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June 2011

Final 2010 Urban Water Management Plan

CDM

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Abbreviations

Act	Urban Water Management Planning Act
AF	acre-foot, acre-feet
BMOs	basin management objectives
BMP	best management practice
Canal	Contra Costa Canal
CCWD	Contra Costa Water District
CII	commercial, industrial, and institutional
CUWCC	California Urban Water Conservation Council
CVP	Central Valley Project
DMM	demand management measures
DWD	Diablo Water District
DWR	California Department of Water Resources
ECCID	East Contra Costa Irrigation District
ECWMA	East County Water Management Association
EBMUD	East Bay Municipal Utility District
EIR	Environmental Impact Report
GCMs	general circulation models
gpcd	gallons per capita per day
gpf	gallon per flush
gpm	gallons per minute
HET	high efficiency toilet
ISD	Ironhouse Sanitary District
LSCE	Luhdorff & Scalmanini Consulting Engineers
MG	million gallons
mgd	million gallons per day
mg/L	milligrams per liter
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MPN	most probable number
ppm	parts per million
Reclamation	U.S. Bureau of Reclamation
SWP	State Water Project
WTP	Water Treatment Plant
WWTP	wastewater treatment plant
ULFTs	ultra-low flow toilets
UWMP	Urban Water Management Plan
Zone 7	Zone 7 Water Agency

Section 1 Introduction

1.1 Urban Water Management Planning Act

All urban water suppliers within the State of California are required to prepare Urban Water Management Plans (UWMPs). California Water Code Sections 10610 through 10657 detail the information that must be included in these plans as well as who must file them. The relevant sections of the Water Code begin each section of this document. This plan satisfies the requirements of the Urban Water Management Planning Act (the Act) of 1983 and the subsequent amendments to the Act. According to the Act, an urban water supplier is defined as a supplier, either publicly or privately owned, that provides water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet (AF) of water annually.

This report constitutes the Diablo Water District's (DWD's) UWMP for year 2010. Urban water suppliers are required to update their UWMPs at least once every five years on or before December 31, in years ending in either a five or zero. For the 2010 UWMPs, California has extended the UWMP adoption deadline to July 1, 2011. This plan shall be adopted by DWD and submitted to the California Department of Water Resources (DWR). The UWMP requires analyses of management tools and options that will maximize resources and minimize the need to import water from other regions. UWMPs require, and this UWMP includes: an analysis of total projected water use compared to water supply sources over at least the next 20 years in five-year increments; a discussion of water quality, as it affects water management strategies and supply reliability; water demand and supply information compared for single dry year and multiple dry year scenarios; and descriptions of groundwater basins and groundwater production if groundwater is an existing or planned source of water.

1.2 Law

10620 (d) (2) each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.

10621 (b) Every urban water supplier required to prepare a plan pursuant to this part shall notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision.

10621 (c) The amendments to, or changes in, the plan shall be adopted and filed in the manner set forth in Article 3 (commencing with Section 10640).

10635 (b) The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies no later than 60 days after the submission of its urban water management plan.

10642 Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan. Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published. After the hearing, the plan shall be adopted as prepared or as modified after the hearing.

10643 An urban water supplier shall implement its plan adopted pursuant to this chapter in accordance with the schedule set forth in its plan.

10644 (a) An urban water supplier shall submit to the department, the California State Library, and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. Copies of amendments or changes to the plans shall be submitted to the department, the California State Library, and any city or county within which the supplier provides water supplies within 30 days after adoption.

10645 Not later than 30 days after filing a copy of its plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours.

1.2.1 Changes in the Act Since 2005

Since 2005, several amendments have been added to the Act. Some of the amendments provided for reporting on lower income and affordable household water projections, eligibility for state water management grants or loans, and reporting on the feasibility of serving recycled water demands. The following is a summary of the significant changes in the Act that have occurred from 2005 to the present:

- Clarifies that every urban water supplier preparing a plan must give at least 60 days advance notice to any city or county prior to the public hearing on the UWMP within which the supplier provides water supplies to allow opportunity for consultation on the proposed plan (Water Code §10621(b)).
- Requires urban retail water suppliers to include baseline daily per capita water use, urban water use targets, interim urban water use targets, and compliance daily per capita water use, along with the basis for determining those estimates, including references to supporting data.
- Requires plan by retail water suppliers to include water use projections for single-family and multi-family residential housing needed for lower income and affordable households to assist with compliance with the existing requirement under Section 65589.7 of the Government Code that suppliers grant a priority for the provision of service to housing units affordable to lower income households (Water Code §10631.1).
- Conditions eligibility for a water management grant or loan made to an urban water supplier and awarded or administered by DWR, the State Water Resources Control Board, or the California Bay-Delta Authority or its successor agency on the implementation of water demand management measures, including consideration of the extent of compliance with the conservation measures described in the California Urban Water Conservation Council's (CUWCC) Memorandum of Understanding (MOU) Regarding Urban Water Conservation in California (Water Code §10631.5).
- Exempts projects funded by the American Recovery and Reinvestment Act of 2009 from the conditions placed on state funding for water management to urban water suppliers (Water Code §10631.5(a)(2)).

- Requires DWR, in consultation with the State Water Resources Control Board and the California Bay-Delta Authority or its successor agency, to develop eligibility requirements to implement the foregoing grant and loan conditions (Water Code §10631.5(b)).
- Repeals existing grant funding conditions of state water management grants or loans on July 1, 2016 if the UWMP is not extended or altered prior to this date (Water Code §10631.5(f)).
- Deems water suppliers that are members of the CUWCC and comply with the MOU, as it may be amended, to be in compliance with the requirement to describe the supplier's water demand management measures in its urban water management plan (Water Code §10631(j)).
- Requires DWR, in consultation with the CUWCC, to convene a technical panel, no later than January 1, 2009, to provide information and recommendations to the Department and the Legislature on new demand management measures, technologies, and approaches. The panel and DWR were to report to the Legislature on their findings no later than January 1, 2010 and each five years thereafter (Water Code §10631.7.3).
- Clarifies that "indirect potable reuse" of recycled water should be described and quantified in the plan, including a determination with regard to the technical and economic feasibility of serving those uses (Water Code §10633(d)).
- Requires DWR to recognize exemplary efforts by water suppliers by obligating DWR to identify and report to the technical panel, described above, any "exemplary elements" of individual water suppliers' plans, meaning any water demand management measures adopted and implemented by specific urban water suppliers that achieve water savings significantly above the levels required to meet the conditions to state grant or loan funding (Water Code §10644(c)).

1.2.2 Senate Bill 7

In addition to changes to the Act, the State Legislature passed Senate Bill 7 as part of the Seventh Extraordinary Session, referred to as SBX7-7, on November 10, 2009, which became effective February 3, 2010. This new law was the water conservation component to the historic Delta legislative package, and seeks to achieve a 20 percent state-wide reduction in urban per capita water use in California by December 31, 2020. This implements similar 2008 water use reduction goals. The law will require each urban retail water supplier to develop urban water use targets to help meet the 20 percent goal by 2020, and an interim urban water reduction target by 2015.

The bill states that the legislative intent is to require all water suppliers to increase the efficiency of use of water resources and to establish a framework to meet the state targets for urban water conservation. The bill establishes methods for urban retail water suppliers to determine targets to help achieve increased water use efficiency by the year 2020. The law is intended to promote urban water conservation standards consistent with the CUWCC's adopted best management practices.

Additionally, the bill specifically includes reporting requirements in the upcoming UWMPs. Specifically, urban retail water suppliers must include in their 2010 UWMPs the following information from their target-setting process: (1) baseline daily per capita water use; (2) urban water use target; (3) interim water use target; and (4) compliance daily per capita water use, including technical bases and supporting data for those determinations. An urban retail water supplier may update its 2020 urban water use target in its 2015 UWMP (Water Code §10608.20).

To give retail urban water suppliers time to conduct the additional required analyses, SBX7-7 grants an extension for adoption of UWMPs due in 2010 to July 1, 2011 (Water Code §10608.20(j)). Urban retail water suppliers, such as DWD, are to prepare a plan for implementing the Water Conservation Bill requirements and discuss this implementation plan at a public meeting (Water Code §10608.26).

1.3 Agency Coordination

Table 1-1 lists the agencies that have coordinated to support the development of this UWMP or have provided their review and comment on the UWMP. These agencies were notified that DWD was updating its UWMP in March 2011. Copies of these notices are included in Appendix A-1. The agencies also received a copy of this Final Draft UWMP.

Table 1-1
Coordination with Appropriate Agencies

Coordinating Agencies	Contacted for Assistance	Sent Notice of Preparation	Sent Copy of the Draft Plan	Commented on the Draft Plan
City of Antioch		X	X	
Bethel Island Municipal Improvement District		X	X	
City of Brentwood		X	X	
Byron-Bethany Irrigation District		X	X	
Contra Costa County	X	X	X	
Contra Costa Water District	X	X	X	X
County Department of Health Services		X	X	
State Department of Public Health		X	X	
Delta Diablo Sanitation District		X	X	
Town of Discovery Bay		X	X	
East Contra Costa Irrigation District		X	X	
Ironhouse Sanitary District	X	X	X	
City of Oakley	X	X	X	
Oakley Public Library		X	X	
City of Pittsburg		X	X	

DWD has been an active participant for many years in integrated water resource planning for East Contra Costa County. Since 1994, the water and wastewater agencies in East Contra Costa County have worked collaboratively to integrate management initiatives and infrastructure in the interest of increasing water supply reliability. DWD is a member of the East County Water Management Association (ECWMA). ECWMA is a group of eleven public agencies in Eastern Contra Costa County who participate in regional water supply planning efforts for Eastern Contra Costa County. The eleven agencies consist of the City of Antioch, City of Brentwood, Byron-Bethany Irrigation District, Town of Discovery Bay, Contra Costa Water Agency, Contra Costa Water District (CCWD), Delta Diablo Sanitation District, DWD, East Contra Costa Irrigation District, Ironhouse Sanitary District, and City of Pittsburg.

The local cities, districts, and water resource agencies developed and implemented a comprehensive Stormwater Management Plan to protect the beneficial uses of the Delta water system. They developed an innovative habitat conservation plan to reserve endangered species and have launched several ecosystem restoration projects.

In the early 1990s, ECWMA, with DWD participation, worked together to develop a comprehensive water management plan, the East County Water Supply Management Study. In July 2005, the association members, including DWD, participated in the completion of the East Contra Costa County Functionally Equivalent Integrated Regional Water Management Plan. This document brought together into a shared vision the integrated water resource planning initiatives being conducted by the various entities serving East Contract Costa County. The City of Brentwood, CCWD, Town of Discovery Bay, East Contra Costa Water District, and the City of Pittsburg formed an advisory group to guide preparation of DWD's 2007 Groundwater Management Plan. The agency representatives participated in meetings on content and reviewed the draft Plan. In May 2011, DWR released its draft recommendations for Prop 84 Round 1 Implementation Grants, which included $1,775,000 for East Contra Costa County for implementing regional water management projects.

1.4 Plan Adoption

A draft of this UWMP was circulated to parties known to DWD that may have an interest in the UWMP (as shown in Table 1-1). This Final Draft UWMP was made available for review at the Oakley Public Library, DWD's office, and online at DWD's website, www.diablowater.org.

A public hearing was held on May 25, 2011 at DWD's offices during a Regular Meeting of the Board of Directors. The public hearing was noticed in the Oakley Press, a major local newspaper in DWD's service area, on April 22, 2011 and May 13, 2011. A copy of the notice for the public hearing is included in Appendix A-2. Minutes from the meeting are included in Appendix A-3.

The DWD Board of Directors adopted the 2010 UWMP at a Regular Meeting on June 22, 2011. A copy of the resolution of UWMP adoption is included as Appendix B.

Within 30 days of adoption, DWD will submit the Final UWMP to DWR and the California State Library. To facilitate DWR's review, Appendix C contains the Urban Water Management Plan Checklist, which lists the location of each required element of the UWMP.

Within 30 days of adoption, DWD will make the Final UWMP available to the public.

Section 2
System Description

2.1 Law

10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

> (a) Describe the service area of the supplier, including current and projected population, climate, and other demographic facts affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.

2.2 Location

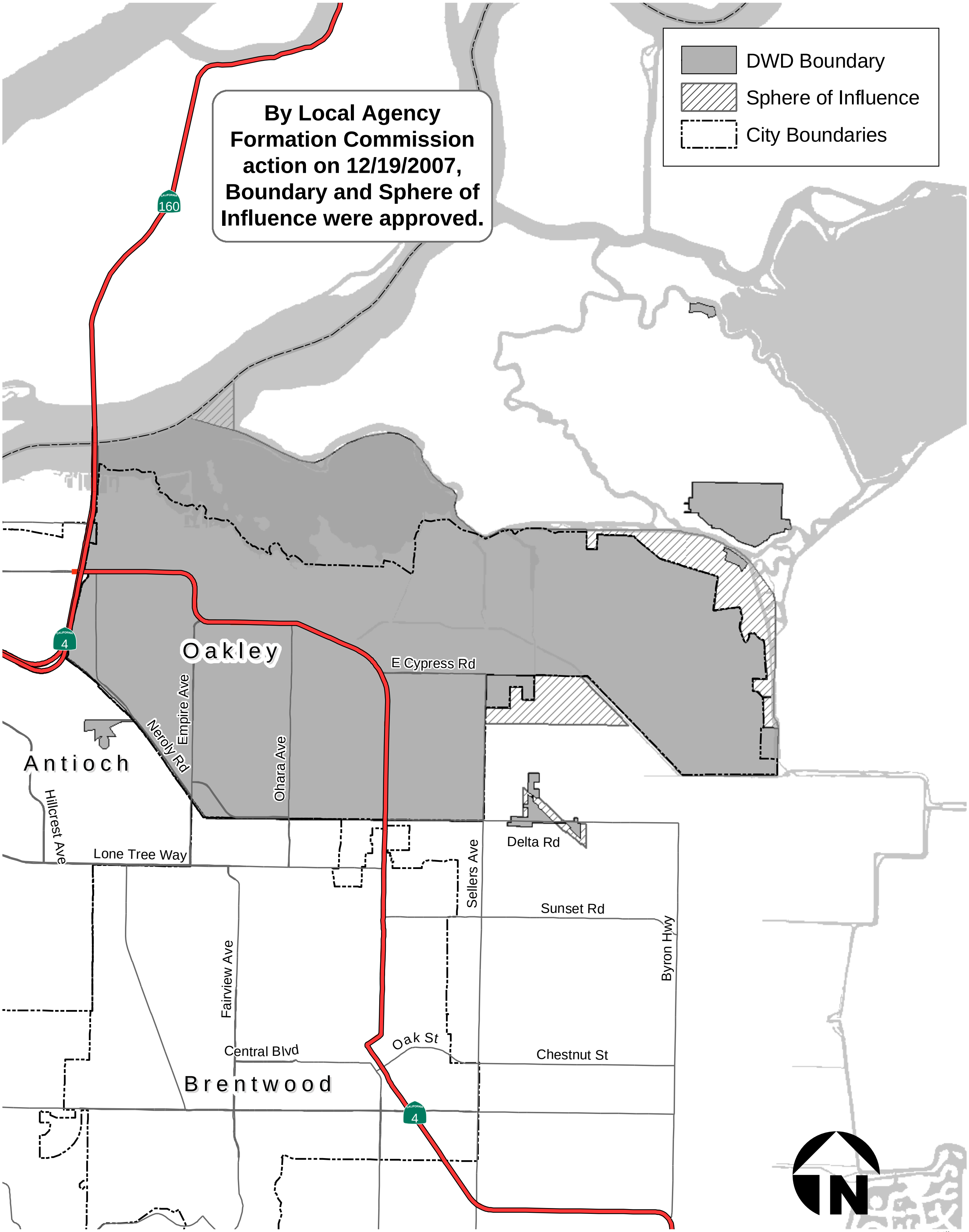
DWD is located in the northeastern corner of Contra Costa County, east of the City of Antioch and north of the City of Brentwood. Ultimately, as shown on Figure 2-1, DWD will provide service to the City of Oakley, including the East Cypress Corridor area, the Town of Knightsen, and some or possibly all of Bethel Island if the island residents wish to secure water service from DWD. DWD's sphere of influence and Bethel Island encompass approximately 19,000 acres. Currently DWD serves about half of this ultimate area; the remainder is undeveloped or in the process of developing.

The existing treated water system is located in the western part of the ultimate area, where the original Oakley community began. Significant development is planned to occur in the eastern part of the ultimate area, and DWD's treated water system is being expanded to serve the eastern area.

The terrain is gently rolling, with a gradual slope toward the San Joaquin River. Ground elevation varies from minus 5 feet in the eastern part of the ultimate area to approximately 100 feet at the southwest corner of DWD's service area.

2.3 Climate Characteristics

DWD's service area experiences a Mediterranean type climate, with mild, rainy winters and hot, dry summers. DWD receives about 13 inches of precipitation annually. Approximately 95 percent of this precipitation occurs in the months of October through April. Table 2-1 presents average monthly precipitation, temperature, and evapotranspiration data.



Source: Contra Costa County Community Development Department, GIS Program May 2008

W:\REPORTS\DWD\Urban Water Management Plan_Feb11\Graphics\Figure 2-1 DWD District Boundary and SOI.ai 04/11/11 JJT

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Figure 2-1
DWD Service Area and Sphere of Influence

Table 2-1
Climate Data for DWD's Service Area

Month	Monthly Average Maximum Temperature (1) (°F)	Monthly Average Minimum Temperature (1) (°F)	Monthly Average Precipitation (1) (inches)	Monthly Average Evapotranspiration (2) (inches)
Jan	53.7	37.1	2.78	0.95
Feb	60.2	41.0	2.43	1.75
Mar	65.4	43.4	2.00	3.48
Apr	71.4	46.3	0.90	5.37
May	78.6	51.4	0.36	6.88
Jun	86.0	56.2	0.09	7.79
Jul	91.2	57.6	0.02	8.29
Aug	89.9	56.8	0.04	7.24
Sep	86.2	55.3	0.18	5.33
Oct	77.4	50.2	0.65	3.63
Nov	64.3	43.1	1.58	1.76
Dec	54.7	37.3	2.20	1.01
Annual	73.3	48.0	13.23	53.48

(1) Source: Western Region Climate Center, Antioch Pump Plant 3 weather station (#040232) http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca0232.
(2) Source: California Irrigation Management Information System, Brentwood, California station, http://www.cimis.water.ca.gov/cimis/frontStationDetailData.do?stationId=47.

2.4 Demographic Characteristics

Population and housing projections are all tools utilized to project municipal and industrial water demands. DWD currently serves about 35,600 residents of Oakley. According to the City's 2020 General Plan (amended in 2010), the total buildout population is projected to be about 68,000, which includes about 50,000 people within the 2002 city limits and 18,000 in the city's expansion areas (the City has now annexed some of these expansions areas into its city limits). In addition, DWD will serve Knightsen and some or all of Bethel Island in the future, although it does not currently provide treated water service to those areas.

For this UWMP, ultimate buildout is assumed to occur by 2040. Oakley's General Plan indicates that residential buildout within its planning area will occur at sometime after 2020, but does not give a specific timeframe. The population at buildout of DWD's ultimate service area was estimated using planning information from Oakley's General Plan and Contra Costa County General Plan (for Knightsen and Bethel Island). The population was calculated based on buildout residential land uses, the average allowable residential densities, and average household sizes. The buildout population was estimated at about 75,000 persons assuming that DWD serves the entire ultimate area.

Table 2-2 presents the current Oakley population and population projections from 2015 through 2035 for the area served by DWD. Linear interpolation was used to estimate the population at 5-year intervals between 2010 and 2040. The actual growth in population over time will depend on economic and development cycles. The East Contra Costa County area has experienced alternating periods of slow growth and high growth since the 1980s.

Table 2-2
Current and Projected Population for DWD's Ultimate Service Area

Area	2010	2015	2020	2025	2030	2035
City of Oakley	35,646	41,038	46,431	51,823	57,215	62,608
Unincorporated Areas	--	1,167	2,333	3,500	4,667	5,833
Ultimate Service Area	35,646	42,205	48,764	55,323	61,882	68,441

Source: 2010 population data from California Department of Finance. Population projections based on City of Oakley General Plan and Contra Costa County General Plan.

Section 3
Water Demands

This section details current and future water demands for DWD's service area. These demands include various water use sectors including single-family residential, multi-family residential, commercial/institutional, industrial, landscape irrigation, and other uses. Various water sectors such as saline water intrusion barriers, groundwater recharge, and conjunctive use do not contribute to water demand in the DWD service area and are not discussed further. Water use projections for the service area are provided in 5-year increments to year 2035.

3.1 Law

10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

10631 (e) (1) Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors including, but not necessarily limited to, all of the following uses:

> (A) Single-family residential; (B) Multifamily; (C) Commercial; (D) Industrial; (E) Institutional and governmental; (F) Landscape; (G) Sales to other agencies; (H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof; and (I) Agricultural.

10631 (e) (2) The water use projections shall be in the same 5-year increments to 20 years or as far as data is available.

New Requirements for 2010 UWMPs

10608.20 (e) An urban retail water supplier shall include in its urban water management plan due in 2010 the baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the basis for determining those estimates, including references to supporting data.

10631.1 (a) The water use projections required by Section 10631 shall include projected water use for single-family and multifamily residential housing needed for lower income households, as defined in Section 50079.5 of the Health and Safety Code, as identified in the housing element of any city, county, or city and county in the service area of the supplier.

3.2 Service Area Demands

Table 3-1 presents 2005 and 2010 customer connections and water demand for the DWD service area. The total demand shown is the sum of metered and unaccounted-for water demands, in million gallons (MG). Two flat-rate, unmetered commercial/industrial connections are not included in Table 3-1. These flat rate connections are not significant water users and will be converted to meters by 2016.

Table 3-1
Water Meters and Deliveries – 2005 and 2010

Water Use Sectors	2005		2010	
	# of Meters	Volume (MG)	# of Meters	Volume (MG)
Single Family Residential	8,349	1,539	10,028	1,450
Multi-Family Residential	41	--	15	35
Commercial/Institutional	108	1.5	142	115
Industrial	1	--	1	1
Landscape Irrigation	87	--	139	127
Other (e.g., hydrants, construction)	0	103	91	28
Total Meters	8,586	--	10,416	--
Total Consumption	--	1,643	--	1,756
Unaccounted-for Water	--	118	--	60
Total Water Demand	--	1,761	--	1,816

Source: Based on DWD records. Prior to 2010, DWD's billing system was unable to distinguish customer water use into the same customer categories used for customer meters, so limited data was available on water use separated by customer type for 2005. Total water demand for 2005 is shown accurately in Table 3-1. Beginning in 2010, DWD's record system has been updated to track usage by customer type.

Unaccounted-for water is the difference between total water supply production and billed consumption. All water systems have some level of unaccounted-for water, typically ranging from 5-10 percent of total demand. Sources of unaccounted-for water in DWD's system may include losses from system leaks, meter inaccuracies, unmetered uses of water, or other unauthorized uses. In 2010, DWD's unaccounted-for water was 3.3 percent of total demand. From 2001-2010, unaccounted-for water averaged 5.9 percent, well within the acceptable range.

Table 3-2 presents water demand and connection projections for DWD for 2015 through 2035, based on buildout land uses and currently adopted general plans. Over the period from 2010 to 2035, DWD's demand is estimated to increase from 1,815 MG per year to 5,572 MG per year, and the number of service connections is estimated to increase from 10,416 to 20,270.

Future connections were estimated based on the calculated number of residential units and estimates of number of non-residential connections per acre from available buildout land use planning information for the service area. Linear interpolation was used to determine the number of connections at 5-year intervals from 2015 to 2035, which assumes a constant growth rate from 2010 to buildout in 2040.

Single family connections equal estimated buildout number of single family housing units. Multi-family connections are based on the estimated number of multi-family housing units, assuming eight units per connection (average density for multi-family land use is eight units per acre). Non-residential connections assume one connection per approximately two acres, which is similar to the current density for areas served. DWD's current accounting system tracks accounts in a combined category for commercial/institutional. Table 3-2 provides an estimated breakdown of projected connections into separate commercial and institutional categories. Limited growth is assumed for irrigation connections. Prior to 2010, DWD's accounting system had not been able to accurately track "other" meters, typically used for hydrants and construction connections. Limited growth is assumed for these others meters as the number of meters varies throughout the year and over time.

Table 3-2
Projected Meters and Water Deliveries – 2015 through 2035

Water Use Sectors	2015		2020		2025		2030		2035	
	# of Meters	Volume (MG)	# of Meters	Volume (MG)	# of Meters	Volume (MG)	# of Meters	Volume (MG)	# of Meters	Volume (MG)
Single Family Residential	11,815	1,871	13,602	2,292	15,389	2,713	17,176	3,134	18,963	3,555
Multi-Family Residential	111	129	207	223	303	318	398	412	494	506
Commercial	206	253	270	391	334	529	397	667	461	805
Institutional	13	36	25	72	38	108	50	144	63	180
Industrial	1	120	1	134	1	201	1	267	1	334
Landscape Irrigation	141	131	143	135	145	139	146	143	148	147
Other (e.g., hydrants, construction)	101	32	111	35	121	39	130	42	140	46
Total Meters	12,387	--	14,358	--	16,329	--	18,299	--	20,270	--
Total Water Demand	--	2,572	--	3,283	--	4,046	--	4,809		5,572

Buildout water usage was estimated and then linear interpolation used to determine the usage at 5-year intervals from 2015 to 2035, which assumes a constant growth rate over the entire planning period. By 2035, residential usage will comprise about 73 percent of the total use; and non-residential usage about 27 percent.

Buildout water usage for each customer sector was calculated using buildout land uses from the Oakley General Plan, the East Cypress Corridor Specific Plan, and the Contra Costa County General Plan (for Knightsen and Bethel Island), and average unit demand factors for each customer type. Industrial includes a future large heavy industrial user(s) to replace the former Dupont chemical manufacturing facility, which may use up to a total of 1.1 million gallons per day (mgd) on an average daily basis. Unaccounted-for water was assumed to remain at the historic average of 6 percent of total customer usage. The unit demand factors for each customer type included unaccounted–for water; therefore, the total water use includes unaccounted–for water.

Open space and Delta recreation areas are not irrigated with DWD water. In addition, DWD's policy is to require that large new turf landscape areas use private groundwater wells or non-potable water for irrigation. Landscape irrigation is assumed to increase over existing levels to accommodate small or isolated areas where it is not feasible to provide another source of irrigation water. It is assumed that parks and landscape areas in new development areas, such as the East Cypress Corridor, will irrigate large landscape areas with groundwater, not with DWD water.

DWD does not provide water for agricultural uses, does not sell water to other agencies, and does not participate in exchanges or non-recurring agreements, saline barriers, groundwater banking, or groundwater recharge and conjunctive use programs.

3.3 Low-Income Water Demand

New requirements for 2010 UWMPs include reporting the projected low-income customer water demand. Low-income households are classified as households that have an annual income that is 80 percent or less than the area median household income, adjusted by the number of persons in the household (California Health and Safety Code Section 50079.5).

DWD does not independently track all its customers by income category. Customers can choose to apply for DWD's discounted rate program for low-income senior citizens and the fully disabled. DWD serves 111 single family customers and 5 multi-family properties (with several meters each) that are part of this low-income program. Table 3-3 presents those customers' 2010 water use, and projected water use for low-income program customers through 2035, based on maintaining the current percentage of DWD customers participating in the program. This low-income water use is accounted for in DWD's overall demand projections.

Table 3-3
Current and Projected Water Demands for Low-Income Customers

Type	Water Demand (MG)					
	2010	2015	2020	2025	2030	2035
Single-Family Residential	7	10	13	16	19	21
Multi-Family Residential	23	33	42	51	61	71
Total Low-Income Demand	30	42	54	67	79	92

Source: 2010 water use based on DWD records. 2015-2035 water use projected based on current use levels and maintaining the current ratio of customers participating in the reduced rate program.

3.4 Water Conservation Bill Requirements

The Water Conservation Bill (Senate Bill X7-7) was developed to implement the 20x2020 Plan, which sets forth a statewide road map to maximize the state's urban water efficiency and conservation opportunities between 2009 and 2020, and beyond. It aims to set in motion a range of activities designed to achieve a 20 percent reduction in gross per capita urban water demand by 2020. Section 1060.12 (g) defines gross water use as the total volume of water, whether treated or untreated, entering the distribution system of an urban retail water supplier, excluding all of the following:

- Recycled water that is delivered within the service area of an urban retail water supplier or its urban wholesale water supplier;
- The net volume of water that the urban retail water supplier places into long-term storage;
- The volume of water the urban retail water supplier conveys for use by another urban water supplier;
- The volume of water delivered for agricultural use, except as otherwise provided in subdivision (f) of Section 10608.24; and
- Industrial process water, which may be exclude from the calculation of gross water use to avoid a disproportionate burden on another customer sector if it comprises a *substantial percentage* of industrial water use in its service area.

DWR has published guidelines describing how to determine the baseline gross per capita water demand for water purveyors throughout California. The guidelines allow for use of one of four alternatives to calculate the reduction in baseline per capita demand between baseline levels and 2020 needed to demonstrate compliance.

DWD is part of a regional alliance with CCWD and its other wholesale municipal customers: the Cities of Antioch, Martinez, and Pittsburg, and Golden State Water Company. As part of this regional alliance, CCWD has prepared a regional target; however, members of the alliance must present their own baseline gross per capita water use, service area population, and individual 2015 and 2020 targets. The following sections first describe this process for DWD and then CCWD's regional alliance analysis.

3.4.1 DWD's Individual Analysis

Section 3.4.1.1 presents the computation of baseline per capita demand values for DWD, and Section 3.4.1.2 presents interim and final targets. In addition, Section 3.4.1.3 calculates the remaining demand reduction needed to reach the interim and final targets for per capita demand by 2015 and 2020, respectively.

3.4.1.1 Baseline Gross Per Capita Demand for DWD

Actual per capita water demand for DWD was determined for each calendar year from 1995 through 2010 as the total water demand (including unaccounted-for water) divided by the population. The baseline per capita water demand represents water use over a continuous multi-year base period. To account for year-to-year fluctuations in per capita water use, multi-year averages of annual per capita demand are the basis for the baseline per capita demand. Two base periods are to be determined for the water supplier for different functions of the analysis, as follows:

- For the baseline per capita demand, if recycled water made up 10 percent or more of 2008 retail water delivery, use a continuous 10- to 15-year period ending no earlier than December 31, 2004, and no later than December 31, 2010. Otherwise, only a continuous 10-year period can be used to set the baseline per capita demand.

- For the minimum water use reduction requirement, it is necessary to compute per capita demand over a continuous five-year base period ending no earlier than December 31, 2007, and no later than December 31, 2010. The urban water use target is not to exceed 95 percent of the per capita demand over this base period.

DWD does not use recycled water; therefore, a continuous 10-year period was used as the baseline per capita demand. The averages of per capita demand over the evaluated base periods provided a basis for selecting a baseline per capita demand of 175 gallons per capita per day (gpcd), as shown in Table 3-4. DWD selected the maximum value of the base period averages, which occurred for the period of 1995-2004, to represent the baseline per capita demand.

Table 3-4
Computation of Baseline Per Capita Water Demand for DWD

Year	Population [1]	Annual Demand (MG) [2]	Annual Per Capita Demand (gpcd)	10-Year Average Per Capita Demand (gpcd) [3]
1995	18,000	1,488	227	NA
1996	18,000	1,457	222	NA
1997	22,000	1,620	202	NA
1998	22,000	1,296	161	NA
1999	22,500	1,234	150	NA
2000	25,619	1,457	156	NA
2001	26,012	1,446	152	NA
2002	26,983	1,529	155	NA
2003	27,678	1,564	155	NA
2004	28,370	1,715	166	175
2005	28,962	1,761	167	169
2006	29,341	1,755	164	163
2007	31,742	1,943	168	159
2008	33,189	1,993	165	160
2009	34,500	1,815	144	159
2010	35,646	1,816	140	157
Baseline Per Capita Demand (maximum of multi-year average per capita demand)				**175**

[1] Population data for 1995 through 1999 was acquired from DWD records submitted to DWR. The City of Oakley was incorporated in 1999. Population data from 2000 through 2010 was acquired from the California Department of Finance.
[2] Water use data based on DWD records.
[3] Ten-year averages of per capita demand for setting DWD's baseline per capita demand cannot end earlier than 2004 or later than 2010.

Water Code Section 10608.22 specifies a minimum water use reduction requirement, which sets a value for baseline per capita demand that computed targets for compliance in 2020 are not to exceed, unless the five-year base period average is less than 100 gpcd. The minimum water use reduction requirement for DWD is computed in Table 3-5. This value would be used as the urban water use target per capita water demand if estimates of the urban water use target per capita water demand using other methods (described in Section 3.4.1.2) are greater.

Table 3-5
Computation of Minimum Water Use Reduction Target for DWD

Year	Population [1]	Annual Demand (MG) [2]	Annual Per Capita Demand (gpcd)	5-Year Average Per Capita Demand (gpcd) [3]
2003	27,678	1,564	155	NA
2004	28,370	1,715	166	NA
2005	28,962	1,761	167	NA
2006	29,341	1,755	164	NA
2007	31,742	1,943	168	164
2008	33,189	1,993	165	166
2009	34,500	1,815	144	161
2010	35,646	1,816	140	156
Minimum Water Use Reduction Requirement (0.95 * max five-year average per capita water demand)				**157**

[1] Population data was acquired from the California Department of Finance.
[2] Water use data based on DWD records.
[3] Five-year average of per capital water demand for setting the minimum water use reduction requirement cannot end earlier than 2007 or later than 2010.

3.4.1.2 Urban Water Use Target for DWD

The urban water use target is the per capita demand that would result in compliance with the requirements of the Water Conservation Bill. DWD's per capita demand in 2020 must be reduced to the urban water use target to demonstrate compliance. In addition, development of an interim urban water use target, equal to the mid-point between baseline use and the 2020 urban water use target, is required.

DWR provides four alternative methods to compute an individual urban water use target for a water supplier. DWR allows an urban water supplier to use any of the four methods. The first method is to reduce the baseline per capita demand by 20 percent, which is consistent with the state-wide goal of 20 percent reduction in per capita urban water use demand by 2020. The other three methods estimate a less aggressive demand reduction appropriate for agencies that have a high proportion of commercial, industrial, or institutional demand forecasted, or if current water demand indicates high levels of water conservation and/or recycling have already been achieved. Detailed guidance on implementing each method is included in DWR's "Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use." The methods are briefly summarized below:

- **Method 1:** Eighty percent of the water supplier's baseline per capita demand.
- **Method 2:** Per capita daily water use estimated using the sum of performance standards applied to indoor residential use; landscaped area water use; and commercial, industrial, and institutional uses.
- **Method 3:** Ninety-five percent of the applicable state hydrologic region target as stated in the State's February 2010 20x2020 Water Conservation Plan.
- **Method 4:** Calculates water demand savings through implementation of the following best management practices (BMPs): retrofits of inefficient indoor residential fixtures, such as toilets, washers, and showers; increased efficiency in the commercial, industrial, and institutional accounts; and conversion of unmetered connections to metered connections. The target represents the water demand if the BMPs are implemented within the service area at saturation levels.

DWD selected Method 3 to compute its urban water use target per capita demand. Table 3-6 presents the target setting calculations using Method 3. DWD's baseline per capita demand of 175 gpcd must be reduced to 157 gpcd by 2020. The interim target for 2015 is 166 gpcd.

Table 3-6
Method 3 Computation of DWD's 20x2020 Target

Demand Category	gpcd
San Joaquin River Hydrologic Region Baseline Water Use Target	174
95% of San Joaquin River Region Target	165
Minimum Water Use Reduction Calculation (see Table 3-5)	157
Required 2020 Target (minimum of 95% of Region's Target or Minimum Water Use Reduction)	**157**
Baseline Daily Per Capita Water Use (see Table 3-4)	175
Interim 2015 Target	166

3.4.1.3 Method for Demonstrating DWD's Compliance with the Water Conservation Bill Requirements

DWD will demonstrate compliance if the per capita demand during the final year of the 2010-2015 and 2016-2020 reporting periods is less than or equal to the interim and final urban water use targets, respectively. Compliance assessments will be reported in DWD's 2015 and 2020 UWMPs. If the 2015

UWMP shows that the interim water use target is not achieved, adjustments will be made to its water conservation plan to achieve the 2020 urban water use target.

DWD estimated recent per capita demand to determine how effective current conservation measures have been toward reducing the per capita demand from average levels over the 1995 – 2004 baseline period. As shown in Table 3-4, DWD's urban per capita water use in 2010 was 140 gpcd, which equates to a 20 percent reduction from the baseline per capita demand of 175 gpcd and is consistent with the required 2015 interim goal of 166 gpcd.

The demand reduction currently estimated to be necessary to reduce future per capita demand to the interim and final urban water use targets is shown in Table 3-7. DWD's per capita water use is currently below both the 2015 interim target and the 2020 target. This demonstrates that DWD's existing water conservation program has been very successful. Other factors potentially contributing to the demand reduction include recent drought conditions, the economic downturn, and a drop in Dupont's water use, which is expected to rebound in the future.

Table 3-7
Computation of Demand Reduction Needed for DWD to Comply with the Water Conservation Bill

Planning Year	Demand (MG)	Population - Current and Projected	Per Capita Demand - Current and Projected (gpcd)	Per Capita Demand Target (gpcd)	Demand Reduction Needed to Reduce Projected Per Capita Demand to Target Levels (MG)
2010	1,816	35,646	140	--	--
2015	2,572	42,205	167	166	15
2020	3,283	48,764	184	157	488
2025	4,046	55,323	200	157	876
2030	4,809	61,882	213	157	1,263
2035	5,572	68,441	223	157	1,650

Based on the population and demand projections shown above, per capita demand in DWD's service area is currently estimated to increase over time. To ensure compliance with the 2015 and 2020 targets, DWD will regularly monitor its per capita demand and maintain it to at or below the target levels. To achieve these goals, DWD may implement the following activities in the future, as needed:

- Ensure correct application of more stringent design standards related to indoor and outdoor water use for new development projects (e.g., Statewide Model Water Efficient Landscape Ordinance).
- Enforce prohibited water uses during Stage A per the Emergency Water Conservation Ordinance (see Section 5.9.2).
- Enhance demand management measure implementation (see Section 6).
- Develop Cash for Grass rebate program to help property owners convert water-thirsty grass to a water efficient landscape. DWD could offer property owners a dollar amount per square foot of grass removed and replaced with water efficient landscaping. Other communities have offered a square footage rebate of $0.50 - $1.50. Every square foot of grass replaced with water-smart trees, shrubs, and flowers can save an average of 30 gallons of water per year.
- Create permit for graywater reuse systems to establish appropriate graywater system permitting exemptions for residential applications pursuant to regulations set by the California Building Standards Commission. California Senate Bill 1258 authorizes a city, county, or other local agency to adopt building standards that prohibit the use of graywater, or that are more restrictive than State

requirements, thus allowing residential graywater systems except where an agency specifically does not allow it. The new residential graywater standard divides graywater installations into three types of systems, two of which usually require treatment:

  - Clothes washer system (commonly referred to as laundry-to-landscape systems) or single fixture system, which usually does not need to be treated and can be installed without a permit when certain conditions are followed.
  - Simple system, reusing up to 250 gallons per day and requiring a permit.
  - Complex system, reusing over 250 gallons per day and requiring a permit.

- Implement residential rainwater collection: Create a policy to support permitting and regulation of residential rainwater systems. Develop a program to distribute rainwater barrels to homeowners to capture water runoff from homes for irrigation uses.
- Require commercial rainwater collection: Create a policy that requires collection, storage, and use of rainwater from commercial roof surfaces for on-site landscape irrigation uses and establish a financial incentive program to assist property owners. Concurrently, distribute information regarding rainwater collection systems to commercial property owners and assist them in securing financial support for implementation.
- Develop incentives for residential plumbing fixture upgrades: Plumbing retrofits, low-flow showerheads, aerators, and toilet displacement fixtures are responsible for significant water savings. DWD could increase the funding and scope associated with existing incentive programs to increase water efficiency and conservation.
- Incentivize water conservation: DWD's billing structure could be modified to include more significant incentives for water conservation, such as tiered water rates. However, this must be approached extremely carefully to account for the financial realities of water conveyance. DWD has certain fixed costs for water supply operation and treatment, regardless of water use levels.
- Develop a business outreach program: Create a business outreach program on water conservation to provide reduction strategies to businesses within the community.

3.4.2 CCWD's Regional Alliance Analysis

As mentioned above, DWD is participating in the regional alliance organized by CCWD. The regional alliance must comply with the same requirements as water suppliers developing an individual target for urban per capita water use: compute a baseline per capita water demand; determine the urban water use target, compare the target to the minimum required reduction; and determine the interim water use target. CCWD's regional alliance analysis discussion, from Appendix H of its June 2011 UWMP, is presented in Appendix D. CCWD submitted a letter to DWR stating that a regional alliance was formed and listed the members. This letter is included in Appendix D.

Section 4
Water Supply Sources

This section details current and future water supplies for the District's service area.

4.1 Law

10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

10631 (b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments as described in subdivision (a). If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan:

10631(b) (1) A copy of any groundwater management plan adopted by the urban water supplier, including any specific authorization for groundwater management.

10631(b) (2) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as over drafted or has projected that the basin will become over drafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition.

10631(b) (3) A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

10631(b) (4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

10631 (d) Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.

10631 (h) Include a description of all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs, other than the demand management programs identified pursuant to paragraph (1) of subdivision (f), that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in average, single-dry, and multiple-dry water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program 10631 (i) Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.

10631 (k) Provide documentation that either the retail agency provided the wholesale agency with water use projections for at least 20 years, if the UWMP agency is a retail agency, OR, if a wholesale agency, it provided its urban retail customers with future planned and existing water source available to it from the wholesale agency during the required water-year types

10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area, and shall include all of the following:

10633 (a) A description of the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.

10633 (b) A description of the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.

10633 (c) A description of the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.

10633 (d) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.

10633 (e) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.

10633 (f) A description of actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.

10633 (g) A plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.

10634. The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management strategies and supply reliability.

4.2 Introduction

DWD's primary water supply for its distribution system is treated surface water from the Bureau of Reclamation's (Reclamation's) Central Valley Project (CVP) purchased from CCWD. CVP water is conveyed through the Contra Costa Canal (Canal) and treated at the Randall-Bold Water Treatment Plant (WTP) in Oakley, which is jointly owned by DWD and CCWD.

DWD developed its own groundwater supply system that provides additional supply reliability. The first groundwater well came online in 2006. When fully implemented, groundwater may comprise up to 20 percent of DWD's total supply.

Table 4-1 summarizes the current and projected water supply sources for DWD, which are described in more detail below.

Table 4-1
Current and Projected Water Supplies (MG)

Water Supply Sources	2010	2015	2020	2025	2030	2035
Surface Water Purchased from CCWD [1]	2,738	2,738	4,563	4,563	5,475	5,475
DWD Groundwater [2]	336	672	924	924	1,176	1,176
Total Supply	3,074	3,410	5,487	5,487	6,651	6,651

(1) DWD currently has 15 mgd treatment capacity for surface water with the ability to purchase an additional 15 mgd capacity in 5 mgd increments as needed to meet future peak demands. The 15 mgd current capacity will provide an average day supply of 7.5 mgd (2,738 MG per year). A total of 30 mgd ultimate capacity for maximum day will provide an average day supply of 15 mgd (5,475 MG per year). It is anticipated that DWD will purchase 5 mgd additional capacity in 2020 and 2030 in order to meet demands and water quality blending goals.

(2) Groundwater supply in 2010 is from one, existing, potable water well with approximately 2.0 mgd capacity, which produced 336 MG in 2010. By 2015, an additional well will be constructed that will provide an additional 2.0 mgd capacity (estimated 336 MG production). An additional 1.5 mgd well will be provided by 2020 and another well by 2030. Ultimately, groundwater may provide up to about 20 percent of the District's supply, which would be a total ultimate well capacity of about 6 to 7 mgd.

4.3 Surface Water Purchased from CCWD

DWD purchases CVP water from CCWD, its wholesale supplier, who has a contract with Reclamation for 195,000 AF per year. In March 2005, CCWD renewed their water service contract with Reclamation for a period of 40 years, through February 2045.

