1.6 Grimes Canyon Aquifer

The aquitard that separates the Fox Canyon and the underlying Grimes Canyon Aquifers is composed of silt and clay, attains a maximum thickness of about 40 feet in the Oxnard Basin. The Grimes Canyon Aquifer is composed of fine to coarse-grained materials, with a maximum thickness of more than 1,500 feet and corresponds in area to the Fox Canyon Aquifer.

2.2.2 Fox Canyon Groundwater Management Agency

The Fox Canyon Groundwater Management Agency (FCGMA) was established in Ventura County by special act of the State Legislature in 1982 to control groundwater overdraft and minimize the threat of seawater intrusion in the upper and lower aquifer systems of the Oxnard Plain. The purpose of the FCGMA is to control groundwater overdraft in the Upper and Lower Aquifer Systems. In 1985, a plan for management of the LAS and UAS within the FCGMA boundaries was adopted.

2.2.2.1 FCGMA Management Plans

Major elements of the UAS Plan included the following programs:

1. Ventura County Ordinance No. 3739 - This existing County ordinance prohibits the construction, repair or modification of UAS wells in areas where increased extractions would increase the overdraft and the rate of seawater intrusion in the Oxnard Plain.
2. Completion of the Seawater Intrusion Abatement Project through improvement of the Vern Freeman Diversion and operating the new project under criteria developed to ensure proper water allocation.
3. Annual monitoring to determine the effectiveness of the project.

Major elements of the LAS Plan include the following:

1. Monitoring for seawater intrusion in the LAS near the coastline by constructing four new monitoring wells.
2. Development of Contingency Plans in the event seawater intrudes the LAS. These plans call for conservation and reclamation efforts, increased monitoring and pumping restrictions.
3. Implementation of pumping restrictions in the North Las Posas Basin would prohibit expansion of all types of water use to land on or topographically above the LAS outcrop or to other nonwater-bearing areas. This outcrop more or less parallels the south flank of South Mountain. The restriction would regulate the drilling of new LAS water wells and use of groundwater in the North Las Posas Basin to ensure that adopted GMA groundwater pumping projections are not exceeded.
4. Pumpage will be accurately monitored throughout the GMA by requiring semiannual reporting of metered extractions. Results will be used to verify water use rates and to limit groundwater extractions in basins where adopted GMA extractions are exceeded after adjustment of the date to account for wet and dry years.

2.2.2.2 Ordinance 5.9

In order to eliminate groundwater overdraft and reduce extractions to within the safe yield by the year 2010, the FCGMA adopted Ordinance No. 5.0 in 1990. This ordinance has been updated nine times since then. The key element of FCGMA Ordinance 5.9 is the gradual reduction in groundwater extractions by all municipal pumpers. FCGMA assigned allocations to each groundwater pumper. The reduction schedule is based on the average "historical extraction" using the five calendar years of reported extractions from 1985 to 1989. Groundwater extraction allocations for each well are set according to the following formula:

- 1992-1994 extraction allocation = 95% of historical extraction, as adjusted.

- 1995-1999 extraction allocation = 90% of historical extraction, as adjusted.
- 2000-2004 extraction allocation = 85% of historical extraction, as adjusted.
- 2005-2009 extraction allocation = 80% of historical extraction, as adjusted.
- After 2009 extraction allocation = 75% of historical extraction, as adjusted.

Baseline allocations are not subject to the incremental reductions.

Unused groundwater allocation (or conservation credits) can be accumulated and used in future years if additional water supplies are needed without incurring a FCGMA monetary penalty as long as the aquifer system is not damaged. The City can also accrue groundwater storage credits by recharging water to the aquifers. These credits can also be used in the future without incurring the FCGMA penalty as long as the aquifer system is not damaged. In addition, adjustments and transfers of groundwater extraction allocations are allowed under Sections 2 and 3 of Ordinance 5.9. When irrigated agricultural land changes to a Municipal and Industrial (M&I) use, the groundwater extraction allocation is transferred to the provider of the M&I water supply. The amount of allocation available for transfer from agricultural land is based on the amount of land irrigated for agriculture during the 1985-1989 base period. Up to two acre-feet can be transferred to the M&I provider for each acre of land irrigated for agricultural uses during the base period. Any remaining amount of the historic extraction allocation is eliminated. The FCGMA also allows the assignment of an extraction allocation from one party to another.

The City has two existing allocations – one (a suballocation) held in trust through United Water Conservation District and one for the City's own wells. Each of these allocations is discussed below. The City will also receive additional transferred groundwater allocations as allowed by Ordinance 5,9 as agricultural land within the City's planning area is converted to municipal and industrial uses consistent with the City's General Plan and extraction allocations associated with existing groundwater wells are transferred to the City. Because the reductions in allocation are designed to bring the groundwater basins within their safe yields, these groundwater allocations are considered to be reliable future water sources

2.2.3 United Water Conservation District Wells

United Water Conservation District (UWCD) currently provides a portion of the City's groundwater supply. This arrangement is formalized in the 1996 Water Supply Agreement for Delivery of Water Through the Oxnard/Hueneme Pipeline (copy included in Appendix A). UWCD holds a pumping sub-allocation for all users of the Oxnard-Hueneme (O-H) Pipeline, which includes the City, the Port Hueneme Water Agency, and a number of small mutual water companies.

UWCD diverts Santa Clara River water at the Vern Freeman Diversion Dam northwest of Saticoy and delivers a portion of the water to the El Rio Spreading Grounds via a pipeline. Water is then used to recharge the underlying Montalvo Groundwater Basin. Eleven wells are then used to extract the water and deliver it to the O-H users. Of the eleven wells, three extract water from the LAS, and the remaining eight extract water from the UAS. The El Rio wellfield has sufficient active pumping capacity to supply the peak O-H pipeline capacity of 53.0 cfs.

Water extracted by these wells is delivered to the El Rio Pumping Station, disinfected, and pumped directly through the O-H Pipeline to each of the O-H customers. UWCD built the O-H system in 1954 to move municipal groundwater extraction away from the coastal areas subject to seawater intrusion. The O-H Delivery System consists of 12 miles of distribution pipeline.

The City's sub-allocation through UWCD totaled 5,302 acre-feet in 2000, but as a result of future scheduled FCGMA cutbacks, will only amount to 4,990 and 4,678 acre-feet per year in 2005 and 2010, respectively. The City purchased approximately 5,852 acre-feet of water from UWCD in 2001. This number exceeded the City's annual suballocation, but the difference was made up, without FCGMA imposed penalties, through the exchange of unused groundwater allocation/conservation credits.

UWCD and the O-H users are in the process of amending the Water Supply Agreement. The primary changes affecting the City are the combining of the City's and Ocean View Municipal Water District's (OVMWD) peak capacity in the O-H Pipeline and related suballocations. This was done to streamline the agreement because the City currently wheels O-H water through its water distribution system to supply OVMWD. All parties to the agreement have agreed to the amendment and final adoption is expected at the June 2002 UWCD Board Meeting.

2.2.4 City of Oxnard Wells

The City owns seven wells in the Oxnard Plain Basin, two in the UAS and five in the LAS. The UAS wells include Nos. 22 and 23 that are located at Blending Station No. 1 on Third Street. These wells pump groundwater from the Oxnard Aquifer into a 220,000-gallon clearwell reservoir. The reservoir acts as a suction forebay for the blending station. This station boosts the water above the system pressure for mixing with imported water prior to introducing the water into the distribution system. The UAS wells have a pumping capacity of 3,000 gpm each. It should be noted that pumping capacity is a function of aquifer condition as well as the condition of the well, pumping equipment, groundwater levels, and distribution system pressure.

The LAS wells include Nos. 19, 20, 21, 24, and 25. Well Nos. 19, 24, and 25 are not currently active, but are anticipated to be completed by the end of 2002. Well Nos. 20 and 21 are located at Blending Station No. 1 and pump groundwater from the Hueneme Aquifer. Groundwater from Well Nos. 20 and 21 (pumping capacity of 3,000 gpm each) is also pumped to the clearwell reservoir prior to blending. Well Nos. 19, 24, and 25 are located at Blending Station No. 3 at the intersection of Gonzalez Avenue and Rose Avenue. The LAS wells will have a total pumping capacity of 14,000 gpm when Well Nos. 19, 24, and 25 are completed.

Like UWCD's sub-allocation, the City also has a groundwater allocation from the FCGMA. A copy of the City's allocation through the FCGMA is contained in Appendix B. For 2001, the City's allocation was 5,975 acre-feet. Cutbacks in 2005 and 2010 will result in groundwater pumping allocation limitations of 5,658 and 5,341 acre-feet, respectively, if no additional allocation transfers are granted. The City pumped 7,021 acre-feet of groundwater from its wells in 2001, which exceeded their annual allocation, but the difference was made up with unused groundwater allocation/conservation credits.

Section 3: Past Water Use and Trends

Table 3-1 presents the City water supplies over the past twenty years. In general, Table 3-1 indicates a trend of increasing water demand. This trend is expected to continue as Oxnard further develops.

TABLE 3-1
CITY WATER SUPPLY SOURCES

Calendar Year	City Wells (acre-feet)	UWCD (acre-feet)	CMWD (acre-feet)	Total (acre-feet)
1982	361	5,859	12,417	18,637
1983	133	5,733	12,263	18,129
1984	161	6,414	14,116	20,691
1985	138	6,227	13,752	20,117
1986	35	6,419	13,873	20,327
1987	86	6,559	14,223	20,868
1988	479	6,477	14,519	21,475
1989	1,933	5,507	15,148	22,588
1990	1,206	5,585	15,338	22,129
1991	491	5,133	13,642	19,266
1992	445	5,452	13,528	19,425
1993	515	7,788	12,328	20,631
1994	3,303	5,697	12,609	21,609
1995	1,768	2,233	17,916	21,917
1996	0	32	23,195	23,227
1997	0	10,478	14,077	24,555
1998	51	7,861	12,198	20,110 (a)
1999	0	10,198	14,282	24,511
2000	5,319	6,417	14,752	26,488
2001	7,021	5,852	13,215	26,088

Note: (a) 1998 production is an acknowledged anomaly.
Source: City of Oxnard Water Division.