The raw surface water is supplied via the Canal that conveys water from Rock Slough in the Sacramento-San Joaquin Delta. The Canal is owned by Reclamation and operated by CCWD. The Canal water can also be supplemented by surface water stored at Los Vaqueros Reservoir or conveyed from CCWD's other intakes on Old River and Victoria Canal (near Middle River). The Los Vaqueros Reservoir is a 100,000 AF storage facility located eight miles south of Brentwood. Water to fill the reservoir comes from a pump station intake on Old River near Highway 4 or Victoria Canal near Middle River. CCWD owns and operates the Los

Vaqueros Reservoir and its related intake, pumping, conveyance, and blending facilities. The reservoir provides water quality and emergency supply benefits.

In 2011, CCWD began construction to raise the dam height by 34 feet and expand the capacity of Los Vaqueros Reservoir to 160,000 AF. Completion of this project is expected in early 2012. The project will immediately improve water quality and water supply reliability for CCWD customers while providing a net environmental benefit to the Delta.

The raw surface water from the Contra Costa Canal and/or Los Vaqueros Reservoir is treated at the Randall-Bold WTP in Oakley. The Randall-Bold WTP is jointly owned by DWD and CCWD, and is operated and maintained by CCWD. DWD currently has a joint powers agreement with CCWD for 15 mgd of treated water from the Randall-Bold WTP, with the right to purchase additional capacity up to a total of 30 mgd. DWD intends to purchase additional treated surface water capacity from CCWD, when needed, as its primary supply for future development.

Accommodating buildout of DWD's ultimate service area will require either: purchase of additional excess capacity at the existing WTP, if any is available; or expansion of the existing WTP, which was initially designed and constructed with a capacity of 40 mgd and is expandable to 80 mgd. The Randall-Bold WTP was designed assuming that it would be expanded in the future to serve future development within its planned service area.

DWD's current capacity of 15 mgd from the Randall-Bold WTP provides an average day supply of 7.5 mgd (2,738 MG). A total of 30 mgd ultimate capacity for maximum day demand conditions will provide an average day supply of 15 mgd (5,475 MG). In accordance with current agreements, DWD must purchase additional supply in 5 mgd increments. It is anticipated that DWD will purchase 5 mgd additional capacity in 2020 and 2030 in order to meet demands and water quality blending goals for the groundwater system. In August 2010, DWD provided its demand projections to CCWD for 2010 to 2035.

4.4 Groundwater

4.4.1 Groundwater Management Plan

In 2007, DWD adopted a groundwater management plan according to the procedures outlined in the Groundwater Management Planning Act (Sections 10750-10546 of the California Water Code AB 3030). This action was voluntary, not mandatory. The Groundwater Management Plan is included as Appendix E and can be viewed at www.diablowater.org/documents.

The purpose of the Groundwater Management Plan is to provide a management framework for maintaining a high quality, reliable, and sustainable supply of groundwater from the Tracy Subbasin within DWD's sphere of influence. To accomplish this, DWD intends to manage groundwater conjunctively with its surface water resources and support basin management objectives (BMOs) directed toward the sustainability of groundwater supplies on regional and local scales (e.g., groundwater basin and subbasin). Groundwater management involves coordinated actions related to groundwater withdrawal, replenishment, and protection to achieve long-term sustainability of the resource without detrimental effects on other resources and the environment. The Groundwater Management Plan sets forth the framework and related actions necessary to accomplish DWD's purposes while satisfying regional BMOs.

Regional BMOs addressed by the Groundwater Management Plan include the following:

- **Assessment of Groundwater Basin Conditions.** Monitoring programs and reporting on groundwater levels, groundwater quality, and pumping are necessary to ensure that undesirable effects such as long-term groundwater level declines, groundwater quality degradation, and significant inelastic land subsidence are avoided. Regional coordination of groundwater monitoring is important, and monitoring programs should be reevaluated periodically. Currently, comprehensive regional evaluation is not conducted on a regular basis. However, results from individual monitoring programs are made available to other agencies to aid in effective groundwater resource management and accomplishment of BMOs.

- **Avoidance of Overdraft.** It is important that groundwater pumping in the Tracy Subbasin not exceed the sustainable yield of the subbasin in order to avoid chronic water level declines that could lead to overdraft conditions or cause significant inelastic land subsidence.

- **Preservation of Groundwater Quality.** This objective involves actions needed to sustain a supply of good quality groundwater for beneficial uses in the basin. It includes coordinated efforts that identify short and longer-term water quality trends, wellhead and recharge area protection and actions to avoid salt accumulation and/or mobility of naturally occurring constituents. It also includes active characterization and solution of any groundwater contamination problems through cooperation with responsible parties or through independent action.

- **Preservation of Interrelated Surface Water and Groundwater Resources.** Several entities in the Tracy Subbasin, including DWD, use both surface water and groundwater. There are opportunities to expand these programs in the future and to increase the use of recycled water to meet existing and projected demands.

Local BMOs addressed by the Groundwater Management Plan include the following:

- **Understanding Local Groundwater Conditions.** Monitoring programs and reporting on groundwater levels, groundwater quality, and pumping have been implemented to assess groundwater conditions in the DWD service area. These programs are necessary to ensure that undesirable effects such as long-term groundwater level declines, groundwater quality degradation, and significant inelastic land subsidence are avoided.

- **Preservation of Groundwater Quality.** This objective involves actions needed to sustain a supply of good quality groundwater in the DWD service area. It includes coordinated efforts that identify short and longer-term water quality trends, wellhead and recharge area protection, and actions to avoid salt accumulation and/or mobility of naturally occurring constituents.

- **Avoid Impacts to Shallow Groundwater.** This objective involves actions needed to avoid deleterious impacts to shallow wells that exist throughout DWD's sphere of influence. These wells may serve individual households or small community systems.

- **Local Groundwater Monitoring and Coordination with Regional Monitoring Program.** DWD has conducted intermittent monitoring of groundwater levels and quality within its service area. Coordination of the DWD groundwater monitoring program with other regional monitoring programs will eliminate duplication and ensure that adequate monitoring is being conducted and enhance its own understanding of conditions in its area.

To accomplish the BMOs discussed above, the Groundwater Management Plan incorporates a number of components that are divided into five categories: 1) monitoring program; 2) water resource sustainability; 3) groundwater resource protection; 4) agency coordination and public outreach; and 5) plan implementation and updates. The Groundwater Management Plan components reflect the focus on local groundwater management in the Tracy Subbasin by DWD and continuing cooperation with the members of the ECWMA and other stakeholders in the subbasin. The components, listed below, include actions to accomplish the regional and local BMOs. More detail on these elements can be found in Appendix E.

- Category 1: Monitoring Program
  - *1A. Elements of Monitoring Program*
  - *1B. Evaluation and Reporting of Monitoring Data*
- Category 2: Water Resource Sustainability
  - *2A. Maintaining Stable Groundwater Levels*
  - *2B. Water Conservation*
  - *2C. Implementation of Conjunctive Water Management*
  - *2D. Integration of Recycled Water*
- Category 3: Groundwater Resource Protection
  - *3A. Well Construction and Destruction Policies*
  - *3B. Management and Mitigation of Contaminated Groundwater*
  - *3C. Long-Term Salinity Management*
  - *3D. Identification and Management of Recharge Areas and Wellhead Protection Areas*
- Category 4: Agency Coordination and Public Outreach
  - *4A. Continuation of Local, State, and Federal Agency Relationships*
  - *4B. Public Outreach*
  - *4C. Water Awareness Education*
- Category 5: Plan Implementation and Updates
  - *5A. Plan Implementation and Reporting*
  - *5B. Provisions to Update the Groundwater Management Plan*

4.4.2 Groundwater Basin Overview

DWD overlies a portion of the San Joaquin Valley Groundwater Basin as designated by DWR. DWD is located in the northwestern portion of the Tracy Subbasin, which is one of sixteen subbasins in the San Joaquin Valley Groundwater Basin. DWD's existing and prospective new wells (e.g., under the Well Utilization Project) are located in the Tracy Subbasin. DWR's Bulletin 118 (Update 2006) provides the following description of the Tracy Subbasin:

> "The San Joaquin Valley comprises the southernmost portion of the Great Valley Geomorphic Province of California. The Great Valley is a broad structural trough bounded by the tilted block of the Sierra Nevada on the east and the complexly folded and faulted Coast Ranges on the west. The Tracy Subbasin is defined by the areal extent of unconsolidated to

semiconsolidated sedimentary deposits that are bounded by the Diablo Range on the west; the Mokelumne and San Joaquin Rivers on the north; the San Joaquin River to the east; and the San Joaquin-Stanislaus County line on the south. The Tracy Subbasin is located adjacent to the Eastern San Joaquin Subbasin on the east and the Delta-Mendota Subbasin on the south. All of the above mentioned subbasins are located within the larger San Joaquin Valley Groundwater Basin. The Tracy Subbasin also lies to the south of the Sacramento Valley Groundwater Basin, Solano Subbasin.

The Tracy Subbasin is drained by the San Joaquin River and one of its major westside tributaries; Corral Hollow Creek. The San Joaquin River flows northward into the Sacramento and San Joaquin Delta and discharges into the San Francisco Bay."

Bulletin 118 indicates that groundwater levels in most wells in the subbasin remained stable for at least 10 years prior to the 2006 Bulletin update. DWR does not identify the subbasin as being in overdraft conditions.

4.4.3 DWD Groundwater Supply Facilities

DWD is currently operating a groundwater supply system that provides additional supply reliability. The system currently consists of groundwater from one well located in the Oakley, conveyed in a dedicated well supply pipeline to a blending facility located near the Randall-Bold WTP. At the blending facility, the groundwater is treated and blended with treated surface water within DWD's distribution system, prior to distribution to any customers, so that there is negligible impact on water quality. The amount of groundwater used in proportion to surface water is automatically controlled to maintain good water quality with a maximum hardness of 140 milligrams per liter (mg/L).

The first phase of the groundwater supply system included a 320-foot deep well and pump station located in Glen Park in Oakley, the blending facility at the Randall-Bold WTP, and an 18-inch diameter, 18,250-foot-long dedicated well supply pipeline connecting the well and the blending facility. The 18-inch diameter pipeline is sized for the anticipated ultimate groundwater use of 7 mgd to allow flexibility to meet future demands; however, installation of the 18-inch diameter pipeline does not commit DWD to implementing future phases of the well project.

The first well, the Glen Park Well, was put into service in 2006 and has a pumping capacity of approximately 2.0 mgd. Table 4-2 presents the annual amount of groundwater supplied by the Glen Park Well from 2006 through 2010.

Table 4-2
Groundwater Supply from 2006 - 2010

Year	2006	2007	2008	2009	2010
Groundwater Supply (MG)	72	307	302	241	336

Source: Based on DWD records.

A second well, the Stonecreek Well, is anticipated to be placed into service in June 2011. The Stonecreek Well will be located approximately one-half mile northeast of the existing Glen Park Well in Oakley, and constructed to similar standards. The Stonecreek Well is anticipated to have a pumping capacity of approximately 2.0 mgd and a yield similar to that of the Glen Park Well at 336 MG per year. Figure 4-1 presents the facilities of DWD's Well Utilization Project.

Each pump motor is operated using a variable frequency drive which allows DWD to control the flow rate produced from each well. The wells will operate year-round to reduce annual operating costs, since groundwater supply is lower cost than surface water, and at higher flow rates to meet peaking needs during the higher demand summer months. DWD will operate one or more wells at a time, potentially at a variety of flow rates, based upon time of use periods, and seasonal groundwater basin water quality parameters and elevations.

Table 4-1 presents the projected amount of groundwater to be supplied by the Well Utilization Project through 2040. With completion of the second well, DWD will have developed a total groundwater supply capacity of 4.0 mgd. By 2020, it is assumed that an additional 1.5 mgd well capacity is provided. By 2030, it is assumed that an additional 1.5 mgd well capacity is provided. Ultimately, groundwater may provide up to about 20 percent of the District's supply, which would be a total ultimate well capacity of about 6 to 7 mgd. Future wells are assumed to have the same ratio of pumping capacity to annual yield as the existing Glen Park well.

DWD will implement additional wells as "future phases." Future wells may also be located in the eastern part of DWD's Sphere of Influence. Specific locations of such wells will be determined as part of future well siting studies. DWD will base the decision to expand the groundwater supply system based on the performance of the Glen Park and Stonecreek Wells. Based on available information, it is possible that up to a 7 mgd ultimate pumping capacity can be achieved from the local groundwater basin. However, the long-term ability of the groundwater basin to provide these quantities is not known with certainty. As the first and second wells continue to be operated, ongoing data collection and monitoring conducted by DWD will provide better information.

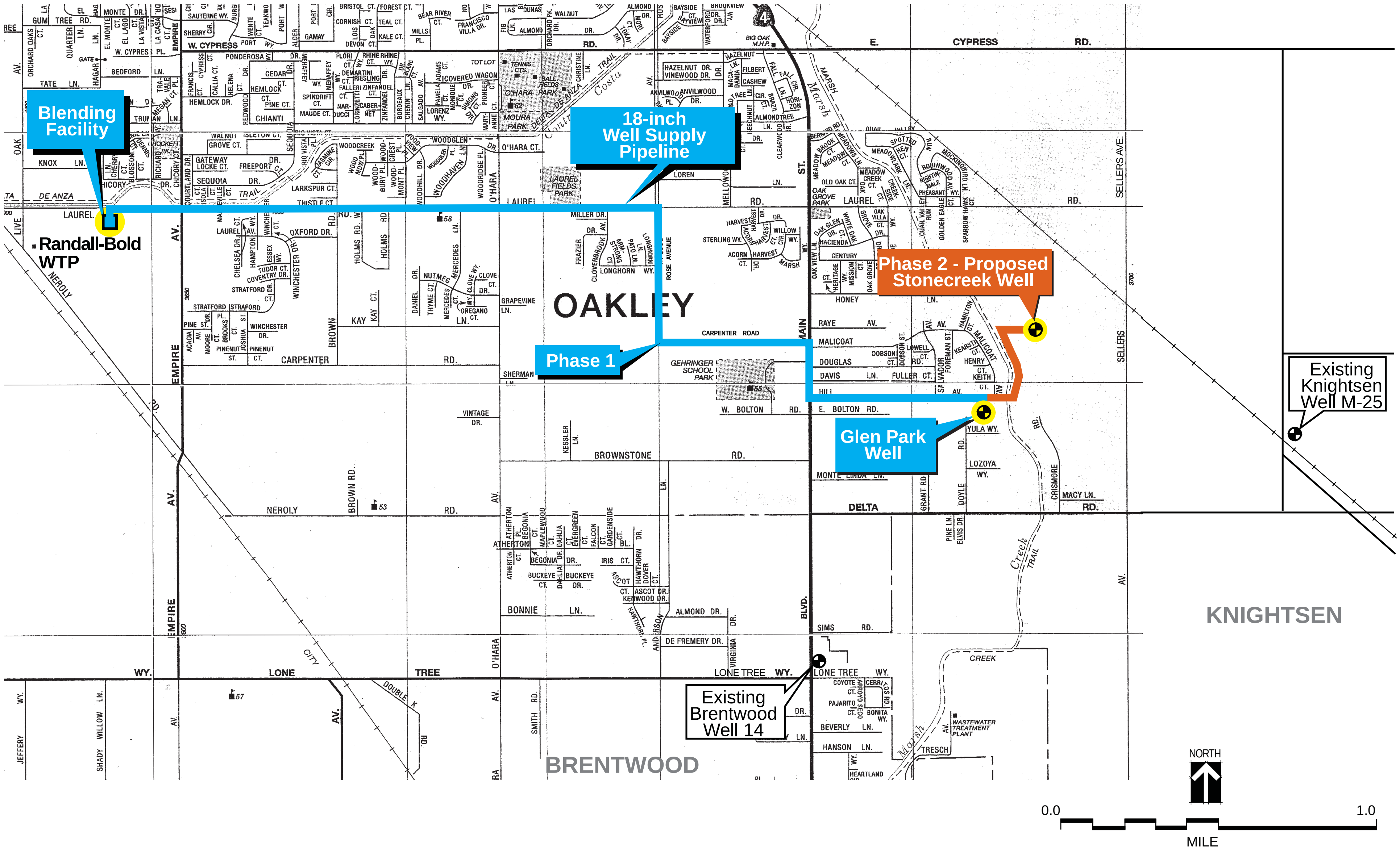
If future investigations indicate that it will not be possible to provide the anticipated amount of groundwater supply to meet demands, then DWD will either procure additional surface water supply from CCWD and/or investigate other local supply sources.

4.4.4 Local Groundwater Basin Characteristics

DWD's existing and future wells are located in a groundwater basin that has been studied since the late 1990s by Luhdorff & Scalmanini Consulting Engineers (LSCE). The last LSCE study of the groundwater basin is in the "Investigation of Groundwater Resources in East Contra Costa County" (March 1999). The groundwater basin is not adjudicated, and has not been studied by DWR beyond the information provided in Bulletin 118. The groundwater basin is not overdrafted.

The wells are located within the region identified as the Marginal Delta Dunes in LSCE's 1999 study. The 1999 study, and subsequent detailed investigations by LSCE, identified a favorable hydro-geologic area for well locations within DWD's service area.

When groundwater is withdrawn from an aquifer, groundwater levels are lowered around the well, creating a cone of depression. Additional pumping could increase the amount of drawdown and decrease the productivity of existing wells in the area. Under certain conditions this could result in a lowered water table, which in turn could adversely affect certain shallow wells, trees and creeks. However, the potential



W:\REPORTS\DWD\Urban Water Management Plan_Feb11\Graphics\DWD Well Utilization Fig 4-1.ai 02/17/11 JJT

Figure 4-1
DWD Well Utilization Project Facilities

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for such impacts from DWD's groundwater supply system has been investigated several times, and found to be low, as described below.

In 1999, a regional groundwater investigation was completed for DWD. This investigation determined that there is a hydraulic connection with the alluvial plain to the south, where a significant amount of groundwater pumping already exists for municipal uses (City of Brentwood) and agricultural uses (East Contra Costa Irrigation District). As part of the regional groundwater investigation, test borings and wells were completed to obtain geological and water quality information.

Luhdorff and Scalmanini also conducted an investigation of potential impacts on nearby wells in 2002. Approximately 35 wells, including the Knightsen municipal well, private domestic wells, and irrigation wells, were identified within 2,500 feet of the Glen Park well site. Thirty-four of these wells are shallower than 200 feet.

The deep annular seal of each of the Glen Park and Stonecreek Wells extends to 200 feet below the ground surface, and serves to isolate nearby wells from significant pumping impacts. The results of testing performed by DWD to date indicates that the operation of the Glen Park Well since 2006 has had no measurable or discernable impact on the water levels or water quality in nearby shallow wells. The Stonecreek Well and Pump Station will be located in the proposed Stonecreek Park, a future Oakley neighborhood park that will be constructed as part of the proposed Stonecreek Subdivision. The facility will be completed and ready for operation in early 2011; as such, long-term testing of the influence of this well on nearby shallow wells has not yet been performed.

In March-April 2007, DWD drilled a test hole and monitoring well at the Stonecreek site to assess hydrogeologic conditions and suitability for siting of a production well. The results indicated the site to be similar with regards to consistency in samples and geophysical logs as compared to the Glen Park site; as a result, it is anticipated that the maximum pumping capacity from the Stonecreek Well site is approximately 2 mgd. Besides demand and blending constraints, other considerations may dictate that pumping be limited to less than the maximum capacity stated above. These other considerations include mutual pumping interference, potential impacts to local wells, and groundwater management considerations as contained in DWD's Groundwater Management Plan. The plan embodies an impact-avoidance strategy based on phased development and ongoing testing and monitoring to ensure that pumping from DWD facilities do not induce adverse impacts on local and regional scales.

As part of the Groundwater Management Plan, DWD will continue to monitor groundwater levels and consult other well operators to monitor effects on other wells in the region. In the event local wells were to be adversely affected (i.e., lowering of groundwater below existing pumps or degradation of water quality), decisions about mitigation actions would be made on a case-by-case basis. Mitigation measures may include, but not be limited to, supplying the property with a different source of water, lowering or replacing pumps, or installing new wells.

4.5 Other Water Sources

4.5.1 Recycled Water

4.5.1.1 Wastewater System Description

Ironhouse Sanitary District (ISD) owns and operates the wastewater treatment and collection systems in DWD's service area including the Oakley area and Bethel Island. ISD provided the information in this section on the wastewater system and potential recycled water use.

The wastewater treatment plant (WWTP) currently produces a disinfected secondary effluent. The plant uses an aeration pond treatment system consisting of a 9-inch parshall flume, two grinders, two pumps, and two parallel two-stage aerated treatment ponds followed by chlorination. The average daily flow to the plant in 2010 was approximately 2.4 mgd. The dry weather treatment capacity is approximately 2.7 mgd. Wastewater is collected and conveyed to the WWTP by a network of gravity sewer mains and force mains where needed due to ground elevations.

ISD conveys recycled water from the WWTP for irrigation of agricultural lands on property adjacent to the WWTP and on Jersey Island. Jersey Island is not within DWD's planning area.

4.5.1.2 Wastewater Generation, Collection, and Treatment

Table 4-3 shows the wastewater flows generated within ISD's service area that are collected and conveyed to the WWTP. These quantities include flows from Bethel Island as well as the Oakley area.

Table 4-3
Current and Projected Wastewater Generated and Collected in ISD Service Area

	2010		Projected					
	Projected in 2005 UWMP	Actual	2015	2020	2025	2030	2035	2040
Average Daily Flows (mgd)	3.2	2.4	2.8	3.2	3.6	4.0	4.4	4.8

Source: Data provided by Ironhouse Sanitary District.

Table 4-4 presents current, future, and buildout flows at the WWTP.

Table 4-4
ISD Wastewater Treatment Plant Flows

2010 Average Daily Flow	2010 Maximum Daily Flow	Year of Planned Build-Out	Planned Average Daily Flow
2.4 mgd	4.8 mgd	2050+	6.8 mgd

Source: Data provided by Ironhouse Sanitary District.

4.5.1.3 Wastewater Disposal and Recycled Water Uses

Currently, all wastewater collected and treated by ISD is recycled in the form of irrigation water for agricultural lands. The wastewater is conveyed through a series of pipes and valves to designated fields. The crops grown on the agricultural lands are for non-human consumption and consist primarily of rye, wheat, forage mix, and sudan grasses. Irrigation currently takes place on 166 acres of land adjacent to the WWTP in Oakley and on 433 acres of land on Jersey Island.

At present, collected wastewater receives secondary treatment and disinfection to meet a 23 MPN/100 mL (Most Probable Number per 100 milliliters) coliform count, which limits its reuse options. To expand reuse options, the treatment process would need to be improved to further clean the wastewater.

In 2007, ISD completed an Environmental Impact Report (EIR) to expand and improve treatment and disposal capacity to 8.6 mgd. In the EIR, ISD evaluated several alternatives including: continued irrigation of agricultural lands; direct discharge of treated effluent to the San Joaquin River year-round or only during periods when land disposal is not feasible; and a combination of land and river discharge. A determination was made to construct a new membrane bioreactor WWTP with treated effluent meeting Title 22 water quality criteria for unrestricted reuse. The WWTP is scheduled to be completed in October 2011. Treated effluent will be applied to agricultural fields to the best extent possible, discharged to the San Joaquin River year-round, and used for off-site reclamation when users are identified.

Though the new WWTP may make it possible to provide non-potable water for reuse by golf courses, industry, or landscape irrigation, a need for such use would have to be identified. ISD participated in a regional water recycling study looking at providing recycled water to industry outside of the ISD service area. ISD is also in the process of preparing a Recycled Water Master Plan looking at potential users of recycled water within the ISD service area and the economic feasibility of developing a separate non-potable water system that could supply recycled water to off-site users.

4.5.1.4 Encouraging and Optimizing Recycled Water Use

Since all wastewater effluent is currently recycled by ISD on agricultural lands, DWD is taking no current actions to encourage or optimize additional use of recycled water. DWD's policy is to require that large new turf landscape areas use private groundwater wells or non-potable water for irrigation. The separate irrigation systems to serve these areas could be supplied by recycled water if such a system is determined to be economically feasible by ISD.

In the future, if DWD identifies large potential users of recycled water within its service area, DWD will coordinate with ISD to determine whether an economic feasibility study may be warranted. For example, such users may include large industries requiring cooling water or other non-potable uses, or large landscape areas that would otherwise irrigate with potable water.

4.5.2 Water Transfers and Exchanges

Most of DWD's water is purchased from CCWD; therefore, no exchange or transfer opportunities exist for DWD except through CCWD. CCWD has identified water transfers as a preferred means of strengthening drought protection for existing customers and meeting supply shortfalls.

CCWD's location in the Sacramento-San Joaquin Delta provides access to supplies from the Sacramento and San Joaquin Rivers and their tributaries. In addition, the DWR State Water Project (SWP) and CVP direct their supplies through the Delta en route to delivery points in the San Joaquin Valley and Southern California. CCWD's location provides direct or indirect access to virtually all water supply and storage facilities in the Central Valley.

Current and future opportunities through CCWD are summarized below.

4.5.2.1 East Contra Costa Irrigation District Contract for Long-Term Water Transfer

CCWD's February 2000 Agreement with the East Contra Costa Irrigation District (ECCID) is for a long-term water transfer. It provides up to 8,200 AF in normal years and includes provisions for an additional 4,000 AF through groundwater exchange when the CVP is in a shortage condition.

4.5.2.2 Other Long-Term Water Transfer Opportunities

CCWD anticipates that an additional water transfer will be purchased in the next 5 to 10 years. The following water transfer opportunities are being evaluated by CCWD:

- **Conjunctive Use with Long-term Contract.** CCWD could partner with an agricultural district holding surface water rights and co-invest in conjunctive use facilities, such as new groundwater wells. The new wells could allow the agricultural district to shift use from surface water to groundwater supplies in dry years and exchange its surface water supplies to CCWD to meet dry-year demand.

- **Groundwater Banking.** CCWD could extend the reliability of its existing CVP supplies by groundwater banking, through groundwater storage, surplus CVP entitlement or other available wet year supplies. CCWD could draw upon the banked water supplies to meet demand when needed.

- **Lease/Purchase Water Rights and Remarket Surplus Supplies.** CCWD could enter into a long-term water supply lease or purchase an existing water right. The lease or sale would be for a fixed amount of annual supplies. All surplus water supplies could be remarketed through a long-term contract with a third-party buyer or the spot market.

- **Co-Investment in Agricultural Conservation.** This option could involve forming a long-term relationship with an agricultural partner holding surface water rights. CCWD could invest in agricultural conservation infrastructure, such as canal lining and weed abatement projects. A fixed amount of conserved supplies could be made available to CCWD annually and any surplus supplies could be banked through groundwater storage or remarketed.

- **Fallowing or Crop Shifting Option Contract.** This option includes a long-term option contract with an agricultural district. When called upon by CCWD through exercise of the option, the agricultural district could fallow land or shift crops to make water supplies available.

4.5.2.3 Short-Term Water Transfers

CCWD has experience in implementing short-term water transfers. For example, CCWD purchased approximately 3,400 AF from Western Water in 2000 and 5,000 AF from the Yuba County Water Agency in 2003 and 2004. The goal of the short-term transfer program was to establish relationships with sellers, work through the various institutional issues associated with transfers before a serious water shortage occurs, and to develop water transfer agreements that would allow CCWD to purchase water in shortage years.

Many agricultural districts in Northern California participate in the spot market each year. If required, CCWD could pursue additional short-term water transfers directly with these agencies, or short-term water transfers available through DWR's Dry Year Water Purchase Program.

4.5.3 Desalinated Water

Desalination involves removing salts and impurities from seawater or non-potable surface water or groundwater using treatment technologies such as reverse osmosis membranes or distillation methods. Desalination facilities are costly to construct and operate relative to DWD's current supply sources. There are also significant environmental and permitting issues associated with the water intake and with disposal of brine from the treatment process.

Potential opportunities for desalination supply in East Contra Costa County are being explored on a regional level through the ECWMA, of which DWD is an active participant. To date, the cost of implementing desalination supply including brine disposal, has not been cost-effective compared with other available sources. As advancements in technology make desalination a more cost-effective option in coming years, the East County water agencies, including DWD, will consider desalination projects as potential supply sources in future years.

Since 2003, CCWD has been jointly coordinating with three other San Francisco Bay Area water suppliers (East Bay Municipal Utility District [EBMUD], San Francisco Public Utilities Commission, and Santa Clara Valley Water District) to evaluate the feasibility of a regional desalination facility to supplement dry-year supplies. In the spring of 2010, the Zone 7 Water Agency (Zone 7) joined the project in the interest of an all-year water supply option. The Project would provide a new local water supply source for a combined population of 5.6 million people and increase supply reliability during emergencies, such as droughts and earthquakes. Benefits of the project include:

- Minimizing potential adverse environmental impacts associated with the construction of separate desalination plants in close proximity;
- Providing substantial cost savings through economies of scale and resource pooling; and
- Promoting strong regional cooperation through joint ownership, operation, and management of a regional facility serving the needs of multiple Northern California water districts.

Recent Project milestones include the successful completion of a $1.9 million pilot test at CCWD's Mallard Slough Pump Station, which operated from November 2008 to April 2009. A final report summarizing the pilot plant results was finalized in June 2010, which included recommended treatment facilities and estimated capital and operating costs for a full-scale facility. The pilot testing evaluated two pretreatment options using brackish water, sea water and nanofiltration membranes divided into three treatment trains. The feed water salinity varied seasonally and tidally, exposing the pilot plant to chloride concentrations ranging from 300 to 3,300 mg/L, representing the range of conditions a desalination facility at Mallard Slough would need to treat. The treatment train with a brackish water membrane followed by a seawater membrane performed the most efficiently, with a 70-82 percent recovery and final chloride levels between 19 to 67 mg/L.

The Project partners are currently developing an institutional framework to further define the regional Project. The framework includes identifying the Project plant size and location, identifying preferred water right options, and evaluating the optimal production and delivery options. Currently, the Project partners' preferred alternative is a 20 mgd product water facility located at CCWD's Mallard Slough Pump Station.

Further study is necessary to model the effects on Delta water quality of a full-scale desalination facility located at the Mallard Slough Pump Station. Detailed hydraulic modeling is also necessary to evaluate wheeling capacity within the EBMUD distribution system, which would be required to deliver water to other Project partners. The pilot plant phase was completed within the scope of a 2007 Memorandum of Agreement (MOA) between the Project partners. A new MOA is being developed which will include Zone 7 and cover the proposed additional planning studies, modeling tasks and agency outreach. Completion of work under the new MOA is anticipated by 2014.

4.5.4 Non-Potable Water

DWD no longer uses its existing well at the Rose Avenue Corporation yard under normal conditions due to poor water quality. It is a standby emergency well only. The well is 12 inches in diameter and has a capacity of 1,100 gallons per minute. The well has not been used to any extent over the past ten years.

In 2009, DWD explored the option of using the Rose Avenue well as a non-potable supply. The potential project would utilize the poor quality well water for construction water purposes. A connection would be made from the well to a fill hydrant to be located at the ISD parking lot, which is adjacent to the DWD Corporation Yard and well. DWD did not move forward with this project in 2009 because drought conditions lessened and the additional supply was not necessary. This project could be implemented at any time if a source of non-potable supply is needed to lessen potable demands.

4.5.5 Indirect Potable Water Reuse

DWD currently does not use and does not have any plans to implement indirect potable water reuse.

Section 5
Water Supply Reliability and Shortage Contingency Plan

5.1 Law

10620 (f) An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions.

10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

10631 (c) (1) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following:

- An average water year.
- A single dry water year.
- Multiple dry water years.

10631 (c) (2) For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describes plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.

10631 (h) Include a description of all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use as established pursuant to subdivision (a) of Section 10635.

10632. The plan shall provide an urban water shortage contingency analysis, which includes each of the following elements, which are within the authority of the urban water supplier:

10632 (a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage.

10632 (b) An estimate of the minimum water supply available during each of the next three years based on the driest three-year historic sequence for the agency's water supply.

10632 (c) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.

10632 (d) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street-cleaning.

10632 (e) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.

10632 (f) Penalties or charges for excessive use, where applicable.

10632 (g) An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.

10632 (h) A draft water shortage contingency resolution or ordinance.

10632 (i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.

10634. The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management strategies and supply reliability.

10635 (a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional or local agency population projections within the service area of the urban water supplier.

5.2 Introduction

This section of the UWMP describes factors that affect water supply reliability, provides an estimate of the minimum three-water supply from current sources, and compares existing water and planned water supplies with projected water demand between 2010 and 2040. This evaluation of water reliability requires the integration of information provided in previous sections of this UWMP including Section 3, which presents DWD's projection of water demand before conservation and quantifies additional demand reduction needed to meet new requirements from the recently adopted Water Conservation Bill. Also critical to assess reliability is information from Section 4 describing and quantifying the various local and imported sources of water supply available to meet water demands.

Several factors affect water supply reliability in DWD's service area, including:

- Existing or potential future water quality;

- Potential impacts of long-term climate change;
- Environmental issues; and
- Non-drought conditions.

The impact of these factors on supply yield depends upon many factors unique to each type of supply, as summarized in Table 5-1. Section 5 summarizes the reliability of each source of supply and the influence of reduced yields on DWD's ability to meet current and projected water demand.

Table 5-1
Factors Influencing Water Supply Reliability

Water Supply Source	Water Quality	Climate Change	Environmental issues
Surface water	X	X	X
Groundwater	X	X	

Reductions from normal supply volume are a result of these factors. To assess the impact of these factors on current water supplies, Table 5-2 provides an estimate of the minimum water supply volume from CCWD surface water and groundwater during each of the next three years, based on the information presented in the subsections that follow.

Table 5-2
Estimated Minimum Water Supply Over the Next Three Years (2011-2013)

Water Supply Source	Normal Hydrologic Conditions (MG)	Multiple Dry-Year Hydrologic Conditions (MG)		
		2011	2012	2013
Surface water	2,738	2,738	2,738	2,491
Groundwater	672	672	672	672
Total	3,410	3,410	3,410	3,163

5.3 Water Supply Reliability by Source

5.3.1 Surface Water from CCWD

CCWD, DWD's wholesale supplier of surface water, provided information regarding its supply reliability to year 2035 in the February 7, 2011 letter included in Appendix F. CCWD's supply planning includes all of its supply sources, including surface water from the CVP. The CCWD supply reliability conditions are:

- Normal (average) year: a below normal or wetter year on the Sacramento River Hydrologic Region 40-30-30 Water Supply Index;
- Single-year drought: 1977 conditions; and
- Multiple-year drought sequence: 1987-1992 conditions.

CCWD's water supply planning includes other supply sources to make up for cutbacks in CVP supply, e.g., transfer/exchange agreements discussed in Section 4.5.2, in order to meet their supply reliability goals. The water supply reliability goal approved by the CCWD Board of Directors is to meet 100 percent of demand in normal years and at least 85 percent of demand during drought conditions. The remaining 15 percent would be met by a combination of short-term water purchases by CCWD and a voluntary short-term conservation program by CCWD retail customers, and its wholesale customers, including DWD.

CCWD expects to meet near-term demands to 2020 under all supply conditions except the third year of a drought, when an 8-9 percent demand reduction would be requested. Beginning in 2025, additional actions will be needed during a single-year drought and the second and third years of a multiple-year drought. These actions include short-term water purchases by CCWD, in conjunction with a request for up to a 5 percent demand reduction during a single-year drought and the second year, and a 15 percent demand reduction during the third year of a drought. The maximum amount of short-term demand reduction expected to be necessary during a multiple year drought is 15 percent of demand.

Table 5-3 summarizes the expected reliability of supplies during a normal year, a single dry year, and a multiple-year drought period. As indicated in Table 5-3, DWD should not experience any severe rationing during a three-year drought or other shortage situation. During the critical 1977/1978 drought, DWD customers voluntarily conserved water to such an extent that DWD did not need to impose mandatory rationing.

Table 5-3
Summary of CCWD Supply Reliability

Year	Normal Water Year	Single Year Drought	Multi-Year Drought		
			Year 1	Year 2	Year 3
2010	100%	100%	100%	100%	91%
2015	100%	100%	100%	100%	92%
2020	100%	100%	100%	100%	92%
2025	100%	99%	100%	99%	88%
2030	100%	96%	100%	96%	85%
2035	100%	95%	100%	95%	85%

Source: CCWD Supply Reliability Analysis, provided in Appendix F.

5.3.2 Groundwater

As discussed in Section 4.4, DWD is currently implementing its Well Utilization Project. This groundwater supply will be available during dry years when surface water supplies may be reduced. If surface supplies are reduced, DWD will operate its wells to make up the difference. The combination of surface water and groundwater supply will meet all of DWD's demands.

The first well has a capacity of 2 mgd. The second well, to be placed into service in June 2011, will also provide 2 mgd. Future wells are planned that will ultimately increase the groundwater supply up to a maximum capacity of 7 mgd.

DWD does not utilize a 100 percent groundwater supply on a regular basis given the District's commitment to keeping the hardness of the water to its customers as low as possible. During times of drought, DWD will utilize more of the groundwater supply.

5.4 Water Reliability by Categorical Year Type

The water supply reliability assessment shown in Tables 5-4 through 5-6 presents comparisons of water supply and demand for three categories of hydrologic condition: normal, single dry year, and multiple dry years. Results of the comparisons show surpluses of water supply compared with demand during normal and single-dry year conditions. The data used to develop these comparisons reflects the variability in surface water supplies from CCWD.

Table 5-4
Water Supply and Demand Comparison for a Normal Hydrologic Condition

Supply / Demand (MG)	2010	2015	2020	2025	2030	2035
CCWD	2,738	2,738	4,563	4,563	5,475	5,475
DWD Groundwater (1)	336	672	924	924	1,176	1,176
Total Supply	3,074	3,410	5,487	5,487	6,651	6,651
Demand Projection	1,816	2,518	3,282	4,045	4,808	5,572
Additional Conservation (2)	0	15	488	876	1,263	1,650
Total Demand	1,816	2,504	2,793	3,169	3,545	3,922
Surplus/(Deficit) (3)	1,257	906	2,693	2,317	3,106	2,729
Surplus/(Deficit) as % of Supply	41%	27%	49%	42%	47%	41%
Surplus/(Deficit) as % of Demand	69%	36%	96%	73%	88%	70%

(1) Values shown for groundwater represent estimated yield. With the Glen Park and Stonecreek Wells, groundwater supply capacity is 1,460 MG. Ultimate groundwater supply capacity at 7 mgd is 2,555 MG.
(2) Estimate of demand reduction needed to achieve urban water use targets of 166 gpcd in 2015 and 157 gpcd in 2020.
(3) Total supply minus total demand.

Table 5-5
Water Supply and Demand Comparison for a Single-Dry Year Hydrologic Condition

Supply / Demand (MG)	2010	2015	2020	2025	2030	2035
CCWD	2,738	2,738	4,563	4,517	5,256	5,201
DWD Groundwater (1)	336	672	924	924	1,176	1,176
Total Supply	3,074	3,410	5,487	5,441	6,432	6,377
Demand Projection	1,816	2,518	3,282	4,045	4,808	5,572
Additional Conservation (2)	0	15	488	876	1,263	1,650
Total Demand	1,816	2,504	2,793	3,169	3,545	3,922
Surplus/(Deficit) (3)	1,257	906	2,693	2,271	2,887	2,456
Surplus/(Deficit) as % of Supply	41%	27%	49%	42%	45%	39%
Surplus/(Deficit) as % of Demand	69%	36%	96%	72%	81%	63%

(1) Values shown for groundwater represent estimated yield. With the Glen Park and Stonecreek Wells, groundwater supply capacity is 1,460 MG. Ultimate groundwater supply capacity at 7 mgd is 2,555 MG.
(2) Estimate of demand reduction needed to achieve urban water use targets of 166 gpcd in 2015 and 157 gpcd in 2020.
(3) Total supply minus total demand.

Table 5-6
Water Supply and Demand Comparison for a Multiple-Dry Year Hydrologic Condition

Year	Supply / Demand (MG)	2010	2015	2020	2025	2030	2035
First Year of Supply	CCWD	2,738	2,738	4,563	4,563	5,475	5,475
	DWD Groundwater (1)	336	672	924	924	1,176	1,176
	Total Supply	3,074	3,410	5,487	5,487	6,651	6,651
	Demand Projection	1,816	2,518	3,282	4,045	4,808	5,572
	Additional Conservation (2)	0	15	488	876	1,263	1,650
	Total Demand	1,816	2,504	2,793	3,169	3,545	3,922
	Surplus/(Deficit) (3)	1,257	906	2,693	2,317	3,106	2,729
	Surplus/(Deficit) as % of Supply	41%	27%	49%	42%	47%	41%
	Surplus/(Deficit) as % of Demand	69%	36%	96%	73%	88%	70%
Second Year of Supply	CCWD	2,738	2,738	4,563	4,517	5,256	5,201
	DWD Groundwater (1)	336	672	924	924	1,176	1,176
	Total Supply	3,074	3,410	5,487	5,441	6,432	6,377
	Demand Projection	1,816	2,518	3,282	4,045	4,808	5,572
	Additional Conservation (2)	0	15	488	876	1,263	1,650
	Total Demand	1,816	2,504	2,793	3,169	3,545	3,922
	Surplus/(Deficit) (3)	1,257	906	2,693	2,271	2,887	2,456
	Surplus/(Deficit) as % of Supply	41%	27%	49%	42%	45%	39%
	Surplus/(Deficit) as % of Demand	69%	36%	96%	72%	81%	63%
Third Year of Supply	CCWD	2,491	2,519	4,198	4,015	4,654	4,654
	DWD Groundwater (1)	336	672	924	924	1,176	1,176
	Total Supply	2,827	3,191	5,122	4,939	5,830	5,830
	Demand Projection	1,816	2,518	3,282	4,045	4,808	5,572
	Additional Conservation (2)	0	15	488	876	1,263	1,650
	Total Demand	1,816	2,504	2,793	3,169	3,545	3,922
	Surplus/(Deficit) (3)	1,011	687	2,328	1,770	2,284	1,908
	Surplus/(Deficit) as % of Supply	36%	22%	45%	36%	39%	33%
	Surplus/(Deficit) as % of Demand	56%	27%	83%	56%	64%	49%

(1) Values shown for groundwater represent estimated yield. With the Glen Park and Stonecreek Wells, groundwater supply capacity is 1,460 MG. Ultimate groundwater supply capacity at 7 mgd is 2,555 MG.
(2) Estimate of demand reduction needed to achieve urban water use targets of 166 gpcd in 2015 and 157 gpcd in 2020.
(3) Total supply minus total demand.

As indicated in the tables, DWD has adequate supply sources to meet future needs under all conditions. DWD is entitled to and intends to purchase additional surface water treatment capacity, when needed to meet future demands. Ultimately, DWD can purchase up to 30 mgd treatment capacity to meet maximum day demands, which will provide a nominal average day supply of 15 mgd.

DWD's groundwater supply will provide additional supply to supplement surface water and meet the projected demands. Ultimately groundwater is anticipated to provide up to 20 percent of the total supply, up to a capacity of 6 to 7 mgd. If future investigations indicate that it will not be possible to provide the anticipated amount of groundwater supply, then DWD will either procure additional surface water supply from CCWD and/or investigate other local supply sources.

5.5 Water Quality

5.5.1 Surface Water

The Los Vaqueros Reservoir is part of the CCWD raw water supply system. DWD is no longer subject to the impacts of seasonal or climatic shortages as severely as before the Los Vaqueros Reservoir was constructed. A reservoir expansion project will increase the storage capacity to 160,000 AF and raise the dam height by 34 feet. Construction began in early 2011 and will be be completed in 2012. The project will immediately improve water quality and water supply reliability.

Prior to construction of the 100,000-AF Los Vaqueros Reservoir, surface water quality was affected by seasonal shortages or dry hydrologic conditions. During periods of water shortage there are insufficient river flows in the Delta to push back the salt water from the San Francisco Bay. As a result, salt water flows into the Delta thus reducing the quality of the water at the water supply intakes located at Rock Slough and Old River.