The table also shows the City's recent shift in blending strategy. Since 2000, the City has attempted to reduce its dependency on UWCD and CMWD by producing more groundwater from its own wells. Previously, the City had been expending unused groundwater allocation to cover exceedances of its suballocation through UWCD. The City is now intent on remaining within its own annual well allocation and within its annual UWCD suballocation, and maintaining any unused groundwater allocation credits for emergency conditions.

Section 4: Urban Water Management Plan

4.1 Service Area

The City's service area encompasses a wide range of land uses including agricultural, industrial, commercial, and residential uses. Although agriculture represents a significant portion of the local economy, it is almost entirely reliant on private sources external to the City (UWCD and/or private wells) for water supply. There are only three service connections in the City serving agricultural customers. Residential customers (single and multi-family users) represent the largest segment of the City's water demands from both a number of users (service connections) and volume used. Commercial users ranked second followed by industrial users.

4.2 Future Water Demand

The City's adopted Urban Water Management Plan indicates that water demand is anticipated to be nearly 44,600 acre-feet (68 percent increase compared with 2000 demand) by 2020. The City has established diverse plans to meeting future water demands including constructing City facility improvements (Blending Station No. 3), increasing deliveries of UWCD and City groundwater, implementing City seasonal storage programs, increasing deliveries of imported water, participation in CMWD's regional and local supply programs, implementing recycled water (through the GREAT Program), and supporting water demand management programs. These phased programs are expected to provide the City with sufficient guaranteed supplies to meet water demands.

4.3 Reliability Planning

The Urban Water Management Planning Act requires an assessment of water supply reliability and vulnerability to seasonal or climatic shortage. Reliability is a measure of a water service system's anticipated success in managing water shortages. This assessment must include a comparison of the total projected water demand with the supply available for the following conditions: 1) average water year, 2) single dry water year, and 3) three consecutive dry years. The average year assessment (2000 calendar year) indicated that no shortage was observed. The single dry-year assessment (2005 calendar year) resulted in a potential shortage of approximately 6,500 acre-feet. The multiple dry-year assessment (years 2001-2003) resulted in shortages of approximately 3,200 acre-feet, 4,400 acre-feet, and 5,500 acre-feet, respectively. However, the City will utilize several programs, previously identified in Section 4.2, to address any potential shortages identified in the reliability assessment.

4.4 Recycled Water

The City's Oxnard Wastewater Treatment Plant (OWTP) has a design capacity of 31.7 million gallons per day (MGD) (35,000 acre feet per year) and a planned ultimate capacity of 39.6 MGD (44,000 AFY). The plant currently produces approximately 20 MGD (22,400 AFY) of secondary treated wastewater and discharges the effluent via a 48-inch diameter one-mile long ocean outfall into the Pacific Ocean. The City does not currently operate a City-wide recycled water program. In an effort to identify a project that could take advantage of the water recycling

potential from the OWTP, the City completed a Water Reclamation Master Plan in 1993. In addition, the City has been meeting with regional agencies to promote the City's Groundwater Recovery Enhancement And Treatment (GREAT) Program. This Program involves construction of a new regional groundwater desalination facility to serve the City and Port Hueneme Water Agency (PHWA), and a recycled water system to serve agricultural water users in the Pleasant Valley area.

4.5 Water Shortage Contingency Plan

Water shortages can be triggered by a hydrologic limitation in supply (i.e., a prolonged period of below normal precipitation and runoff), limitations or failure of supply and treatment infrastructure, or both. As a result of severe drought conditions, the City adopted Water Shortage Emergency Procedures in April 1991 (City Code Chapter 33-98). This Ordinance established two major components. First, it expanded the existing water conservation/public information program to provide greater community awareness and response to concerns expressed by residents and business owners. Second, it provided for an eleven-stage (ranging from voluntary to mandatory 50 percent reduction) water regulation and allocation program.

4.6 Demand Management Program

As part of the UWMP, the City adopted a Demand Management Program. The goal of the program was to permanently reduce the level or change the pattern of water demand from the City's customers. This program consists of several diverse activities including the following:

- Residential audit program targeting the top 1,000 single-family residential users on an annual basis.
- Resumption of the Fixture Retrofit Program (in conjunction with the aforementioned audit program).
- Implementation of a Water Offset Program to fund water conservation activities.
- Continued integration of the Automated Meter Reading (AMR) Program.
- Expansion of the Landscape Audit Program.
- Expansion of the Public Information Program.
- Further evaluation of the water rate structure.
- Explore additional staffing needs including a Water Conservation Coordinator position.
- Continued participation in the ultra-low flush toilet program.
- Continued support of agricultural water conservation programs.

Section 5: Projected Water Demands and Sources

5.1 Projected Water Demands

The City's adopted 2020 General Plan indicates that the population projected for year 2020 is 164,936. However, the City's Planning Department acknowledged that this 2020 projection, which was prepared in 1998, is outdated as the 2000 Census determined the population of the City to be 170,358. Similarly, Southern California Association of Governments (SCAG) and the Greater Oxnard Chamber of Commerce projected 2010 populations of 165,988 and 167,027 respectively, which are also considered outdated based on the current population.