The quality of the water in the Delta is typically measured by its chloride content. Current drinking water standards require chloride concentrations not to exceed 250 parts per million (ppm), with short term limits of 500-600 ppm. The chloride concentration at the water supply intakes has historically fluctuated between 20 and 250 ppm and in some instances has gone above 250 ppm during drought conditions. Low chloride concentration water is transferred into the Los Vaqueros Reservoir when higher-quality water is available. The stored water is then blended as needed with water from the water supply intakes in order to achieve a consistent water quality of 65 ppm 100 percent of the time.

CCWD completed the Middle River Intake (Alternative Intake Project) to relocate some of its pumping to a new drinking water intake in the Delta. Because water quality varies widely throughout the Delta, the new intake located further east allows CCWD to divert water of higher quality during dry periods, including droughts. The intake provides CCWD with the flexibility to divert higher quality water from the Delta without increasing the amount of water pumped. The project began operation in July 2010.

CCWD is also implementing the Canal Replacement Project which consists of lining or encasement of approximately four miles of the Canal from the Rock Slough Intake to Pumping Plant No. 1. The purpose of the project is to improve source water quality at the Rock Slough Intake by hydraulically isolating the high saline groundwater from the Canal. The project will also increase public safety and flood control. Construction of the 1,900-foot initial phase was completed in 2010. The project is being completed in phases with each phase of the project spanning a specific reach of the canal with unique project partners, funding sources, and benefits.

In January 2004, CCWD and EBMUD entered into an agreement to wheel water through the Freeport Regional Water Project facilities. In 2007, the EBMUD-CCWD untreated water interconnection was completed, which connected CCWD's Los Vaqueros Pipeline and the EBMUD's Mokelumne Aqueduct in Brentwood. The intertie enables CCWD to divert up to 3,200 AF per year of its CVP supply at the Freeport diversion facility where water quality is better than at CCWD's Delta Intakes. The new intertie also provides for the sharing of water supplies between the agencies during emergency conditions or to support planned maintenance.

Also in early 2004, CCWD formed a regional partnership with local water agencies to begin a research project on advanced water treatment processes. The Advanced Treatment Demonstration Project included a full-scale application of new technologies as applied to source water from the Sacramento-San Joaquin Delta. The research examined methods to produce safer drinking water with new and existing disinfectants and advanced filtration. A second phase of the Advanced Treatment Project was initiated to improve understanding of Delta source water quality with respect to levels of various contaminants including endocrine disrupting compounds and pharmaceuticals, and to quantitatively assess removal effectiveness of existing and advanced treatment processes (membrane filtration and chemical addition). The results of the study will be documented in a report scheduled for completion in late 2011.

5.5.2 Groundwater

DWD's Well Utilization Project is being implemented to provide good quality water. In addition, treatment and monitoring are provided at the centralized blending facility to ensure that all drinking water standards are met.

A water quality evaluation of the first well, the Glen Park Well, indicated that the groundwater is generally of good quality. The only constituent regulated by the California Department of Public Health that was detected at levels well below the regulatory limits was nitrate. Based on the water quality data, the only treatment required on water from the Glen Park Well is disinfection.

Based on several groundwater investigations conducted by LSCE from 1999 through April 2004, it has been determined that the proposed groundwater pumping at a rate of 1-2 mgd would not induce groundwater quality degradation locally or regionally. This assessment was confirmed during the testing of the Glen Park Well in April 2004, when it was found that water quality was essentially the same as found in the monitoring well previously installed in Glen Park. DWD will monitor groundwater quality continuously during the Glen Park and Stonecreek Wells' operation.

The most common scenario would be water quality degradation by introducing nitrates from the shallower aquifer and manganese from the deep aquifer. However, groundwater quality impacts are unlikely to occur given the presence of multiple clay layers between the aquifers, and the 200-foot annular seal on the deep well.

5.6 Climate Change

While climate change is a global-scale concern, it is particularly important in the West and Pacific Coast of the United States where water resources are currently constrained. As such, California is leading the way with laws that require reductions in greenhouse gas emissions and requirements to incorporate climate change and impacts in water planning.

To understand some of the key issues surrounding climate change impacts, it is important to put it into the context of DWD's water supplies. California lies within multiple climate zones. Therefore, each region will experience unique impacts to climate change. Because DWD relies on both local and imported water sources, it is necessary to consider the potential impacts climate change could have on locally as well as the Sierra Nevada watershed where a significant portion of imported water originates.

Generally speaking, any water supplies that are dependent on natural hydrology are vulnerable to climate change, especially if the water source originates from mountain snow pack. In addition to water supply impacts, changes in local temperature and precipitation are expected to alter water demand patterns.

Scientists predict future scenarios using highly complex computer general circulation models (GCMs). Although most of the scientific community agrees that climate change is occurring and, as a result, mean temperatures for the planet will increase, the specific degree of this temperature increase cannot be accurately predicted. Predictions of changes in precipitation are even more speculative, with some scenarios showing precipitation increasing in the future and others showing the opposite. To place the global coarse-scale climate projections to a regional level that incorporates local weather and topography, the GCMs are "downscaled". Generally, the GCMs predict the following impacts throughout California:

- An increase in average temperatures that will be more pronounced in the summer than in the winter
- An increase in heat waves and droughts that will extend for a longer duration
- A decrease in precipitation that, coupled with higher temperatures, will increase evaporation/transpiration
- An increase in short-duration/high volume intense storm events during the winter

The impacts of these climate effects will likely be increased water demands for irrigation and cooling purposes, and decreased total local surface runoff. Other impacts might include increased fire events that could impact water quality and sedimentation, as well as decreased groundwater recharge due to lower soil moisture.

To date, most studies on climate change impacts to California's water supply have been conducted for the Northern California region, which supplies both the CVP and the SWP. In 2009, DWR released a SWP Delivery Reliability Report, which specifically analyzes changes in volume of water available under various climate change scenarios. In this report, DWR predicted that SWP deliveries could be reduced by as much as 15 percent in some cases (see Figure 5-1). The primary effects of climate change to the Delta supply include, among others:

- More precipitation will fall as rain than snow;
- Reduced Sierra snowpack;
- Shifted timing of snowmelt runoff into streams – spring runoff comes earlier resulting in increased winter flows and decreased spring flows;
- Increased flood events; and
- The most severe climate impacts in California are expected to occur in the Sierra watershed, which is where the SWP and CVP supplies originate. Therefore, imported water supply is extremely vulnerable to climate change.

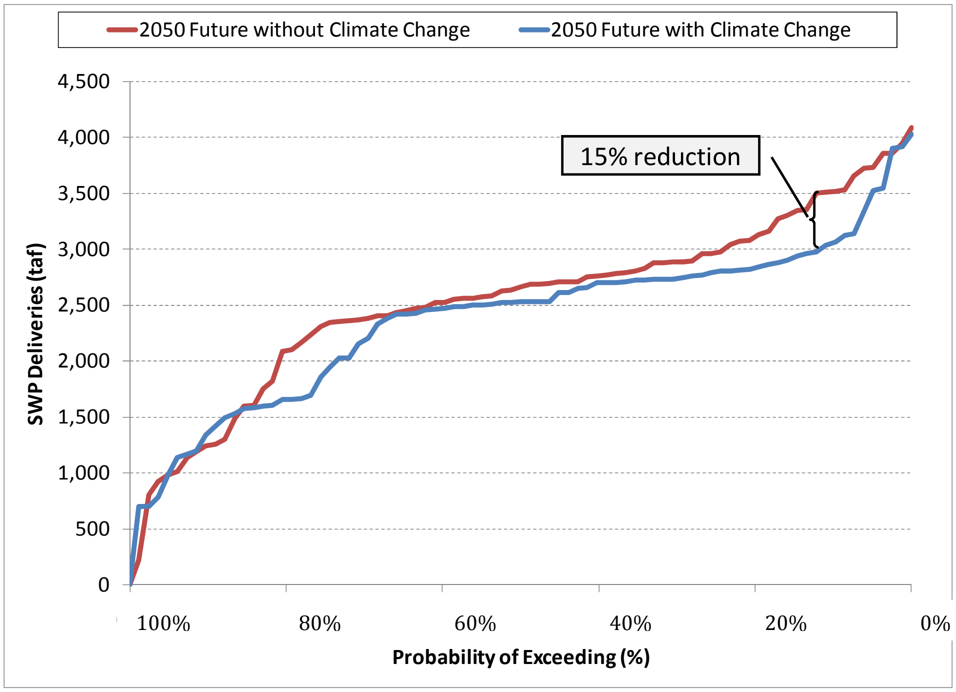

Figure 5-1
Climate Change Impacts to SWP Reliability

Water agencies can reduce the impacts of climate change on water resources through adaptation and/or mitigation. For water resources planning, a climate change adaptation strategy involves taking steps to effectively manage the impacts of climate change by making water demands more efficient and relying on supply sources that are less vulnerable to climate change. A mitigation strategy involves proactive measures that reduce greenhouse gas emissions.

5.7 Environmental Issues

In addition to climate change, the reliability of the CVP supply is reduced as a result of pumping restrictions to protect fish species listed as threatened and endangered under the federal or state Endangered Species Acts in the Bay-Delta. Restrictions on Delta pumping were required by the biological opinions issued by the U.S. Fish and Wildlife Service (December 2008) and National Marine Fisheries Service (June 2009). If the current conveyance systems in the Delta are improved in the future, CVP reliability would improve. Considering the recently approved Delta Vision plan, there is a high potential for future updates to the SWP and CVP reliability reports to reflect plans for additional facilities that would then improve reliability. These updates will be incorporated into subsequent UWMPs for DWD.

5.8 Reliability under Non-Drought Conditions

DWD has no inconsistent water sources, and can provide adequate water supply during all conditions.

The supply received from CCWD is very reliable given CCWD's contracts with Reclamation and with ECCID for supplemental supply. With the completion of the Los Vaqueros Reservoir, the reliability of DWD's supply from CCWD has increased dramatically. CCWD previously had only three to seven days of storage with Contra Loma Reservoir. CCWD has three to six months of emergency supply storage with Los

Vaqueros Reservoir. When the expanded reservoir is full, it will provide enough storage for approximately 14 to 28 months of normal use, if necessary.

In addition, CCWD conducted a seismic reliability of their water supply system and is implementing recommended improvements. These improvements include the Multi-Purpose Pipeline, to improve flexibility and reliability of supply, as well as a pipeline interties, landslide mitigations, and modifications of petroleum pipelines at canal crossings.

Historically, the Canal has been a reliable source of water. The only mandatory water supply restriction in the last thirty years occurred from February 1977 to January 1978. During this period, all Contra Costa Canal raw water customers were rationed. The only other period of water shortage occurred during 1991 to 1994 when all Contra Costa Canal customers were asked to use not more than 90% of their 1990 usage.

Canal operations have infrequently stopped from 1 to 8 hours duration due to electrical or mechanical failures over the past twenty years. However, the treatment plant intake is positioned so that water can be fed by gravity from the Los Vaqueros Reservoir south of Brentwood or from the Contra Loma Reservoir located in Antioch. Consequently, no water supply interruptions have occurred due to electrical or mechanical failures.

A catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster are expected to be short term. DWD has never had a catastrophic event that has prevented it from being able to supply water to its customers. Catastrophic events that have occurred in the past include the Loma Prieta earthquake of 1989, the freeze of 1990, and occasional power outages that have lasted up to nine hours. DWD was unaffected by the Loma Prieta earthquake. Although water was observed to be sloshing back and forth in DWD's reservoirs, no structural failures or loss of water occurred.

During the freeze of 1990, DWD was inundated with customer calls about not having water service due to frozen pipes. DWD staff responded to the needs of the customers and continued repairs until all services were restored.

When power outages occur, DWD relies on its elevated storage to provide service to its customers. DWD also has backup gas and propane driven pumps which can be brought into service in the event of a power failure. With current standby generators, the Randall-Bold WTP does have the capability to produce water during a power failure, and is able to pump water from its 5 MG underground storage reservoir at a rate of 4.2 mgd with one pump running on a stand-by generator.

If DWD's surface water supply is disrupted, DWD's groundwater supply will be available for emergency fire fighting or to maintain service. In addition, DWD has three emergency interties with the City of Antioch's treated water system, which could provide 1,000 gallons per minute each.

5.9 Water Shortage Contingency Plan

5.9.1 Purpose of Contingency Planning

The purpose of the water shortage contingency plan is to be prepared to impose temporary demand reductions in case available supply falls below the planned levels discussed in this UWMP. Supplies may be reduced below planned levels due to such causes as extreme (worst case) drought conditions, unplanned outages of water supply facilities due to earthquakes or other major disasters, prolonged power outages, or any other catastrophic loss of supply.

In the event of an interruption of water supply beyond the control of DWD's staff or a local emergency declared by an adjoining city or a state of emergency declared by the Governor or his staff, DWD's Emergency Plan is put into effect. Appendix G contains a copy of the current Emergency Plan. This Plan addresses provisions for handling emergencies, including emergency notification procedures, operational criteria for priority uses such as fire fighting, emergency operational procedures, emergency public information procedures, and related relevant procedures. The Plan is updated periodically.

DWD's Emergency Plan addresses two levels of operational emergency planning:

1. Short-Term Water Supply Outage – Duration of 72 hours or less during which water supply may fall short of desired quantity and/or pressure, such that DWD's usable storage could be reduced to 33 percent capacity before the end of approximately 72 hours. In such an event, DWD would implement the following measures:
   - In the event of a raw water outage from the Contra Costa Canal intake, request CCWD to backflow water from Contra Loma Reservoir or provide supply from Los Vaqueros Reservoir.
   - Conserve treated water by reducing and maintaining minimum pressure in system. Restrict Reservoir 2 outflow to reduce loss of storage.
   - Should the outage be due to broken water mains, valve off affected areas.
   - Supplement with City of Antioch supply, if interconnections are available for use.

2. Long-Term Water Supply Outage - Unknown length of time when water supply may fall short of desired quantity and or pressure, such that DWD's storage could be reduced to less than 25%. In such an event, DWD would implement the following measures:
   - Take all of the steps described above for the short-term outage.
   - Maintain a minimum of 1,000,000 gallons storage for fire protection if possible.
   - Contact Contra Costa County Office of Emergency Services and notify them of the water supply outage.
   - Ban use of water for all non-essential uses. This may require going house to house and notifying customers.
   - Board of Directors to adopt regulations on emergency water use as discussed below.
   - Send out news bulletins periodically to keep the public updated on the problem.

5.9.2 Stages of Action

DWD's water shortage contingency plan provides for three stages of action during water supply shortages. These stages of action are described below:

5.9.2.1 Stage A - Up to 15% Reduction

If DWD's supply is reduced by not more than 15 percent of normal use in a non-drought period, DWD will appeal to its customers to voluntarily reduce their water consumption, to prevent waste and unreasonable use of water and to comply strictly with the conservation measures set forth in DWD's Regulation No. 8 "Water Conservation" and in the UWMP.

5.9.2.2 Stage B - 15% to 35% Reduction

If DWD's supply is reduced by 15 to 35 percent, DWD will continue with all measures from Stage A. In addition, DWD's Board of Directors may declare, pursuant to Water Code section 350, a water shortage emergency condition to prevail within DWD. Thereafter, the Board could adopt regulations and restrictions on the use of water that will, in the sound discretion of the Board, conserve DWD's water supply for the greatest public benefit with particular regard to essential domestic uses, sanitation, and fire protection.

5.9.2.3 Stage C - 35% to 50% Reduction

If the reduction of available water supply is between 35 and 50 percent of normal use or if the measures implemented in Stages A and B above do not achieve their intended reduction in water use, the Board may adopt limitations on consumption by rationing customer water use and imposing extra charges and other penalties for exceeding allotments.

5.9.3 Prohibitions, Consumption Reduction Methods and Penalties (Draft Emergency Water Shortage Ordinance)

The following is a draft of an emergency regulation restricting the quantity and use of water supplied by DWD and imposing penalties for non-compliance. In the event of a water shortage emergency requiring such measures, the Board of Directors would enact this or a similar ordinance.

Section 1 - Effective Period

These regulations shall be effective during the water shortage emergency condition which the Board declared on ________________ and shall continue in effect until such date as the Board may declare that the condition has ended.

Section 2 - Allocation of Water

A. Allocation for residential single-unit service

Each single-unit residence is allocated _______ gallons per day from and after ______. Upon application to the District, said allocation may be increased by _______ gallons per day for each resident of the unit in excess of four, and by _______ gallons per day for each horse, cow or other large animal kept at the residence.

B. Allocation for other treated water services

Each treated water service other than a residential single-unit is allocated a percentage of the customer's use during the same months of the previous year as follows:

Type of service	***Allocation***
Residential multiple unit	______ percent
Commercial	______ percent
Industrial	______ percent

Service to public authorities	_______	percent
Irrigation (residential, commercial, industrial, public authority)	_______	percent
Service through fire hydrants	_______	percent
Temporary service	_______	percent

If DWD did not serve water to a customer's property during the previous year, DWD shall compute a hypothetical use by the customer during that period on the basis of quantities used on similar properties or other information available to DWD.

C. Under-use carryover

Water savings below a customer's allocation in any month may be carried over and used in a subsequent month.

D. Penalties for excess use

If a customer uses water in excess of its allocation, the customer shall be charged for such excess use at the following rates:

Current rate for approved allocation (rate per 100 cubic feet): $________

Use in excess	Rate per 100 cubic feet for excess
First 10% of excess use	$ _______
Second 10% of excess use	$ _______
Third 10% of excess use	$ _______
Fourth 10% of excess use	$ _______
All additional use	$ _______

If water use at any connection to DWD's system exceeds the allocation by more than 20% for two consecutive months, DWD may install a flow restrictor in the meter serving the property.

Section 3 - Prohibited Uses of Water

The following uses of water supplied by DWD have been determined to be unreasonable and are prohibited during the effective period of this regulation:

- Using water for decorative fountains or filling decorative lakes or ponds.
- Washing paved or other hard-surfaced areas, including sidewalks, walkways, driveways, patios, and parking areas.

- Outside watering that results in excessive flooding or runoff in a gutter, drain, patio, driveway, walkway or street.
- Flushing sewers or hydrants, or washing streets except for emergencies, protection of public health or safety, or essential operations.
- Using potable water for construction except if no other water supply is reasonably available.
- Washing cars, boats, trailers or other vehicles without a shut-off nozzle on the hose, or at a commercial car wash with recirculating water.

Section 4 - Exceptions and Waivers

Written applications for exceptions to or waivers of any provision of these regulations shall be received and may be granted in any case where the restriction might create a hazard to the health and safety of any individual or the public, or would cause an undue and unavoidable hardship, including but not limited to adverse economic impacts such as loss of production or jobs. Denial of an application may be appealed in writing to the Appeals Committee appointed by the Board.

5.9.4 Revenue and Expenditure Impacts

Table 5-7 summarizes hypothetical reductions in revenue due to 15, 35, and 50 percent cutbacks in water use based on estimated 2010 water sales and costs as a normal year. The Net Revenue Loss is the difference between the reduction in revenue from lower water sales minus the savings from not having to purchase, treat and distribute as much surface water. The revenue impact analysis assumes that the water reduction condition is in effect for an entire year.

As noted in Table 5-7, DWD currently has monies in a contingency reserve to balance the budget if revenues fall up to 15 percent below expected levels, such as during abnormally low water use years. For example, DWD used these reserves during the El Nino winter and spring of fiscal year 1997/98 when water use was at a ten-year low.

Table 5-7
Revenue Impacts With Up to 50 Percent Reduction in Demand

Percent Reduction	15%	35%	50%
Water sales reduction [estimated sales of 1,756 MG in 2010]	263 MG	615 MG	878 MG
Revenue Reduction (Loss) [estimated normal total revenue for 2010 of $6.056 million]	($908,400)	($2,119,600)	($3,028,000)
Savings for Not Purchasing Surface Water (Accounts for 20% of supply from groundwater & 6% losses) [estimated normal total purchase cost of $2.5 million for 2010]	$375,000	$875,000	$1,250,000
Savings for Reduced Randall Bold WTP Treatment Cost [estimated normal total cost of $370,000 in variable expenses for 2010]	$55,500	$129,500	$185,000
Net Revenue Loss	($477,900)	($1,115,100)	($1,593,000)
Reserve Funds Available	$1,000,000	$1,000,000	$1,000,000
Estimated Deficiency	$0	($115,100)	($593,000)

A one-time 15 percent reduction in water sales can be covered by reserves. Reductions in water sales of 35 percent and 50 percent are estimated to result in revenue deficiencies of about $115,100 and $593,000, respectively. It is not anticipated that reductions this severe will occur, as discussed in Section 5.3. However, should they occur, DWD could take any of the following actions to offset the loss in revenue:

- Defer capital and maintenance expenditures,
- Utilize funds from other District emergency reserves,
- Temporary excess use charges (such as described in the emergency water shortage ordinance),
- Temporary increases in water rates,
- Short term borrowing.

It is important to note that the above discussion on revenue impacts is hypothetical. As discussed in Section 5.8, the likelihood of a catastrophic long-term significant reduction in DWD supply is very low. According to CCWD's February 2011 correspondence (Appendix F), any supply deficiency that may occur over a three-year period can be met by a combination of short-term water purchases by CCWD and a voluntary short-term conservation program of up to 15 percent demand reduction. In addition, DWD has a groundwater supply system in place that provides additional reliability. It is anticipated that there will be ample supply to meet DWD's demands for the next three years. Given this scenario, DWD does not anticipate demand reductions and corresponding revenue reductions greater than 15 percent, which can be handled using available reserve funds.

A catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster are expected to be short term. DWD has never had a measurable loss of revenue from such an event. It is difficult to determine the revenue impacts from a hypothetical catastrophic event. DWD maintains sufficient reserves to make necessary repairs as well as to make up for lost revenue. Any revenue shortages could be made up with short term borrowing.

DWD's revenues would be increased as a result of penalties that may be imposed by DWD during a time of water shortage. The extent of the revenue increase would be based on the amount of water a customer used in excess of their allocation and the charge for such excess as may be established by the Board of Directors. In the case of extreme excessive use by a customer, DWD's revenues would not be enhanced since this usage pattern would most likely result in installation of a flow restrictor or disconnection of service. Additional revenues from penalties would be used to supplement reserve funds and other methods.

5.9.5 Reduction Measuring Mechanisms

Demands must be monitored frequently during emergency water shortages to enable the District to effectively manage the balance between supply and demand. The demand monitoring methods are described below.

During normal water supply conditions, production figures are recorded daily. Totals are reported monthly to the General Manager and the Board of Directors.

During a 15 percent reduction stage, daily production figures would be reported to the General Manager. A comparison of weekly production targets with actual figures would also be prepared and reviewed by the General Manager. These summaries would also be forwarded to the Board of Directors on a monthly basis.

During a 35 percent reduction stage, the procedure for the 15 percent reduction stage would be followed with the Board of Directors receiving weekly updates rather than monthly. If reduction goals are not met then the General Manager would call a special meeting of the Board of Directors to discuss corrective actions.

During a 50 percent reduction stage, daily reports would be generated for review by the General Manager with weekly, or more frequent, reports given to the Board of Directors. If reduction goals are not met then, the General Manager would call a special meeting of the Board of Directors to discuss corrective actions.

Section 6
Demand Management Measures

6.1 Law

10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

10631 (f) Provide a description of the supplier's water demand management measures. This description shall include all of the following:

10631 (f) (1) A description of each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following:

(A) Water survey programs for single-family residential and multifamily residential customers.

(B) Residential plumbing retrofit.

(C) System water audits, leak detection, and repair.

(D) Metering with commodity rates for all new connections and retrofit of existing connections.

(E) Large landscape conservation programs and incentives.

(F) High-efficiency washing machine rebate programs.

(G) Public information programs.

(H) School education programs.

(I) Conservation programs for commercial, industrial, and institutional accounts.

(J) Wholesale agency programs.

(K) Conservation pricing.

(L) Water conservation coordinator.

(M) Water waste prohibitions.

(N) Residential ultra-low-flush toilet replacement programs.

10631 (f) (2) A schedule of implementation for all water demand management measures proposed or described in the plan.

10631 (f) (3) A description of the methods if any, that the supplier will use to evaluate the effectiveness of water demand management measures implemented or described under the plan.

10631 (f) (4) An estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of such savings on the supplier's ability to further reduce demand.

10631 (g) An evaluation of each water demand management measure listed in paragraph (1) of subdivision (f) that is not currently being implemented or scheduled for implementation. In the course of the evaluation, first consideration shall be given to water demand management measures, or combination of measures, which offer lower incremental costs than expanded or additional water supplies. This evaluation shall do all of the following:

10631 (g) (1) Take into account economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors.

10631 (g) (2) Include a cost-benefit analysis, identifying total benefits and total costs.

10631 (g) (3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost.

10631 (g) (4) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation.

10631 (j) Urban water suppliers that are members of the California Urban Water Conservation Council and submit annual reports to the council in accordance with the "Memorandum of Understanding Regarding Urban Water Conservation in California," dated September 1991, may submit the annual reports identifying water demand management measures currently being implemented, or scheduled for implementation, to satisfy the requirements of subdivisions (f) and (g).

6.2 Overview of Implementation Status

This section provides a description of DWD's demand management measures (DMMs). Appendix H contains a copy of DWD Regulation No. 8, "Water Conservation", which was originally adopted in 1986 and most recently amended in 2009.

Table 6-1 summarizes the implementation status of the DMMs. A description of each measure is provided in Section 6.3. DWD, in conjunction with CCWD, has implemented all the DMMs, except for wholesale agency program which is not applicable because DWD is not a wholesale agency. CCWD offers conservation programs within both its retail and wholesale area, including the DWD service area. A portion of the raw water purchase price that DWD pays for CCWD surface water supply is allocated for implementation of the water conservation programs.

Table 6-1
Summary of Demand Management Measure Implementation

DMM #/BMP # — Name	Implementation Status
A/3.1 — Water Survey Programs for Single-Family Residential and Multi-Family Residential Customers	Implemented
B/3.1 — Residential Plumbing Retrofits	Implemented
C/1.2 — System Water Audits, Leak Detection, and Repair	Implemented
D/3 — Metering with Commodity Rates	Implemented
E/5 — Large Landscape Conservation Programs	Implemented
F/3.3 – High-Efficiency Washing Machine Rebate Programs	Implemented
G/2.1 — Public Information Programs	Implemented
H/2.2 — School Education Programs	Implemented
I/4 — Conservation Programs for CII Accounts	Implemented
J/1.1.3 — Wholesale Agency Programs	Not applicable - DWD is not a wholesale supplier
K/1.4 — Conservation Pricing	Implemented
L/1.1.1 — Water Conservation Coordinator	Implemented
M/1.1.2 — Waste Water Prohibition	Implemented
N/3.4 — Residential Ultra-Low-Flush Toilet Replacement Programs	Implemented

DWD receives its water supply from CCWD who is a signatory to the Memorandum of Understanding Regarding Urban Water Conservation in California developed by the California Urban Water Conservation Council. The 14 demand management measures identified in the MOU are implemented by DWD, with assistance from CCWD. Customers within the DWD service area are eligible to participate in all of CCWD's conservation programs. DWD periodically publicizes the availability of these services to their customers. The CCWD website contains detailed information on the water conservation programs.

Appendix I contains the DWD's 2008 annual report regarding implementation of the CUWCC BMPs, which are analogous to the Act's DMMs. The CUWCC reporting database for the 2009/2010 reporting cycle has recently been updated. DWD will submit the 2009/2010 reports to the CUWCC by August 1, 2011. Appendix J presents DWR's June 2010 letter stating that DWD is currently implementing the BMPs consistent with AB 1420 and is therefore eligible to receive water management grants and loans.

Below is a description of each of the demand management measures.

6.3 Description of Demand Management Measures

6.3.1 Water Survey Programs for Single-Family Residential and Multi-Family Residential Customers (DMM A)

This measure involves offering water conservation surveys to not less than 20 percent of single- and multi-family residential customers every two years, and completing surveys for not less than 15 percent of single- and multi-family residential customers within 10 years of program initiation. Each month DWD evaluates every account in the service area for abnormal water use. Each account is compared to a history of the prior 18 months usage. If the current month's usage is higher than what would be considered normal usage for the given time of year the customer is contacted by phone and left a door hanger alerting the customer of a possible leak. The DWD employee interviews the customer as to any changes in usage patterns, new landscaping, or swimming pool fill that might account for the increase. The DWD employee also offers to dispatch a field worker to conduct an audit of water usage and to help the customer to check for leaks.

In addition, DWD customers are also eligible for free home water surveys conducted by CCWD water conservation staff. These water use surveys are conducted for single family and multiple family residences. Since 2009, a total of 12 audits for single-family residential customers have been performed (7 in 2009 and 5 in 2010). The CCWD staff person checks toilets for leaks and determines flush volume, determines flow rates of showerhead and faucets. Installs high-efficiency showerheads and faucets as needed, and provides a brief report of findings and installations done.

Customers with unusually high consumption will experience higher than average water bills. There is significant incentive for the customer to participate in the audit program given the substantial monetary savings associated with reduced water consumption.

6.3.2 Residential Plumbing Retrofits (DMM B)

The purpose of this measure is to make available low-flow showerheads, aerators, toilet displacement devices, and other water savings fixtures or devices to single- and multi-family residences constructed prior to 1992 when building standards were modified to require water saving fixtures in new construction. This measure would require that DWD distribute these devices to not less than 10 percent of their single- and multi-family customers every two years until such time DWD can demonstrate that at least 75 percent of residences constructed prior to 1992 have been retrofitted. As shown in Appendix I, DWD has reached 80 percent saturation for both single-family and multi-family residences.

DWD serves water within Contra Costa County and the City of Oakley which require all new construction to utilize low flow fixtures including 1.6 gallon per flush (gpf) toilets. This requirement for low flow fixtures has been in place since 1992 on a statewide basis.

For customers with older pre-1992 homes, DWD makes available water conservation kits that include high-quality, 2.5 gallons per minute (gpm) or less showerheads and 2.2 gpm or less faucet aerators. In addition, DWD customers are eligible to receive free conservation devices from CCWD including showerhead, kitchen faucet aerator, bathroom faucet aerator, hose nozzle, and dye tablets to check for toilet leaks. Over time, as older buildings are maintained and remodeled, older fixtures are replaced with new low flow fixtures, since they are all that is now commercially available. Since 2009 a total of 354 showerheads (171 in 2009 and 183 in 2010) and 312 aerators (144 in 2009 and 168 in 2010) were provided to single-family residential customers.

6.3.3 System Water Audits, Leak Detection and Repair (DMM C)

This measure requires water suppliers to conduct audits of the water system consistent with AWWA guidelines if unaccounted-for water exceeds 10 percent. DWD constantly monitors the amount of unaccounted-for water which is the difference between the quantity of water pumped into the distribution system and the metered quantity delivered to its customers. When a distribution system pipe is suspected to be leaking in a particular area, DWD immediately either performs or contracts out the leak detection and repair.

The percentage of unaccounted-for water in DWD's system has historically ranged from about 4 percent to 11 percent (one instance in 2009), and averaged about 6 percent per year over the last 10 years. This percentage is well below the target level of below 10 percent.

6.3.4 Metering with Commodity Rates (DMM D)

All water services connected to DWD's system are required to be metered. All meters register in cubic feet with customers being billed for every hundred cubic feet of water usage. Meters are read on a monthly basis which allows DWD to catch a customer water leak or abnormally high usage. DWD then contacts the customer in an effort to determine the cause of the high usage. In the past, meters were read every 60 days. Reading meters every 30 days has allowed DWD to curtail high usage 30 days sooner than before.

6.3.5 Large Landscape Conservation Programs (DMM E)

This measure consists of two parts. The first part requires developing evapotranspiration-based water budgets for accounts with dedicated irrigation meters. DWD currently has 139 irrigation meters. The second part involves providing large landscape surveys to not less than 15 percent of commercial, industrial, and institutional accounts with mixed-use meters within 10 years of program initiation.

DWD's Regulation Number 8 "Water Conservation" provides that no area in the District which was not regularly irrigated prior to April 1, 1991, shall be landscaped, planted, or irrigated unless the landscaping plan and irrigation system makes efficient use of a minimum quantity of water and is installed, operated and maintained in accordance with plans that comply with all ordinances and regulations of Contra Costa County relating to landscaping in new developments.

DWD utilizes CCWD services to conduct large landscape audits. CCWD has an ongoing large landscape audit program which includes customers within the DWD service area. The CCWD program provides non-residential customers with support and incentives to improve their landscape water use efficiency, and provides information on climate-appropriate landscape and irrigation design to new and changed service connections. The large landscape program assists owners and managers of large landscape areas including: commercial properties, stores, homeowners associations, parks, apartments, schools, and business complexes. In fiscal year 2010, CCWD provided two Cash For Grass Rebates within the DWD service area, totaling $627.

During the free Large Landscape Water Survey, CCWD conservation staff will: inspect the irrigation equipment; perform sprinkler precipitation tests; provide a written report listing suggestions for improving the efficiency of the irrigation system; provide a site-specific irrigation schedule based on test data and local weather data; and provide a site-specific landscape water budget designed to assist in managing landscape water.

In conjunction with the Large Landscape Survey, CCWD also provides rebates designed to encourage customers to upgrade selected irrigation equipment with new more-efficient irrigation equipment. Items included as appropriate may be: controllers, drip retrofits, rain sensors, flow meters, and sprinkler heads. These rebates are only provided after a landscape survey has been conducted to evaluate the existing equipment.

6.3.6 High-Efficiency Washing Machine Rebate Programs (DMM F)

This measure calls on water suppliers to offer cost-effective rebates to their customers for the purchase of high-efficiency washing machines. DWD customers are eligible for a washing machine rebate program through CCWD. The program is administered by CCWD and provides a $50 to $100 rebate for purchasing and installing a new high efficiency washing machine. The amount of the rebate depends on the efficiency of the washing machine, with the highest rebate for the most water-efficient models. In fiscal year 2009, 187 washer rebates were provided in the DWD service area and in fiscal year 2010, 239 washer rebates were provided.

CCWD and Energy Solutions are currently implementing LightWash II, a high-efficiency commercial clothes washer rebate program authorized by the California Public Utilities Commission. LightWash II combines energy efficiency rebates with CCWD's water efficiency rebates to make installation of high-efficiency commercial washers more cost-effective. This rebate program is open to owners and operators of multi-family properties and institutions with common area laundries, commercial laundries, coin laundries, and similar entities with on-premise washers. Rebates are $300 per qualifying washer.

6.3.7 Public Information Programs (DMM G)

DWD's public information program includes mailing a periodic newsletter to its customers. This newsletter contains conservation tips, and reminds customers of the availability of water conservation programs through CCWD, as well as DWD.

CCWD's public information program includes providing speakers to the public, mailing newsletters to DWD customers providing them with many water conservation ideas, sponsoring media events related to conservation, and producing public service announcements.

DWD monitors system wide usage on a daily basis. When usage climbs above the norm for the given time of year, DWD publishes a notice in the local newspaper to its customers advising them to check their sprinkler systems and to look for leaks. DWD also reminds its customers via bill messages and newspaper advertisements to reduce the amount of outside landscape watering when the weather turns cooler.

DWD also participates in local community functions such as the Oakley Almond Festival and Community Awareness Day. DWD provides water conservation information, tips, and resources.

6.3.8 School Education Programs (DMM H)

CCWD provides an extensive Water Education Program available to school districts and private schools in DWD's service area. All programs are provided free of charge. The current school education program reaches over 30,000 students, parents and teachers every year. Students learn about water conservation, water quality and stewardship through a variety of resources:

- Classroom presentations are provided for Grades 2 through 5. The classroom presentations are designed to support grade-level state curriculum standards.
- A new assembly theater program "Delta Dawn" for elementary and middle schools explores the local water system from the Sacramento-San Joaquin Delta to homes and schools. Students and teachers interact with the performers.

- For schools located near the Contra Costa Canal, community service presentations are provided year-round to Grades K through 5 to remind students that canal safety rules exist to protect them and their families.

- Field trip opportunities are provided to: Los Vaqueros Reservoir Watershed (Grades 3 and up); a water treatment plant tour at either the Concord or Oakley locations (Grades 5 and up); and a science cruise on the Research Vessel Brownlee studying the Delta (Grade 5, co-sponsored with Mt. Diablo Unified School District).

Teacher development workshops are also provided to enable teachers to provide ongoing information as part of regular classes.

6.3.9 Conservation Programs for Commercial, Industrial, and Institutional (CII) Accounts (DMM I)

This measure requires water suppliers to provide facility water audits to not less than 10 percent of their commercial, industrial, and institutional customers within 10 years of program initiation. These water audits are essentially one-on-one public education efforts. CCWD initiated a Commercial Audit Program within DWD's service area in September 1992. CCWD offers free technical assistance to commercial, industrial and institutional customers to operate more water efficiently, and thereby reduce costs.

CCWD provides free commercial water use surveys to: evaluate and analyze water usage; provide an annual water consumption history; calculate a cost/benefit analysis for water conserving technology; provide water-efficient plumbing fixtures, devices and materials, subject to availability; provide a detailed evaluation of the site and recommend equipment upgrades and water management improvements; and offer rebate incentives for selected plumbing upgrades. In fiscal year 2010, CCWD conducted 9 CII audits within the DWD service area.

In addition, CCWD also offers rebates and incentives for replacing selected existing plumbing fixtures and devices with new water-efficient plumbing fixtures and devices. These include: commercial high-efficiency washer rebates (up to $300); free pre-rinse dishwashing sprayers; ultra low flow toilet rebates (up to $150 per unit); low flow urinal or waterless urinal rebates (up to $75 per unit); water broom rebates (up to $75 per unit); and cooling tower conductivity meter rebates (up to $500 per unit).

6.3.10 Wholesale Agency Program (DMM J)

DWD does not function as a wholesale water agency and therefore does not have a wholesale agency program. This DMM is not applicable to DWD.

6.3.11 Conservation Pricing (DMM K)

DWD's uniform price rate structure, which includes a monthly service charge and a charge per 100 cubic feet of water use, encourages water use efficiency. DWD's low monthly service charge rewards consumers with low water usage.

6.3.12 Water Conservation Coordinator (DMM L)

As DWD's water supplier, CCWD has maintained a full time conservation coordinator position since 1991. In addition to the CCWD conservation coordinator, DWD's General Manager has overall responsibility for conservation measures implemented in the service area.

6.3.13 Water Waste Prohibition (DMM M)

DWD's Regulation Number 8 was put into effect to assure that all water furnished by DWD is put to reasonable beneficial use, to prevent unreasonable use or waste of water and to promote efficient use and conservation of water. All users of water furnished by DWD are urged to take all reasonable action to conserve water and prevent waste of water. Recommended actions under normal conditions include:

- Periodically examine all plumbing systems to detect any leaks and repair leaks immediately upon detection.
- Prevent water from running off premises into street gutters.
- Install flow restrictors on all shower head that will limit flow to not more than 3 gallons per minute.
- Install displacement devices in toilet tanks to reduce water use to 3.5 gpf.
- Install aerators or laminar flow devices on kitchen and lavatory faucets to reduce maximum flow to 2.75 gpm.
- Landscape with minimal turf and drought-tolerant (low water-using) plants.

Every new DWD customer is advised to water lawns only five minutes at a time, twice a day, given the sandy soil conditions in Oakley. This communication takes place when a new customer calls to sign-up for water service.

During water shortage conditions, DWD has imposed additional prohibitions on the following uses of water:

- Outside watering that results in excessive flooding or in runoff into a gutter or drain, or onto a street, sidewalk, driveway or paved area.
- Washing paved or other hard-surfaced areas, including sidewalks, driveways, patios and parking areas.
- Washing cars, boats, trailers or other vehicles without a shut-off nozzle on the hose.
- Using water for decorative fountains or for filling decorative ponds or lakes.
- Flushing sewers or hydrants or washing streets, except for emergencies, protection of public health or safety, or essential industrial operations.
- Using potable water for construction except if no other water supply is reasonably available.

6.3.14 Residential Ultra-Low-Flush Toilet Replacement Programs (DMM N)

CCWD is currently offering free ultra-low flow toilets (ULFTs) to its customers, including those within DWD's service area, to replace older toilets in homes and multi-family properties. Customers are given a voucher and told where to pick up the new ULFT ($175 value). The new ULFT must be installed within 30 days of receiving the ULFT. This program will continue as long as funding is available.

At other times, instead of providing a free toilet, CCWD has offered $175 rebates to single and multi-family customers who replace older toilets with ULFTs. The rebate program initially began in 1994.

In fiscal year 2009, DWD provided 68 single-family high efficiency toilet (HET) rebates. In fiscal year 2010, DWD provided 214 single-family and 15 multi-family HET rebates.

Appendix A
Public Involvement Materials

Appendix A-1

Notices of UWMP Preparation

March 16, 2011

DIABLO WATER DISTRICT

2107 Main St.
P.O. Box 127
Oakley, CA 94561-0127
925 • 625 • 3798
Fax 925 • 625 • 0814
www.diablowater.org

Ms. Patricia Corey, General Manager
East Contra Costa Irrigation District
626 First Street
Brentwood, CA 94513

Subject: Diablo Water District's 2010 Urban Water Management Plan

Dear Ms. Corey:

Diablo Water District (DWD) is updating its Urban Water Management Plan (UWMP) which will be submitted to the State of California's Department of Water Resources (DWR) in July 2011.

DWD is required by the California Water Code to update and adopt an UWMP and submit a completed plan to the DWR every five years.

In compliance with the California Water Code, DWD is providing this notice to encourage involvement in the update of the UWMP.

DWD's Final Draft 2010 UWMP is expected to be released in mid to late April 2011. A public hearing will be held in May 2011, to provide an opportunity to comment on the Final Draft 2010 UWMP.

If you have any questions or if you would like additional information, please contact Christine Belleci via e-mail at cbelleci@diablowater.org or by phone at (925) 625-0588.

Sincerely,

Mike Yeraka, P.E.
General Manager

DIABLO WATER DISTRICT

March 16, 2011

2107 Main St.
P.O. Box 127
Oakley, CA 94561-0127
925 • 625 • 3798
Fax 925 • 625 • 0814
www.diablowater.org

Mr. Rick Gilmore
Byron-Bethany Irrigation District
7995 Bruns Road
Byron, CA 94514

Subject: Diablo Water District's 2010 Urban Water Management Plan

Dear Mr. Gilmore:

Diablo Water District (DWD) is updating its Urban Water Management Plan (UWMP) which will be submitted to the State of California's Department of Water Resources (DWR) in July 2011.

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If you have any questions or if you would like additional information, please contact Christine Belleci via e-mail at cbelleci@diablowater.org or by phone at (925) 625-0588.

Sincerely,

Mike Yeraka, P.E.
General Manager

DIABLO WATER DISTRICT

March 16, 2011

2107 Main St.
P.O. Box 127
Oakley, CA 94561-0127
925 • 625 • 3798
Fax 925 • 625 • 0814
www.diablowater.org

Ms. Betty Graham
California Department of Public Health
850 Marina Bay Parkway
Bldg. P, Second Floor
Richmond, CA 94804-6403

Subject: Diablo Water District's 2010 Urban Water Management Plan

Dear Ms. Graham:

Diablo Water District (DWD) is updating its Urban Water Management Plan (UWMP) which will be submitted to the State of California's Department of Water Resources (DWR) in July 2011.

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Sincerely,

Mike Yeraka, P.E.
General Manager

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2107 Main St.
P.O. Box 127
Oakley, CA 94561-0127
925 • 625 • 3798
Fax 925 • 625 • 0814
www.diablowater.org

March 16, 2011

Mr. Jason Vogan
City of Oakley
Engineering Department
3231 Main Street
Oakley, CA 94561

Subject: Diablo Water District's 2010 Urban Water Management Plan

Dear Mr. Vogan:

Diablo Water District (DWD) is updating its Urban Water Management Plan (UWMP) which will be submitted to the State of California's Department of Water Resources (DWR) in July 2011.

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Sincerely,

Mike Yeraka, P.E.
General Manager

DIABLO
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DISTRICT

March 16, 2011

2107 Main St.
P.O. Box 127
Oakley, CA 94561-0127
925 • 625 • 3798
Fax 925 • 625 • 0814
www.diablowater.org

Mr. Tim Ellsworth
Contra Costa County
Department of Health Services
2120 Diamond Blvd., Suite 200
Concord, CA 94520

Subject: Diablo Water District's 2010 Urban Water Management Plan

Dear Mr. Ellsworth:

Diablo Water District (DWD) is updating its Urban Water Management Plan (UWMP) which will be submitted to the State of California's Department of Water Resources (DWR) in July 2011.