Since realistic projected population numbers for the years 2005 to 2020 were not available from local and/or regional sources, the City's adopted Urban Water Management Plan developed future population projections based on available land use data and average residential densities. Table 5-1 indicates that the City's 2010 and 2020 population is projected to increase to 186,000 and 209,000, respectively.

TABLE 5-1
ESTIMATED FUTURE POPULATION PROJECTIONS

	2005	2010	2015	2020
Population (a)	174,000	186,000	197,000	209,000

Note: (a) City of Oxnard, Urban Water Management Plan 2001.

Growth management was a key concept in Oxnard's 2020 General Plan, completed in 1990. Rather than establish building quotas based on arbitrary numerical limits, the Plan sought to establish a level of community growth where municipal service levels and infrastructure kept pace with the natural consequences of development, such as traffic, sewage, water consumption or school enrollment.

Water demand is a function of several factors. Geographic location, topography, land use, demography and water system characteristics (i.e. system pressures, water quality and metering of connections) all influence water usage. Water demand characteristics within the City will therefore differ from water demands of other areas in Southern California according to these factors of influence.

In developing projections for future water demands, a two-step approach was used. For single-family residential, multi-family residential, and commercial demands, a stepwise regression model was developed to project future unit consumption rates. This model attempted to correlate changes in unit consumption with a linear combination of explanatory variables such as price, climatic factors (rainfall and temperature), and seasonality. In the course of the analysis, combinations of explanatory variables are used to model water demand behavior and those of lesser statistical significance are systematically dropped until only those of statistical significance remain. The model displayed a high degree of correlation with historical demands (1992 – 1999 data) from these user segments.

For industrial, agricultural, and City (park and landscape irrigation typically) uses, monthly consumption factors from 1997 to 1999 were used to project future demands based on anticipated buildout.

Based on the preceding analysis, total water demand was projected on a land-use basis as the sum of the individual components. Since detailed buildout schedules were not available for all of the City's undeveloped parcels, uniform rates of growth were assumed for each land use type, with full buildout achieved in year 2020. Results of this approach are summarized in Table 5-2. Table 5-2 indicates that demand is anticipated to be nearly 44,600 acre-feet by 2020. There are no adopted plans or projections available addressing growth in Oxnard past the year 2020, which is the planning horizon year for the City's adopted General and Urban Water Management Plans. Recent planning trends, as reflected in the Urban Growth Boundary incorporated into the General Plan in 1998, encourage the slowing of the outward expansion of the City. For this reason, growth after the year 2020 is expected to occur at a lower rate than it has historically. A growth rate of 0.5 percent is assumed after 2020 consistent with this planning trend. This growth rate reflects an assumption that infill and redevelopment activity will primarily account for growth in the City after 2020.

TABLE 5-2

CITY WATER DEMAND PROJECTIONS UNDER THE CURRENT GENERAL PLAN

	2000	2005	2010	2015	2020	2025
Total Demand	26,488	31,081	35,730	40,380	44,565	45,679 (a)

Source: City of Oxnard, Urban Water Management Plan (2001).
Note: (a) 2025 water demand projection based on 0.5 percent annual rate increase beginning in 2020.
All values rounded up to nearest 1 AF.

Table 5-2 took into account demands from the areas inclusive of the RiverPark development, but using land use designations in the City's current General Plan. Removing those demands and replacing them with the land use designations under the proposed RiverPark Specific Plan results in the new demands presented in Table 5-3. The RiverPark water demands assume a linear growth pattern with demands reaching their ultimate levels in 2020.

TABLE 5-3

CITY WATER DEMANDS INCLUDING THE RIVERPARK SPECIFIC PLAN

	2000	2005	2010	2015	2020	2025
Existing Master Plan	26,488	31,081	35,730	40,380	44,565	45,679
Oxnard Town Center	0	(238)	(475)	(713)	(950)	(950)
RiverPark Specific Plan	0	466	932	1,398	1,864	1,864
Revised Totals	26,488	31,309	36,187	41,065	45,479	46,593

All values rounded up to nearest 1 AF.

5.2 Projected Water Sources

Except for periods of regional water shortages, which affect the entire Southern California area, CMWD and UWCD have met the City's purchased water demands. However, the existing agreements that the City has with CMWD and UWCD do not guarantee the quantity of water the City may purchase from these agencies, nor does the City own an entitlement to water from these agencies. In addition, variability of State Water Project deliveries, hydrologic conditions, and catastrophic outages may affect the ability of the City to reliably meet water demand estimates.

In response to the above reliability questions, the City has established diverse plans to meeting a projected water shortage including enhanced groundwater deliveries, continued imported water deliveries, implementing a recycled water program, and supporting water demand management programs. These phased programs are expected to provide the City with the assurance that there will be sufficient supplies to meet its water demands, including those of the RiverPark Specific Plan.

5.2.1 MWD/CMWD

Imported surface water from CMWD will continue to be a source of supply for the City. However, as part of its rate restructuring program, CMWD is developing a new two-tier rate system. Tier 1 rates would apply to allocations for each CMWD member agency in a take-or-pay arrangement. The amount of the allocation has not yet been determined, but initial discussions were based on using 85 percent of the maximum deliveries from 1991 to 2001. Tier 2 rates would apply to imported water purchases that exceed the Tier 1 allocation. Tier 2 water would be priced at a higher rate than Tier 1 water. Provisions that would allow the City or any of

CMWD's member agencies to increase their Tier 1 allocation are expected, but have also not been finalized.

Although there are no guarantees that Tier 1 or Tier 2 water will be available, it is assumed for this analysis that the Tier 1 allocation is reliable under average year conditions. Under drought conditions, it is assumed that even the Tier 1 allocation would be subject to cutbacks. The basis for this assumption is that both CMWD and MWD, CMWD's wholesaler, have undertaken a number of steps to provide for better water supply reliability.

MWD recently issued its *Report on Metropolitan's Water Supplies* with the objective of providing information that would assist member agencies in complying with SB 221 and SB 610. A copy of this report (excluding the appendices) is contained in Appendix C. As the sole source of water for CMWD, MWD's planning is vital to ensuring the City with a reliable source of imported surface water. As part of its Integrated Resource Plan (IRP), the MWD Board of Directors established a water supply reliability objective as follows:

> "Through the implementation of the IRP, Metropolitan [MWD] and its member agencies will have the full capability to meet full-service demands at the retail level at all times."

MWD has developed a water resource strategy to meet this objective. It includes a portfolio of diversified supplies in accordance with the IRP and MWD's Regional Urban Water Management Plan (RUWMP). The IRP established policy guidelines for investing in water conservation, water recycling, desalination, Colorado River deliveries, State Water Project deliveries, water transfers, and storage in groundwater basins and surface reservoirs.

Once the IRP is fully implemented, water shortages like those experienced in the late 1980's and early 1990's are expected to occur less than once every 50 years based on potential hydrologic and weather conditions.

As a result of investments made since 1991 in storage, supply, conservation, and water recycling, MWD expects to be 100 percent reliable over the next 10 years (CMWD, 2000). Resource and facility additions to the MWD system that make this level of reliability possible include the following:

- Local supply and conservation programs yielding approximately 160,000 AFY
- Colorado River storage and conservation programs yielding approximately 280,000 AF of dry year supply
- State Water Project storage programs yielding approximately 130,000 AF of dry year supply
- Diamond Valley Reservoir (800,000 acre-feet of storage) yielding 400,000 AF of dry year supply.

CMWD is also taking steps to ensure that it will be able to meet its member agency demands reliably. In response to the urgent need to "drought-proof" its service area and minimize the potentially debilitating effects associated with seismic activity, CMWD is implementing projects like the Aquifer Storage and Recovery Project and City Seasonal Storage that will enhance the reliability of its water supply. Each of these programs is described below.

In a cooperative effort with MWD, CMWD is developing a storage reservoir in the Las Posas Groundwater Basin. The Las Posas Basin Aquifer Storage and Recovery (ASR) project is designed to provide for subsurface storage of up to 300,000 acre-feet of imported water for use to meet emergency, drought, and peak demands.

ASR technology includes dual-purpose, injection/extraction groundwater wells that can store water and subsequently produce the stored water as needed. The project will enable pre-delivery and storage of large volumes of State water in the CMWD service area during periods of availability. The stored water will later be "recovered" or extracted by CMWD to meet seasonal, drought and emergency demands.

The project includes the installation of thirty ASR wells within an approximate nine-square mile area in the Lower Aquifer System of the Las Posas Basin, nearly thirty miles of large diameter pipeline to connect the wells with existing CMWD infrastructure in the cities of Simi Valley and Thousand Oaks, and a combined pump/hydroelectric generation station in the City of Moorpark to facilitate the flow of water to from the wells. The project will be constructed in phases and is anticipated to be fully operational in 2010. To date, five wells are operational and have injected 35,000 acre-feet of imported water into the Lower Aquifer System for storage. Fourteen additional ASR wells are currently under development and should be operational in late 2002 (personal communication with CMWD staff).

Project facilities will enable the conveyance of water between the well field and distribution system at a rate of 100 cubic feet per second (cfs). This rate is based on an extraction capacity of 3.33 cfs (1,500 gallons per minute) per ASR well. Injection rates are estimated to be slightly lower at 2.66 cfs (1,200 gallons per minute). Given the projected extraction capacity, and assuming twelve months of around-the-clock production, the maximum annual extraction capacity of the project would be on the order of 72,000 acre-feet.

The Las Posas ASR project will provide the following benefits to the City:

- Increases the reliability of CMWD's drinking water supply by storing large volumes of State water when available for later use.
- Increases the water storage capacity for the CMWD service area. The available storage capacity in the Las Posas Basin is 30 times the capacity of Lake Bard.
- Provides increased operational flexibility in the event of a severe drought or emergency. If the State water supply is either reduced or disrupted entirely, the stored water will be retrieved, treated and delivered to meet CMWD's service area demands.

5.2.2 UWCD

Groundwater from UWCD will continue to be a source of supply for the City in the future. To date, the City has not experienced any difficulty in receiving water from UWCD and given the efficiencies in UWCD's recharge operations, it is likely that the City would be able to receive its full suballocation in any given year in spite of climactic (drought) conditions. In addition, City staff have estimated that they can reliably utilize 600 acre-feet per year of unused groundwater allocation from the Ocean View Municipal Water District to whom the City wheels water.