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Sincerely,

Mike Yeraka, P.E.
General Manager

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P.O. Box 127
Oakley, CA 94561-0127
925 • 625 • 3798
Fax 925 • 625 • 0814
www.diablowater.org

March 16, 2011

Mr. Walter Pease, Director of Water Utilities
Department of Public Works
City of Pittsburg
65 Civic Avenue
Pittsburg, CA 94565

Subject: Diablo Water District's 2010 Urban Water Management Plan

Dear Mr. Pease:

Diablo Water District (DWD) is updating its Urban Water Management Plan (UWMP) which will be submitted to the State of California's Department of Water Resources (DWR) in July 2011.

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Sincerely,

Mike Yeraka, P.E.
General Manager

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P.O. Box 127
Oakley, CA 94561-0127
925 • 625 • 3798
Fax 925 • 625 • 0814
www.diablowater.org

March 16, 2011

Mr. Dennis Barry, Interim Director
Contra Costa County
Community Development Department
651 Pine Street, 4^{th} Floor – North Wing
Martinez, CA 94553

Subject: Diablo Water District's 2010 Urban Water Management Plan

Dear Mr. Barry:

Diablo Water District (DWD) is updating its Urban Water Management Plan (UWMP) which will be submitted to the State of California's Department of Water Resources (DWR) in July 2011.

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Sincerely,

Mike Yeraka, P.E.
General Manager

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P.O. Box 127
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925 • 625 • 3798
Fax 925 • 625 • 0814
www.diablowater.org

March 16, 2011

Ms. Linda Weeks
P. O. Box 276
Knightsen, CA 94548

Subject: Diablo Water District's 2010 Urban Water Management Plan

Dear Ms. Weekes:

Diablo Water District (DWD) is updating its Urban Water Management Plan (UWMP) which will be submitted to the State of California's Department of Water Resources (DWR) in July 2011.

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Sincerely,

Mike Yeraka, P.E.
General Manager

DIABLO
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DISTRICT

March 16, 2011

2107 Main St.
P.O. Box 127
Oakley, CA 94561-0127
925 • 625 • 3798
Fax 925 • 625 • 0814
www.diablowater.org

Mr. Tom Williams, General Manager
Ironhouse Sanitary District
P. O. Box 1105
Oakley, CA 94561

Subject: Diablo Water District's 2010 Urban Water Management Plan

Dear Mr. Williams:

Diablo Water District (DWD) is updating its Urban Water Management Plan (UWMP) which will be submitted to the State of California's Department of Water Resources (DWR) in July 2011.

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Sincerely,

Mike Yeraka, P.E.
General Manager

March 16, 2011

DIABLO
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2107 Main St.
P.O. Box 127
Oakley, CA 94561-0127
925 • 625 • 3798
Fax 925 • 625 • 0814
www.diablowater.org

Mr. Ron Bernal, Director
City of Antioch
Public Works Department
P. O. Box 5007
Antioch, CA 94531

Subject: Diablo Water District's 2010 Urban Water Management Plan

Dear Mr. Bernal:

Diablo Water District (DWD) is updating its Urban Water Management Plan (UWMP) which will be submitted to the State of California's Department of Water Resources (DWR) in July 2011.

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Sincerely,

Mike Yeraka, P.E.
General Manager

DIABLO WATER DISTRICT

March 16, 2011

2107 Main St.
P.O. Box 127
Oakley, CA 94561-0127
925 • 625 • 3798
Fax 925 • 625 • 0814
www.diablowater.org

Mr. Mark Seedall, Principal Planner
Contra Costa Water District
Planning Department
P. O. Box H2O
Concord, CA 94524

Subject: Diablo Water District's 2010 Urban Water Management Plan

Dear Mr. Seedall:

Diablo Water District (DWD) is updating its Urban Water Management Plan (UWMP) which will be submitted to the State of California's Department of Water Resources (DWR) in July 2011.

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Sincerely,

Mike Yeraka, P.E.
General Manager

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March 16, 2011

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P.O. Box 127
Oakley, CA 94561-0127
925 • 625 • 3798
Fax 925 • 625 • 0814
www.diablowater.org

Mr. Steve Spence, District Manager
Bethel Island Municipal Improvement District
P. O. Box 244
Bethel Island, CA 94511

Subject: Diablo Water District's 2010 Urban Water Management Plan

Dear Mr. Spence:

Diablo Water District (DWD) is updating its Urban Water Management Plan (UWMP) which will be submitted to the State of California's Department of Water Resources (DWR) in July 2011.

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Sincerely,

Mike Yeraka, P.E.
General Manager

DIABLO
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DISTRICT

March 16, 2011

2107 Main St.
P.O. Box 127
Oakley, CA 94561-0127
925 • 625 • 3798
Fax 925 • 625 • 0814
www.diablowater.org

Mr. Gary Darling, General Manager
Delta Diablo Sanitation District
2500 Pittsburg-Antioch Highway
Antioch, CA 94509

Subject: Diablo Water District's 2010 Urban Water Management Plan

Dear Mr. Darling:

Diablo Water District (DWD) is updating its Urban Water Management Plan (UWMP) which will be submitted to the State of California's Department of Water Resources (DWR) in July 2011.

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Sincerely,

Mike Yeraka, P.E.
General Manager

DIABLO WATER DISTRICT

March 16, 2011

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P.O. Box 127
Oakley, CA 94561-0127
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Fax 925 • 625 • 0814
www.diablowater.org

Mr. Virgil Koehne, General Manager
Town of Discovery Bay
1800 Willow Lake Road
Discovery Bay, CA 94514

Subject: Diablo Water District's 2010 Urban Water Management Plan

Dear Mr. Koehne:

Diablo Water District (DWD) is updating its Urban Water Management Plan (UWMP) which will be submitted to the State of California's Department of Water Resources (DWR) in July 2011.

DWD is required by the California Water Code to update and adopt an UWMP and submit a completed plan to the DWR every five years.

In compliance with the California Water Code, DWD is providing this notice to encourage involvement in the update of the UWMP.

DWD's Final Draft 2010 UWMP is expected to be released in mid to late April 2011. A public hearing will be held in May 2011, to provide an opportunity to comment on the Final Draft 2010 UWMP.

If you have any questions or if you would like additional information, please contact Christine Belleci via e-mail at cbelleci@diablowater.org or by phone at (925) 625-0588.

Sincerely,

Mike Yeraka, P.E.
General Manager

DIABLO WATER DISTRICT

March 16, 2011

2107 Main St.
P.O. Box 127
Oakley, CA 94561-0127
925 • 625 • 3798
Fax 925 • 625 • 0814
www.diablowater.org

Mr. Balwider Grewal, City Engineer
City of Brentwood
Engineering Department
118 Oak Street
Brentwood, CA 94513

Subject: Diablo Water District's 2010 Urban Water Management Plan

Dear Mr. Grewal:

Diablo Water District (DWD) is updating its Urban Water Management Plan (UWMP) which will be submitted to the State of California's Department of Water Resources (DWR) in July 2011.

DWD is required by the California Water Code to update and adopt an UWMP and submit a completed plan to the DWR every five years.

In compliance with the California Water Code, DWD is providing this notice to encourage involvement in the update of the UWMP.

DWD's Final Draft 2010 UWMP is expected to be released in mid to late April 2011. A public hearing will be held in May 2011, to provide an opportunity to comment on the Final Draft 2010 UWMP.

If you have any questions or if you would like additional information, please contact Christine Belleci via e-mail at cbelleci@diablowater.org or by phone at (925) 625-0588.

Sincerely,

Mike Yeraka, P.E.
General Manager

Appendix A-2
Notice of Public Hearing

Oakley Press

April 22, 2011
May 13, 2011

DIABLO WATER DISTRICT

NOTICE OF PUBLIC HEARING
and
Availability of Final Draft Urban Water Management Plan for Public Review

As required by Law, the Diablo Water District has prepared an update of its Urban Water Management Plan. The Final Draft Plan is available for public inspection and review as of April 22, 2011, at the following locations:

Diablo Water District office in Oakley, (Located in the Raley's Shopping Center) Hours:Monday through Friday from 8 a.m. to noon and 1 p.m. to 5 p.m.
Closed from noon – 1 p.m.
Closed Saturday and Sunday

Diablo Water District's Website: www.diablowater.org

Oakley Public Library (Located in the Freedom High School Complex), 1050 Neroly Road
Hours: Tuesday and Wednesday from 10 a.m. to 9 p.m.; Thursday from 2 p.m. to 9 p.m.; Friday from 2 p.m. to 6 p.m.; Saturday from 10 a.m. to 6 p.m.; Closed Sunday and Monday

A public hearing on the Final Draft Plan will be held on May 25, 2011, at 7:30 p.m. at the District's office. Comments may be presented in person at the public hearing. Written comments on the Final Draft Plan should be submitted to the District no later than June 3, 2011, at the address shown below.

Ms. Christine Belleci
Diablo Water District
P. O. Box 127
2107 Main Street
Oakley, CA 94561

The Final Plan, incorporating appropriate comments, will be set for adoption at a Board Meeting in mid to late June 2011. Please call Christine Belleci at 925-625-0588 with any questions.

Publish April 22 and May 13, 2011

Appendix A-3
Minutes from Public Hearing

MINUTES OF THE REGULAR MEETING
OF THE BOARD OF DIRECTORS OF
DIABLO WATER DISTRICT
HELD ON MAY 25, 2011

The regular meeting of the Board of Directors of Diablo Water District was called to order by President Howard Hobbs, at the District's office, 2107 Main Street, Oakley, California at 7:30 p.m. on May 25, 2011.

ROLL CALL

Directors Present:	Hobbs, Cinquini, Crockett, Garcia, and Head
Directors Absent:	None
Staff Present:	Messrs. Yeraka and Polisner
Others Present:	Bill Brick, Jon Toyoda, and Andria Loutsch (Camp, Dresser, and McKee)

PUBLIC INPUT

There were no comments from members of the public.

APPROVAL OF MINUTES OF THE REGULAR MEETING OF APRIL 27, 2011

It was moved by Director Head, seconded by Director Garcia, and unanimously carried to approve the minutes of the regular meeting of April 27, 2011.

PUBLIC HEARING FOR THE DIABLO WATER DISTRICT FINAL DRAFT 2010 URBAN WATER MANAGEMENT PLAN

The Final Draft 2010 Urban Water Management Plan was reviewed by Bill Brick and Andria Loutsch from Camp, Dresser, & McKee. Camp, Dresser, and McKee responded to questions put forth by the Directors. At 8:08 p.m., the President opened the Public Hearing for the Final Draft 2010 Urban Water Management Plan. There being no members of the public present at the meeting, the President closed the Public Hearing at 8:09 p.m.

AUTHORIZATION TO SET JULY 27, 2011, AS THE PUBLIC HEARING DATE FOR A PROPOSED 5% INCREASE IN WATER CHARGES FOR COUNTY WELL SYSTEMS M-25 AND M-26, WITH NO INCREASE FOR COUNTY WELL SYSTEM M-27 IN THE KNIGHTSEN AND BETHEL ISLAND AREAS OF THE DISTRICT

After discussion, it was moved by Director Cinquini, seconded by Director Crockett, and unanimously carried to authorize the General Manager to send notices of the Public Hearing to the residences of M-25, M-26, and M-27.

RESPONSE TO CONTRA COSTA COUNTY GRAND JURY REPORT NUMBER 1104, REGARDING COMPENSATION OF DIRECTORS

After discussion, it was moved by Director Cinquini, seconded by Director Garcia, and unanimously carried to approve the response prepared by the General Manager for the Contra Costa County Grand Jury Report Number 1104, in the form presented.

APPOINTMENT OF DIRECTOR(S) TO THE DELTA SCIENCE CENTER BOARD OF DIRECTORS

After discussion, it was moved by Director Head, seconded by Director Garcia, and unanimously carried to appoint Director Enrico Cinquini to act as a liaison to the Delta Science Center rather than as a Director on the Delta Science Center Board of Directors; and that, Directors Crockett and Garcia be appointed as alternates in the event Director Cinquini cannot attend one of the Delta Science Center Board Meetings.

CORRESPONDENCE

Mr. Yeraka reviewed the letter dated May 5, 2011, from Marie Valmores, Contra Costa Water District, regarding payment of $230,949.37 from the State of California towards the Proposition 50 Grant for the Stonecreek Well Pump Station and Pipeline Projects.

DISCUSSION ITEMS AND REPORTS

Mr. Yeraka reported on the following:

1. Update on the Stonecreek Well Project.
2. Letter going to homeowners regarding check valve charges on homes with fire sprinklers.
3. Local Agency Formation Commission presentation scheduled for the June 8, 2011, Board Meeting by Chairman Mike McGill.
4. Consumer Confidence Reports were being mailed to the Knightsen, Willow Park Marina, and Beacon West customers as well as the Annual Water Quality Report to all Diablo Water District Customers.

APPROVAL OF WARRANT REGISTER NUMBER 2011-5

It was moved by Director Head, seconded by Director Crockett, and unanimously carried to approve Warrant Register Number 2011-5 and that warrants numbered 35079 through 35213, with the exception of void warrants numbered 35079, 35093, and 35213 be issued as thereon indicated.

ADJOURNMENT

It was moved by Director Cinquini, seconded by Director Head, and unanimously carried to adjourn the meeting at 8:53 p.m.

Respectfully submitted,

Mike Yeraka, Secretary

Appendix B

UWMP Adoption Resolution

RESOLUTION NO. 2011 - 6

A RESOLUTION OF THE BOARD OF DIRECTORS OF DIABLO WATER DISTRICT ADOPTING UPDATED AND REVISED URBAN WATER MANAGEMENT PLAN

WHEREAS, the Urban Water Management Plan of Diablo Water District has been reviewed, updated and revised, and

WHEREAS, a draft of the updated and revised Plan has been made available for public inspection at the office of the District and at the Oakley Public Library since April 22, 2011, and

WHEREAS, following two notices published in the *Oakley Press*, a public hearing on the Plan was held on May 25, 2011, now therefore;

BE IT RESOLVED, by the Board of Directors of Diablo Water District as follows:

1. This Board finds and declares that the Urban Water Management Plan of Diablo Water District has been reviewed, updated and revised in accordance with the provisions of the Urban Water Management Planning Act.

2. Said Plan bearing the date June 2011, is hereby approved and adopted.

3. General Manager is directed to forward a copy of the Plan to the Department of Water Resources and California State Library within 30 days of adoption.

* * * * * * *

I certify that the foregoing is a true and complete copy of a resolution duly and regularly adopted by the Board of Directors of Diablo Water District at a meeting thereof regularly held on June 22, 2011 by the following vote:

AYES:	Hobbs, Cinquini, Crockett, Garcia, and Head
NOES:	NONE
ABSENT:	NONE
DATED:	June 24, 2011

Mike Yeraka, Secretary

Appendix C
Urban Water Management Plan Checklist

Appendix C
Urban Water Management Plan Checklist

No.	UWMP requirement	Calif. Water Code reference	Subject	Additional clarification	UWMP location
1	Provide baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.	10608.20(e)	System Demands		Section 3.4, p 3-4
2	*Wholesalers:* Include an assessment of present and proposed future measures, programs, and policies to help achieve the water use reductions. *Retailers:* Conduct at least one public hearing that includes general discussion of the urban retail water supplier's implementation plan for complying with the Water Conservation Bill of 2009.	10608.36 10608.26(a)	System Demands	Retailer and wholesalers have slightly different requirements	Section 3.4.1.3, p 3-7 Section 1.4, p 1-5 Appendices A-2 and A-3
3	Report progress in meeting urban water use targets using the standardized form.	10608.40	Not applicable	Standardized form not yet available	Not applicable at this time.
4	Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.	10620(d)(2)	Plan Preparation		Section 1.3, p 1-4
5	An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions.	10620(f)	Water Supply Reliability . . .		Section 4.4, p 4-4 Section 5.3.2, p 5-4
6	Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days prior to the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision.	10621(b)	Plan Preparation		Section 1.3, p 1-4 Appendix A-1
7	The amendments to, or changes in, the plan shall be adopted and filed in the manner set forth in Article 3 (commencing with Section 10640).	10621(c)	Plan Preparation		Not applicable at this time.

No.	UWMP requirement	Calif. Water Code reference	Subject	Additional clarification	UWMP location
8	Describe the service area of the supplier	10631(a)	System Description		Section 2.2, p 2-1
9	(Describe the service area) climate	10631(a)	System Description		Section 2.3, p 2-1
10	(Describe the service area) current and projected population . . . The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier . . .	10631(a)	System Description	Provide the most recent population data possible. Use the method described in “Baseline Daily Per Capita Water Use.” See Section M.	Section 2.4, p 2-2
11	. . . (population projections) shall be in five-year increments to 20 years or as far as data is available.	10631(a)	System Description	2035 and 2040 can also be provided to support consistency with Water Supply Assessments and Written Verification of Water Supply documents.	Section 2.4, p 2-3
12	Describe . . . other demographic factors affecting the supplier's water management planning	10631(a)	System Description		Section 2.4, p 2-2
13	Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a).	10631(b)	System Supplies	The ‘existing’ water sources should be for the same year as the “current population” in line 10. 2035 and 2040 can also be provided to support consistency with Water Supply Assessments and Written Verification of Water Supply documents.	Section 4.2, p 4-3 Section 4.3, p 4-3 Section 4.4, p 4-4

No.	UWMP requirement	Calif. Water Code reference	Subject	Additional clarification	UWMP location
14	(Is) groundwater . . . identified as an existing or planned source of water available to the supplier . . .?	10631(b)	System Supplies	Source classifications are: surface water, groundwater, recycled water, storm water, desalinated sea water, desalinated brackish groundwater, and other.	4.2, p 4-3 4.4, p 4-4
15	(Provide a) copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management. Indicate whether a groundwater management plan been adopted by the water supplier or if there is any other specific authorization for groundwater management. Include a copy of the plan or authorization.	10631(b)(1)	System Supplies		Discussed in Section 4.4.1, p 4-4 Plan located in Appendix E
16	(Provide a) description of any groundwater basin or basins from which the urban water supplier pumps groundwater.	10631(b)(2)	System Supplies		Section 4.4.2, p 4-6 Section 4.4.4, p 4-8
17	For those basins for which a court or the board has adjudicated the rights to pump groundwater, (provide) a copy of the order or decree adopted by the court or the board	10631(b)(2)	System Supplies		Not applicable to DWD, see Section 4.4.4, p 4-8
18	(Provide) a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree.	10631(b)(2)	System Supplies		Not applicable to DWD, see Section 4.4.4, p 4-8
19	For basins that have not been adjudicated, (provide) information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition.	10631(b)(2)	System Supplies		Bulletin 118 discussed in Section 4.4.2, p 4-6 Efforts to prevent overdraft discussed in Section 4.4.4, p 4-8

No.	UWMP requirement	Calif. Water Code reference	Subject	Additional clarification	UWMP location
20	(Provide a) detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.	10631(b)(3)	System Supplies		Section 4.4.3, p 4-7
21	(Provide a) detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.	10631(b)(4)	System Supplies	Provide projections for 2015, 2020, 2025, and 2030.	Summary in Section 4.2, p 4-3 Detailed discussion in Section 4.4.3, p 4-7 Additional discussion in Section 4.4.4, p 4-8
22	Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following: (A) An average water year, (B) A single dry water year, (C) Multiple dry water years.	10631(c)(1)	Water Supply Reliability . . .		Reliability by source in Section 5.3, p 5-3 Climate change in Section 5.6, p 5-8 Reliability by year type in Section 5.4, p 5-5
23	For any water source that may not be available at a consistent level of use - given specific legal, environmental, water quality, or climatic factors - describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.	10631(c)(2)	Water Supply Reliability . . .		Section 5.2, p 5-2 Section 5.3, p 5-3
24	Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.	10631(d)	System Supplies		Section 4.5.2, p 4-11

No.	UWMP requirement	Calif. Water Code reference	Subject	Additional clarification	UWMP location
25	Quantify, to the extent records are available, past and current water use, and projected water use (over the same five-year increments described in subdivision (a)), identifying the uses among water use sectors, including, but not necessarily limited to, all of the following uses: (A) Single-family residential; (B) Multifamily; (C) Commercial; (D) Industrial; (E) Institutional and governmental; (F) Landscape; (G) Sales to other agencies; (H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof;(I) Agricultural.	10631(e)(1)	System Demands	Consider “past” to be 2005, present to be 2010, and projected to be 2015, 2020, 2025, and 2030. Provide numbers for each category for each of these years.	Section 3.2, p 3-2
26	(Describe and provide a schedule of implementation for) each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following: (A) Water survey programs for single-family residential and multifamily residential customers; (B) Residential plumbing retrofit; (C) System water audits, leak detection, and repair; (D) Metering with commodity rates for all new connections and retrofit of existing connections; (E) Large landscape conservation programs and incentives; (F) High-efficiency washing machine rebate programs; (G) Public information programs; (H) School education programs; (I) Conservation programs for commercial, industrial, and institutional accounts; (J) Wholesale agency programs; (K) Conservation pricing; (L) Water conservation coordinator; (M) Water waste prohibition;(N) Residential ultra-low-flush toilet replacement programs.	10631(f)(1)	DMMs	Discuss each DMM, even if it is not currently or planned for implementation. Provide any appropriate schedules.	Section 6.2, p 6-2 Section 6-3, p 6-3 Appendix I Appendix J
27	A description of the methods, if any, that the supplier will use to evaluate the effectiveness of water demand management measures implemented or described under the plan.	10631(f)(3)	DMMs		Section 6.2, p 6-2 Section 6.3, p 6-3 Appendix I
28	An estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the supplier's ability to further reduce demand.	10631(f)(4)	DMMs		Appendix I

No.	UWMP requirement	Calif. Water Code reference	Subject	Additional clarification	UWMP location
29	An evaluation of each water demand management measure listed in paragraph (1) of subdivision (f) that is not currently being implemented or scheduled for implementation. In the course of the evaluation, first consideration shall be given to water demand management measures, or combination of measures, that offer lower incremental costs than expanded or additional water supplies. This evaluation shall do all of the following: (1) Take into account economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors; (2) Include a cost-benefit analysis, identifying total benefits and total costs; (3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost; (4) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation.	10631(g)	DMMs	See 10631(g) for additional wording.	Not applicable to DWD. All applicable DMMs are being implemented, See Section 6.2.
30	(Describe) all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs, other than the demand management programs identified pursuant to paragraph (1) of subdivision (f), that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in average, single-dry, and multiple-dry water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.	10631(h)	System Supplies		Section 4.4, p 4-4 Section 4.5, p 4-10
31	Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.	10631(i)	System Supplies		Section 4.5.3, p 4-13 Section 4.5.4, p 4-14

No.	UWMP requirement	Calif. Water Code reference	Subject	Additional clarification	UWMP location
32	Include the annual reports submitted to meet the Section 6.2 requirement (of the MOU), if a member of the CUWCC and signer of the December 10, 2008 MOU.	10631(j)	DMMs	Signers of the MOU that submit the annual reports are deemed compliant with Items 28 and 29.	Section 6.2, p 6-3
33	Urban water suppliers that rely upon a wholesale agency for a source of water shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (c).	10631(k)	System Demands	Average year, single dry year, multiple dry years for 2015, 2020, 2025, and 2030.	Section 4.3, p 4-4 Section 5.3.1, p 5-3 Appendix F
34	The water use projections required by Section 10631 shall include projected water use for single-family and multifamily residential housing needed for lower income households, as defined in Section 50079.5 of the Health and Safety Code, as identified in the housing element of any city, county, or city and county in the service area of the supplier.	10631.1(a)	System Demands		Section 3.3, p 3-3
35	Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage.	10632(a)	Water Supply Reliability . . .		Section 5.9.2, p 5-12
36	Provide an estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply.	10632(b)	Water Supply Reliability . . .		5.2, p 5-3

No.	UWMP requirement	Calif. Water Code reference	Subject	Additional clarification	UWMP location
37	(Identify) actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.	10632(c)	Water Supply Reliability . . .		Section 5.8, p 5-11 Section 5.9.1, p 5-11 Appendix G
38	(Identify) additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.	10632(d)	Water Supply Reliability . . .		Section 5.9.3, p 5-13
39	(Specify) consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.	10632(e)	Water Supply Reliability . . .		Section 5.9.3, p 5-13
40	(Indicated) penalties or charges for excessive use, where applicable.	10632(f)	Water Supply Reliability . . .		Section 5.9.3, p 5-13
41	An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.	10632(g)	Water Supply Reliability . . .		Section 5.9.4, p 5-15
42	(Provide) a draft water shortage contingency resolution or ordinance.	10632(h)	Water Supply Reliability . . .		5.9, p 5-11 Appendix G
43	(Indicate) a mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.	10632(i)	Water Supply Reliability . . .		Section 5.9.5, p 5-16
44	Provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area	10633	System Supplies		Section 4.5.1. p 4-10

No.	UWMP requirement	Calif. Water Code reference	Subject	Additional clarification	UWMP location
45	(Describe) the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.	10633(a)	System Supplies		Section 4.5.1, p 4-10
46	(Describe) the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.	10633(b)	System Supplies		Section 4.5.1, p 4-10
47	(Describe) the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.	10633(c)	System Supplies		Section 4.5.1, p 4-10
48	(Describe and quantify) the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, indirect potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.	10633(d)	System Supplies		Section 4.5.1, p 4-10
49	(Describe) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.	10633(e)	System Supplies		Section 4.5.1, p 4-10
50	(Describe the) actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.	10633(f)	System Supplies		Section 4.5.1, p 4-10
51	(Provide a) plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.	10633(g)	System Supplies		Section 4.5.1, p 4-10

No.	UWMP requirement	Calif. Water Code reference	Subject	Additional clarification	UWMP location
52	The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management strategies and supply reliability.	10634	Water Supply Reliability . . .	For years 2010, 2015, 2020, 2025, and 2030	Section 5.5, p 5-7
53	Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.	10635(a)	Water Supply Reliability . . .		Section 5.4, p 5-5
54	The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies no later than 60 days after the submission of its urban water management plan.	10635(b)	Plan Preparation		Section 1.4, p 1-5
55	Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan.	10642	Plan Preparation		Section 1.3, p 1-4 Section 1.4, p 1-5

No.	UWMP requirement	Calif. Water Code reference	Subject	Additional clarification	UWMP location
56	Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. The urban water supplier shall provide notice of the time and place of hearing to any city or county within which the supplier provides water supplies. A privately owned water supplier shall provide an equivalent notice within its service area.	10642	Plan Preparation		Section 1.4, p 1-5 Appendix A-2 Appendix A-3
57	After the hearing, the plan shall be adopted as prepared or as modified after the hearing.	10642	Plan Preparation		Section 1.4, p 1-5 Appendix B
58	An urban water supplier shall implement its plan adopted pursuant to this chapter in accordance with the schedule set forth in its plan.	10643	Plan Preparation		Section 1.4, p 1-5 Appendix B
59	An urban water supplier shall submit to the department, the California State Library, and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. Copies of amendments or changes to the plans shall be submitted to the department, the California State Library, and any city or county within which the supplier provides water supplies within 30 days after adoption.	10644(a)	Plan Preparation		Section 1.4, p 1-5
60	Not later than 30 days after filing a copy of its plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours.	10645	Plan Preparation		Section 1.4, p 1-5

Appendix D
CCWD Regional Alliance Analysis

Appendix H

Water Conservation Bill of 2009
Regional Alliance Analysis

APPENDIX H
THE WATER CONSERVATION BILL OF 2009
REGIONAL ALLIANCE ANALYSIS

> *10608.20. (a) (1) Each urban retail water supplier shall develop urban water use targets and an interim urban water use target by July 1, 2011. Urban retail water suppliers may elect to determine and report progress toward achieving these targets on an individual or regional basis, as provided in subdivision (a) of Section 10608.28, and may determine the targets on a fiscal year or calendar year basis.*
> *10608.20(e) Include the baseline daily per capita water use, urban water use target, interim water use target, and compliance daily per capita water use. Provide basis for determination and supporting data references.*
> *10608.20(h)(2) An urban retail water supplier shall use the methods developed by the department in compliance [with methodologies and criteria developed by DWR]*
>
> *10608.28. (a) An urban retail water supplier may meet its urban water use target within its retail service area, or through mutual agreement, by any of the following:*
> *(1) Through an urban wholesale water supplier.*
> *(2) Through a regional agency authorized to plan and implement water conservation, including, but not limited to, an agency established under the Bay Area Water Supply and Conservation Agency Act (Division 31 (commencing with Section 81300)).*
> *(3) Through a regional water management group as defined in Section 10537.*
> *(4) By an integrated regional water management funding area.*
> *(5) By hydrologic region.*
> *(6) Through other appropriate geographic scales for which computation methods have been developed by the department.*
> *10608.36 Wholesale suppliers will provide an assessment of their present and proposed future measures, programs, and policies to achieve water use reduction required in SBX7 7.*

Beginning with the 2010 UWMPs, the Water Conservation Bill of 2009, Senate Billx7-7 (SBx7-7), requires each urban retail water supplier to include the following in its UWMP:

- Baseline daily per capita water use – how much water is used within an urban water supplier's distribution system area on a per capita basis. It is determined using water use and population estimates from a defined range of years.

- Urban water use target – how much water is planned to be delivered in 2020 to each resident within an urban water supplier's distribution system area, taking into account water conservation practices that currently are and plan to be implemented.

- Interim urban water use target – the planned daily per capita water use in 2015, a value halfway between the baseline daily per capita water use and the urban water use target.

In 2015 and 2020, each water supplier will determine a compliance daily per capita water use to assess progress toward meeting interim and 2020 urban water use targets. SBx7-7 allows water suppliers to update their calculation methodologies and water use target in the 2015 UWMP.

CCWD is both a retail and wholesale water supplier. CCWD fulfilled its SBx7-7 reporting requirements for its retail treated water service area in Section 9 of the 2010 UWMP. Appendix H of the 2010 UWMP provides an analysis of the SBx7-7 requirements for CCWD's wholesale service area. The regional alliance includes CCWD's retail service area and CCWD's wholesale municipal customers (Cities of Antioch, Pittsburg, and Martinez, Golden State Water Company, and Diablo Water District). As required by DWR, CCWD submitted a letter to DWR on June 8, 2011 stating that a regional alliance was formed and providing a list of the water supplier members. A copy of this letter is provided at the end of Appendix H. Additionally, CCWD's wholesale municipal customers have provided a statement in their 2010 UWMPs that they are members of CCWD's regional alliance.

DWR's "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" (Guidebook) outlines four steps water suppliers must complete to meet the 2010 UWMP requirements identified in SBx7-7:

1. Determine Base Daily Per Capita Water Use
2. Determine Urban Water Use Target
3. Compare Urban Water Use Target to the 5-year Baseline
4. Determine Interim Urban Water Use Target

CCWD has completed these steps for its regional alliance analysis as follows.

Step 1. Determine Base Daily Per Capita Water Use

As defined in CWC Section 10608.12(b), base daily per capita water use is the average gross water use reported in gallons per capita per day (gpcd) and calculated over a continuous 10-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.

For an urban retail water supplier that meets at least 10 percent of its 2008 measured retail water demand through recycled water, the water supplier has the option to extend the base period up to an additional five years to a maximum continuous 15-year period ending no earlier than December 31, 2004, and no later than December 31, 2010. The regional alliance does not meet this requirement, and will therefore use a 10-year period for the baseline calculation.

The gross water use is defined in CWC Section 10608.12(g) as the total volume of water entering the distribution system excluding recycled water. CCWD's gross water use for its total water service area was determined as the sum of the total water deliveries into CCWD's untreated water conveyance facility (Contra Costa Canal) plus wholesale customers' water use from other water supply sources. These water deliveries are metered and do not include any recycled water use.

To calculate per capita water use, CCWD developed service area population estimates according to guidance provided in Section M of DWR's Guidebook, "Water Conservation Bill of 2009 Technical Methodologies.

CCWD utilized its GIS database and the following sources to calculate population data:

- Available U.S. Census Bureau (Census) data from 1990 and 2000
- Data published by the California Department of Finance (DOF) for non-census years

CCWD's total service area includes CCWD's retail service area and areas served by wholesale deliveries from CCWD. CCWD's total service area boundaries do not exactly match City boundaries. Therefore, CCWD developed a proportional area approach to incorporate DOF population estimates for the cities and unincorporated areas within CCWD's service area. CCWD's service area covers a total area of more than 140,000 acres, including the largely unpopulated Los Vaqueros (LV) watershed (19,100 acres). For the proportional area estimation method, the LV watershed area was subtracted from the CCWD distribution area. The CCWD distribution area does not include large institutions with wholly private water systems, therefore no subtractions were made for this category. A map showing CCWD's service area is provided as Figure H-1.

CCWD's gross water use and population estimates for the 10-year base period of 1995 to 2004 are presented in Table H-1. The base daily per capita water use is calculated to be 261 gpcd.

TABLE H-1: 10-YEAR BASE DAILY PER CAPITA WATER CCWD REGIONAL ALLIANCE				
Base period year		**Distribution System Population**	**Daily system gross water use (acre-feet)**	**Annual daily per capita water use (gpcd)**
Sequence Year	**Calendar Year**			
Year 1	1995	378,909	112,431	265
Year 2	1996	383,409	118,693	276
Year 3	1997	389,899	123,738	283
Year 4	1998	397,962	113,253	254
Year 5	1999	409,361	118,756	259
Year 6	2000	417,477	120,913	259
Year 7	2001	420,462	123,172	262
Year 8	2002	435,167	125,385	257
Year 9	2003	439,858	120,822	245
Year 10	2004	445,059	126,924	255
			Base Daily Per Capita Water Use	261

Step 2. Determine Urban Water Use Target

The CWC Section 10608.20(b) provides four methods for calculating the 2020 water use target. Three of the methods are detailed in the CWC. The fourth method was developed by DWR. The following is a summary of the methods along with CCWD's preliminary evaluation of each method:

- Method 1 – Eighty percent of the water supplier's baseline per capita daily water use. This is a straightforward method that yields a regional alliance water use target of 209 gpcd based on the baseline per capita daily water use determined in Step 1 of this section. For this UWMP, CCWD has utilized this method to set its 2015 interim and 2020 regional alliance water use targets. Method 2 – Per capita daily water use estimated using the sum of performance standards applied to indoor residential use; landscape area water use, and commercial, industrial, and institutional uses. This method requires the use of satellite imagery, site visits, or other best available technology to develop an accurate estimate of landscaped area. CCWD will coordinate with its wholesale customers to evaluate this method in the future.
- Method 3 – Ninety-five percent of the applicable state hydrologic region target as set forth in the state's 20x2020 Water Conservation Plan. CCWD's total service is split between the San Francisco Bay (SF Bay) and San Joaquin River (SJR) hydrologic regions. The city of San Francisco is densely populated with relatively low landscape irrigation needs and a cooler climate than CCWD's water service area. As shown in Figure F-1 of the DWR Guidebook, the urban water use target for the SF Bay and SJR hydrologic regions are 131 gpcd and 174 gpcd, respectively. A rough estimate based on surface area indicates that CCWD's service area is split 60/40 between the SF Bay and SJR hydrologic regions. Using Method 3 yields an urban water use target of

approximately 148 gpcd for the regional alliance. This target would require a reduction of more than 40% from the regional alliance baseline per capita daily water use.

- Method 4 – Provisional "Water Savings" method developed by DWR and described in Appendix C of DWR's Guidebook. For this method, water savings are achieved due to metering of unmetered water connections and implementing water conservation measures in three water use sectors (indoor residential, CII, and landscape area). The urban water use target is set by subtracting the determined total water savings from the base per capita daily water use. Currently, Method 4 is provisional and will be updated by DWR by December 31, 2014. CCWD will evaluate this method once it is finalized.

Based on a preliminary evaluation of the four methods, CCWD utilized Method 1 to set its 2015 interim and 2020 regional alliance water use targets. CCWD will update its analysis and potentially use an alternative method in its 2015 UWMP. Table H-2 presents the urban water use target calculation using Method 1.

TABLE H-2: WATER USE TARGET CALCULATION
CCWD REGIONAL ALLIANCE

Required Data	Gallons per capita per day (gpcd)
Baseline Daily per Capita Water Use [a]	261
Urban Water Use Target Method 1: 80% of Baseline	209

a) See Table H-1 for 10-year base daily per capita water use calculation.

Step 3. Compare Urban Water Use Target to the 5-year Baseline

As described in CWC Section 10608.22, water agencies must achieve a minimum daily per capita use reduction of 5 percent of base daily per capita water use, calculated using a five-year period ending no earlier than December 31, 2007, and no later than December 31, 2010.

Table H-3 presents CCWD's 5-year base daily per capita water use, which is calculated to be 247 gpcd for the 5-year base period of 2003 to 2007. Methodologies for calculating gross water use and service area population are described in Step 1 of this section.

TABLE H-3: 5-YEAR BASE DAILY PER CAPITA WATER
CCWD REGIONAL ALLIANCE

Base period year		Distribution System Population	Daily system gross water use (acre-feet)	Annual daily per capita water use (gpcd)
Sequence Year	Calendar Year			
Year 1	2003	439,858	120,822	245
Year 2	2004	445,059	126,924	255
Year 3	2005	446,412	121,282	243
Year 4	2006	445,175	120,746	242
Year 5	2007	447,922	125,433	250
			Base Daily Per Capita Water Use	247

Table H-4 provides a comparison of the urban water use target to the 5-year baseline target. The regional alliance is required to use the lesser of the two values as its 2020 urban water use target. Therefore, the regional alliance 2020 water use target is 209 gpcd.

TABLE H-4: WATER USE TARGET CALCULATION CCWD REGIONAL ALLIANCE	
Required Data	**Gallons per capita per day (gpcd)**
Baseline Daily per Capita Water Use [(a)]	261
2020 Water Use Target	
Method 1: 80% of Baseline	209
95% of Base Daily per Capita Water Use using 5-year Average [(b)]	235
Actual 2020 Water Use Target [(c)]	209
2015 Interim Water Use Target [(d)]	235

a) See Table H-1 for 10-year baseline calculation.
b) See Table H-3 for 5-year baseline calculation.
c) The water use target is the lesser of Method 1 or 95% of the 5-year baseline daily per capita water use.
d) Interim water use target is defined as halfway between 10-year baseline and 2020 water use target.

Step 4. Determine Interim Urban Water Use Target

The interim urban water use target is defined in the CWC Section 10608.12 (j) as the midpoint between the base daily per capita water use and the urban water use target for 2020. As presented in Table H-4, the 2015 interim water use target for the regional alliance is calculated to be 235 gpcd.

<u>Present and Proposed Future Measures, Programs, and Policies to Achieve Water Use Reduction Required in SBx7-7</u>

CCWD and its wholesale customers have already made significant progress towards meeting the regional alliance urban water use target. Some of the progress can be attributed to customers' response to recent drought conditions and the current economic downturn. In 2009, CCWD implemented a Drought Management Program that was in effect for CCWD's total service area from May 1, 2009 through April 30, 2010. The daily per capita water use for CCWD's total water service area was approximately 190 gpcd in 2010, which is lower than the 2020 urban water use target.

The future measures, programs, and policies presented in Section 9 of the UWMP for CCWD's retail treated water service area also apply to CCWD's total service area and the regional alliance. CCWD will continue to implement its Water Conservation Program that has been active for over 20 years. CCWD offers its Conservation Program services to both its retail and wholesale service area customers. The Water Conservation Program is designed to reduce long-term water demand in conformance with the District's FWSS. Total savings resulting from active and passive conservation activities are estimated to be over 21,000 acre-feet by 2035. The Conservation Program played a key role in helping customers meet their reduction goals for the 2009 DMP and will be an important tool for the regional alliance in meeting its 2020 urban water use target.

The following is a summary of key Conservation Program elements, which are described in more detail in Section 7 of the UWMP.

- Conservation surveys for single-family, multi-family, CII, and large landscape customers
- Conservation incentives including shower timers, restaurant table tents, smart car wash coupons, and money-saving mulch coupons
- Conservation rebates for high-efficiency toilets, high-efficiency clothes washers, smart sprinkler timers, sprinkler and nozzle retrofits, drip retrofits, and pilot water-efficient landscapes
- Education and outreach programs including flyers on how to read your meter, lawn and landscape watering schedule, and school education programs

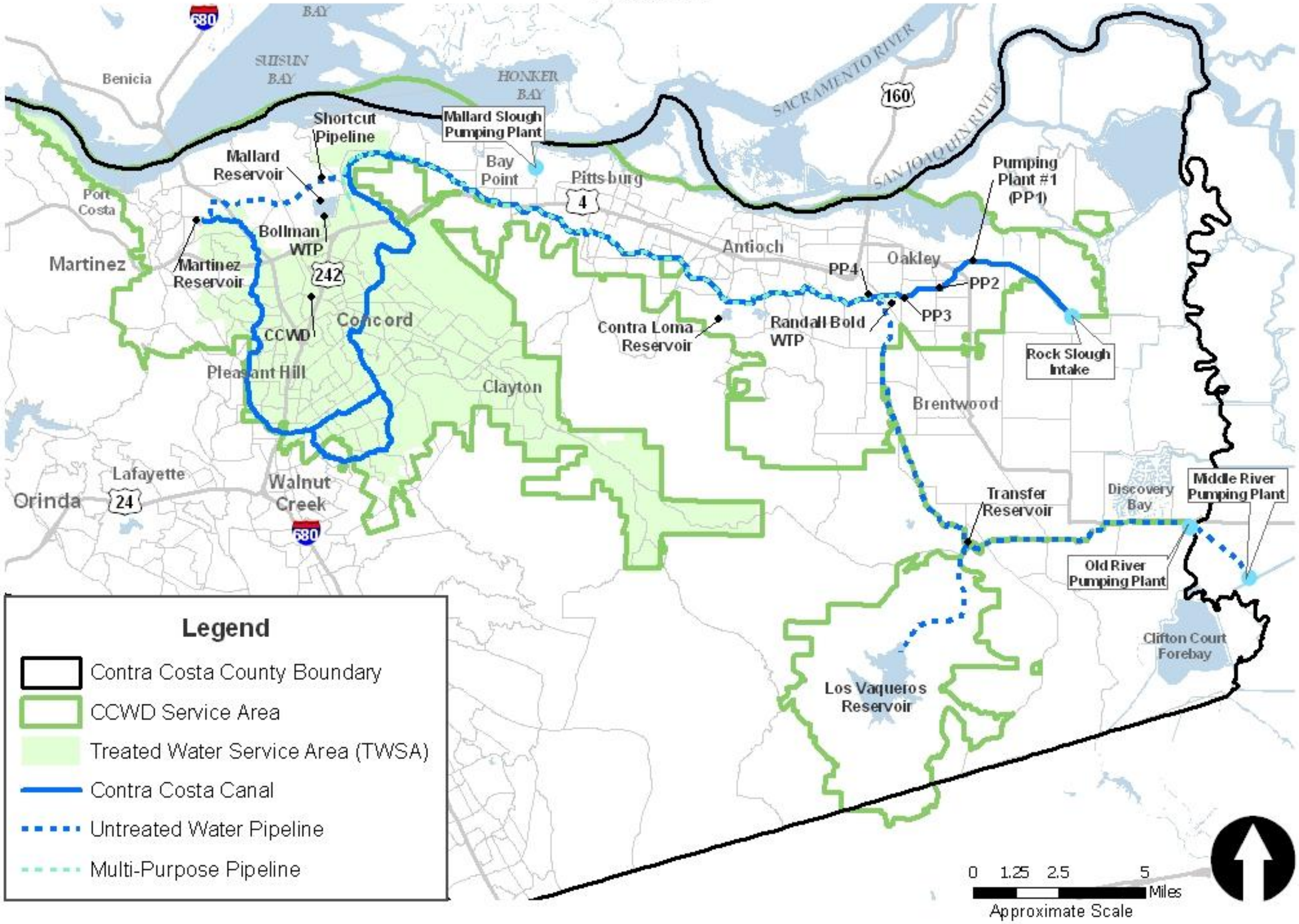
In addition to active conservation activities implemented through CCWD's Conservation Program, passive conservation is also achieved through state and local efficiency codes. Efficiency codes that require efficient fixtures and appliances, grant funding to promote water conservation, residential weather-based irrigation controllers, and efficient landscape practices are expected to achieve additional water use reductions in CCWD's service area.