Nevertheless, UWCD is in the planning stages of two projects that would enable it to achieve higher levels of reliability.

The first project is the Saticoy wellfield. UWCD has recharge facilities upstream of the El Rio Spreading Grounds, but the Saticoy Spreading Grounds do not have any associated extraction facilities. The Saticoy wellfield would enable UWCD to extract groundwater similar to their El Rio Spreading Grounds for the purpose of distribution. By extracting groundwater near the recharge location, UWCD will be able to reduce the impacts of localized groundwater mounding and should be able to recharge more Santa Clara River water than in the absence of the Saticoy wellfield. The capacity of this facility has not been determined at this time.

The second project that UWCD is pursuing is the long-term use of the RiverPark gravel pits as storage facilities. The gravel pits will enable UWCD to divert more Santa Clara River Water than they would normally. This additional water would increase the yield from the El Rio Spreading Grounds. This project is also in the planning stages so detailed information in not available, but it has been estimated that over the historical period used in the RiverPark Specific Plan DEIR that an additional 7,000 acre-feet per year could be diverted.

5.2.3 City Wells

5.2.3.1 Additional Capacity

The City is currently developing plans for improvements at Blending Station No. 3. These plans include an iron and manganese removal/treatment system and the completion of three wells (Wells 19, 24, and 25). Well No. 19 will have an approximate capacity of 3,000 gallons per minute. Well No. 24 (2,500 gpm) will be designed as an injection/extraction well. Well No. 25 will have a pumping capacity of approximately 2,500 gpm. Well No. 19 will pump groundwater from the Fox Canyon Groundwater Basin, Well No. 24 from the Oxnard Basin, and Well No. 25 from the Hueneme Basin. Groundwater from Well Nos. 19, 24, and 25 will be blended with imported water at the Blending Station No. 3.

Although completion of these wells (additional 8,000 gpm) will not secure additional groundwater rights for the City, they provide redundant extraction facilities should existing wells become inoperative and will allow for increased extraction capacity when additional groundwater rights become available (through the GREAT Program). Completion of Well 24 as an injection/extraction well will allow the City to take advantage of seasonal storage water from CMWD (excess water typically available during the winter months at lower cost) should such water become available. This will enable the City to develop groundwater storage credits from the FCGMA.

The Draft Water System Master Plan is also making recommendations for the development of additional injection/extraction wells to reduce peak imported water requirements. These wells will also benefit the City by reducing the amount of water distribution pipes that would need to be upsized to serve future development. Once implemented, the injection/extraction wells can serve as an additional source of supply in the event of a catastrophic failure to one of the other sources.

5.2.4 Accumulated Unused Groundwater Allocation

As shown in Table 3-1, the City has only recently begun to make use of its own groundwater wells. During the prior period, the City accumulated unused groundwater allocation credits when its annual pumping did not exceed its annual allocation when water demands were lower and CMWD purchases were higher. The unused groundwater allocation credits were then used to supplement those instances when the City exceeded its own allocation or its suballocation through UWCD. Based on past and current practices, the City has estimated that there is sufficient unused groundwater allocation to meet its needs for approximately the next three years.

5.2.5 Ocean View Municipal Water District

The Ocean View Municipal Water District (OVMWD) serves water from UWCD to residential and agricultural customers in the Oxnard Plain. This water is wheeled through City owned and operated infrastructure to OVMWD. Based on discussions with OVMWD, the City has determined that approximately 600 acre-feet per year of unused OVMWD groundwater allocation would be available to the City for use. Based on existing crop patterns, this amount of water would be available throughout the period of projection.

5.2.6 Groundwater Extraction Allocation Transfers

Article 3 of the FCGMA Ordinance 5.9 addresses adjustments to extraction allocations. Section 2 of Article 3 defines the types of adjustments allowed, while Section 3 outlines the procedures for adjustments. When irrigated agricultural land changes to Municipal and Industrial (M&I) use, the groundwater extraction allocation is transferred to the provider of the M&I water supply. The amount of allocation available for transfer from agricultural land is based on the amount of land irrigated for agriculture during the 1985-1989 base period. Up to two acre-feet of allocation can be transferred to the M&I provider for each acre of land irrigated for agricultural uses during the base period. Any remaining amount of historic extraction allocation is eliminated. The transferred allocation is subject to the same cutbacks that affect the City's existing allocation and suballocation.

Implementation of the RiverPark Specific Plan will result in the conversion of agricultural land to M&I use. Additionally, there are several groundwater wells with industrial allocations within the proposed RiverPark Specific Plan Area. As the City of Oxnard will be the M&I service provider, the groundwater extraction allocations associated with these existing wells and agricultural uses will be transferred to the City. Based in FCGMA records, 2,106 acre-feet of groundwater extraction allocations associated with eight wells in the proposed Specific Plan Area will be transferred to the City. Factoring in the FCGMA mandated reductions, 1,684 acre-feet of allocation would be available in 2005 and 1,580 acre-feet would be available in 2010 and beyond.