Future recycled water projects within CCWD's service area will also contribute towards achieving water use reduction goals. Potential opportunities include recycled water projects for agricultural irrigation, urban landscape irrigation, industrial reuse, and groundwater recharge. Section 5 of this UWMP includes a more detailed discussion of current and future recycled water opportunities, and Table 5-3 provides projected future use of recycled water in the CCWD service area. It is anticipated that by the year 2035, recycled water use will be approximately 14,800 AFY. CCWD will continue to work collaboratively with its wholesale customers and municipalities in the CCWD service area to encourage recycled water use in future development projects.

An example of a future development in CCWD's service area that would incorporate significant water conservation measures and recycled water standards is the City of Concord Community Reuse Plan (Reuse Plan), which proposes to redevelop approximately 5,000 acres of the Concord Naval Weapons Station located within CCWD's treated water service area. These standards have reduced the project's potable water demand projections by more than 50 percent. It is estimated that the project will utilize recycled water in an amount equal to or greater than the net potable water demand. There are also opportunities to provide up to an additional 3,000 acre-feet annually of recycled water if the planned open spaces and parks are irrigated.

There are also potential future opportunities for industrial reuse projects within CCWD's service area. These projects could supply highly treated recycled wastewater to selected industrial customers for process and cooling purposes. Potential customers include the Tesoro and Shell oil refineries, power plants and other manufacturing facilities.

CONTRA COSTA WATER DISTRICT
SERVICE AREA MAP
FIGURE H-1



File copy

CONTRA COSTA
WATER DISTRICT

1331 Concord Avenue
P.O. Box H2O
Concord, CA 94524
(925) 688-8000 FAX (925) 688-8122
www.ccwater.com

June 8, 2011

Mr. Peter Brostrom
Urban Water Use and Efficiency Branch
California Department of Water Resources
P.O. Box 942836
Sacramento, CA 94236

Subject: 2010 Urban Water Management Plan – Regional Alliance

Dear Mr. Brostrom:

The purpose of this letter is to inform the California Department of Water Resources of the regional alliance Contra Costa Water District (CCWD) has formed with its wholesale municipal customers. The regional alliance includes the following members:

- Contra Costa Water District
- City of Antioch
- City of Martinez
- City of Pittsburg
- Diablo Water District
- Golden State Water Company (Bay Point)

Each member of the regional alliance has prepared an individual Urban Water Management Plan that includes individual baseline and water use target analyses required by the Water Conservation Bill of 2009 (SBX 7-7) as well as acknowledgement that the agency is participating in the CCWD regional alliance. The regional alliance analysis was prepared by CCWD and is included in Appendix H of CCWD's 2010 Urban Water Management Plan.

If you have any questions or concerns, please feel free to contact me at (925) 688-8310.

Sincerely,

Jeff Quimby

Jeff Quimby
Principal Engineer

KL:cmn

cc: Mr. Phil Harrington, City of Antioch
Mr. Alan Pellegrini, City of Martinez
Mr. Walter Pease, City of Pittsburg
Mr. Mike Yeraka, Diablo Water District
Mr. Ernie Gisler, Golden State Water Company

Appendix E

Diablo Water District Groundwater Management Plan for AB 3030

Diablo Water District Groundwater Management Plan for AB 3030

May 2007

LUHDORFF & SCALMANINI
CONSULTING ENGINEERS

DIABLO WATER DISTRICT

Diablo Water District Groundwater Management Plan for AB 3030

Prepared for

Diablo Water District

Luhdorff and Scalmanini Consulting Engineers, Inc.

Woodland, California

May 2007

DIABLO
WATER
DISTRICT

May 31, 2007

2107 Main St.
P.O. Box 127
Oakley, CA 94561-0127
925 • 625 • 3798
Fax 925 • 625 • 0814

To Interested Parties and Individuals:

The Diablo Water District (District) is pleased to release this Groundwater Management Plan (Plan), adopted May 23, 2007. The Plan establishes a framework for maintaining a high quality and sustainable groundwater supply for the District. The Plan also supports basin management objectives directed toward the sustainability of groundwater supplies on a regional scale.

The District's primary objective is to provide a safe and reliable supply of water to the citizens and businesses of Oakely and the unincorporated portions of its service area. Since 2006, the District's surface water source has been supplemented by groundwater. As the District expands its use of groundwater to meet population growth in the next 30 years, it has taken steps to preserve the valuable groundwater resources underlying the region. The components of local groundwater management planning already implemented and future actions are described in the Plan.

The Plan has benefited by valuable input from public agencies as well as the public. This Plan acts as a guide as the District embarks on groundwater development and presents a strategy and management actions to ensure sustained conjunctive use of the two subject sources of supply. Comments and suggestions offered in support of the District's groundwater management objectives are welcome and encouraged.

Sincerely,

Mike Yeraka, P.E.
General Manager

RESOLUTION No. 2007-4

RESOLUTION OF THE BOARD OF DIRECTORS OF DIABLO WATER DISTRICT AUTHORIZING ADOPTION OF GROUNDWATER MANAGEMENT PLAN

The Board of the Directors of the Diablo Water District (District) does hereby find that:

WHEREAS, the District was formed in 1953 by a vote of the citizens of Oakley for the purpose of serving a safe, adequate, and reliable supply of water to the residents and businesses within the District; and

WHEREAS, California Water Code, Part 2.75 of Division 6, Section 10750, et seq., permits the adoption and implementation of Groundwater Management Plans to encourage authorized local agencies to manage groundwater resources within their service areas; and

WHEREAS, the District is an authorized local agency and may therefore adopt and implement such a Groundwater Management Plan; and

WHEREAS, a Groundwater Management Plan will further the District's efforts to protect and provide a safe, sufficient, and reliable groundwater supply to citizens and businesses within the District's boundaries, will facilitate collection of information to further understand groundwater basin conditions and evaluate additional policies and programs for protection of the groundwater resources in the Plan area, and will assist in integrated regional water resources planning and monitoring efforts conducted in coordination with other public entities whose service areas also overly the Plan area; and

WHEREAS, the District adopted a Resolution of Intent to prepare a Groundwater Management Plan on June 28, 2006; and

WHEREAS, California Water Code, Part 2.75 of Division 6, Section 10750, et seq. requires an entity to adopt a Groundwater Management Plan no later than two years after passing said Resolution of Intent; and

WHEREAS, a Public Hearing was held on May 23, 2007, to determine whether to adopt a Groundwater Management Plan; and

WHEREAS, prior to the Public Hearing a Notice of the Public Hearing was published in a newspaper of general circulation in Contra Costa County on May 4, 2007, and May 11, 2007; and

WHEREAS, less than 50% of the District's assessed property owners protested the draft Plan.

NOW, THEREFORE, BE IT RESOLVED that the District does hereby authorize the adoption of the District's Groundwater Management Plan.

RESOLVED FURTHER that this resolution shall be published in a paper of general circulation in Contra Costa County at least two times to give public notice of the adoption of the District's Groundwater Management Plan.

*　*　*　*　*　*

The foregoing Resolution was duly and regularly adopted at a meeting held on this 23rd day of May 2007 by the Board of Directors of Diablo Water District by the following vote of the Board:

AYES: Crockett, de Fremery, Garcia, Head, and Hobbs

NOES: none

ABSENT: none

Dated: May 31, 2007

Mike Yeraka, Secretary

DIABLO
WATER
DISTRICT

2107 Main St.
P.O. Box 127
Oakley, CA 94561-0127
925 • 625 • 3798
Fax 925 • 625 • 0814

Acknowledgments

Diablo Water District would like to thank the five East County Water Management Association member agencies that formed an advisory group to guide the preparation of this plan. Representatives from these agencies participated in meetings on content of the Groundwater Management Plan and reviewed a draft Plan. The agencies represented include:

- City of Brentwood, Paul Elderdge
- Contra Costa Water District, Jerry Brown
- Town of Discovery Bay, Virgil Koehne
- East Contra Costa Water District, Larry Preston
- City of Pittsburg, Walter Pease

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Appendices

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Acronyms and Abbreviations

AB	Assembly Bill
BMO	basin management objectives
CCWD	Contra Costa Water District
CORS	Continuously Operating Reference Station
CSRC	California Spatial Reference Center
CUWCC	California Urban Water Conservation Council
CVP	Central Valley Project
CWC	California Water Code
DHS	Department of Health Services
District	Diablo Water District
DMM	demand management measure
DWD	Diablo Water District
DWR	California Department of Water Resources
DWSAP	Drinking Water Source Assessment Protection
e-logs	electrical geophysical logs
ECCID	East Contra Costa Irrigation District
ECWMA	East County Water Management Association
EDR	Environmental Data Resources Inc.
GPS	global positioning system
IRWMP	Integrated Regional Water Management Plan
ISD	Ironhouse Sanitary District
LSCE	Luhdorff & Scalmanini Consulting Engineers
MCL	Maximum Contaminant Level
mgd	million gallons per day
MOU	Memorandum of Understanding
NGS	National Geodetic Survey
PCA	Possible Contaminating Activities
Plan	District Groundwater Management Plan
RBWTP	Randall-Bold Water Treatment Plant
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SDWA	Safe Drinking Water Act
SOI	Sphere of Influence
SWRCB	State Water Resources Control Board
USBR	United States Bureau of Reclamation
USGS	United States Geological Survey
UST	Underground Storage Tank
UWMP	Urban Water Management Plan
WPPs	Wellhead Protection Porgrams

1.0 INTRODUCTION

1.1 DISTRICT DESCRIPTION AND OVERVIEW

1.1.1 Diablo Water District

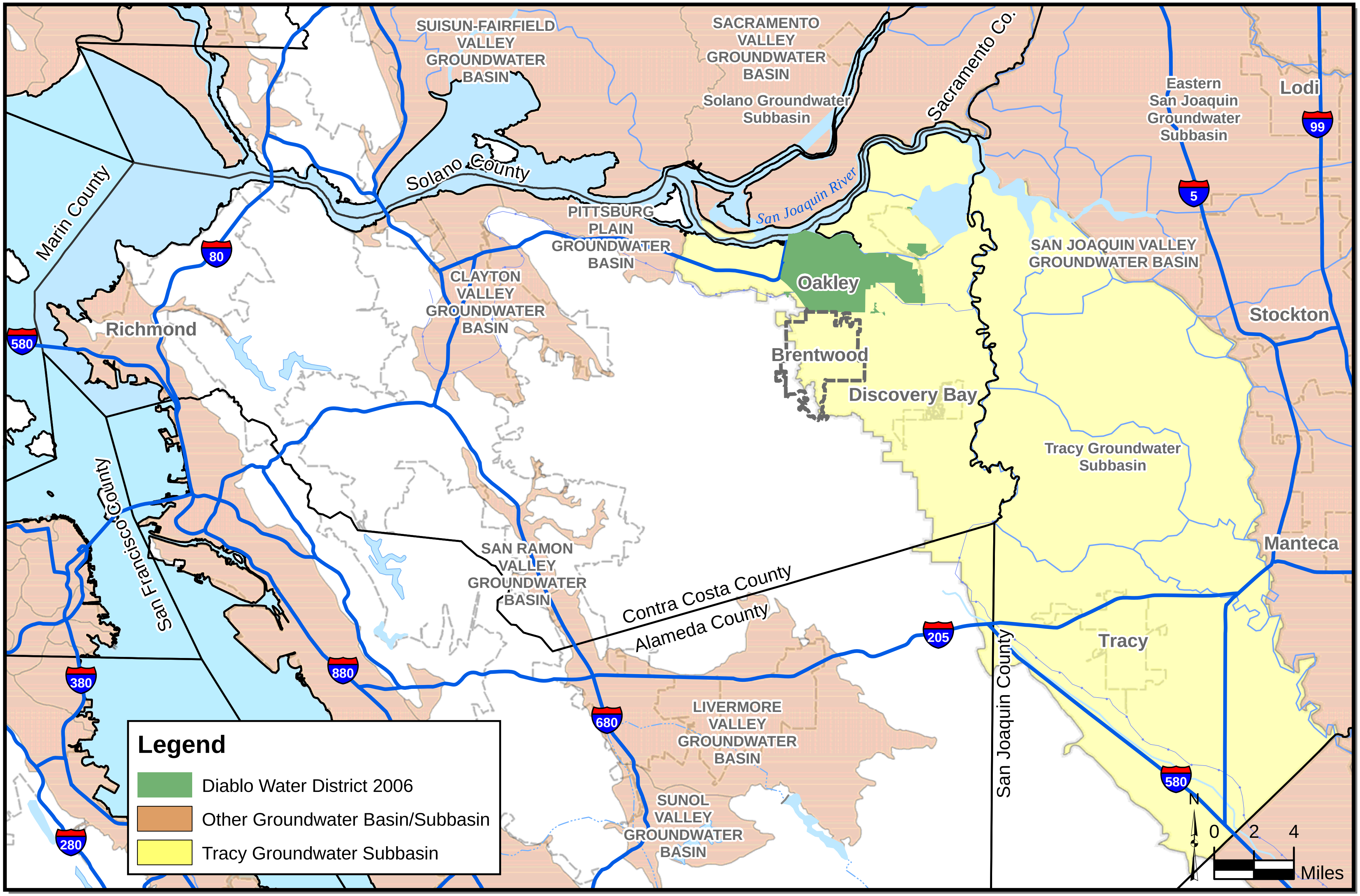
Diablo Water District (District), formed in 1953 as the Oakley County Water District and in 1993 changed its name to Diablo Water District, is located on the southern shore of the San Joaquin River Delta, midway between San Francisco and Sacramento in eastern Contra Costa County (**Figure 1-1**). The District's current service area encompasses approximately 17 square miles and includes the City of Oakley (incorporated on July 1, 1999) and other unincorporated areas, and provides service to over 28,000 people and approximately 8,500 water connections (CDM, 2005).

The District's primary objective is to provide a safe and reliable supply of water to the citizens and businesses of Oakley and the unincorporated portions of its service area. Most of the water delivered by the District is surface water supplied by Contra Costa Water District (CCWD), which is treated at the Randall-Bold Water Treatment Plant. Since 2006, the District's surface water source has been supplemented by groundwater from the Glen Park municipal well. Water from the well is conveyed and blended with treated surface water and then distributed through the main municipal system serving the City of Oakley. Expanded use of groundwater is an objective of the District under its Well Utilization Project in which it seeks to develop up to 6 – 7 million gallons per day of well capacity to supplement surface water and improve reliability, drought supply, and operating flexibility of its system. Outside of its main distribution system, in unincorporated areas, the District owns and/or operates a number of small community wells.

The District's current service area and Sphere of Influence (SOI) are shown on **Figure 1-2**, along with the boundaries of other public water agencies in northeastern Contra Costa County. The District's Urban Water Management Plan (UWMP) contains projections of population growth and water demand and supply from 2005 to 2040 (CDM, 2005). Water demand within the District's SOI is expected to increase significantly as the population increases from about 28,000 in 2005 to 75,000 in 2040. This includes about 50,000 residents within the existing City of Oakley limits, 18,000 within the City's expansion areas, and 7,000 in areas outside the City such as Knightsen and Bethel Island, portions of which are served by the District (CDM, 2005). The projected population growth corresponds to an annual growth rate of 4.8 percent.

1.1.2 Authority for Groundwater Management

The District is a local public agency that provides water service to customers within its service area. As a result of Assembly Bill (AB) 3030, the California Water Code (CWC), Section 10750



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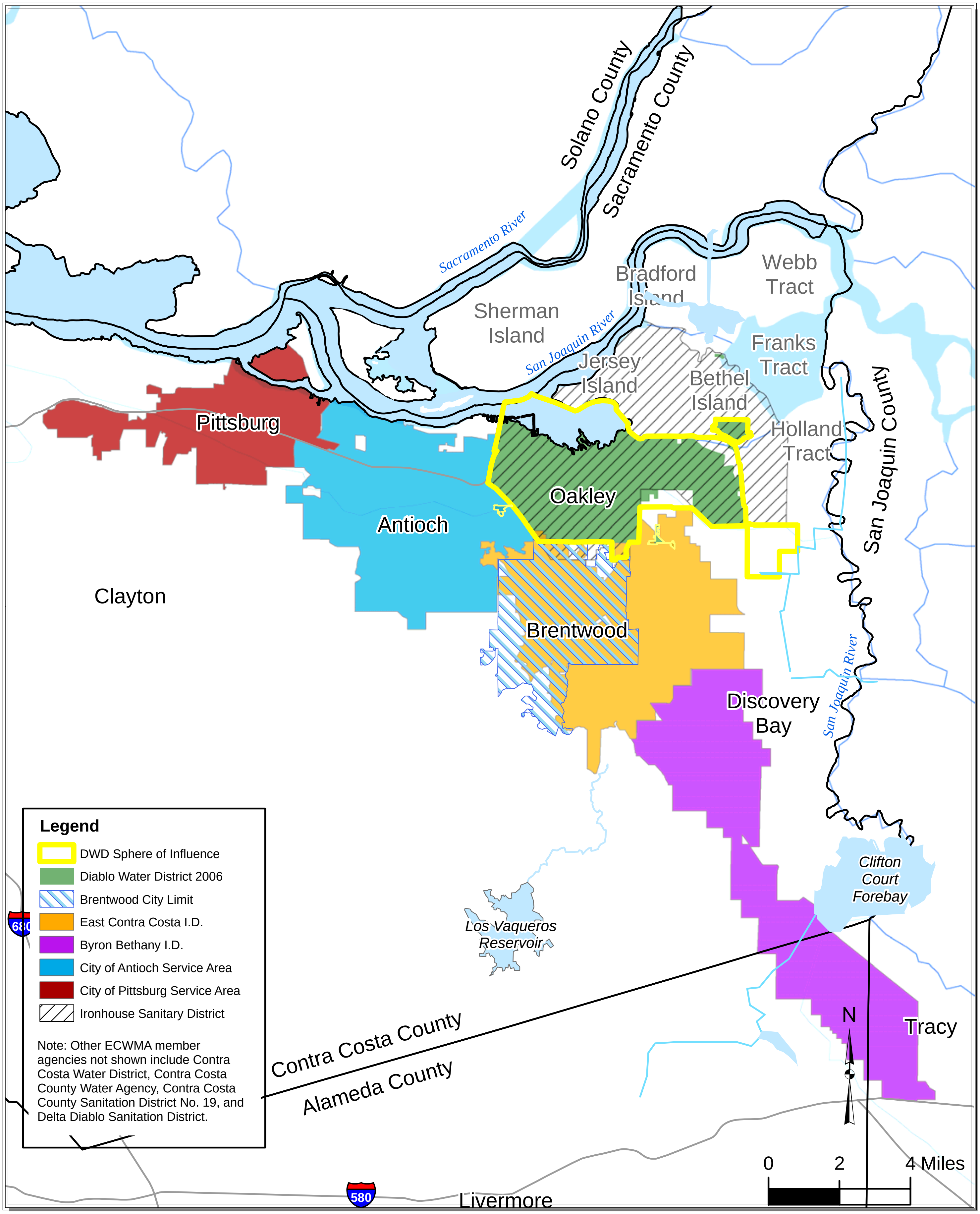
LUHDORFF & SCALMANINI CONSULTING ENGINEERS

Figure 1-1
Diablo Water District Location Map



FILE: \Public\Diablo WD 04-1-058\GIS\Figure 2.mxd

LUHDORFF & SCALMANINI
CONSULTING ENGINEERS

Figure 1-2
Diablo Water District Sphere Influence

et. seq., provides local agencies with the authority to adopt and implement groundwater management plans. As described further below, the CWC was subsequently amended as a result of Senate Bill (SB) 1938 (Machado), effective January 2003. On June 28, 2006, the District Board of Directors voted to adopt a resolution of intention to prepare a groundwater management plan, in accordance with the requirements of the CWC. This document embodies the District's Groundwater Management Plan (Plan).

1.1.3 Plan Purpose

The purpose of the Plan is to provide a management framework for maintaining a high quality, reliable, and sustainable supply of groundwater within the District's sphere of influence. To accomplish this, the District intends to manage groundwater conjunctively with its surface water resources and support basin management objectives (BMOs) directed toward the sustainability of groundwater supplies on regional and local scales (e.g., groundwater basin and subbasin). Groundwater management involves coordinated actions related to groundwater withdrawal, replenishment, and protection to achieve long-term sustainability of the resource without detrimental effects on other resources and the environment. This Plan sets forth the framework and related actions necessary to accomplish the District's purposes while satisfying regional BMOs.

1.2 OVERVIEW OF REGIONAL WATER RESOURCE PLANNING

The District participates in a variety of regional water management activities. Most notably, it is one of eleven public agencies that comprise the East County Water Management Association (ECWMA), which includes water purveyors in the eastern portion of Contra Costa County (**Figure 1-2**). The ECWMA was formed in 1995 to identify and evaluate potential water management strategies to meet future water needs in the area. In addition to the Diablo Water District, the member agencies include: City of Antioch, City of Brentwood, City of Pittsburg, Byron-Bethany Irrigation District, Town of Discovery Bay, Contra Costa County Water Agency, CCWD, Delta Diablo Sanitation District, East Contra Costa Irrigation District, and Ironhouse Sanitary District.

The ECWMA prepared a report entitled "Phase II East County Water Supply Management Study" (CH2M Hill, 1996) in response to projected growth in population and water demand in eastern Contra Costa County. The report focuses on the water resources, treatment, and infrastructure that will be required to respond to the increased water demand due to urbanization in the eastern portion of the County. Although a number of the ECWMA agencies use some groundwater, the primary source of water supply is surface water delivered by CCWD through Central Valley Project (CVP) contracts or an agreement with ECCID (City of Brentwood).

The ECWMA member agencies participated in the preparation of the East Contra Costa County Functionally Equivalent Integrated Regional Water Management Plan (IRWMP) consisting of existing local and regional planning documents, which was completed in July 2005. Completion of the Functionally Equivalent IRWMP enabled the ECWMA members to apply for a Proposition 50, Chapter 8 regional grant (CCWD, 2005). Eight eastern Contra Costa County agencies, including Diablo Water District, have projects to be included in the grant application.

The District receives its surface water supplies from CCWD and most of its service area is located within the CCWD boundaries (**Figure 1-3**). Current and projected future water supplies available to the District are summarized in CCWD's 2005 UWMP (CCWD, 2005), in addition to Diablo Water District's 2005 UWMP.

1.3 DIABLO WATER DISTRICT WATER SUPPLIES

In 1953, the residents of Oakley formed the Oakley County Water District, an independent local government agency (City of Oakley web site, www.ci.oakley.ca.us, 2006). In 1993, the Oakley Water District became the Diablo Water District. The District's water system currently consists of transmission and distribution pipelines, two water storage reservoirs (2.5 and 5 million gallons) built in 1986 and 1990, respectively, one active municipal supply well, pumping facilities, and a water treatment facility. The Randall-Bold Water Treatment Plant (RBWTP), owned jointly by the District (37.5 percent) and Contra Costa Water District (62.5 percent), began service in 1992. Diablo Water District has an initial maximum treatment plant capacity allocation from the RBWTP of 15 million gallons per day (mgd) with a future maximum allocation of 33 mgd.

In 1998, the Los Vaqueros Reservoir was placed into service by Contra Costa Water District. The reservoir provides up to three months of emergency water storage for Diablo Water District. In addition to surface water from CCWD, the Diablo Water District's system also utilizes water from one municipal well (Glen Park Well) that began production in July 2006. The percentage of water used from each supply source will vary as a function of the District's planned management strategy for its water resources. The District also operates and/or owns several wells that serve small community water systems as regulated by Contra Costa County Environmental Health Division.

Prior to completion of the Glen Park Well, the sole water supply source for the District's municipal customers was provided by CCWD. The District receives untreated CCWD water through an agreement with CCWD. While the District does not have a written quantity guarantee of supply from CCWD, it does have the right to draw up to 30 mgd from the RBWTP during normal years to meet maximum day water demands within its system. CCWD has a full commitment from the Central Valley Project of 195,000 acre-feet per year and provides water to central and eastern Contra Costa County via the Contra Costa Canal.

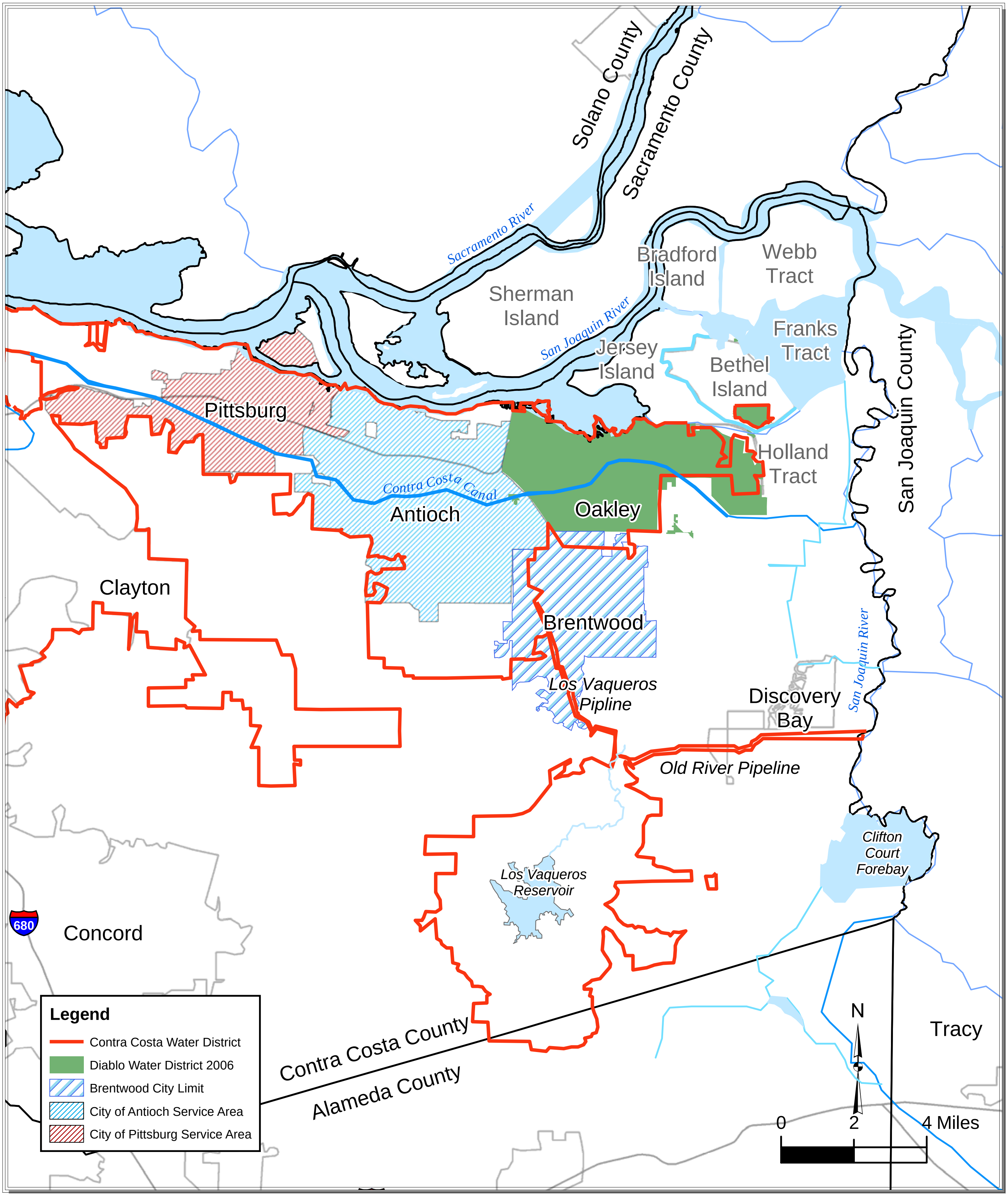


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Figure 1-3
Contra Costa Water District
(Eastern Portion)

In 2004, the District initiated the first phase of the Well Utilization Project (CDM, 2004) consisting of planning, construction, and testing of the Glen Park well, design of a blending facility at RBWTP, and a pipeline from the well to the blending facility. The purpose of the project is to construct wells to supplement the District's surface water supply with groundwater. The groundwater supply will replace a portion of the treated surface water and provide an emergency supply in the event of drought reductions of surface supplies or an outage of the RBWTP.

The first phase of the Well Utilization Project was completed in 2006 with the commissioning of the Glen Park well. Subsequent phases will add more wells and supply pipelines to the extent that groundwater quality is found to be favorable at prospective sites and increased pumping does not adversely affect local and regional groundwater resources. If these conditions were met, the project would provide a total groundwater supply for the District of up to 7,800 acre-feet per year at build-out. Thus, for maximum average day water use, the District would have available 15 mgd from the RBWTP and 7 mgd from wells installed under the Well Utilization Project.

1.4 LEGISLATION RELATED TO GROUNDWATER MANAGEMENT PLANS

The Legislature enacted legislation in 1992 (AB 3030) and 2002 (SB 1938), now incorporated in the CWC Section 10753, *et seq*. to encourage local public agencies to adopt plans to manage groundwater resources within their jurisdictions. The District has prepared this Groundwater Management Plan to be compliant with AB 3030 and revisions to the CWC that resulted from SB 1938.

SB 1938 provides that adoption of a groundwater management plan will be a prerequisite to obtaining funding assistance for groundwater projects from funds administered by California Department of Water Resources (DWR). To comply with SB 1938, a groundwater management plan must include components that address monitoring and management of water levels, groundwater quality degradation, inelastic land subsidence, and changes in surface flows and quality that either affect groundwater or are affected by groundwater pumping. SB 1938 specifies that groundwater management plans contain provisions to cooperatively work with other public (and presumably private) entities whose service area or boundary overlies the groundwater basin. Provisions must also be made to allow participation by interested parties in development of the plan. The plan must include mapping of the groundwater basin, as defined in DWR's Bulletin 118, along with the boundaries of the local agencies that overlie the basin. In this case, the Plan focuses on that portion of the San Joaquin Groundwater Basin that underlies Diablo Water District's SOI. Finally, to comply with SB 1938, monitoring protocols must be designed to detect changes in groundwater levels, groundwater quality, inelastic land subsidence (for basins where subsidence has been identified as a potential problem), and flow and quality of surface water that either directly affect groundwater, or are directly affected by groundwater pumping.

The potential components of groundwater management plans are listed in CWC Section 10753 and consist of:

- Control of saline water intrusion.
- Identification and management of wellhead protection areas and recharge areas.
- Regulation of the migration of contaminated groundwater.
- Administration of a well abandonment and well destruction program.
- Mitigation of conditions of overdraft.
- Replacement of groundwater extracted by water producers.
- Monitoring of groundwater levels and storage.
- Facilitating conjunctive use operations.
- Identification of well construction policies.
- Construction and operation by the local agency of groundwater contamination cleanup, recharge, storage, conservation, water recycling, and extraction projects.
- Development of relationships with state and federal regulatory agencies.
- Review of land use plans and coordination with land use planning agencies to assess activities, which create a reasonable risk of groundwater contamination.

In 2002, SB 1938 was amended and added to CWC Section 10750 *et seq.* regarding the implementation of local groundwater management plans. While the provisions of SB 1938 did not alter the potential components of a local groundwater management plan, as listed above, it did add the following provisions:

- The local agency, in preparing a groundwater management plan, shall make available to the public a written statement describing how interested parties may participate in developing the plan. For that purpose, the local agency may appoint, and consult with, a technical advisory committee consisting of interested parties.

- In order to qualify for funding assistance for groundwater projects, for funds administered by DWR, a local agency must accomplish all the following relative to groundwater management (CWC 10753.7(a)):

- Prepare and implement a groundwater management plan that includes basin management objectives for the groundwater basin that is subject to the plan.

- Include groundwater management components that address monitoring and management of water levels, groundwater quality degradation, inelastic land subsidence, and changes in surface flows and quality that either affect groundwater or are affected by groundwater pumping.

- Include provisions to cooperatively work with other public (and presumably private) entities whose service area or boundary overlies the groundwater basin.

- Include mapping of the groundwater basin, as defined in DWR's Bulletin 118, and the boundaries of the local agency subject to the plan, plus the boundaries of other local agencies that overlie the basin.

- Adopt monitoring protocols designed to detect changes in groundwater levels, groundwater quality, inelastic land subsidence (for basins where subsidence has been identified as a potential problem), and flow and quality of surface water that either directly affect groundwater, or are directly affected by groundwater pumping.

In summary, the District has prepared this Plan to be compliant with the AB 3030 and SB 1938 requirements as part of its interest in developing and sustaining reliable water supplies. To ensure the reliability of groundwater supplies to meet existing and projected demands, the components of local groundwater management planning already implemented include a monitoring program, analysis of groundwater conditions in the basin, conjunctive use of local groundwater and imported surface water supplies, and coordination with other agencies on the control of localized groundwater contamination.

1.5 PREPARATION AND ORGANIZATION OF GROUNDWATER MANAGEMENT PLAN

A resolution to prepare this Groundwater Management Plan was passed by the Diablo Water District Board of Directors in accordance with AB 3030 and SB 1938. Copies of the resolution and associated public notification are contained in **Appendix A**.

This Plan is organized to provide an overview of regional and local water supplies; to describe existing groundwater conditions; to discuss land subsidence in the context of groundwater use; identify areas of concern with respect to the groundwater system; to present a set of groundwater management objectives and components; and to present a set of management actions to be undertaken by the District; which collectively form the Plan.

2.0 SUMMARY OF WATER SUPPLIES

2.1 WATER SUPPLIERS IN EAST CONTRA COSTA COUNTY

As shown on **Figure 1-2**, other local agencies that supply or use water in the vicinity of Diablo Water District include the City of Antioch, Town of Discovery Bay, City of Pittsburg, City of Brentwood, Contra Costa Water District, and East Contra Costa Irrigation District, and Byron Bethany Irrigation District. A brief overview of the sources for each agency is presented below.

Antioch, Discovery Bay, Pittsburg

The City of Antioch currently does not use groundwater as a source of supply and does not plan to pump groundwater to meet its future needs (Brown and Caldwell, 2006). Antioch relies on purchases of raw water from CCWD, which it treats at the Antioch Treatment Plant, and wholesale treated water from CCWD, in addition to its own pre-1914 river diversion that is also treated at the Antioch Water Treatment Plant. The Town of Discovery Bay is located southeast of the District's SOI and relies entirely on groundwater for its water supply. Water is pumped from four groundwater wells with an average depth of 400 feet; total groundwater production was 2,800 AF in 2003. The City of Pittsburg currently meets about 90 percent of its water demand through raw surface water purchased from CCWD; the balance of the City's demand is met by groundwater supplied by two wells. Groundwater use is limited primarily by groundwater quality (hardness). The City has undertaken a groundwater exploration project and is seeking to construct one or more wells to supplement its surface water supply and increase reliability and operational flexibility.

City of Brentwood

The 2005 City of Brentwood Urban Water Management Plan states that the City uses a mix of groundwater and surface water. Groundwater pumpage ranged from about 6,300 to 9,000 acre-feet per year during 2000 to 2004 from eight public supply wells. Brentwood's northeast well field consists of six wells located about 1 to 1.5 miles south of the Glen Park Well. Future City pumpage is expected to remain at about 7,700 acre-feet per year until 2025. Surface water is supplied by CCWD and ranged from about 6,700 to 6,900 acre-feet per year for the years 2000 to 2004. Surface and other supplies are expected to increase to over 12,000 acre-feet per year after the new water treatment plant, located near the RBWTP, is completed in 2008.

CCWD

The Contra Costa Water District Urban Water Management Plan (2005) reports that CCWD supplies water to over 550,000 people (60,000 connections) throughout north, central, and east Contra Costa County covering an area of more than 130,000 acres. The source of this water is the Sacramento-San Joaquin Delta. The Contra Costa Canal, completed in 1948, is 48 miles long and is the primary conveyance facility for CCWD's water. It delivers water to the Randall-Bold Water Treatment Plant (current capacity of 40 mgd) located in the City of Oakley and jointly owned by Diablo Water District (37.5 percent) and CCWD (62.5 percent). The treatment process is sedimentation, intermediate ozonation, filtration, and chloramination for final disinfection. CCWD is planning a second treatment plant adjacent to the RBWTP with a capacity of 30 mgd for the City of Brentwood. The Los Vaqueros Reservoir, completed in 1998, is a 100,000 acre-foot reservoir located eleven miles south of the Diablo Water District. The water is used to improve CCWD water quality and provide for a three-month emergency supply as well as to protect fisheries.

ECCID and Byron Bethany Irrigation District

East Contra Costa Irrigation District and the Byron-Bethany Irrigation District are each cited in the Contra Costa Water District UWMP as having the ability to produce about 5,000 acre-feet of groundwater annually each. In 2000, CCWD and ECCID entered into an agreement allowing CCWD to purchase up to 8,200 acre-feet of surface water in drought years and deliver it to customers in areas where the service areas of the agencies overlap. The agreement also provides for purchase of an additional 4,000 acre-feet with no restrictions whereby ECCID would offset the amount through groundwater pumping. The United States Bureau of Reclamation (USBR) web site (www.usbr.gov) announced a contract renewal for about 20,600 acre-feet of CVP water over a 25-year term with the Byron-Bethany Irrigation District.

2.2 DIABLO WATER DISTRICT SOURCES OF SUPPLY

As summarized in the Diablo Water District Urban Water Management Plan (CDM, 2005), the District's water supply currently includes both surface water and groundwater sources. The primary water supply is treated surface water from the Central Valley Project purchased from Contra Costa Water District. CCWD contracts with the USBR for the Central Valley Project water. The CVP water is conveyed through the Contra Costa Canal and treated at the Randall-Bold Water Treatment Plant in Oakley (**Figure 2-1**). The remainder of the District's water supply is groundwater. Per the 2005 UWMP, current District water supplies are summarized in **Table 2-1** for normal, single-dry, and multiple-dry years. The availability of CVP water in the year 2030 is projected at approximately 100 percent of demand (14,000 acre-feet per year) for a

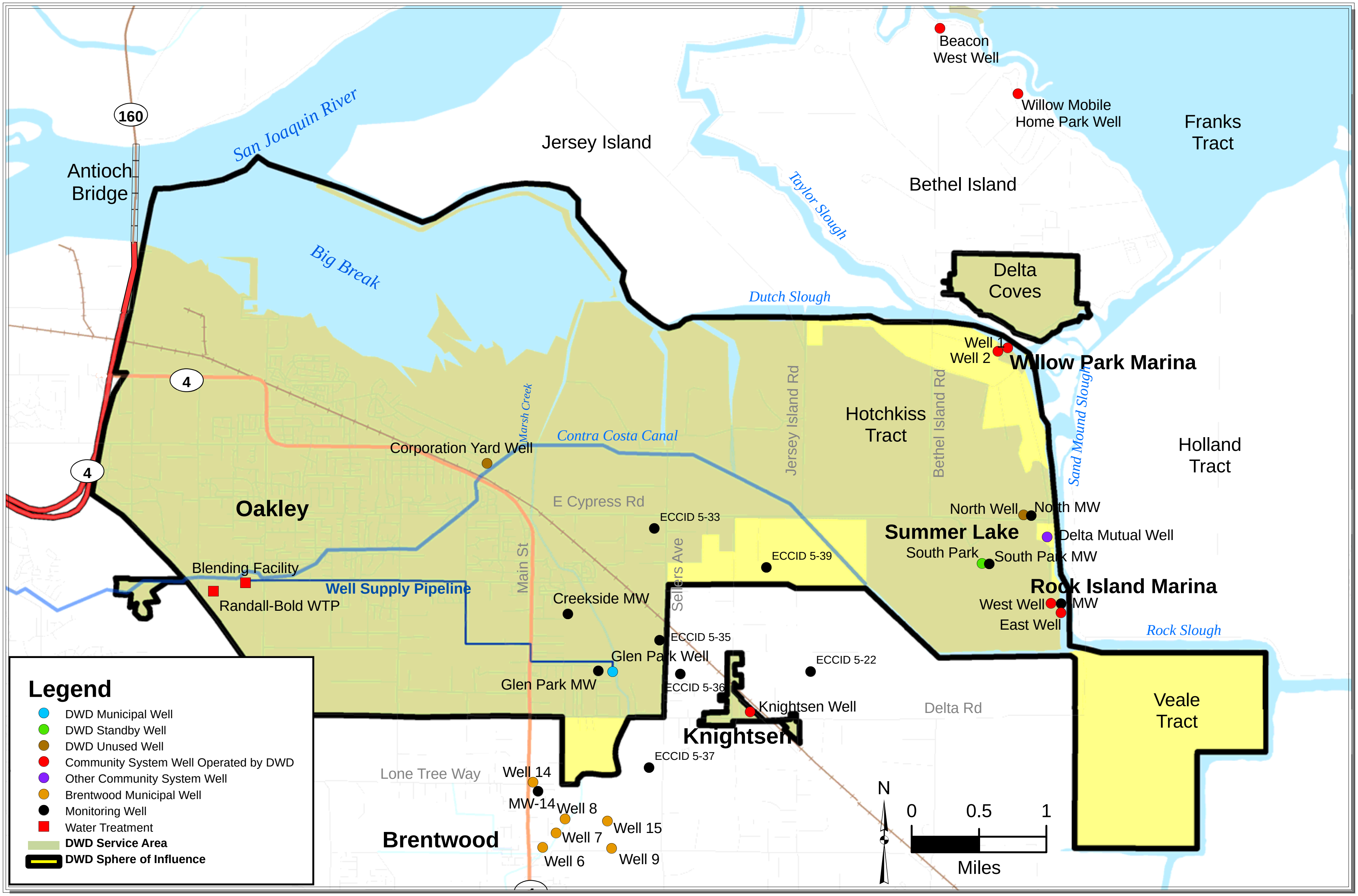

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Figure 2-1
Diablo Water District Service Area and Well Locations

Table 2-1
Supply for Normal, Single Dry and Multiple Dry Years[1]
2030

Source	Normal Year		Single-Dry Year		Multiple-Dry Year Years 2 and 3	
	% Available	acre-ft	% Available	acre-ft	% Available	acre-ft
Surface Water from CCWD	100%	14,000	100%	14,000	100% to 2010 85% after 2010	11,901
DWD Groundwater	100%	5,039	100%	5,039	100%	5,039
Total		19,039		19,039		16,940

1. Adapted from Diablo Water District Urban Water Management Plan Final Report, Camp Dresser & McKee Inc., December 2005.

normal and single-dry year. For a multiple dry-year period, the availability is projected to decrease to 85 percent of demand (11,900 acre-feet per year) after the year 2010.

Projected water supply sources for 2005 to 2040 in a normal year are summarized in **Table 2-2**, which is adapted from the District's 2005 UWMP. Availability of surface water is expected to increase from approximately 8,400 acre-feet per year through 2010 to 16,800 acre-feet per year by 2040. The District began pumping from the Glen Park Well in July 2006 and has increased pumpage from July (0.1 mgd) to October (1 mgd), or 10 to 190 acre-feet per month, respectively. Total groundwater pumpage by the District in normal years is projected to increase to approximately 6,700 acre-feet per year by 2040 as new well facilities under the Well Utilization Project are developed and commissioned over the next 30 to 35 year planning horizon.

2.2.1 Diablo Water District Groundwater Pumping

Prior to 2000, the District pumped from the Corporation Yard Well (500 acre feet in 1996). However, due to poor groundwater quality found at that site, the Corporation Well provides only standby emergency service (CDM, 2005). The Glen Park Well (**Figure 2-1**) came on line in 2006, and is equipped to pump at capacities of 1 to 2 mgd, and supplies the District's municipal water system.

Additional municipal wells, similar to the Glen Park facility, are planned out to year 2040, assuming feasibility criteria are met under the Well Utilization Project. Ultimately, groundwater may provide up to 20 percent of the District's supply with a well capacity of 6 to 7 mgd (CDM, 2005).

2.2.2 Other Groundwater Pumping

The Oakley General Plan (2002) states that over 30 small water companies or service districts serving less than 5,000 people are located in the eastern portion of the District's SOI. The District owns or operates a number of these wells. In the future, if any area is brought into the District's system, some of these wells would be de-commissioned and destroyed.

Also within the District's SOI are residences with individual domestic wells (wells serving one home). These are small capacity wells that are generally shallower than 200 feet and many are less than 100 feet. By contrast, the Glen Park Well targets groundwater from lower aquifer units (230 to 300 feet below ground surface) as a means to mitigate potential impacts to the existing wells and to satisfy source water protection requirements under the state Drinking Water Source Assessment and Protection Program, discussed further herein.

New and planned subdivisions in Oakley are anticipated to pump some groundwater to irrigate parks, other green areas, or to fill lake features. The District owns and operates a back-up emergency well within the Summer Lake subdivision off Cypress Road and Bethel Island Road

Table 2-2
Current and Projected Water Supply Sources in Normal Year[1]
(acre-feet)

Source	2005	2010	2015	2020	2025	2030	2035	2040
Surface Water Purchased from CCWD[2]	8,403	8,403	10,925	10,925	14,000	14,000	16,802	16,802
Groundwater[3]	0	1,679	1,679	3,360	3,360	5,039	5,039	6,718
Total Supply	8,403	10,081	12,604	14,286	17,361	19,039	21,841	23,520

1. Adapted from Diablo Water District Urban Water Management Plan Final Report, Camp Dresser & McKee Inc., December 2005.

2. DWD currently has 15 mgd treatment capacity for surface water with the ability to purchase an additional 15 mgd capacity in 5 mgd increments as needed to meet future peak demands. The 15 mgd available capacity will provide an average day supply of 7.5 mgd (8,403 ac-ft/yr). A total of 30 mgd ultimate capacity for maximum day will provide an average day supply of 15 mgd (16,802 ac-ft/yr). It is anticipated that DWD will purchase 5 mgd additional capacity in 2015, 2025, and 2035 in order to meet demands.

3. Ultimately, groundwater is projected to provide up to about 20% of the District's supply under the Well Utilization Project, with a total well capacity of about 6 to 7 mgd. This assumes that no adverse impacts arise as a result of the District's Project thereby allowing the ultimate capacity to be achieved.

(**Figure 2-1**). Besides serving as a standby source of supply, the well is used to fill the lake feature in the subdivision and provide irrigation for large turf areas.

Pumpage by industrial and domestic wells in the unincorporated portions of the District is un-metered, but the pumpage is assumed to represent a small component of overall extraction. Irrigation pumping within new subdivision areas is expected to represent a more significant component of the District's groundwater pumpage. The potential impacts of such pumping would be monitored under provisions of this Plan.

2.2.3 Conjunctive Water Use and Management

Implementation of the Well Utilization Project represents a step by the District to augment its surface water supplies with groundwater. As part of developing a groundwater supply, the District will seek to conjunctively manage its groundwater and surface water to most effectively use these resources during varying water years (i.e., normal, wet, and dry periods). Conjunctive water management is expected to enable the District to meet its future water demands for a 20-year horizon and beyond.

Under a conjunctive water management strategy involving groundwater and its contract surface water supply, the District will achieve diversification of its sources and gain flexibility and reliability in meeting future operational needs. Since surface water will remain its primary source, the District can more effectively manage groundwater resources as compared to an entity that relies exclusively on wells. This Plan encompasses a strategy and management actions to ensure sustained conjunctive use of the two subject sources of supply.

3.0 GROUNDWATER, LAND SUBSIDENCE, AND AREAS OF CONCERN

3.1 GROUNDWATER

3.1.1 Introduction

Most public supply, irrigation, and domestic wells in the Diablo Water District SOI are completed to depths shallower than 400 feet. While many domestic wells may be less than 100 feet in depth, municipal and large capacity irrigation wells are typically 200 to 400 feet deep, reflecting the extent of favorable aquifer materials for these types of wells. Borings associated with oil and gas exploration indicate a lack of sand and gravel aquifers and an occurrence of saline or brackish water at depths of 800 feet and greater. In some areas, evidence from well logs indicates possible brackish to saline conditions between depths of 400 and 800 feet.

A detailed study of the occurrence of groundwater was performed by Luhdorff & Scalmanini Consulting Engineers (LSCE, 1999) for several east Contra Costa County agencies, including Diablo Water District, with an interest in groundwater resources. The study produced a base map that delineated geologic and hydrogeologic features of the region, a well map showing available well logs with information useful in interpreting the geologic setting, and a series of geologic cross sections depicting the interpreted subsurface conditions. The study area encompassed the greater Brentwood area, the area around Discovery Bay, and the Delta region encompassing Oakley and vicinity. Elements of the LSCE study as it pertains to the subject Groundwater Management Plan are presented in this chapter along with an updated cross section depicting hydrogeologic conditions within Diablo Water District's SOI.

The following section cites the current state Department of Water Resources description of the regional groundwater basin encompassing the east Contra Costa County area, including Diablo Water District's SOI.

3.1.2 Groundwater Basin Description (DWR)

As shown on **Figure 1-1**, the Diablo Water District overlies a portion of the San Joaquin Valley Groundwater Basin as designated by the California Department of Water Resources (DWR). The District is located in the northwestern portion of the Tracy Subbasin, which is one of sixteen subbasins in the San Joaquin Valley Groundwater Basin. The District's existing and prospective new wells (e.g., under the Well Utilization Project) are located in the Tracy Subbasin. The description of the Tracy Subbasin provided below is partly based on the information contained in DWR Bulletin 118, Update 2003 (DWR, 2003b). A more detailed groundwater basin description is posted on the DWR web site (DWR, 2004).

San Joaquin Valley Groundwater Basin, Tracy Subbasin (Basin No.: 5-22.15)

The Tracy Subbasin includes the northwestern most portion of the San Joaquin Valley Groundwater Basin around the Sacramento-San Joaquin Delta and extending south into the central portion of the San Joaquin Valley. Overall, population density within the subbasin is relatively sparse, with the major cities being Tracy, Brentwood, and Oakley. Subbasin boundaries are defined by the Mokelumne and San Joaquin Rivers on the north; the San Joaquin River on the east; and the San Joaquin-Stanislaus County line on the south. The western subbasin boundary is defined by the contact between the unconsolidated sedimentary deposits and the rocks of the Diablo Range (DWR, 2004).

3.1.3 Geologic Setting

East Contra Costa County and Diablo Water District's SOI are situated on the western side of the northern San Joaquin Valley portion of the Great Valley province of California. West of the District lie the lower foothills of the Diablo Mountains of the Coast Range province. To the north, the Sacramento and San Joaquin Rivers combine in the Delta and drain westward into the San Francisco Bay region. Descriptions of rock formations that comprise the geologic setting are presented below in order of oldest-to-youngest. The youngest formations, Pleistocene to Holocene alluvium, are the target for potable groundwater supply wells in the District and the greater east County area.

Surficial geology of the east County area is depicted on the two regional geologic maps for the Sacramento and San Francisco-San Jose quadrangles (Wagner and others, 1981; Wagner and others, 1990). In the Coast Ranges, the geology consists of strongly deformed (faulted and folded) Mesozoic (pre-63 million years ago) marine sedimentary rocks of the Franciscan Complex and Great Valley Sequence. Along the northeastern edge of the Coast Range occur slightly less deformed, Tertiary (Eocene to Miocene, 55 to 5 million years) marine sedimentary rocks. The marine rocks of sandstones, shales, and mudstones trend northwest/southeast and dip, or slope, steeply to the north/northeast. These rocks are exposed in low hills from Deer Valley north to near Antioch, and southeast of Marsh Creek Reservoir. The Tertiary marine rocks extend east beneath the San Joaquin Valley with increasing depths to several thousand feet. These rocks contain saline water from their marine deposition as well as natural gas accumulations that are exploited in numerous gas fields in the area.

Detailed surface geologic maps of the Coast Range in this area include Davis and Goldman (1958), Brabb and others (1971), and Dibblee (1980 a, b, c). Subsurface characterization of the marine rocks beneath the San Joaquin Valley can be found in oil and gas field summaries produced by the California Division of Oil & Gas (1982), and Thesken and Adams (1995). General geologic descriptions and histories of these marine rocks are contained in Bartow

(1991), and Bertoldi and others (1991). Because of their marine origin, highly consolidated nature, and presence of saline water, the Mesozoic and Tertiary marine rocks are not a source of potable water supply in the region.

Overlying the Tertiary marine rocks is a sequence of late Tertiary (Pliocene 5.3 to 1.6 million years) and Quaternary (Pleistocene 1.6 to 0.6 million years) non-marine sedimentary deposits. Surface exposures of these Plio-Pleistocene deposits are limited to an area south of Antioch to Oakley, and a small area south of Brentwood. These beds dip moderately to the east to northeast and extend eastward below the San Joaquin Valley. The nature of these Plio-Pleistocene deposits is poorly known in the area. Subsurface data are limited to logs from a few deep water wells and oil and gas exploratory test holes. It is believed that these deposits occur below about 400 feet to depths of 1,500 to 2,000 feet below the San Joaquin River. Westward, the sequence thins and rises to near the surface overlying the Tertiary marine rocks of the Coast Range. These deposits seem to be dominated by fine-grained clays, silts, and mudstones with few sand beds. Water quality from electrical logs is difficult to interpret, but the quality appears to become brackish with depth in the few sands that are encountered in boreholes.

Pleistocene to Holocene (600,000 years to present) alluvium overlies all of the older geologic units. These deposits are largely unconsolidated beds of gravel, sand, silts, and clays becoming weakly consolidated with increasing age and burial depth. These units were deposited by surface stream systems (e.g., the present-day Marsh Creek) and contain fresh groundwater and represent targets for water wells. Surface geologic mapping of the youngest units have used various names and subdivisions, largely based on soil characteristics (Welch, 1977), topographic position (Helley and others, 1979), and depositional environments (Atwater, 1982).

Characterization of the alluvium in the subsurface is difficult because of lithologic similarities and lack of distinguishing stratification. Correlation of sand and gravel beds of the alluvium is locally possible based on relative elevation and lateral extent of the beds and the use of descriptions in water well drillers reports. The fine-grained silts and clay beds are generally so massive, thick, and homogenous that stratigraphic correlation is not possible (i.e., clear stratigraphic markers are not evident). The alluvium thickens from a few tens of feet in the western foothills of the Coast Range to about 300 feet beneath Brentwood, and then generally thickens to about 400 feet beneath Old River. Sand and gravel beds tend to be thin and discontinuous in the west, and thin to pinch-out east of Brentwood. Beneath the river floor to the east, is a sequence of thicker more laterally extensive beds of sand and gravel deposited by the river within floodplain silts and clays.

3.1.4 Hydrogeology

Hydrogeology refers to the interrelation of geologic features and the occurrence of groundwater. Hydrogeologic studies pertaining to the east Contra Costa County area are relatively limited. As cited previously in Section 3.1.2, groundwater within the District's SOI is not characterized as a distinct subbasin, but only a portion of the larger Tracy Subbasin (DWR, 2004).

A regional study of the thickness of the Tertiary-Quaternary non-marine sedimentary deposits was made by Page (1974) and evaluations of the depth to base of fresh water by the California State Water Project Authority (1956) and Berkstresser (1973). Regional studies of the Sacramento-San Joaquin Valley groundwater basin were performed by Bertoldi and others (1991), Page (1986), and Williamson and others (1989). The United States Geological Survey (USGS) compiled water quality information that covers the area in a series of reports (Keeter 1980; Sorenson 1981; and Fogelman 1982). Beside information presented in these broad reference sources, there are no detailed hydrogeologic studies of east Contra Costa County that report on groundwater occurrence and aquifer characteristics.

LSCE (1999) conducted a search of water well driller's reports on file at DWR for the east Contra Costa County area from about two miles west of Oakley, through the Delta Islands to just east of the county line, and south through Brentwood to about two miles south of Byron. Between 400 and 500 well logs were collected and classified into depth zones of 100-foot intervals. The majority of these wells were found to be less than 300 feet deep and concentrated outside areas served by large municipal water supply systems. To the east, along the San Joaquin River flood plain, and outside of Byron to the south, very few well logs were found. The types of wells found in the survey included municipal supply wells in Brentwood, Oakley, and Discovery Bay, plus numerous small community systems and individual domestic wells in the unincorporated areas. Agricultural irrigation wells are also distributed throughout the region.

The LSCE study used lithologic descriptions from drillers' reports plus electric geophysical logs (e-logs) to assess the distribution and nature of aquifer materials tapped in water supply wells throughout the region. Because of the lack of deep well control (over 500 feet) over most of the east County study area, electrical logs from oil and gas exploratory test holes were also examined. About 200 oil and gas test hole files were reviewed from gas fields near Brentwood and north to the Delta plus scattered wildcat test holes (outside of the gas fields) elsewhere in the area. Most of the oil and gas electrical logs showed that the geologic material below 800 feet in the region is dominated by fine-grained (clay and shale) deposits and some sandy zones with indications of saline or brackish water present. Within Diablo Water District's SOI and south into Brentwood, the water well and oil and gas logs indicate a lack of aquifer materials (sand and gravels) below 800 feet that might be suitable for potable supply.

From the above, any sands and gravels that are present at depths below about 500 feet may be brackish to saline and, given the historical record of wells drilled in the region, it is concluded that the primary target for groundwater development is aquifer units that occur at depths less than 500 feet below the surface. This conclusion applies to the District's SOI and some surrounding areas, including the City of Brentwood.

The study by LSCE in 1999, prepared for east County agencies, presented descriptions of the alluvium formation that serves as the primary source of groundwater supply in the region. Four subareas were described as having distinguishing characteristics and serve as a hydrogeologic model of alluvium based on depositional factors (e.g., alluvial, fluvial, etc.). The model assists in distinguishing potential groundwater interactions between different regions where groundwater represents a significant water supply component. A brief overview of these regions is presented below followed by a detailed discussion of the features of the alluvium in the Diablo Water District SOI.

3.1.4.1 Depositional Subdivisions of Alluvium

The model of alluvium in the east County area, as presented by LSCE (1999), consists of alluvium subdivisions, or subareas, which are interpreted as having distinguishing sedimentary characteristics because of depositional processes. The model is delineated as four subareas **(Figure 3-1)** as described below:

<u>Fluvial Plain</u>

This subarea is representative of the eastern portions of Diablo Water District's SOI and southward to Discovery Bay. It is characterized as a zone of well-defined, thick-bedded (20 to 30 feet) sands and gravels deposited along the floor of the San Joaquin Valley. The beds appear to occur at distinct levels or depths separated by intervening clay to silt beds, and extend northward in fairly well defined sequences. The sand and gravel beds were probably deposited in stream channels that migrated laterally through time and are confined within and overlain by flood-plain clay and silt deposits. The setting was probably similar to that which occurs today with northward flowing river channels, distributaries, and sloughs across floodplains of overbank areas. The deposits extend to depths of about 350 feet, below which occur largely fine-grained silts and clays.

<u>Delta Islands</u>

This subarea is representative of the northeastern portion of Diablo Water District's SOI and encompasses Bethel Island and vicinity. Sand and gravel beds may correlate to the Fluvial Plain, but net sand thicknesses and the number of beds appear to increase northward. Net sand thickness increases to 60 feet or more per hundred feet beneath much of the Delta Island areas. To the west where well control is limited, the nature of the Delta area is not well documented. The sand beds appear to be somewhat finer-grained than the Fluvial Plain, with fewer reports of gravel materials. As in all the other subareas, the sand beds exist primarily

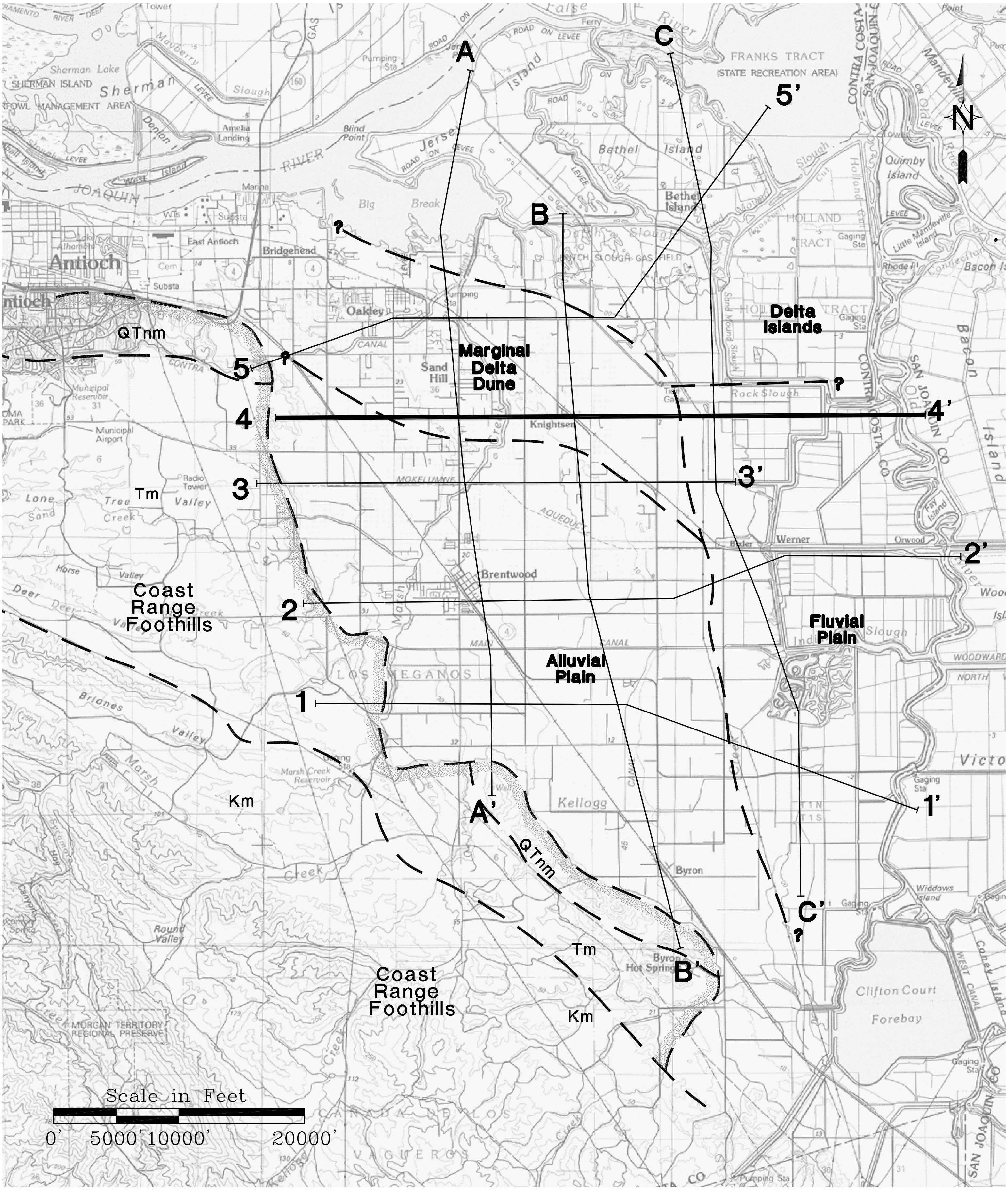

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Figure 3-1
Hydrogeologic Subareas
East Contra Costa County (LSCE, 1999)

to depths of about 300 to 350 feet, below which few sands are encountered. The depositional environment for the Delta Islands is interpreted as multiple stream channels meandering between islands. Channels would be active with through-flowing waters, then abandoned as new channels developed. Possibly slower stream flow and tidal fluctuations allowed thicker, fine-grained sand deposits to form.

Marginal Delta Dunes

This subarea is representative of the central to western portion of Diablo Water District's SOI and is defined by numerous thin to thick sand beds. Net sand thicknesses are generally greater than 30 feet of sand per hundred feet. The sand beds tend to be similar to the Delta Island area with generally finer-grained sands but thinner individual beds. Locally, areas of thicker sand beds occur. The depositional environment is envisioned to be a mixture of delta fluvial distributary channels and possibly aeolian dune fields. Between Oakley and northern Brentwood, a surface deposit of rolling gentle hills of relic sand dunes occur. These sand dunes are believed to have been generated by strong winds blowing sand off the delta margins. Some of the deeper sand beds across the Marginal Delta Dunes area may be older dune fields.

Alluvial Plain

This subarea is representative of greater Brentwood south of the Marginal Delta Dune and the City of Oakley, and west of the Fluvial Plain. The subarea is characterized by thin sand and gravel beds that correlate poorly between wells. Net sand thicknesses are generally low, less than 20 feet of sand per hundred feet, and generally occurring as several beds. Locally, pockets or bands of thicker sand and gravel beds occur where slightly thicker beds may occur. The depositional environment is one of small streams draining eastward from the Coast Range foothills to the west. Flood flows of these streams spread out from the hills depositing fine-grained materials, possibly as mudflows with high sediment content. Stream flows deposited thicker sand and gravel beds that tended to stack upon each other causing the thicker bands of sand beds. Distal alluvial plain deposits probably interbed with floodplain deposits from the adjacent Fluvial Plain region. The thicker stream deposited sand and gravel bands extend eastward until the sands either pinch out or have not been reached by wells. In the north, the stream deposits appear to reach into the Marginal Delta Dunes area, blending into the sand units that are present there.

3.1.4.2 Representative Cross Sections for Diablo Water District

East-West Cross Section 4-4' presented in LSCE (1999) was updated to reflect subsequent exploratory drilling performed by Diablo Water District under the Well Utilization Project and for wells installed as part of new subdivision construction in the eastern portions of Oakley.

Figure 3-2 shows the updated east-west cross section representing the District's SOI that encompasses the deeper oil and gas well logs. On this scale, the lack of aquifer materials below 400 to 500 feet is evident despite less well control than for shallower depth intervals. This cross section also reflects the two alluvium subareas that occur in the District's SOI, the Marginal Delta Dune, and the Fluvial Plain.

Figure 3-3 shows a detail of the alluvium interval from O'Hara Avenue to the eastern boundary of the Veale Tract. The District's initial groundwater development under the Well Utilization Project is represented by the Glen Park well log situated just east of Highway 4. At this location, aquifer materials with favorable water quality for municipal use were found to a depth of approximately 300 feet. Brentwood's Well 14 is projected north onto the cross section showing some correlation of sand units with Glen Park. While the Brentwood well is placed within the Alluvial Plain subarea, the alluvium model suggests some interfingering between subareas. Further, hydraulic response has been documented as measured during pumping of Brentwood's Well 14 and the Glen Park Well.

3.1.5 Groundwater Levels

Due to a lack of significant historic pumping and water level data within the District, there is limited ability to assess groundwater storage through examination of water levels. However, the District has recognized that groundwater level monitoring is a key requirement for ensuring that pumping under the Well Utilization Project and other uses does not induce adverse impacts either by degrading groundwater quality, by causing mutual interference, or adversely affecting sustainable yield in the area and region. Further, the District's explicit strategy for groundwater use under the Well Utilization Project is to develop new source capacity (wells) to the extent that no adverse impacts arise.

The Diablo Water District's strategy for groundwater development is reflected in the mitigated negative declaration approved by the District's Board for the first phase of the District's Well Utilization Project and the Glen Park Well facility (Diablo Water District, 2004). New wells are to be spaced and designed to avoid adverse mutual interference with existing wells and in accordance with standards for source protection as promulgated by the state Department of Health Services under the Drinking Water Source Assessment Protection Program. Potential influences on shallower wells are to be closely evaluated through a monitoring program involving existing wells of private owners. This Plan sets forth continued monitoring of the shallow and deep aquifer units present in the areas where the District is seeking to develop groundwater supply. **Figure 3-4** shows groundwater monitoring locations in the vicinity of the Glen Park Well and Appendix B includes a map of wells in both the shallow and deep monitoring well networks as well as select hydrographs. Results of groundwater level monitoring to date are discussed below.

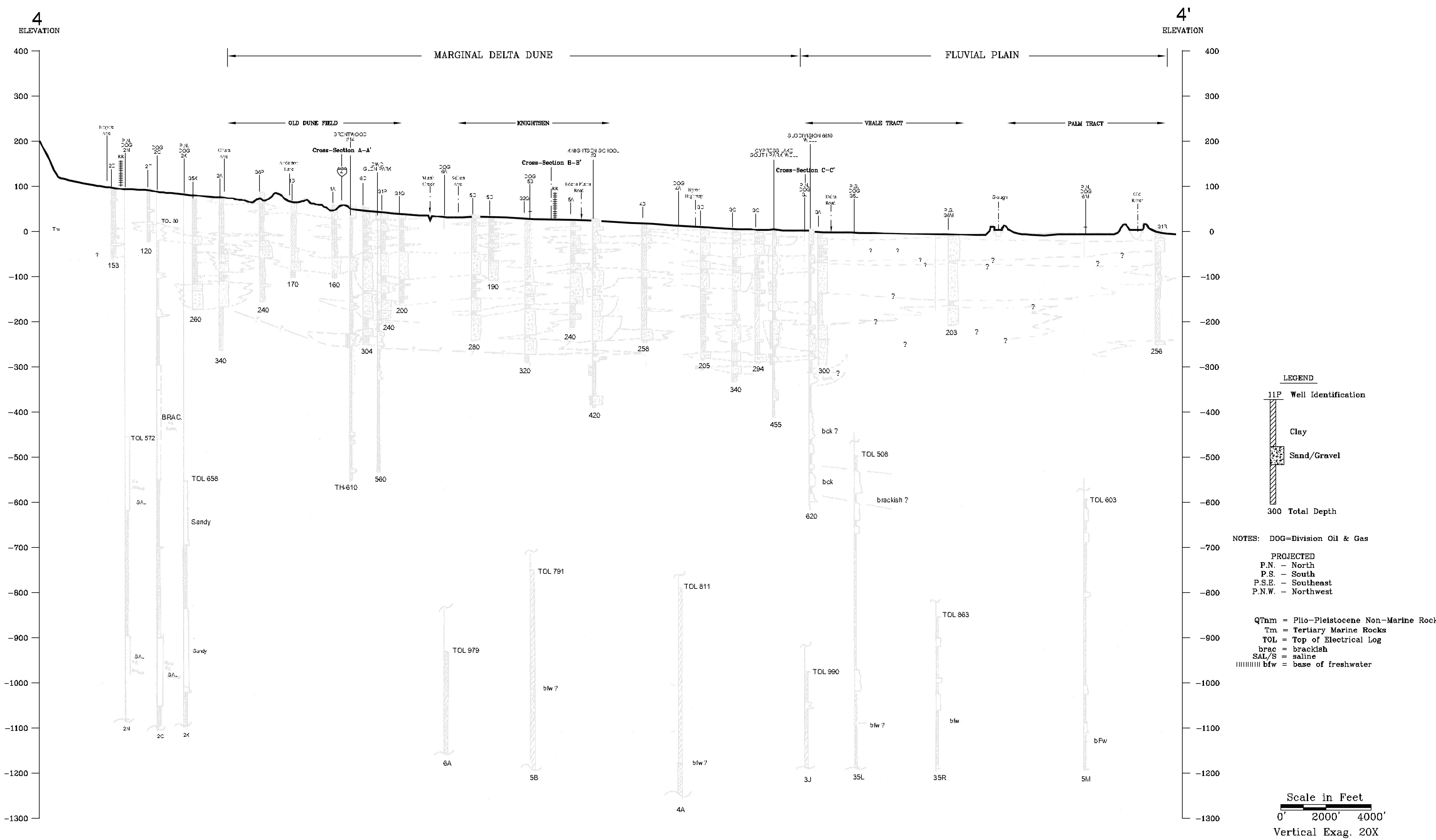

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Figure 3-2
Updated Geologic Cross Section 4-4'
Diablo Water District

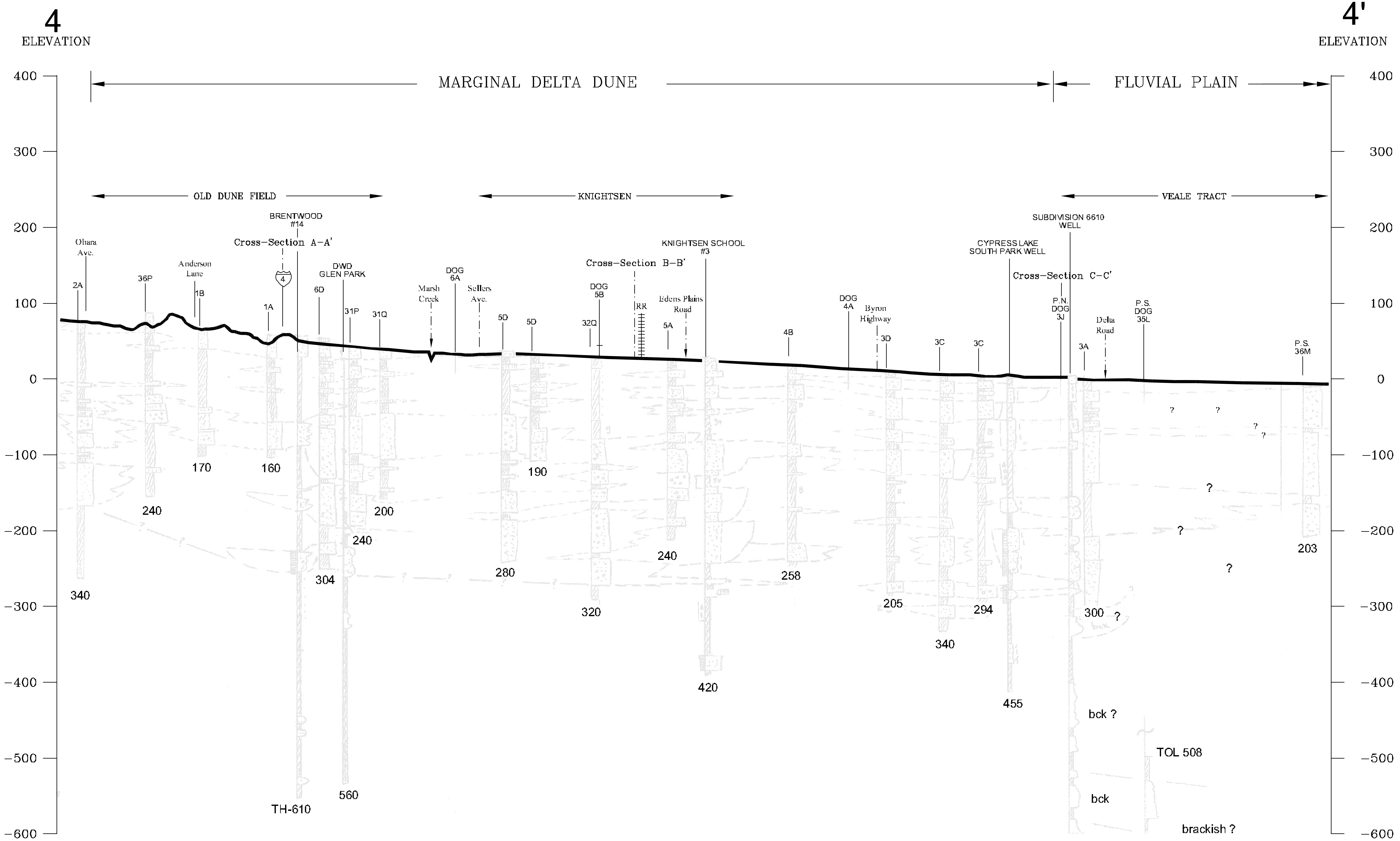

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Figure 3-3
Detail of Geologic Cross Section 4-4'
Diablo Water District

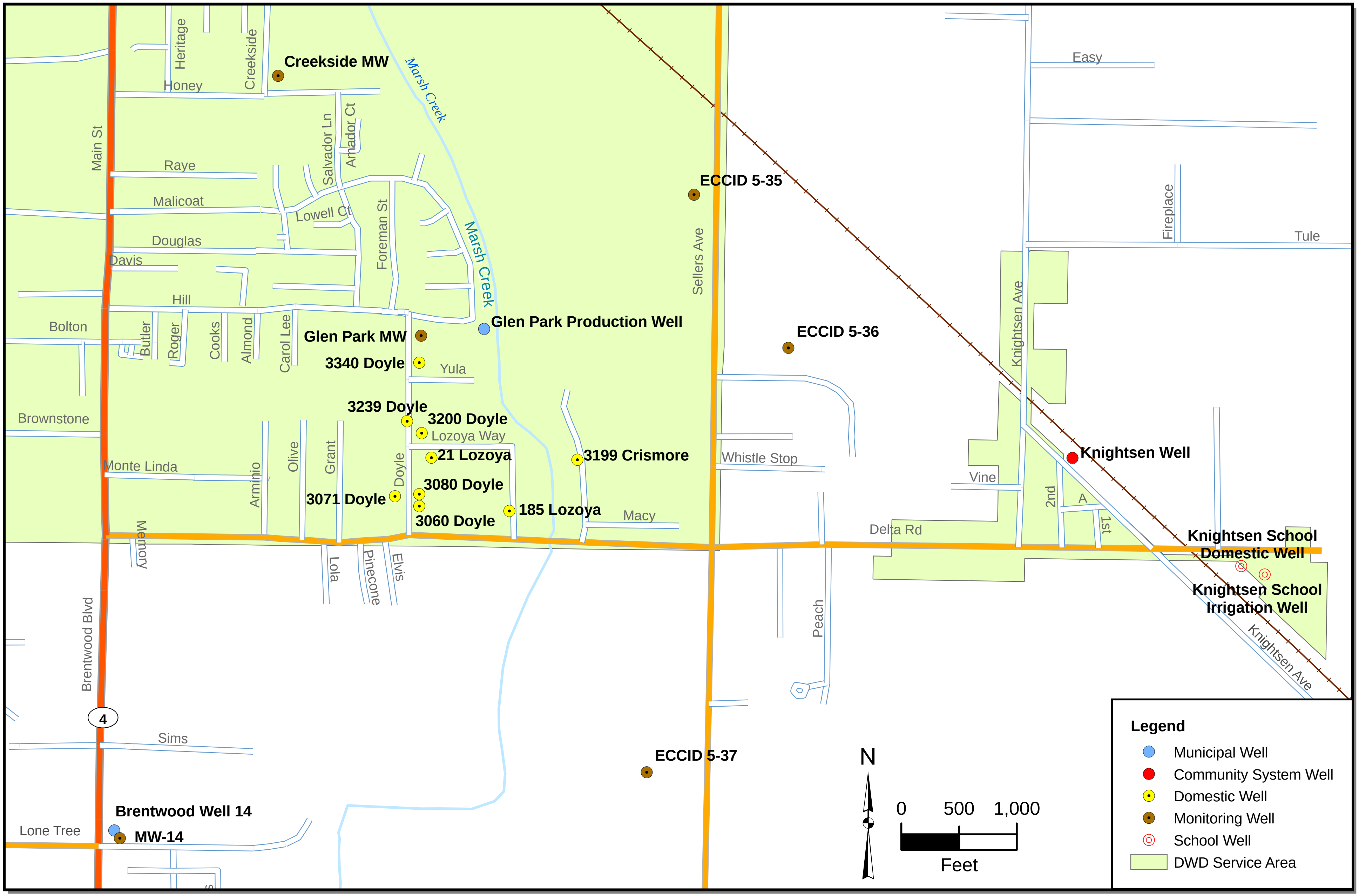

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Figure 3-4
Groundwater Monitoring Locations in Vicinity of Glen Park Well

Shallow Groundwater Levels

In portions of the Diablo Water District, domestic water supply is provided by individual house wells or small community wells, which are regulated by the Contra Costa County Environmental Health Division. A survey conducted of all wells within a one-half mile radius of the new Glen Park Well site indicated that the majority of these wells are shallow, typically less than 100 feet. By comparison, the Glen Park Well and other wells contemplated under the Well Utilization Project will be screened at depths of 200 feet or greater in order to mitigate potential pumping impacts on the shallow wells that exist in the area.

Locally, wells less than 200 feet, and often less than 100 feet deep, are considered to be completed in the “shallow” aquifer system. Water levels in numerous shallow domestic wells were incorporated into the District’s monitoring program to develop baseline information three years prior to installation of the Glen Park Well. Many of these wells will be monitored on an ongoing basis, but at possibly less than the frequency performed initially. In addition, the District obtained historic water level data from shallow piezometers monitored by the East Contra Costa Irrigation District (ECCID). Three ECCID piezometers are situated in an area that provides a basis for assessing whether the District’s pumping is affecting shallow groundwater levels. The ECCID data date to the 1950s and provide a basis for distinguishing seasonal and longer-term climatic influences.

The water level data from the District’s shallow well network (**Appendix B**) indicate that no influence on shallow groundwater levels has occurred since the District commissioned the Glen Park Well. To ensure that impacts by District pumping do not influence shallow groundwater levels in the future, the District will maintain a shallow groundwater level monitoring network. For new well projects, the District’s monitoring network will expand to encompass any shallow wells found in the vicinity of a proposed well site. The network will be modified periodically to monitor key indicator wells once it is determined that influences are not propagating to shallow groundwater. As part of its ongoing assessment of pumping influences, the District will continue to request and evaluate data from ECCID from the three key shallow piezometers cited previously.

Appendix B shows a map of the shallow well network surrounding Glen Park and hydrographs of groundwater levels. The hydrographs will be updated, as recommended in this Plan, for inclusion in annual reports on groundwater conditions in the District.

Deep Groundwater Levels

Based on the hydrogeology of the area, deep groundwater levels within the District are reflected in wells that are 200 feet or more in depth. As is the case with the Glen Park Well, the District will generally seek to employ deep annular seals that constrain pumping to primarily within the “deep” aquifer. Though there is little information on historic conditions in the deeper zones, the District is actively monitoring several wells it has identified as key wells in the area, including the Glen Park Well, the Knightsen community well, and wells in new subdivisions (South Park and 6610). Additionally, even though it is mapped in a separate hydrogeologic subarea, the District will incorporate data from the City of Brentwood’s Wells 6, 7, 8 and 14 because some hydraulic connection has been documented with the Glen Park Well. The District will seek to maintain stable water levels in the deep aquifer system and avoid adverse mutual pumping interference with the City of Brentwood’s water supply wells. **Appendix B** shows the location of deep wells proposed for groundwater monitoring and historical water level data.

Ultimately, the District recognizes that it is important that groundwater pumpage not exceed a sustainable yield for the system and to avoid water level declines that could lead to overdraft conditions, cause water quality degradation, or cause significant inelastic land subsidence. Through this Plan, these objectives can be met in the short term through ongoing evaluation of groundwater level and pumpage data collected as part of the recommended monitoring program. In the long term, estimates of sustainable yield within the District and on a larger (e.g., the Tracy Subbasin, DWR) scale can be used as a benchmark for overdraft avoidance, with groundwater levels representing the key monitoring parameter.

3.1.6 Groundwater Quality

Groundwater quality has constrained groundwater development for municipal supply in some parts of east Contra Costa County. Use of the District’s production well at its Main Street corporation yard is limited by high TDS (approximately 1,000 mg/L). In the eastern portion of Oakley along the Cypress Road corridor, manganese is prevalent in groundwater and restricts groundwater use to small-scale domestic use, irrigation, or back-up municipal supply. As a result, groundwater quality has generally been classified as marginal to poor in the Diablo Water District SOI (CH2M Hill, 1996).

Under the District’s Well Utilization Project, groundwater exploration activities have revealed that acceptable groundwater can be developed, particularly as a supplemental source to the surface water supply. Under this project, groundwater is blended with surface water for which the primary limitation is a hardness standard (140 mg/L) set by the District on blended surface water and groundwater to ensure that its customers experience no degradation in water quality from the standpoint of taste and domestic uses.

The District's exploration activities have focused on open areas such as parks and schools where public land may be available for siting a municipal well station. The first successful facility under the Well Utilization Project is the Glen Park Well completed in 2006. The District commenced a feasibility study for a second well in the early part of 2007. The groundwater quality at the Glen Park Well site was found to meet all primary and secondary Maximum Contaminant Levels (MCLs) for drinking water as regulated by the state Department of Health Services (DHS). A second site is anticipated to be located in the general vicinity of the Glen Park site as water quality data and experience suggests that this area is likely to be the most favorable with respect to meeting DHS drinking water standards and having acceptable hardness to satisfy the District's blending strategy.

Adjacent to the District, the City of Brentwood has been the most significant groundwater pumper historically and at present. While there are no historical data within the District's SOI indicating a degradation of groundwater quality, the City of Brentwood has experienced significant degradation of groundwater quality due to nitrate contamination. This degradation was primarily associated with shallow municipal wells. Over time, these wells have been replaced by deeper wells, which has mitigated the problem (personal communication, Paul Eldredge, May 8, 2007). The historical problems in Brentwood are taken as evidence that sound groundwater design and management is needed in the local hydrogeologic setting. Accordingly, the District seeks to target aquifers that are deeper than the shallow impacted zones seen in Brentwood; future wells will be designed with deep seals extending to confining zones to ensure source water protection. Also, by developing the project in increments, one well at a time, potential pumping influences can be evaluated and design criteria can be further assessed before committing to the next increment of project capacity.

Recognizing that the City of Brentwood has experienced problems with shallow water quality and that portions of the District have groundwater quality that does not meet DHS drinking water standards, the District's new well projects incorporate three important strategies:

1. Sites must have a degree of confinement that permits isolation from shallow aquifers with deep well seals. This requires exploratory drilling and evaluation at candidate sites and knowledge of local geology (i.e., as outlined in the previous section).

2. The target aquifers must contain groundwater quality that meets DHS primary and secondary MCLs and have a hardness level that permits achieving the District's blending goals.

3. Well spacing must permit operating at municipal pumping levels (e.g., on the order of 1 mgd for the District) without adverse pumping interference with existing wells and without adverse impacts on shallow wells.

Based on historical data, key groundwater quality constituents of concern in the District are summarized below. **Appendix C** presents water quality data obtained and compiled to date for production wells and dedicated monitoring wells within the District's SOI.

Total Hardness

As reflected in **Appendix C**, hardness of groundwater in the District ranges from as low as 100 mg/L at the small community well at Willow Park Marina to as high as 390 mg/L at the Creekside Monitoring Well, which was a previous candidate site for the Well Utilization Project. The Glen Park Well water has a hardness of 240 mg/L, which is suitable for blending to achieve a blended quality of 140 mg/L hardness. While there is no secondary MCL for hardness, water is generally considered very hard water at greater than 150 mg/L (Freeze & Cherry, 1979). At these levels, customers may notice change in water quality (e.g., taste and ability to form soap suds). However, the District will mitigate potential issues with respect to customer satisfaction through its blending strategy.

Manganese

Manganese has been found to exceed the secondary MCL in eastern areas of the District. For small community wells in that area, such as the Willow Park Marina Wells, plus the District's emergency back-up well at the Summer Lake subdivision (Shea Homes), manganese ranges up to 2 to 3 times the MCL of 0.050 mg/L. In contrast, the area surrounding Glen Park has proven to be acceptable with respect to this constituent. The Glen Park Well has less than half the MCL with manganese at approximately 0.020 mg/L concentration. In the short- to long-term, the District plans to avoid sites where manganese exceeds the MCL and will monitor this constituent to ensure the District's pumping does not induce migration or comingling of poor and good quality groundwater.

Nitrate

Nitrate concentrations in groundwater targeted by the District for municipal use are very low (e.g., 2.0 mg/L at Glen Park). This is likely due to the fact that the District has sought to develop deeper zones with distinct confining layers as well as because its service area is served by surface water and has experienced relatively little pumping other than for small water systems and irrigation. However, recognizing the historic effects of land use on shallow aquifers in Brentwood, the District will seek to monitor shallow zones for any indication of pumping influences that might foretell of possible problems with nitrate contamination.

Arsenic

Arsenic appears to be of minor concern in the areas developed to date by the District for municipal supply. The Glen Park Well and the Summer Lake emergency well are below the MCL of 0.010 mg/L. The small community system served by the Willow Park Marina Wells, however, has arsenic at 0.013 mg/L. The District will seek to develop new municipal wells at sites for which arsenic is below the MCL.

Regulated Organics

Areas currently under consideration for new groundwater supply in the area do not currently have active contamination sites where regulated organic compounds are present. Through site screening and performing preliminary Drinking Water Source Assessment Protection (DWSAP) surveys, the District will seek to avoid groundwater development in areas that have the potential to mobilize organic contaminants in groundwater.

The District will expand its database through regular monitoring of its municipal wells and through proposed supplemental monitoring of other key wells under this Plan.