5.2.7 GREAT Program

In an effort to identify a project that could take advantage of the water recycling potential from the City of Oxnard Wastewater Treatment Plant (OWTP) and provide a drought-proof, reliable water supply, the City completed a Water Reclamation Master Plan in 1993 (Oxnard, 1993).

Since that time, representatives of the City, PHWA, UWCD, and CMWD have been meeting regularly to discuss regional water supply issues. Through these discussions, a regional water supply program has emerged. This program, entitled the Groundwater Recovery Enhancement And Treatment (GREAT) Program, will involve the construction of a new regional groundwater desalination facility to serve the City and PHWA, and a recycled water system to serve agricultural water users in the Pleasant Valley area.

The Oxnard Wastewater Treatment Plant is currently a secondary treatment facility that discharges its effluent to the Pacific Ocean. Under the GREAT Program, both tertiary treatment and advanced water treatment (demineralization) will be added to the treatment train in order to produce recycled water that met not only DHS mandated criteria (Title 22 standards), but also consumer acceptance standards. Recycled water will be delivered to agricultural users in the Pleasant Valley area. These include users of UWCD's Pumping-Trough-Pipeline, and customers of the Ocean View Municipal Water District and the Pleasant Valley County Water District. Groundwater currently used by these customers has elevated levels of total dissolved solids and chlorides as a result of seawater intrusion. By reducing their pumping demands, the GREAT Program helps address the regional seawater intrusion problem. Furthermore, during low recycled water demand periods, the recycled water will be directly injected into the aquifer to serve as a deterrent to seawater intrusion and generate groundwater storage credits for the City.

Since these users are also subject to the FCGMA ordinances, reduction in their pumping rates will result in unused groundwater allocations. These unused annual allocations would be transferred to the City and extracted at their own wells or extracted by UWCD and delivered to the City via the O-H Pipeline. Since the groundwater is higher in TDS than the current blended supply, some demineralization would be required prior to distribution. A groundwater desalter would be constructed to allow for the production of water suitable for delivery to Oxnard customers. The GREAT Program desalter will have the potential to produce 20,772 acre-feet of potable water per year. Sufficient unused groundwater allocations can be generated through the distribution of recycled water to agricultural users or direct injection of recycled water into the groundwater aquifer to allow the GREAT desalter to operate at a slightly higher rate during the winter months to serve as a source for the planned injection/extraction wells.

The City has invested heavily in the preparation of a feasibility study and has aggressively pursued grant monies to fund the program. The draft feasibility study indicates that the GREAT Program is a cost-effective and reliable water resource solution when compared with the City's current alternatives of paying Tier 2 rates (estimated at $100/acre-foot more than current rates) or paying the FCGMA penalty for exceeding the City's annual groundwater extraction allocation. Grant funding efforts have been fruitful and have already yielded the funding necessary to support the next phase of design and outreach activities. The City has established a goal of obtaining 50 percent of the estimated $55,000,000 initial construction costs and has identified several potential funding sources including the US Bureau of Reclamation, US Department of Agriculture, and the State Water Resources Control Board. The City would finance the remainder of the project through the issuance of general obligation bonds or similar financing mechanisms.

A number of federal, state, and local permits/approvals will be required. Based on the current project definition, the following permits/regulatory requirements are likely to be required:

- CEQA/NEPA documentation
- Domestic Water Permit (DHS)
- Title 22 Engineering Report (DHS)
- Waste Discharge Requirements/Water Recycling Requirements (RWQCB)
- National Pollutant Discharge Elimination System Permit (RWQCB)
- CALTRANS Encroachment Permit
- Utility Survey Agreements (Ventura County Railroad Company/Union Pacific Railroad)
- Hazardous Material Release Response Plan
- Well Permit (Ventura County Public Works Agency)
- California Accidental Release Program (City of Oxnard, Fire Department)

The first phase of the GREAT Program is planned to be operational in 2006.

The GREAT Program Advanced Planning Study Document will be completed by April 2002. The City Council is expected to adopt the Advanced Planning Study Document in May 2002. The City Council is scheduled to consider a resolution, also in May 2002, formally adopting the project description for the GREAT Program and directing staff to proceed with further study consistent with the GREAT Program Advanced Planning Study, and including all necessary environmental review and documentation.

5.3 Normal and Dry Year Supplies

Based on normal demands during drought years, the minimum three-year water supply is provided in Table 5-4. Groundwater supplies from the City and UWCD (including the unused OVMWD allocation) should be unaffected by a three-year drought condition. The supply values from CMWD could change depending on the severity of the supply deficiency. However, CMWD and MWD have significantly improved the reliability of their systems with the construction of Diamond Valley Reservoir (MWD), delivery contracts (MWD), and groundwater storage (CMWD). The supplies from the GREAT Program are considered to be drought-resistant because the recycled water element used to generate unused groundwater allocation is drought-resistant.

If there is a need for significant demand reduction efforts, various voluntary or mandatory conservation efforts will be implemented by the City. It is anticipated that during any three-year drought, the City will have a full supply to meet customer demands. The City will be maximizing use of local resources to reduce dependence on vulnerable imported water supplies.

TABLE 5-4
THREE YEAR ESTIMATED MINIMUM WATER SUPPLY (AF)

Source	Year 1	Year 2	Year 3
City wells (a)	5,341	5,341	5,341
UWCD wells (a)	4,678	4,678	4,678
Unused OVMWD groundwater allocation	600	600	600
RiverPark extraction allocation transfer (b)	1,579	1,579	1,579
CMWD (c)	12,577	11,915	11,253
GREAT Program (d)	20,772	20,772	20,772
TOTAL SUPPLY	45,547	44,885	44,223

Notes:
(a) City and UWCD well capacities assume the full FCGMA allocation is available in 2010 and beyond.
(b) RiverPark extraction allocation transfer assumes all FCGMA reductions have been applied (i.e., post-2010 values)
(c) CMWD supplies assume a cumulative five percent annual reduction from the Tier 1 capacity.
(d) GREAT Program facilities are assumed to be at the ultimate capacity.
Source: City of Oxnard, Urban Water Management Plan (2001).

A summary of the City's projected 20-year water needs for normal and dry conditions are provided in Tables 5-5 and 5-6, respectively.

TABLE 5-5

CITY WATER DEMANDS AND SOURCES OF SUPPLY DURING NORMAL YEAR FOR PERIOD 2000 TO 2025 (AF)

Source	2000	2005	2010	2015	2020	2025 (b)
City wells	5,319	5,658	5,341	5,341	5,341	5,341
UWCD wells	6,417	4,990	4,678	4,678	4,678	4,678
CMWD	14,752	13,239	13,239	13,239	13,239	13,239
Unused OVMWD Allocation	0	600	600	600	600	600
RiverPark extraction allocation transfer	0	1,684	1,579	1,579	1,579	1,579
GREAT Program	0	2,587	10,750	15,628	20,042	20,772
Other sources (a)	0	2,551	0	0	0	384
Total Demand	26,488	31,309	36,187	41,065	45,479	46,593

Notes:
(a) Other sources represent a variety of sources including unused groundwater allocation , Tier 2 CMWD water, and/or pumping in excess of FCGMA allocations.
(b) The Water Demand Projections conservatively assume that the City is built out in year 2020, so there is no difference in the year 2020 and 2025 numbers.
All values rounded up to nearest 1 AF.

The dry year demand in Table 5-6 is assumed to be 6 percent higher than the normal demand.

TABLE 5-6

CITY WATER DEMANDS AND SOURCES OF SUPPLY DURING DRY YEAR FOR PERIOD 2000 TO 2025 (AF)

Source	2000	2005	2010	2015	2020	2025 (b)
City Wells	5,319	5,658	5,341	5,341	5,341	5,341
UWCD Wells	6,417	4,990	4,678	4,678	4,678	4,678
CMWD (a)	14,752	11,100	11,100	11,100	11,100	11,100
Unused OVMWD Allocation	0	600	600	600	600	600
RiverPark extraction allocation transfer	0	1,684	1,579	1,579	1,579	1,579
GREAT Program	0	2,587	15,060	20,231	20,772	20,772
Other sources (c)	1,589	6,569	0	0	4,138	5,319
Total Demand	28,077	33,188	38,358	43,529	48,208	49,389

Note:
(a) CMWD supplies during a single year drought are projected to be equal to the CMWD Tier 1 level less historical average drought drop (i.e., 13,200 AFY- 2,100 AFY = 11,100 AFY)
(b) The Water Demand Projections conservatively assume that the City is built out in year 2020, so there is no difference in the year 2020 and 2025 numbers.
(c) Other sources represent a variety of sources including unused groundwater allocation, Tier 2 CMWD water, pumping in excess of FCGMA allocations, and/or unused OVMWD groundwater allocation.
All values rounded up to nearest 1 AF.

Section 6: Conclusions

The City utilizes three distinct water sources – imported surface water from CMWD, groundwater from UWCD, and groundwater from its own wells – to provide potable water service to its customers. CMWD (and its wholesaler, MWD), UWCD, and the City have all taken steps to diversify their existing water supply resources to enhance service reliability to the City's water customers. The City's programs will result in the projected growth in water demand being met primarily with local reliable groundwater resources.

Groundwater extraction allocation transfers associated with the implementation of the RiverPark Specific Plan will provide approximately 86 percent of its projected water demand at buildout of the Specific Plan. To meet the additional demand associated with the RiverPark Specific Plan and other development allowed by the City's 2020 General Plan, the City intends to design, construct and operate the GREAT Program facilities to facilitate the transfer of over 20,000 acre-feet of additional groundwater extraction allocations to the City.

In the short-term, the City will continue to rely on unused groundwater allocations (accumulated City unused groundwater allocation and/or OVMWD unused groundwater allocations), CMWD Tier 2 water, and groundwater in excess of the City's FCGMA allocation to meet its water demand needs and provide the City the time to design and build the GREAT Program facilities. In the long-term, the City will implement the GREAT Program as a new water supply to meet its water demand needs, inclusive of the RiverPark Specific Plan, and will also utilize unused groundwater allocations and CMWD Tier 2 water as necessary. Existing and planned future water sources currently under development will be sufficient to meet projected demands, including the RiverPark Specific Plan.

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