3.2 LAND SUBSIDENCE

Land subsidence in the context of this Plan is the lowering of the ground surface through compaction of compressible, fine-grained strata caused by pumping from unconsolidated, interbedded aquifer-aquitard systems. Compaction can be fully reversible (elastic) or permanent (inelastic). Elastic compaction and expansion generally occur in response to seasonal groundwater level fluctuations. Inelastic compaction is most likely to occur when groundwater levels reach new historical lows during the summer or do not recover fully during the winter. Subsidence avoidance is generally accomplished through management of groundwater pumping so that water levels do not decline on a long-term or permanent basis below either historic levels, or those levels that would cause dewatering of aquitards.

In east Contra Costa County and elsewhere in the Sacramento-San Joaquin Delta, there has been significant land subsidence (more than 20 feet in some areas) that was not related to extraction of groundwater or other fluids. Construction of levees around the Delta islands and the dewatering of soils for agricultural production increased the exposure of organic (peat) soils to oxygen, which caused subsidence due to microbial oxidation of the peat soils (Blodgett et al., 1990). Another factor is that the natural delivery of sediments from the upper watershed to the Delta has been interrupted by the construction of upstream dams and island levees, so there is less sediment available to counteract the effect of peat soil dewatering. The rate of subsidence in the Delta has been 0.4 to 0.6 inches per year, and ground surface elevations in the central Delta islands are currently 10 to 25 feet below sea level (DWR, 2006).

Historically, land subsidence was monitored along transects using periodic spirit level surveys conducted by the USGS and the National Geodetic Survey (NGS). In the mid-1980s, a transition was made from spirit level surveys to global positioning system (GPS) surveys. Like spirit level transects, GPS monitoring of subsidence relies on periodic resurveying of a network of monuments. The accuracy of GPS surveys has gradually improved and is currently on the order of plus or minus 1 centimeter.

A non-instrumented GPS monitoring network was installed in the Delta in the mid-1990s, and surveys were conducted in 1997 and 2002. The Delta network currently consists of about 120 stations. The 2002 resurvey of the Delta network showed no subsidence because the GPS monuments have deep foundations (typically 25 feet). This means that subsidence due to compaction of peat soils would not be observed in the data.

Instrumented GPS monitoring stations are generally referred to as Continuously Operating Reference Station (CORS). Each CORS site includes a high-resolution GPS receiver and antenna with a solar collector and battery for power supply. The GPS receivers are attached to steel or concrete structures that are anchored deep into the soil. GPS positions are recorded at intervals of five to 30 seconds, and a daily average is calculated from all of the data to achieve maximum accuracy. CORS sites use some form of telemetry (typically a radio transceiver) to upload the data. After processing, the data are accessible on Internet sites operated by entities such as the NGS or the California Spatial Reference Center (CSRC).

At present, there are two CORS sites in east Contra Costa County. The closest site to the District, labeled P256, is located south of the Veale Tract and east of Brentwood (**Figure 3-5**) and is operated by the Plate Boundary Observatory. Historical data are limited for this station, which did not begin operation until March 2005. Data collected since that time show small seasonal fluctuations (elastic subsidence) but no significant inelastic subsidence. Data from this site will be useful to show subsidence resulting from any expanded groundwater pumping in the future.

3.3 AREAS OF CONCERN

Although groundwater conditions in the Diablo Water District are considered generally good, there are several areas of concern that may require changes in future groundwater management. These include:

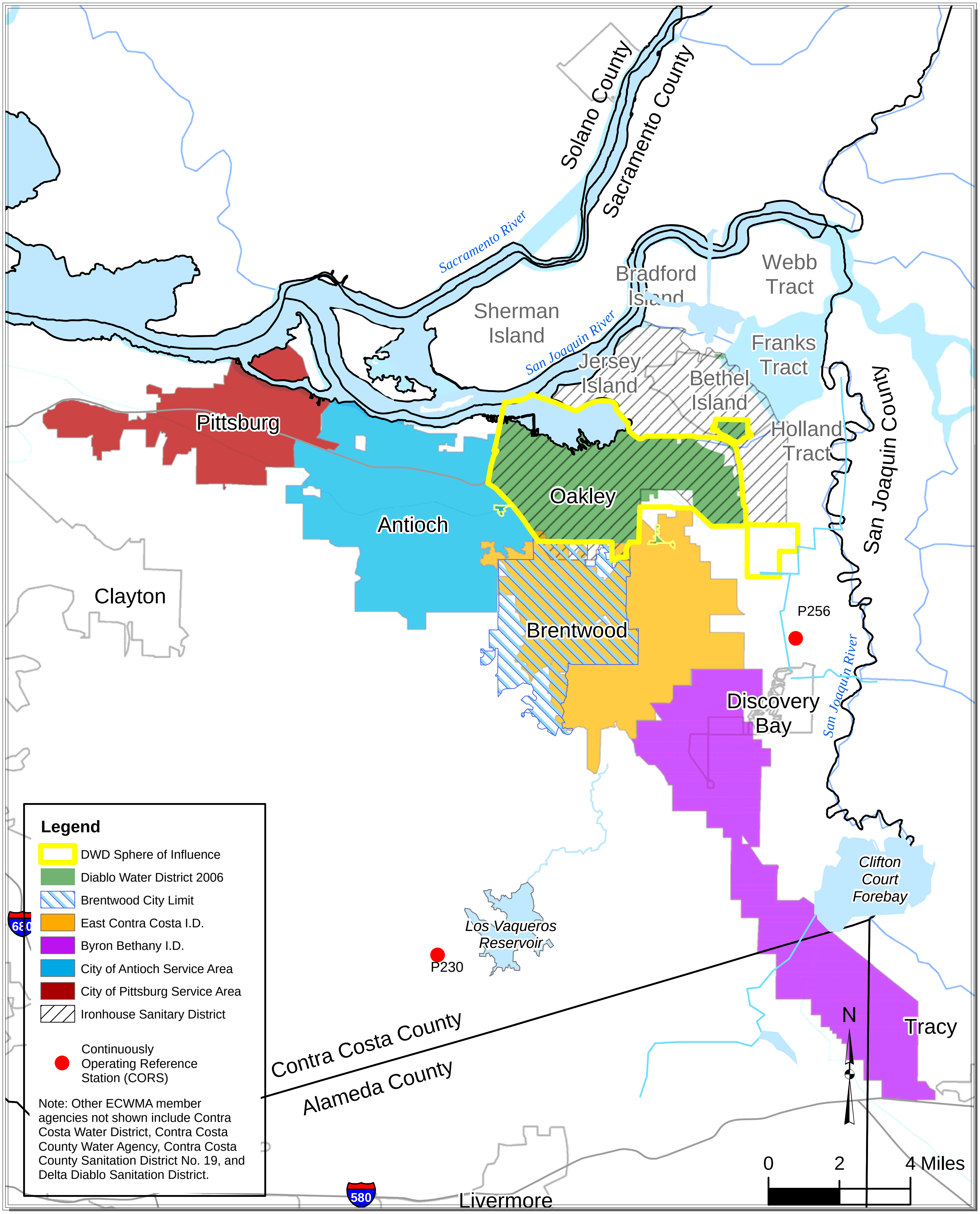

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Figure 3-5
Land Subsidence Monitoring Locations

- Sustainable pumpage from planned municipal wells.
- Preservation of groundwater quality.
- Prevention of significant future land subsidence.

3.3.1 Sustainable Pumpage

Due to a lack of significant historic pumping and data, the LSCE 1999 report on hydrogeology did not quantify sustainable pumpage within the District's SOI or that portion of the greater east County area overlying the Tracy Subbasin. The District's stated strategy for groundwater use is to develop new source capacity (wells) to the extent that no adverse impacts arise. New wells are to be spaced and designed to avoid adverse levels of mutual interference with existing wells and in accordance with standards for source protection as promulgated by DHS under the Drinking Water Source Assessment Protection (DWSAP) Program. This Plan will include a component to assess sustainable pumpage and to monitor and report on groundwater levels.

3.3.2 Preservation of Water Quality

It is recognized that groundwater quality varies throughout the District's SOI and that there may be contamination concerns as a result of municipal, industrial, or agricultural activities. The contamination concerns are addressed largely through meeting the DWSAP program requirements, while the issue of other naturally occurring constituents is a matter addressed through project design and monitoring of pumping influences. Some key native constituents of concern to the District that affect sustainability include hardness and manganese as they affect the ability of the District to achieve its blending objectives. Since there are no hydraulic barriers between areas of "poor" versus "good" groundwater quality, there is a risk that increased groundwater pumping will induce migration and comingling that results in water quality degradation. Due to this potential, the District designed the 315 foot deep Glen Park well with a 200 foot annular seal. The District will design future wells in a manner that avoids adverse and widespread pumping influences (through use of deep annular seals and proper well spacing, for example) and monitor key wells for indications of potential adverse conditions. Based on the hydrogeologic setting, it is anticipated that future wells will be greater than 200 feet in depth. This approach is embodied in this Plan.

3.3.3 Land Subsidence

As indicated in the previous section, land subsidence monitoring data are limited in the east Contra Costa County area. However, there are no data to indicate that subsidence has occurred to a significant degree due to groundwater extraction. In addition, the conditions that would lead to subsidence (i.e., permanent dewatering or decline in groundwater levels) are not evident within the District's SOI, or surrounding areas. With regard to future pumping envisioned under the District's Well Utilization Project, for example, ongoing groundwater level monitoring and conjunctive use of surface water and groundwater resources provide a basis for impact avoidance. This strategy is embodied in the Plan components listed in Chapter 4.

4.0 GROUNDWATER MANAGEMENT PLAN OBJECTIVES AND COMPONENTS

4.1 GROUNDWATER MANAGEMENT PLAN OBJECTIVES

The overall purpose of this Plan is to maintain a high quality, reliable, and sustainable water supply for the customers in the Diablo Water District service area. To accomplish this, the District will support regional and local basin management objectives (BMOs) directed toward the sustainability of groundwater supplies. Groundwater management involves ongoing coordinated actions related to groundwater withdrawal, replenishment, and protection to achieve long-term sustainability of the resource without detrimental effects on other resources. The Plan sets forth a framework and related actions to accomplish the regional and local BMOs.

4.1.1 Regional Basin Management Objectives

The regional BMOs addressed by this Plan can be expressed as follows:

1. **Assessment of Groundwater Basin Conditions.** Programs to monitor and report on groundwater levels, groundwater quality, and pumpage have been conducted by local agencies with an objective to expand the programs into a more cohesive program for the Tracy Subbasin. Land subsidence and surface flow and quality are considered of secondary concern to be developed in the future, as needed. Plans to expand the existing programs are in progress. These monitoring programs are necessary to ensure that undesirable effects such as long-term groundwater level declines, groundwater quality degradation, and significant inelastic land subsidence are avoided. Regional coordination of groundwater monitoring is important, and monitoring programs should be reevaluated periodically to determine whether the location, depth, and frequency are adequate. Data collected by the monitoring programs need to be evaluated on a regular basis to ensure that other BMOs are met. Currently, comprehensive regional evaluation is not conducted on a regular basis. However, results from individual monitoring programs are made available to other agencies to aid in effective groundwater resource management and accomplishment of BMOs.

2. **Avoidance of Overdraft.** It is important that groundwater pumpage in the Tracy Subbasin not exceed the sustainable yield of the subbasin in order to avoid chronic water level declines that could lead to overdraft conditions or cause significant inelastic land subsidence. This objective can be met in the short term through ongoing evaluation of groundwater level and pumpage data collected in the recommended monitoring program. In the long term, estimates of sustainable yield of the region will be targeted as a benchmark for overdraft avoidance.

3. **Preservation of Groundwater Quality.** This objective involves actions needed to sustain a supply of good quality groundwater for beneficial uses in the basin. It includes coordinated efforts that will be required to conduct a regional monitoring program that identifies short and longer-term water quality trends. Currently, comprehensive regional evaluation is not conducted on a regular basis. However, results from individual monitoring programs are made available to other agencies to aid in effective groundwater resource management and accomplishment of BMOs. It also includes wellhead and recharge area protection and actions to avoid salt accumulation and/or mobility of naturally occurring constituents. Also included in this BMO will be the active characterization and solution of any groundwater contamination problems through cooperation with responsible parties or through independent action if timely response by responsible parties is not forthcoming and the preceding management objectives are thereby impacted or constrained.

4. **Preservation of Interrelated Surface Water and Groundwater Resources.** Several entities in the Tracy Subbasin, including Diablo Water District, use both surface water and groundwater. There are opportunities to expand these programs in the future and to increase the use of recycled water to meet existing and projected demands. Included in this management objective is the non-degradation of surface water flows or quality as a result of groundwater management practices. In addition to being classified as a separate BMO, conjunctive use is one of the primary means of accomplishing BMOs 2 and 3 above.

4.1.2 Local Basin Management Objectives

The local BMOs addressed by this Plan are listed below:

1. **Understanding Local Groundwater Conditions.** Programs to monitor and report on groundwater levels, groundwater quality, and pumpage have been implemented to assess groundwater conditions in the Diablo Water District service area. Plans to expand the existing programs are in progress. These monitoring programs are necessary to ensure that undesirable effects such as long-term groundwater level declines, groundwater quality degradation, and significant inelastic land subsidence are avoided. Regional coordination of groundwater monitoring is important, and monitoring programs should be reevaluated periodically to determine whether the location, depth, and frequency are adequate. Data collected by the monitoring programs need to be evaluated on a regular basis to ensure that other BMOs are met.

2. **Preservation of Groundwater Quality.** This objective involves actions needed to sustain a supply of good quality groundwater in the Diablo Water District service area. It

includes wellhead and recharge area protection and actions to avoid salt accumulation and/or mobility of naturally occurring constituents. Also included in this BMO will be the active characterization and solution of any groundwater contamination problems through cooperation with responsible parties or through independent action if timely response by responsible parties is not forthcoming and the preceding management objectives are thereby impacted or constrained.

3. **Avoid Impacts to Shallow Groundwater.** This objective involves actions needed to avoid deleterious impacts to shallow wells that exist throughout the District's SOI. These wells may serve individual households or small community systems. To achieve this BMO, the District shall include in development plans for new wells testing programs that demonstrate less-than-significant impacts from groundwater extraction by District wells. A monitoring program that includes shallow wells should be implemented to demonstrate continued compliance with this objective.

4. **Local Groundwater Monitoring and Coordination with Regional Monitoring Program.** Diablo Water District has conducted intermittent monitoring of groundwater levels and quality within its service area. Establishment of an ongoing program to routinely monitor local groundwater conditions is important to accomplishment of the other BMOs discussed above. Coordination of the Diablo Water District groundwater monitoring program with other regional monitoring programs will eliminate duplication and ensure that adequate monitoring is being conducted and enhance its own understanding of conditions in its area. Examples of the District's coordination of regional data sources include:

   - Use of water level data from the East Contra Costa Irrigation District to assess shallow groundwater conditions.
   - Use of data from the City of Brentwood's Wells 6, 7, 8, and 14 to assess conditions in the deep aquifer system.
   - Use of historic water quality data from City of Brentwood's municipal wells to assess historic and current groundwater conditions.

4.2 PLAN CATEGORIES AND COMPONENTS

To accomplish the BMOs discussed above, this Plan incorporates a number of components that are divided into five categories: 1) monitoring program, 2) water resource sustainability, 3) groundwater resource protection, 4) agency coordination and public outreach, and 5) plan implementation and updates. Each of the Plan components within each category are listed below and described in the following sections.

The Plan components reflect the focus on local groundwater management in the Tracy Subbasin by Diablo Water District and continuing cooperation with the members of the ECWMA and other stakeholders in the Subbasin. In summary, this Plan guides the District in the management of its own groundwater resources, and provides the foundation for the District and other entities in the basin to cooperatively manage and potentially expand the use of groundwater on a regional basis for municipal and emergency water supply purposes.

Category 1: Monitoring Program

1A. Elements of Monitoring Program
1B. Evaluation and Reporting of Monitoring Data

Category 2: Water Resource Sustainability

2A. Maintaining Stable Groundwater Levels
2B. Water Conservation
2C. Implementation of Conjunctive Water Management
2D. Integration of Recycled Water

Category 3: Groundwater Resource Protection

3A. Well Construction and Destruction Policies
3B. Management and Mitigation of Contaminated Groundwater
3C. Long-Term Salinity Management
3D. Identification and Management of Recharge Areas and Wellhead Protection Areas

Category 4: Agency Coordination and Public Outreach

4A. Continuation of Local, State, and Federal Agency Relationships
4B. Public Outreach
4C. Water Awareness Education

Category 5: Plan Implementation and Updates

5A. Plan Implementation and Reporting
5B. Provisions to Update the Groundwater Management Plan

The Plan components are summarized below. Following the summary of each component is a list of actions that the District will implement under the Plan. Implementation of these actions will ensure progress toward accomplishment of the regional and local BMOs discussed above. All of the action items are summarized in **Table 4-1**.

COMPONENT CATEGORY 1: MONITORING PROGRAM

The District has conducted monitoring of groundwater levels and quality in accordance with the requirements of Contra Costa County Environmental Health Division (small community wells) and the state DHS (Glen Park Well). In addition, the District has installed monitoring wells at various locations to assess groundwater conditions and has collected water level and quality data at those locations. A formal groundwater monitoring program has been developed for inclusion in this Plan and is provided in **Appendix D**. As summarized below, the District's local monitoring program includes three elements: 1) groundwater levels, 2) groundwater quality, and 3) groundwater pumpage. A fourth element, monitoring of land subsidence, is part of the regional monitoring program and will not be conducted directly by the District. Another element, monitoring of surface water flows and quality in the Delta, is conducted by various agencies, including DWR. Diablo Water District's pumping does not affect surface flows or quality and, accordingly, the District does not anticipate the need to directly or independently monitor surface water other than the quality of surface water delivered by CCWD to the District.

As discussed below, the District plans to coordinate its groundwater monitoring program with ECWMA and other stakeholders in the Subbasin to ensure completeness and avoid redundancies.

Component 1A: Elements of Monitoring Program

The District's current groundwater monitoring program is summarized in **Appendix D** (note: monitoring locations are shown in **Appendix B**). Well construction data for wells monitored under this Plan are contained in **Appendix E**.

Groundwater Levels

The primary focus of the District's current groundwater monitoring program is on monitoring groundwater levels in the vicinity of the Glen Park Well. As reflected in **Appendix D**, manual water level measurements are made monthly in 12 wells, including three District wells and nine private domestic wells. The District wells include monitoring wells at the Glen Park and Creekside sites, and the Glen Park and Knightsen production wells.

In addition to the wells monitored by the District for groundwater levels, the District also has integrated groundwater level data collected by other entities in the region. The wells in the groundwater level monitoring network are shown in **Appendix B**. These include shallow wells monitored by ECCID since the 1950s. Although most of the ECCID wells are located south of the District's boundaries, three ECCID wells are located favorably with respect to ongoing shallow groundwater monitoring objectives of the District. The

City of Brentwood's Wells 6, 7, 8 and 14 are of interest for deep aquifer monitoring and have been incorporated into the planned program.

Groundwater Quality

Groundwater quality sampling of production wells for general minerals, inorganic chemicals, and organic parameters is conducted every three years as required for all public water supply systems. The District also collects samples annually for nitrate analysis. Samples were collected quarterly for radionuclide analysis from May 2005 to January 2006, and the District has received a 9-year waiver from DHS for future radionuclide sampling because the gross alpha results were below the threshold of 3 pCi/L. The District's groundwater quality monitoring program is summarized in **Appendix D**.

Groundwater Pumpage

The District monitors pumpage from the Glen Park Well via a SCADA system. As new municipal wells are brought on-line, pumpage will continue to be a monitored parameter and reported at least annually as part of a groundwater report specified under this Plan.

Land Subsidence

As discussed in Section 3.2, significant land subsidence occurred historically in the Sacramento-San Joaquin Delta, including in east Contra Costa County. Most of this subsidence is the result of the reclamation of Delta islands by the construction of levees and the dewatering of soils for agricultural production. The exposed organic (peat) soils to oxygen, and the resulting microbial oxidation of the peat soils is the predominant cause of land subsidence in the Delta.

The District does not monitor land subsidence within its boundaries, but land subsidence in Contra Costa County is monitored by various agencies. Regional land subsidence monitoring has included non-instrumented GPS monuments and continuous GPS monitoring stations; there are no extensometers in Contra Costa County.

The Sacramento-San Joaquin Delta non-instrumented GPS network consists of about 120 monuments, including two monuments in eastern Contra Costa County. This network was initially surveyed in 1997 and resurveyed in 2002, but funding has not been available to process the data from the 2002 resurvey. GPS monitoring locations in eastern Contra Costa County are shown on **Figure 3-5**.

Surface Water Flows and Quality

Surface water flows and quality in the Delta are monitored by various agencies including DWR. The District has no plans to conduct additional monitoring at this time.

As required by DHS, the District monitors the quality of surface water delivered by CCWD on a quarterly basis. Both raw and treated surface water are sampled at the Randall-Bold WTP and analyzed for nitrate on a quarterly basis (except for the first quarter) and for general mineral, general physical, inorganic, and organic constituents annually.

Actions

- Implement the groundwater monitoring program detailed in **Appendix D**.
- Make available groundwater monitoring data to other agencies to aid in effective groundwater resource management and accomplishment of BMOs.

Component 1B: Evaluation and Reporting of Monitoring Data

Groundwater level, quality, and production data collected as part of the District's monitoring program should be periodically entered into a database so that the data can be summarized on tables and plots in an efficient manner. The data should be routinely reviewed to check for any significant changes in groundwater conditions. An annual summary report that includes presentation and discussion of these monitoring data is recommended in this Plan.

Actions

- Maintain clear records from all monitoring activities.
- Prepare an annual monitoring report describing conditions as reflected by trends of monitored parameters.
- Make the annual report available to other agencies to aid in effective groundwater resource management and accomplishment of BMOs.

COMPONENT CATEGORY 2: WATER RESOURCE SUSTAINABILITY

Component 2A: Maintaining Stable Groundwater Levels

Accomplishment of the second BMO (avoidance of overdraft) requires that progressive groundwater level declines be avoided. Groundwater levels in the District area have historically been stable because the majority of the water demand is met by surface water. Although groundwater extraction will increase in the future, projected pumping increases are not expected to cause significant groundwater level declines. Seasonal water level fluctuations occur and will likely increase in magnitude as pumping increases, but full water level recovery is expected during the winter months except during dry years.

Year-to-year water level fluctuations are likely to occur because of future conjunctive water management. As discussed below, conjunctive use operations may involve pumping more groundwater from storage during dry years, and reducing pumping so that the storage is replenished during subsequent normal and wet years. This means that groundwater levels could decline during dry years but would recover during normal and wet years. Such fluctuations are normal and are not considered to be inconsistent with the goal of maintaining stable groundwater levels.

The District will continue to monitor groundwater levels and consult with other well operators to monitor effects on other wells in the region. In the event local wells were to be adversely affected (i.e., lowering of groundwater below existing pumps), decisions about mitigation actions would be made on a case-by-case basis. Mitigation measures may include, but would not be limited to, supplying the property with a different source of water, lowering or replacing pumps, or installing new wells.

Actions

- Continue monitoring of groundwater levels discussed under Component 1A to ensure that progressive groundwater level declines do not occur.
- District will employ mitigation measures as applicable to maintain stable groundwater levels.

Component 2B: Water Conservation

Water conservation and related public education measures have generally been developed in California to achieve the following goals:

- meet legal mandates,
- reduce average annual potable water demands,
- reduce sewer flows,
- reduce water demands during peak seasons, and
- meet drought restrictions.

Diablo Water District adopted Regulation No. 8, "Water Conservation" in 1986 and amended it in 1994. The purpose of the regulation is "to assure that all water furnished by the District is put to reasonable beneficial use, to prevent unreasonable use or waste of water and to promote efficient use and conservation of water"

The District's wholesale supplier of surface water, CCWD, is a signatory to the Memorandum of Understanding (MOU) Regarding Urban Water Conservation in California developed by the California Urban Water Conservation Council (CUWCC). The MOU was adopted in 1991 and has been amended 11 times, most recently in 2005, and identifies 14 demand management measures (DMMs). As summarized in the table below, all but one of these have been implemented by the District with assistance from CCWD (CDM, 2005). DMM #10 (Wholesale Agency Program) is not applicable because the District is not a water wholesaler.

Implementation of Demand Management Measures

Demand Management Measures	Status
1. Residential Water Audits	Implemented
2. Residential Plumbing Fixture Retrofits	Implemented
3. Water Delivery System Audits, Leak Detection, and Repair	Implemented
4. Metering with Commodity Rates	Implemented
5. Large Landscape Conservation	Implemented
6. High Efficiency Washing Machine Rebated	Implemented
7. Public Information	Implemented
8. School Education	Implemented
9. Commercial, Industrial, and Institutional Water Conservation	Implemented
10. Wholesale Agency Program	Not Applicable
11. Conservation Pricing	Implemented

Implementation of Demand Management Measures (cont.)

Demand Management Measures	Status
12. Conservation Coordinator	Implemented
13. Water Waste Prohibition	Implemented
14. Ultra-Low Flush Toilets	Implemented

Communication tools used by CCWD and the District to encourage water conservation are outlined in the UWMP (CDM, 2005) under public information (DMM-7) and school education (DMM-8). These DMMs are discussed below under Component 4B (Public Outreach) and Component 4C (Water Awareness Education).

Actions

- Continue to implement and promote water conservation programs within the District's service area.

Component 2C: Implementation of Conjunctive Water Management

Water purveyors such as Diablo Water District that use both surface water and groundwater can operate those supplies conjunctively to obtain maximum benefit from both sources of supply. In its simplest form, conjunctive water management involves increasing groundwater pumping during dry years when there are cutbacks in surface water supplies and reduce groundwater pumping during normal and wet years when surface water supplies are sufficient to meet demands. Historically, the District's ability to implement conjunctive management strategies has been limited due to the lack of a groundwater source of supply. Conjunctive water management was also not a priority because surface water supplies have been sufficient to meet demands. Implementation of conjunctive use strategies may become more important in future years as water demands increase.

Commissioning of the Glen Park Well in 2006 allowed the District to implement conjunctive water management, and the installation of additional wells in future years will increase conjunctive use options. If the District uses more groundwater, during a dry year for example, reducing pumping during normal and wet years will allow groundwater levels to recover and prevent progressive water level declines. This would ensure that the second BMO, avoidance of overdraft, continues to be met.

In many areas of California, conjunctive water management has been demonstrated to be an effective and flexible management approach that allows optimum use of surface water and groundwater during different water year types. Increased groundwater pumping during dry years causes temporary groundwater level declines, but conjunctive use operations help to ensure that groundwater levels recover during normal and wet years.

As part of the conjunctive management of surface water and groundwater to meet the District's requirements, it is recognized that there will be variations in the amount of available surface water supplies from year to year, particularly since the supply consists of CVP water imported from outside the region. Similarly, there are expected to be variations in groundwater conditions as a function of the local hydrogeology that affect, among other things, the natural recharge to the groundwater basin from year to year.

Actions

- The District will continue to develop groundwater source capacity and identify possible conjunctive management strategies to optimize resource protection. This will likely require regional coordination with CCWD and other ECWMA agencies.

Component 2D: Integration of Recycled Water

The wastewater treatment and collection systems in the Diablo Water District service area are owned and operated by the Ironhouse Sanitary District (ISD). The UWMP states that wastewater flows averaged 2.3 mgd in 2005 and are projected to increase to 8.6 mgd at build-out (CDM, 2005). All treated wastewater is currently recycled in the form of irrigation water for agricultural lands; there is no direct discharge of treated effluent to the San Joaquin River. The irrigated crops consist primarily of rye grass grown for non-human consumption. The crops are grown on 162 acres adjacent to the wastewater treatment plant in Oakley and 396 acres on Jersey Island. The Jersey Island acreage can expand in the future as wastewater flows increase.

The Diablo Water District currently requires that large new turf landscape areas be supplied by non-District water. Water supplies for these areas are typically groundwater pumped by non-District wells, but recycled water could also be used. The UWMP states:

> "In the future, if DWD identifies large potential users of recycled water within its service area, it will coordinate with ISD to determine if an economic feasibility study may be warranted. For example, such users may include large industries requiring cooling water or other non-potable uses, or large landscape areas that would otherwise irrigate with potable water." (CDM, 2005)

As wastewater treatment increases in future years, the District will seek opportunities to use recycled water in lieu of non-District groundwater. This would have the dual benefit of reducing groundwater demand and reducing the additional acreage that ISD would need for irrigation with recycled water.

Actions

- As applicable, coordinate opportunities to use recycled water with ISD.

COMPONENT CATEGORY 3: GROUNDWATER RESOURCE PROTECTION

Component 3A: Well Construction and Destruction Policies

The third BMO, preservation of groundwater quality, requires that all wells be properly constructed and maintained during their operational lives and properly destroyed after their useful lives, so that they do not adversely affect groundwater quality by, for example, serving as conduits for movement of contaminants from the ground surface and/or from an aquifer with poor groundwater quality to one with good quality. Toward that end, this component is included in the Plan to support well construction and destruction policies, and to participate in their implementation, particularly with regard to surface and inter-aquifer well sealing and proper well destruction, which are critical in the management of a multiple aquifer system.

Contra Costa County adopted well construction ordinances in 1981 and 1985, and these are included in **Appendix F**. These ordinances establish requirements for well construction permits, specify minimum setbacks from septic tanks and other potential hazards, and reference specific requirements of the California State Well Standards summarized in DWR Bulletin 74-81 (DWR, 1981). The State Well Standards were updated in Bulletin 74-90 (DWR, 1990). Both the State Well Standards and the County's ordinances require a minimum 50-foot annular seal for drinking water wells to guard against exposure to contamination such as coliform bacteria and specify procedures for installation of the annular seal.

The State Well Standards and the County ordinances also establish requirements for destruction of unused wells. These procedures are intended to ensure that abandoned wells cannot act as conduits for infiltration of surface drainage to shallow aquifers or movement of groundwater from shallow to deeper zones.

The Environmental Health Division of the Contra Costa County Health Services is responsible for well construction and destruction permits in Contra Costa County, and the permit guidelines and application form are included in **Appendix F**. The well permit application includes a list of construction information to be verified by the County's Inspector.

Permitting of municipal supply wells is also within the purview of DHS. Each DHS district has specified procedures for siting and permitting new well sources, though all require a source assessment and protection survey under the Drinking Water Source Assessment and Protection Program.

This program assesses potential hazards to drinking water quality and encompasses the following steps that will be performed for each candidate well:

- Identify the proposed well point using coordinates derived from global positioning system equipment.
- Delineate Groundwater Protection Zones using proposed or actual well construction features and the Modified Calculated Fixed Radius method. This step requires input of anticipated or actual well capacity, which will range from 0.25 to 1.0 mgd.
- Complete Physical Barrier Effectiveness checklist using available information on local geology and surface features.
- Complete Well Data Sheet.
- Complete Possible Contaminating Activities (PCA) Inventory Form using information from a neighborhood survey, a database search from Environmental Data Resources Inc. (EDR), a review of data available on the State Water Resources Control Board's (SWRCB) GeoTracker website, and review of Regional Water Quality Control Board (RWQCB) agency files.
- Rank PCAs by vulnerability score.

- Create a zone delineation map showing the well location and protection zones based on average well discharge volumes and groundwater flow directions.

The DWSAP report lists results from database searches within the calculated wellhead protection zones including the Environmental Data Resources, Inc. database, the SWRCB GeoTracker website, and RWQCB agency files. A neighborhood survey is conducted to verify existing conditions (e.g., land use) and identify activities that may cause the groundwater source to be considered vulnerable, but which may not be associated with an existing contamination site.

Actions

- Comply with the County's well construction and destruction policies and state permitting requirements as stipulated by the DHS district engineer.

Component 3B: Management and Mitigation of Contaminated Groundwater

Groundwater quality problems have limited groundwater development in some parts of east Contra Costa County. Groundwater quality is generally classified as marginal to poor in the Diablo Water District SOI (CH2M Hill, 1996). As summarized in Section 3.1, there are areas of naturally occurring groundwater quality problems within the District (e.g., manganese and arsenic).

The Contra Costa County Environmental Health Division has local oversight for groundwater protection through the Underground Storage Tank (UST) and Hazardous Materials programs. The UST regulations provide groundwater protection through annual integrity testing and stringent tank requirements.

The District will consult with other well operators to monitor effects on other wells in the region. In the event local wells were to be adversely affected (i.e., degradation of water quality), decisions about mitigation actions would be made on a case-by-case basis. Mitigation measures may include, but would not be limited to, supplying the property with a different source of water, lowering or replacing pumps, or installing new wells.

Actions

- Identify short and longer-term water quality trends and actions needed to sustain a supply of good quality groundwater.
- Employ BMPs to limit potential sources of contamination in the environment.
- Coordinate with the County Environmental Health Services Division and other land use/regulatory agencies to develop a method for identifying contamination concerns and mitigating public water supply contamination.

- Identify locations of point sources of contamination.
- Identify major non-point sources of contamination.
- Mitigate potential impacts on groundwater quality resulting from point or non-point sources of contamination.
- Identify short and longer-term water quality trends and actions needed to sustain a supply of good quality groundwater.
- Coordinate with other ECWMA members and the County Environmental Health Services Division to assess the quality of groundwater used by private well owners in the Tracy Subbasin.
- Any groundwater contamination induced by District pumping will be mitigated.

Component 3C: Identification and Management of Recharge Areas and Wellhead Protection Areas

The 1986 Amendments to the federal Safe Drinking Water Act (SDWA) established requirements for new Wellhead Protection Programs (WPPs) to protect groundwater that supplies drinking water wells for public water systems. Each state was required to prepare a WPP and submit it to the USEPA by June 19, 1989. However, California did not develop an active statewide WPP at that time. Subsequently, in 1996, reauthorization of the SDWA established a related program called the Source Water Assessment Program. In 1999, the DHS Division of Drinking Water and Environmental Management developed the DWSAP Program, which was approved by USEPA. The overall objective of the DWSAP Program is to ensure that the quality of drinking water sources is protected. The wellhead protection aspect of this groundwater management plan component is now essentially required as a result of the 1996 SDWA reauthorization.

In California, the DWSAP Program satisfies the mandates of both the 1986 and 1996 SDWA amendments. The California DWSAP Program includes delineation of Groundwater Protection Zones surrounding an existing or proposed drinking water source where contaminants have the potential to migrate and reach that source. The program includes preparation of an inventory of Possible Contaminating Activities (PCAs) that may lead to the release of contaminants within these zones as described above under Component 3B. The activities, referred to in the DWSAP Program as Potentially Contaminating Activities, include such land uses as gas stations and dry cleaners, as well as many other land uses. Known contaminant plumes regulated by local, state, and federal agencies are also included. The Groundwater Protection Zones, which are determined based on local hydrogeological conditions and also well operation and construction parameters, represent the approximate area from which groundwater would be withdrawn during 2, 5, and 10-year time periods. These zones also represent the area in which contaminants released to groundwater could migrate and potentially affect the groundwater extracted by wells located within the designated zones. The DWSAP Program evaluation also includes a risk or vulnerability ranking based on a combined numerical score that results from points assigned to various evaluations conducted as part of the DWSAP process. This ranking provides a relative indication of the potential susceptibility of drinking water sources to contamination.

DHS is responsible for conducting DWSAP assessments for systems existing prior to the adoption of the California program but has encouraged purveyors to perform their own assessments. Assessments for existing systems were due to be completed by May 2003. The results of the DWSAP assessments can be used as a planning tool to assess land use development in the vicinity of water sources. The DWSAP analyses prepared for water sources in the basin should, in some fashion, be reviewed at least every five years and updated as appropriate. The collective DWSAP information can also be integrated with other management activities, including siting of new wells, land use policies, and the County's Code concerning well construction.

This Plan component is included to incorporate the DWSAP Program as a tool to assist in accomplishing BMOs identified in this Plan.

Actions

- Identify and employ wellhead protection measures to ensure long-term sustainability of good quality water.
- Use DWSAP information, including delineation of source area and protection zones.
- Require deep sanitary seal construction standards for municipal supply wells.
- Adopt a well destruction policy for abandoned District wells to prevent groundwater contamination.
- Coordinate with other ECWMA members, as applicable, regarding DWSAP analyses (and also other environmental assessments) to guide management decisions.
- Promote recharge area protection to mitigate impacts of urban infrastructure and sources of groundwater contamination that could reduce recharge potential.

COMPONENT CATEGORY 4: AGENCY COORDINATION AND PUBLIC OUTREACH

Component 4A: Continuation of Local, State, and Federal Agency Relationships

The District has long-established working relationships with local and state agencies that will continue on an ongoing basis. The ECWMA is comprised of eleven local water and wastewater agencies in eastern Contra Costa County, including the District, and several other member agencies currently use groundwater or plan to use groundwater in the future. The District works closely with its wholesale supplier of CVP surface water, CCWD, which is also an ECWMA member. The availability of surface water resources is key to meeting the District's future water demands.

The ECWMA member agencies participated in the preparation of the East Contra Costa County Functionally Equivalent IRWMP consisting of existing local and regional planning documents, which was completed in July 2005. Completion of the Functionally Equivalent IRWMP enabled the ECWMA members to apply for a Proposition 50, Chapter 8 regional grant (CCWD, 2005). Eight eastern Contra Costa County agencies, including Diablo Water District, have projects to be included in the grant application.

The District has a historical and ongoing working relationship with local agencies, as well as with other local groundwater pumpers, to manage supplies to effectively meet water demands within the available yields of imported surface water and local groundwater. The District formally presented and solicited comment on its intent to prepare a groundwater management plan with ECWMA in May 2005.

ECWMA member agencies that received a draft Plan for review include:

- City of Brentwood
- Contra Costa Water District
- Town of Discovery Bay
- East Contra Costa Water District
- City of Pittsburg

The above agencies represent an advisory group to the District for this Plan and will continue to be solicited for input on Plan updates and to receive annual reports on groundwater conditions. Representatives from these agencies participated in three meetings on content of the Plan and reviewed the draft Plan.

This Plan component is included to formalize the historical local and state agency working relationships as part of comprehensively managing local groundwater, in concert with imported surface water and local recycled water, to accomplish all the management objectives for the basin.

Actions

- Continue working relationships with local, state, and federal agencies (regulatory and other) to achieve broader local and regional benefits.
- Pursue grant opportunities in cooperation with ECWMA to fund basin management activities and regional water projects.

Component 4B: Public Outreach

The purpose of the Plan is to maintain a high quality, reliable, and sustainable water supply for the citizens and businesses of Oakley and the unincorporated portions of its service area. To accomplish this, the Plan components describe how the District intends to manage its water resources in support of four regional and three local BMOs directed toward the sustainability of groundwater supplies. As the District is managing its water resources as a service to the local citizenry, it is committed to engaging the public in awareness of the Plan's purpose and objectives, and active involvement in Plan implementation. Accordingly, the District has prepared this Plan with the required public notices and hearings on its intention to prepare and adopt a plan per AB 3030 and SB 1938 (see **Appendix A**).

Public outreach tools used by CCWD and the District to encourage water conservation are outlined in the UWMP (CDM, 2005) under DMM-7. The District's public information program includes mailing a periodic newsletter to its customers to provide water conservation tips and other information about water conservation programs. CCWD and the District also sponsor media events related to conservation, produce public service announcements, and provide speakers for community groups and the media.

Actions

- Continue public involvement process with Board meetings that periodically include updates on water resources management activities by the District.
- Continue public outreach with bill inserts and printed media. These notices will include contact information so that interested parties can request additional information, ask questions, or provide comments on water resources management activities.
- Continue to engage the public in future Plan updates.

Component 4C: Water Awareness Education

The District is committed to implementing water awareness programs as discussed in the UWMP (CDM, 2005). School educational programs directed toward water conservation are handled primarily by CCWD, which provides an extensive Water Education Program to schools within the District's service area. The UWMP states that the current school education program reaches over 30,000 students, teachers, and parents each year.

Actions

- Continue water awareness education programs.

COMPONENT CATEGORY 5: PLAN IMPLEMENTATION AND UPDATES

Component 5A: Plan Implementation and Reporting

Table 4-1 summarizes the action items discussed under each Plan component and the implementation schedule for each item. Action items planned to be completed within two years are labeled "short-term" actions, and items expected to require more than two years to complete are labeled "long-term" actions. Action items that represent on-going groundwater management activities conducted by the District are labeled "continuing" actions.

The Functionally Equivalent IRWMP adopted by ECWMA in 2005 identifies and prioritizes regional water-related actions for the eastern Contra Costa County agencies, including the District. Highest priority actions identified in the IRWMP include quantifying countywide water demand and supply, increasing opportunities for conjunctive use, increasing the use of groundwater as part of conjunctive use operations, and implementation of water use efficiency programs (CDM, 2005). The District supports implementation of the IRWMP.

The District's utilization of groundwater has historically been small, and it has not previously prepared reports to summarize groundwater conditions in its service area. A key component of this Plan is the preparation of annual groundwater management reports to describe the status of management actions performed and/or recommended, including monitoring and other cooperative activities with other entities in the County and state or federal agencies. These annual reports will include summaries of monitoring data collected during the previous year, including groundwater conditions (groundwater levels, quality, and production) and land subsidence data. The reports will include data collected through March 31 so that water level recovery during the winter months can be evaluated. The reports will also summarize current water requirements, use of local groundwater and imported surface water from CCWD to meet those requirements, and other appropriate details about water requirements and supplies.

<u>Actions</u>

- Make information and reports available to other agencies to aid in effective groundwater resource management and accomplishment of BMOs.
- Provide copies of adopted Plan, and related reports, to ECWMA members.
- Support the IRWMP, including implementation of priority objectives of the IRWMP.
- Prepare annual groundwater management reports.

Component 5B: Provisions to Update the Groundwater Management Plan

The components of this Plan reflect the current understanding of the occurrence of groundwater in eastern Contra Costa County and specific problems or areas of concern about that resource. The Plan components are designed to achieve specified objectives to utilize local groundwater for regular water supply while both protecting and preserving groundwater quantity and quality. While the Plan provides a framework for present and future actions, new data will be developed as a result of Plan implementation. That new data could identify conditions which will require modifications to currently definable management actions. As a result, this Plan is intended to be a flexible document that can be updated to modify existing components and/or incorporate new components as appropriate in order to recognize and respond to future groundwater conditions.

Review and update of this Plan would initially occur in about five years, or sooner if necessary. Subsequent future updates would be similarly scheduled. ECWMA members would be apprised of future updates to the Plan to ensure that the Plan is consistent with BMOs and management actions being implemented by others utilizing water resources within the same basin. The District will also conduct outreach to encourage public participation in future Plan updates.

Actions

- Review and update Plan every five years or more often as needed.

Table 4-1
Summary of Action Items

Plan Components and Action Items	Short-term[1]	Long-term[2]	Continuing[3]
CATEGORY 1: MONITORING PROGRAM			
1A. Elements of Monitoring Program			
• Implement the groundwater monitoring program detailed in Appendix D.	X		X
1B. Evaluation and Reporting of Monitoring			
• Maintain clear records from all monitoring activities.	X		
• Prepare an annual monitoring report describing conditions as reflected by trends of monitored parameters.	X		
• Make the annual report available to other agencies to aid in effective groundwater resource management and accomplishment of BMOs.	X		
CATEGORY 2: WATER RESOURCE SUSTAINABILITY			
2A. Maintaining Stable Groundwater Levels			
• Continue monitoring of groundwater levels discussed under Component 1A to ensure that progressive groundwater level declines do not occur.	X		X
2B. Water Conservation			
• Continue to implement and promote water conservation programs within the District's service area.			X
2C. Implementation of Conjunctive Water Management			
• The District will continue to develop groundwater source capacity and identify possible conjunctive management strategies to optimize resource protection. This will likely require regional coordination with CCWD and other ECWMA agencies.			X
2D. Integration of Recycled Water			
• As applicable, coordinate opportunities to use recycled water with Ironhouse Sanitation District.			X
CATEGORY 3: GROUNDWATER RESOURCE PROTECTION			
3A. Well Construction and Destruction Policies			
• Comply with the County's well construction and destruction policies and state permitting requirements as stipulated by the DHS district engineer.	X		
3B. Management and Mitigation of Contaminated Groundwater			
• Identify short and longer-term water quality trends and actions needed to sustain a supply of good quality groundwater.		X	
• Employ BMPs to limit potential sources of contamination in the environment.	X		
• Coordinate with the County Environmental Health Services Division and other land use/regulatory agencies to develop a method for identifying contamination concerns and mitigating public water supply contamination.		X	
• Identify locations of point sources of contamination.			X

Table 4-1 (continued)
Summary of Action Items

Plan Components and Action Items	Short-term[1]	Long-term[2]	Continuing[3]
• Identify major non-point sources of contamination.		X	
• Mitigate potential impacts on groundwater quality resulting from point or non-point sources of contamination.		X	
• Identify short and longer-term water quality trends and actions needed to sustain a supply of good quality groundwater.			X
• Coordinate with other ECWMA members and the County Environmental Health Services Division to assess the quality of groundwater used by private well owners in the subbasin.		X	
3C. Identification and Management of Recharge Areas and Wellhead Protection Areas			
• Identify short and longer-term water quality trends and actions needed to sustain supply of good quality groundwater		X	
• Use DWSAP information, including delineation of source area and protection zones.	X		
• Require deep sanitary seal construction standards for municipal supply wells.	X		
• Adopt a well destruction policy for abandoned District wells to prevent groundwater contamination.	X		
• Coordinate with other ECWMA members, as applicable, regarding DWSAP analyses (and also other environmental assessments) to guide management decisions.		X	
• Promote recharge area protection to mitigate impacts of urban infrastructure and sources of groundwater contamination that could reduce recharge potential.		X	
CATEGORY 4: AGENCY COORDINATION AND PUBLIC OUTREACH			
4A. Continuation of Local, State, and Federal Agency Relationships			
• Continue working relationships with local, state, and federal agencies (regulatory and other) to achieve broader local and regional benefits.			X
• Pursue grant opportunities in cooperation with ECWMA to fund basin management activities and regional water projects.			X
4B. Public Outreach			
• Continue public involvement process with Board meetings that periodically include updates on water resources management activities by the District.			X
• Continue public outreach with bill inserts and printed media. These notices will include contact information so that interested parties can request additional information, ask questions, or provide comments on water resources management activities.			X
• Continue to engage the public in future Plan updates.			X
4C. Water Awareness Education			
• Continue water awareness education programs.			X

Table 4-1 (continued)
Summary of Action Items

Plan Components and Action Items	Short-term[1]	Long-term[2]	Continuing[3]
CATEGORY 5: PLAN IMPLEMENTATION AND UPDATES			
5A. Plan Implementation and Reporting			
• Make information and reports available to other agencies to aid in effective groundwater resource management and accomplishment of BMOs.			X
• Provide copies of adopted Plan, and related reports, to ECWMA members.	X		
• Support the IRWMP, including implementation of priority objectives of the IRWMP.		X	
• Prepare annual groundwater management reports.			X
5B. Provisions to Update the Groundwater Management Plan			
• Review and update plan every five years or more often as needed.			X

1. Short-term actions are items to be completed within two years.
2. Long-term actions are items expected to require more than two years.
3. Continuing are items that are ongoing groundwater management activities.

5.0 REFERENCES (includes cited and other references)

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Appendix A

Resolution No. 2006-6, Public Notices, and Resolution No. 2007-4

RESOLUTION NO. 2006 - 6

A RESOLUTION OF THE BOARD OF DIRECTORS OF DIABLO WATER DISTRICT SETTING FORTH ITS INTENTION TO PREPARE A GROUNDWATER MANAGEMENT PLAN

The Board of the Directors of the Diablo Water District (District) does hereby find that:

WHEREAS, the District was formed in 1953 by a vote of the citizens of Oakley for the purpose of serving a safe, adequate, and reliable supply of water to the residents and businesses within the District; and

WHEREAS, California Water Code, Part 2.75 of Division 6, Section 10750, et seq., permits the adoption and implementation of Groundwater Management Plans to encourage authorized local agencies to manage groundwater resources within their service areas; and

WHEREAS, the District is an authorized local agency and may therefore adopt and implement such a Groundwater Management Plan; and

WHEREAS, a Groundwater Management Plan will further efforts to protect and provide a safe, sufficient, and reliable groundwater supply to citizens and businesses within the District's boundaries, will facilitate collection of information to further understand groundwater basin conditions and evaluate additional policies and programs for protection of the groundwater resources in the designated plan area, and will assist in integrated regional water resources planning and monitoring efforts conducted in coordination with other public entities whose service areas also overlie the designated Plan area; and

WHEREAS, there has been no public objection to the District preparing a Groundwater Management Plan for approval by the District's Board of Directors.

NOW, THERFORE, be it resolved that the District intends to prepare a Groundwater Management Plan for the purpose of implementing the plan and establishing a groundwater management program, in accordance with California Water Code, Part 2.75 of Division 6, subject to final approval by the District's Board of Directors and the public hearing and notification provisions of Water Code Section 10753, et seq. A copy of this resolution shall be published in a paper of general circulation in Contra Costa County at least two times to give public notice of its adoption and the intent to prepare a Groundwater Management Plan.

* * * * *

I certify that the foregoing is a true and complete copy of a resolution duly and regularly adopted by the Board of Directors of Diablo Water District at a meeting thereof regularly held on June 28, 2006, by the following vote:

AYES: de Fremery, Crockett, Hobbs, Head, and Garcia

NOES: none

ABSENT: none

Dated: June 29, 2006

Mike Yeraka, Secretary

Oakley News June 9 and 16, 2006

Legal Notice

NOTICE OF A PUBLIC HEARING

Notice is hereby given that the Board of Directors of the Diablo Water District will hold a public hearing regarding the adoption of a Resolution of Intention to Prepare a Groundwater Management Plan pursuant to California Water Code, Part 2.75 of Division 6, Section 10750, et seq. The hearing is intended for review, explanation, and public input on a proposed Groundwater Management Plan. A Resolution of Intention may be adopted after the Public Hearing to be held on June 28, 2006. All interested persons, including all persons owning property in the District, may appear and be heard. **HEARING DATE:** June 28, 2006. 7:30 pm at the District's office, 2107 Main Street Oakley, CA. Additional information, together with a copy of the proposed resolution, may be obtained by contacting the District at 925-625-6159.

Legal EC 6939
Publish: June 9, 16, 2006

East County Times May 4 and May 11, 2007

Legal Notice

NOTICE OF PUBLIC HEARING

Notice is hereby given that the Board of Directors of the Diablo Water District will hold a public hearing on May 23, 2007 to consider adopting a Groundwater Management Plan (GMP) for the groundwater basin underlying the District's boundaries. The District is a local public agency that provides water service to customers within its service area; the California Water Code (CWC), Section 10750 et. seq., provides local agencies with the authority to adopt and implement groundwater management plans.

The purpose of the GMP is to maintain a reliable and sustainable water supply for the District and other groundwater users in and around the District's service area. The GMP describes regional and local groundwater basin management objectives directed toward the sustainability of groundwater and surface water supplies. To accomplish these objectives, the GMP sets forth five categories that identify actions to implement the GMP. Included among the actions is continued local groundwater monitoring and also coordination with other regional monitoring programs to track overall groundwater conditions in the District and the basin.

HEARING DATE: May 23, 2007, 7:30 pm at the District's office, 2107 Main Street, Oakley, CA. Any protests by landowners in the area covered under the plan must be provided to the District, in writing, prior to completion of the hearing. Copies of the plan are available at the District's office for public review. Additional information may be obtained by contacting the District at 925-625-6159.

Legal EC 9715
Publish: May 4, 11, 2007

RESOLUTION No. 2007-4

RESOLUTION OF THE BOARD OF DIRECTORS OF DIABLO WATER DISTRICT AUTHORIZING ADOPTION OF GROUNDWATER MANAGEMENT PLAN

The Board of the Directors of the Diablo Water District (District) does hereby find that:

WHEREAS, the District was formed in 1953 by a vote of the citizens of Oakley for the purpose of serving a safe, adequate, and reliable supply of water to the residents and businesses within the District; and

WHEREAS, California Water Code, Part 2.75 of Division 6, Section 10750, et seq., permits the adoption and implementation of Groundwater Management Plans to encourage authorized local agencies to manage groundwater resources within their service areas; and

WHEREAS, the District is an authorized local agency and may therefore adopt and implement such a Groundwater Management Plan; and

WHEREAS, a Groundwater Management Plan will further the District's efforts to protect and provide a safe, sufficient, and reliable groundwater supply to citizens and businesses within the District's boundaries, will facilitate collection of information to further understand groundwater basin conditions and evaluate additional policies and programs for protection of the groundwater resources in the Plan area, and will assist in integrated regional water resources planning and monitoring efforts conducted in coordination with other public entities whose service areas also overly the Plan area; and

WHEREAS, the District adopted a Resolution of Intent to prepare a Groundwater Management Plan on June 28, 2006; and

WHEREAS, California Water Code, Part 2.75 of Division 6, Section 10750, et seq. requires an entity to adopt a Groundwater Management Plan no later than two years after passing said Resolution of Intent; and

WHEREAS, a Public Hearing was held on May 23, 2007, to determine whether to adopt a Groundwater Management Plan; and

WHEREAS, prior to the Public Hearing a Notice of the Public Hearing was published in a newspaper of general circulation in Contra Costa County on May 4, 2007, and May 11, 2007; and

WHEREAS, less than 50% of the District's assessed property owners protested the draft Plan.

NOW, THEREFORE, BE IT RESOLVED that the District does hereby authorize the adoption of the District's Groundwater Management Plan.

RESOLVED FURTHER that this resolution shall be published in a paper of general circulation in Contra Costa County at least two times to give public notice of the adoption of the District's Groundwater Management Plan.

* * * * * *

The foregoing Resolution was duly and regularly adopted at a meeting held on this 23rd day of May 2007 by the Board of Directors of Diablo Water District by the following vote of the Board:

AYES: Crockett, de Fremery, Garcia, Head, and Hobbs

NOES: none

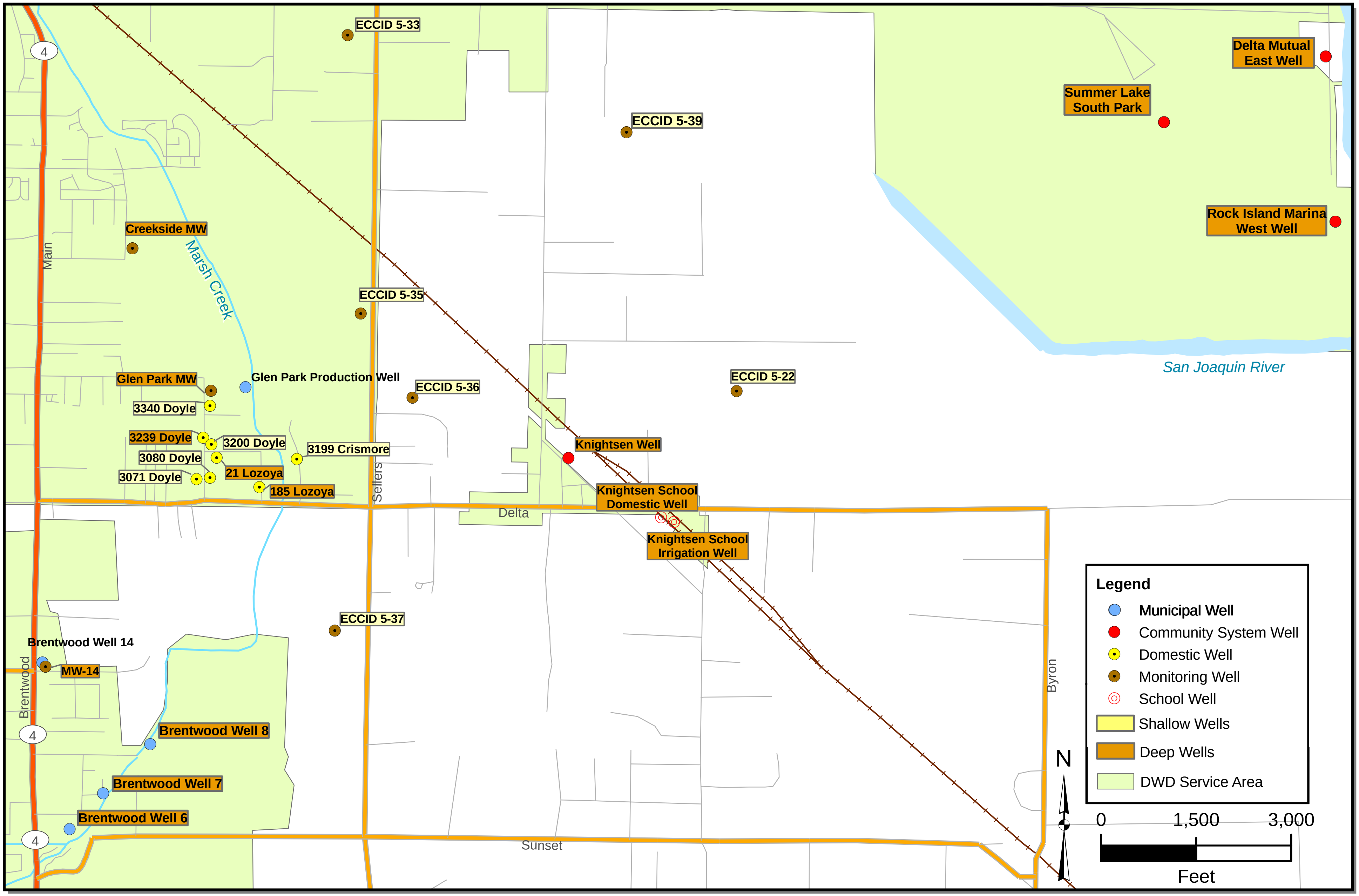
ABSENT: none

Dated: May 31, 2007

Mike Yeraka, Secretary

Appendix B

Groundwater Monitoring Networks



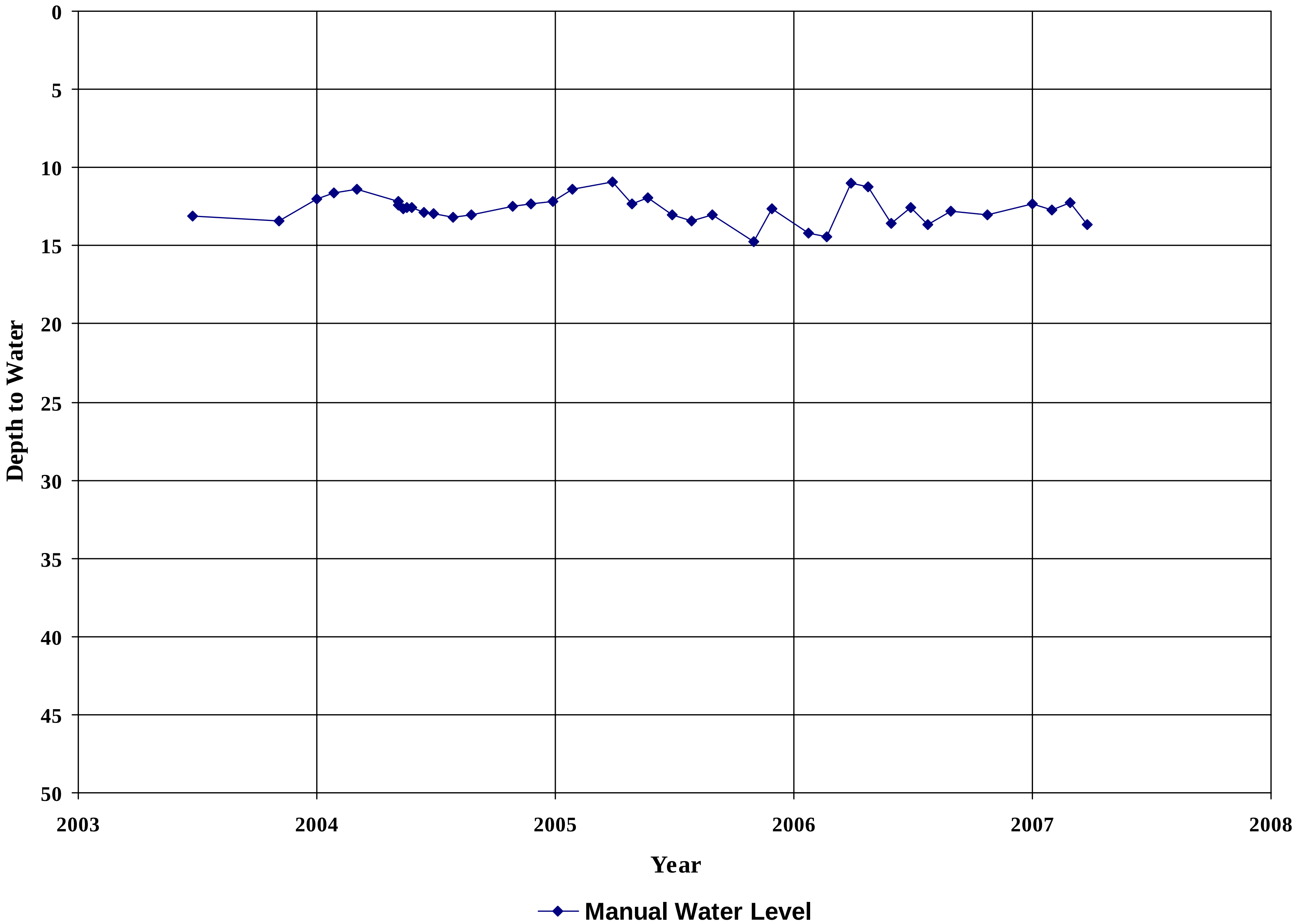
FILE: \Public\Diablo WD 04-1-058\GIS\Basemap1_V1.mxd DATE: 5/17/2007 1:03:38 PM

LUHDORFF & SCALMANINI
CONSULTING ENGINEERS

Appendix B
Groundwater Monitoring Locations in Vicinity of Glen Park Well

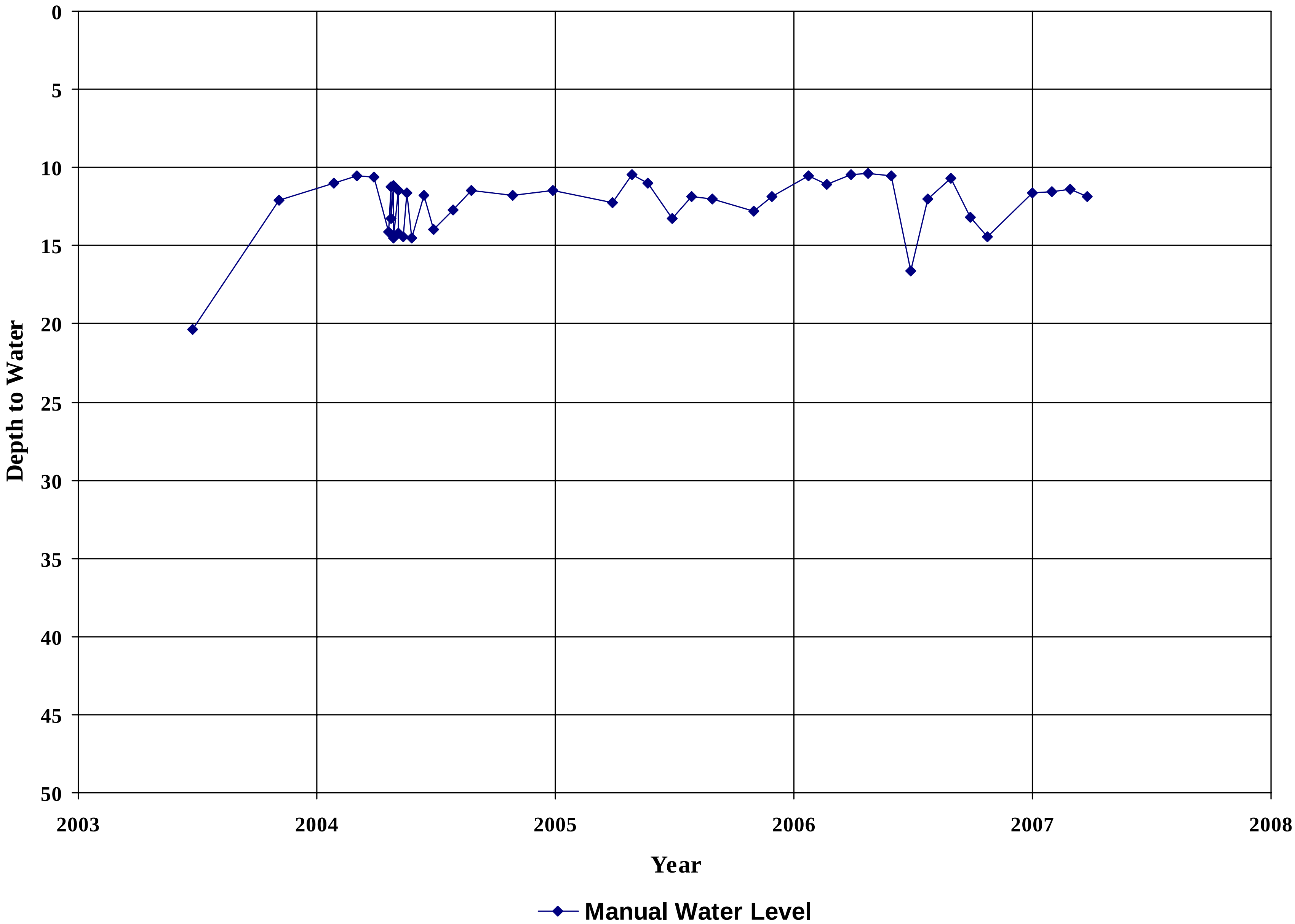
Shallow Monitoring Well Network

Water Level in 3071 Doyle

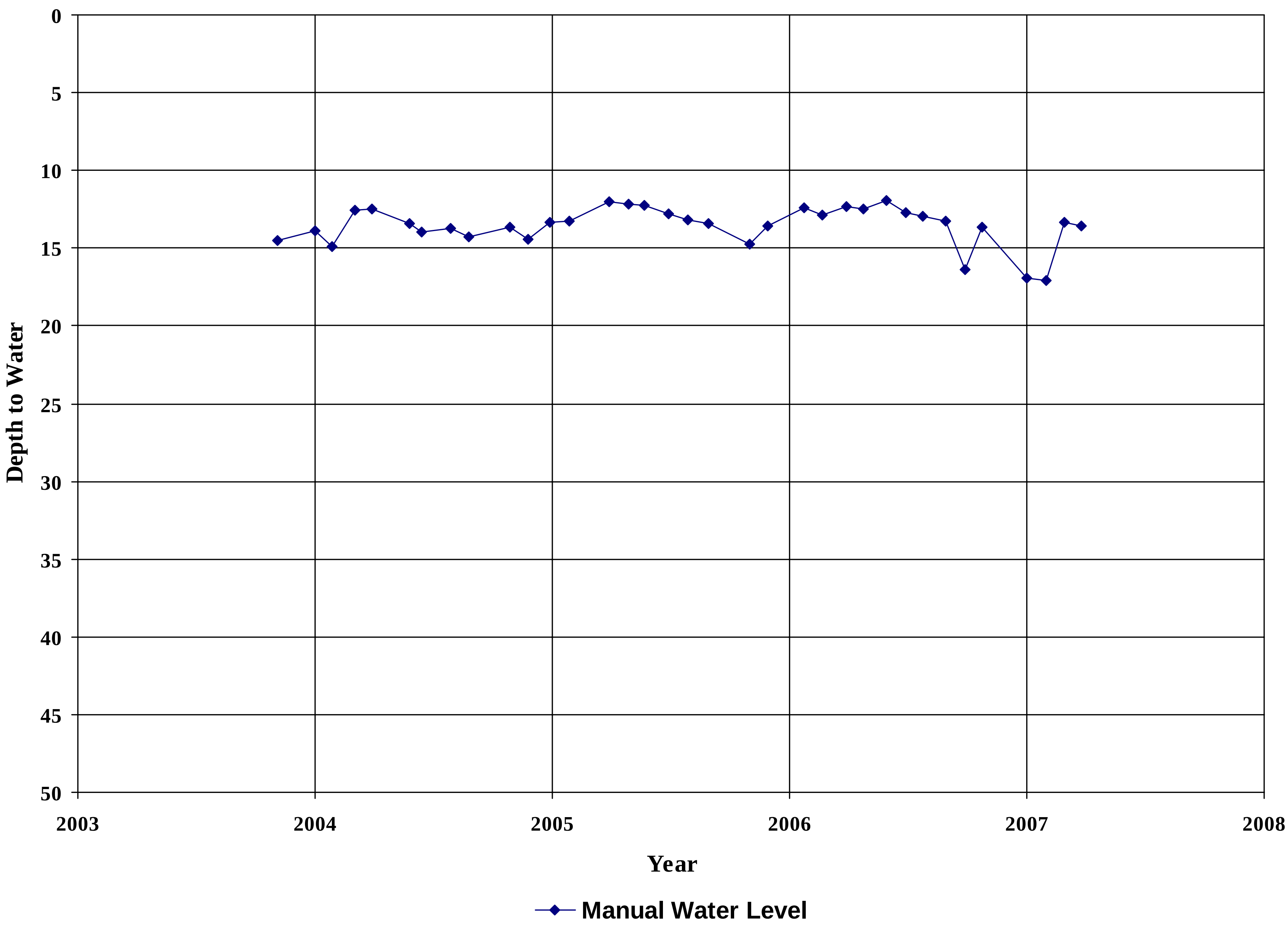


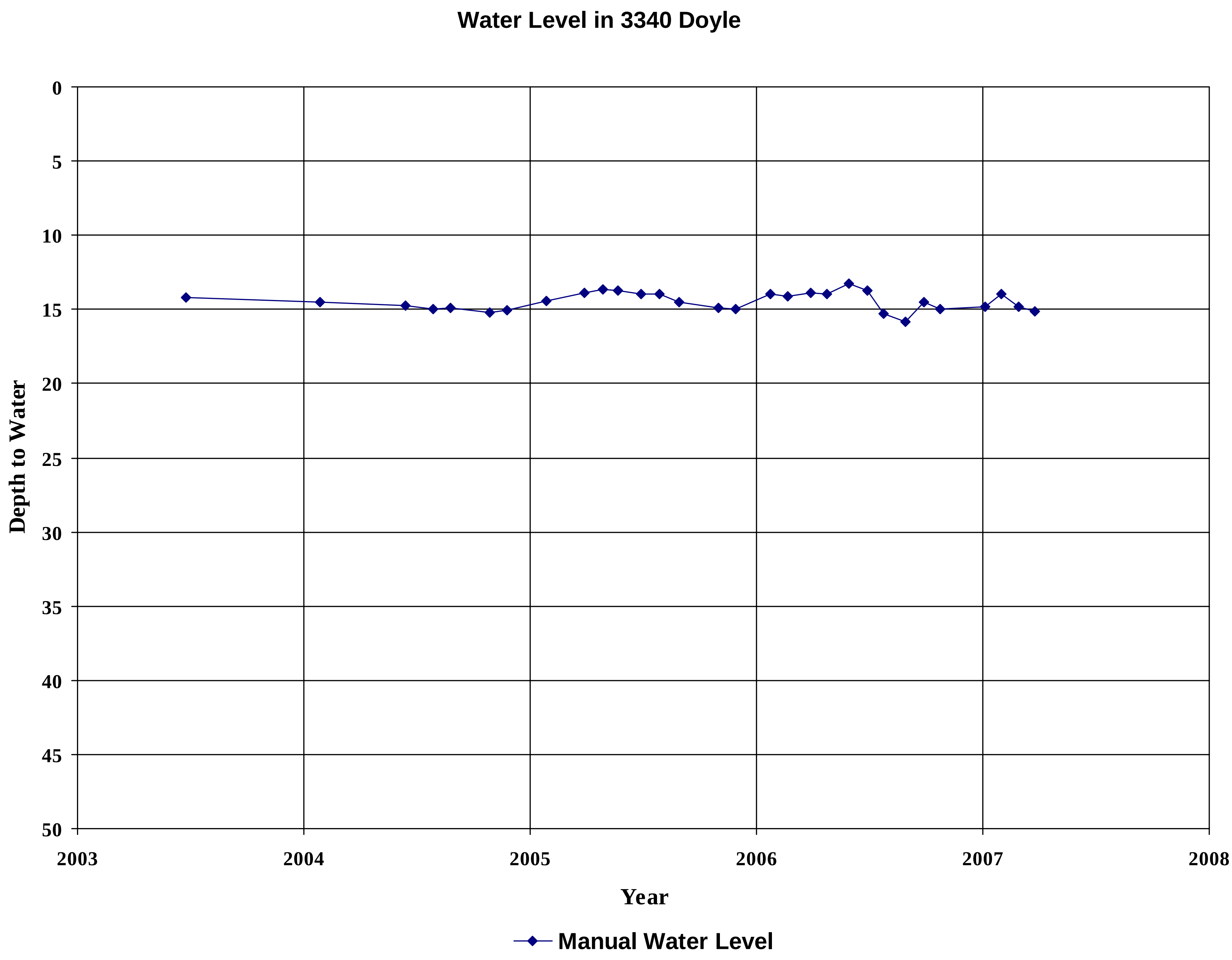
Water Level in 3080 Doyle

Well Depth: 60 ft

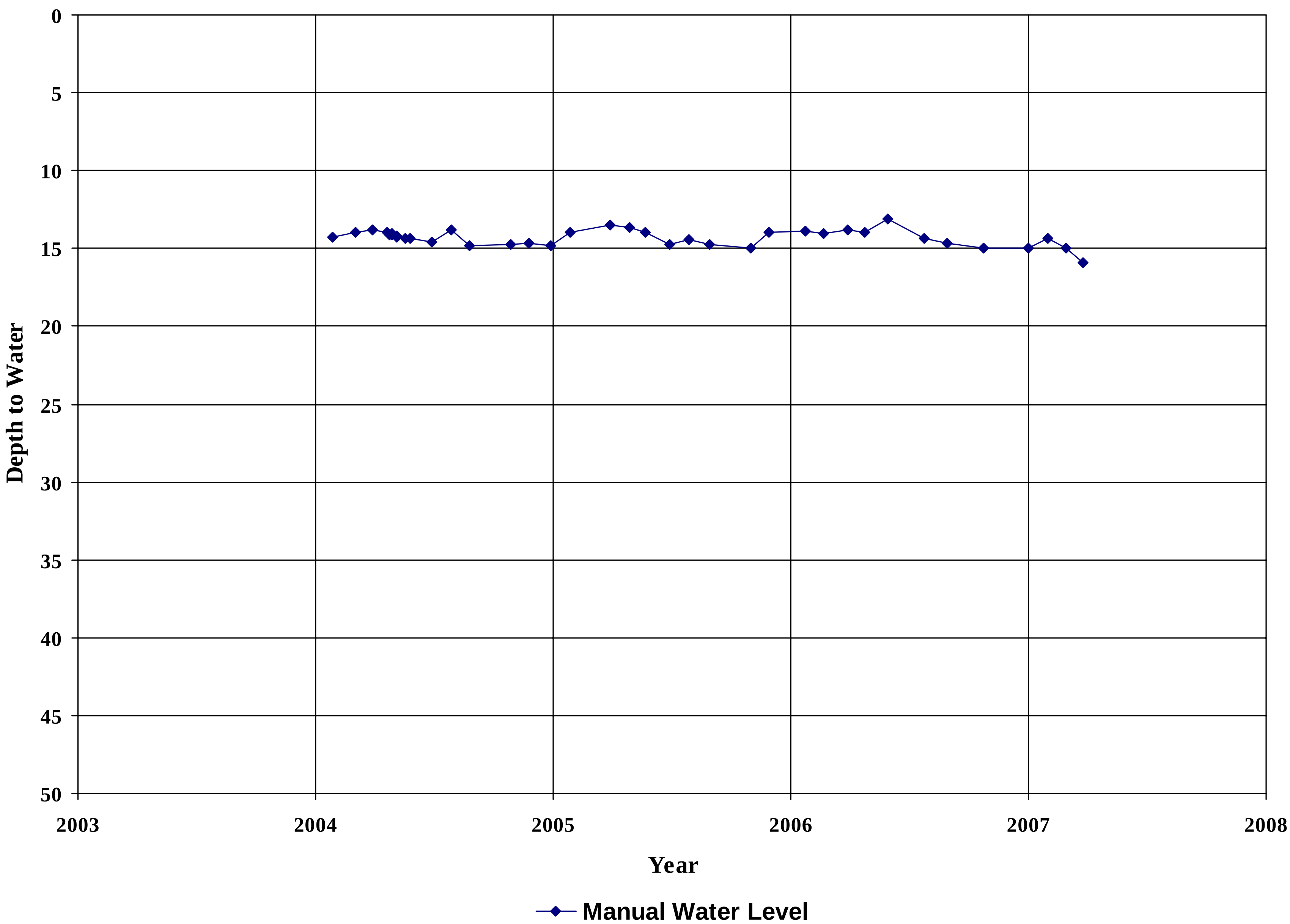


Water Level in 3200 Doyle



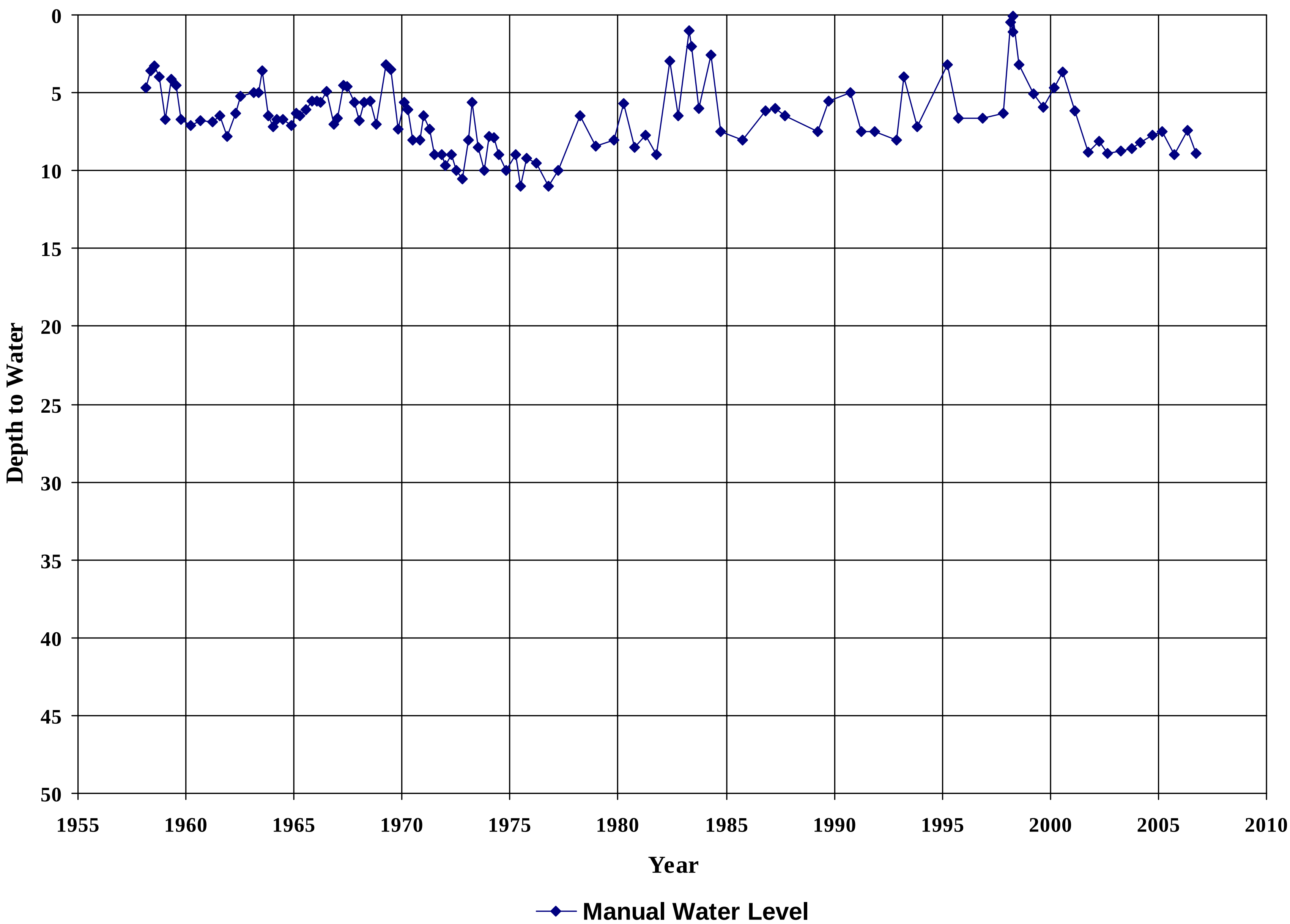

Water Level in 3340 Doyle
0
5
10
15
20
25
30
35
40
45
50
Depth to Water
2003
2004
2005
2006
2007
2008
Year
Manual Water Level

Water Level in 3199 Crismore



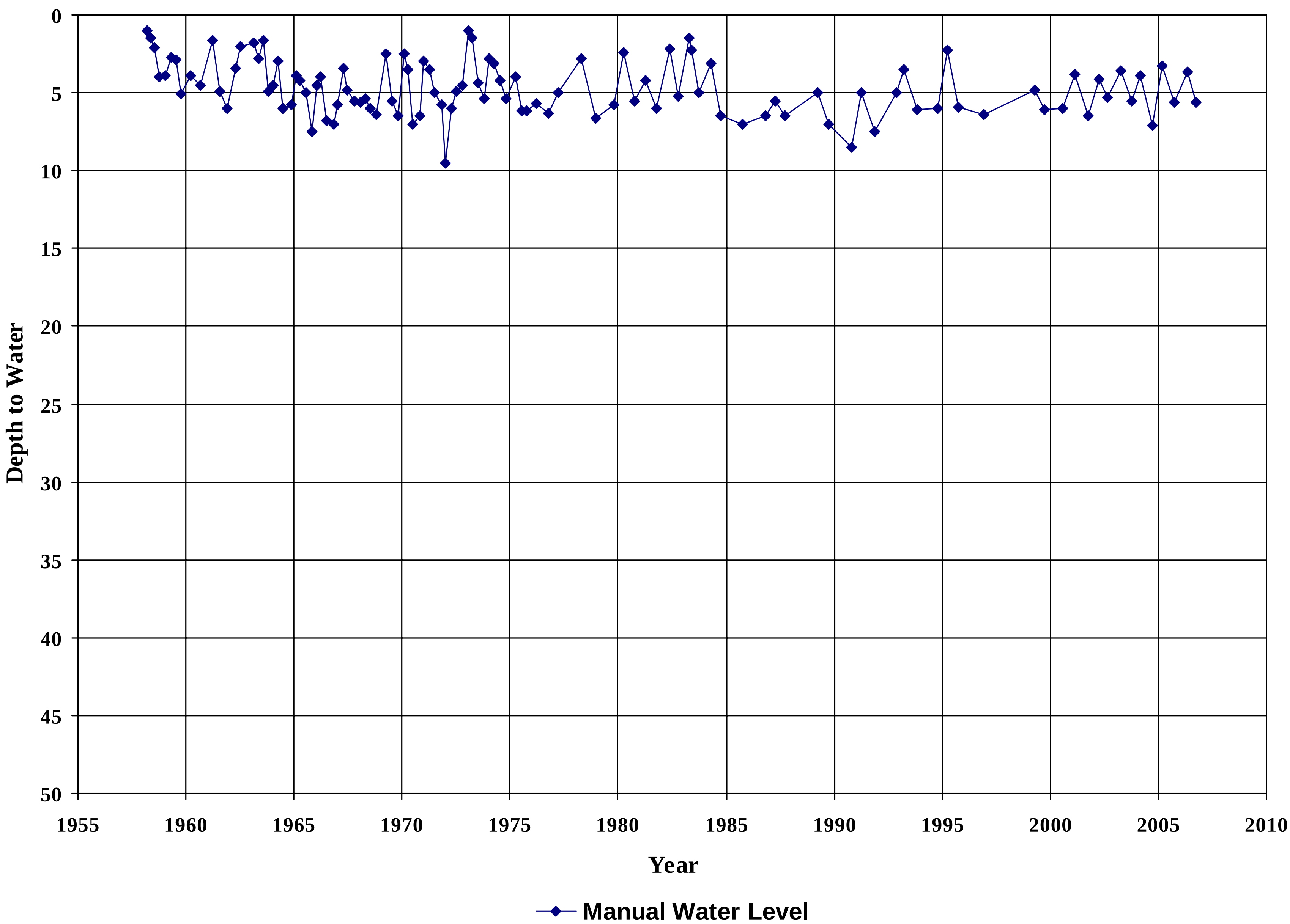
Water Level in ECCID 5-22

Well Depth: 20 ft



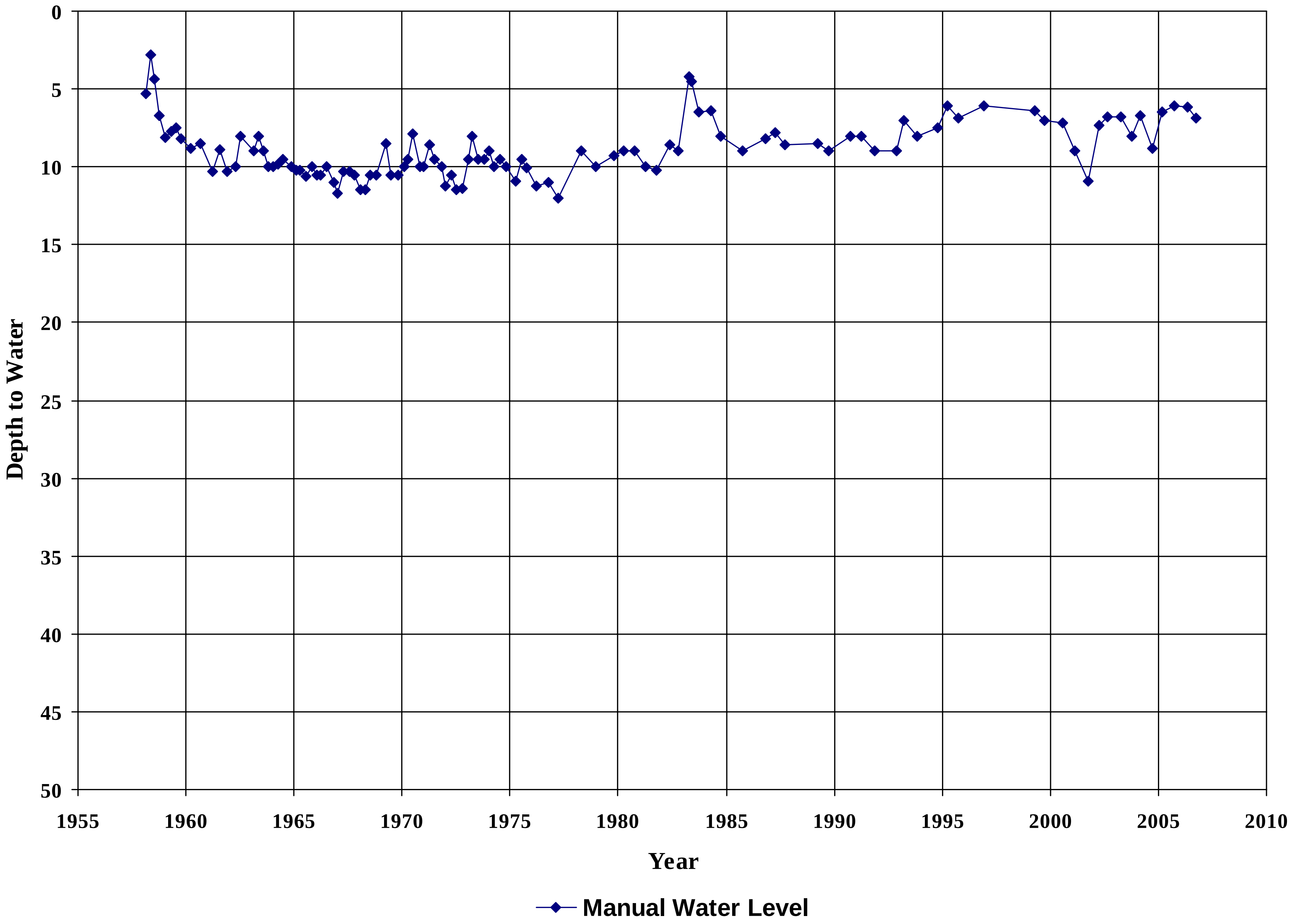
Water Level in ECCID 5-33

Well Depth: 20 ft



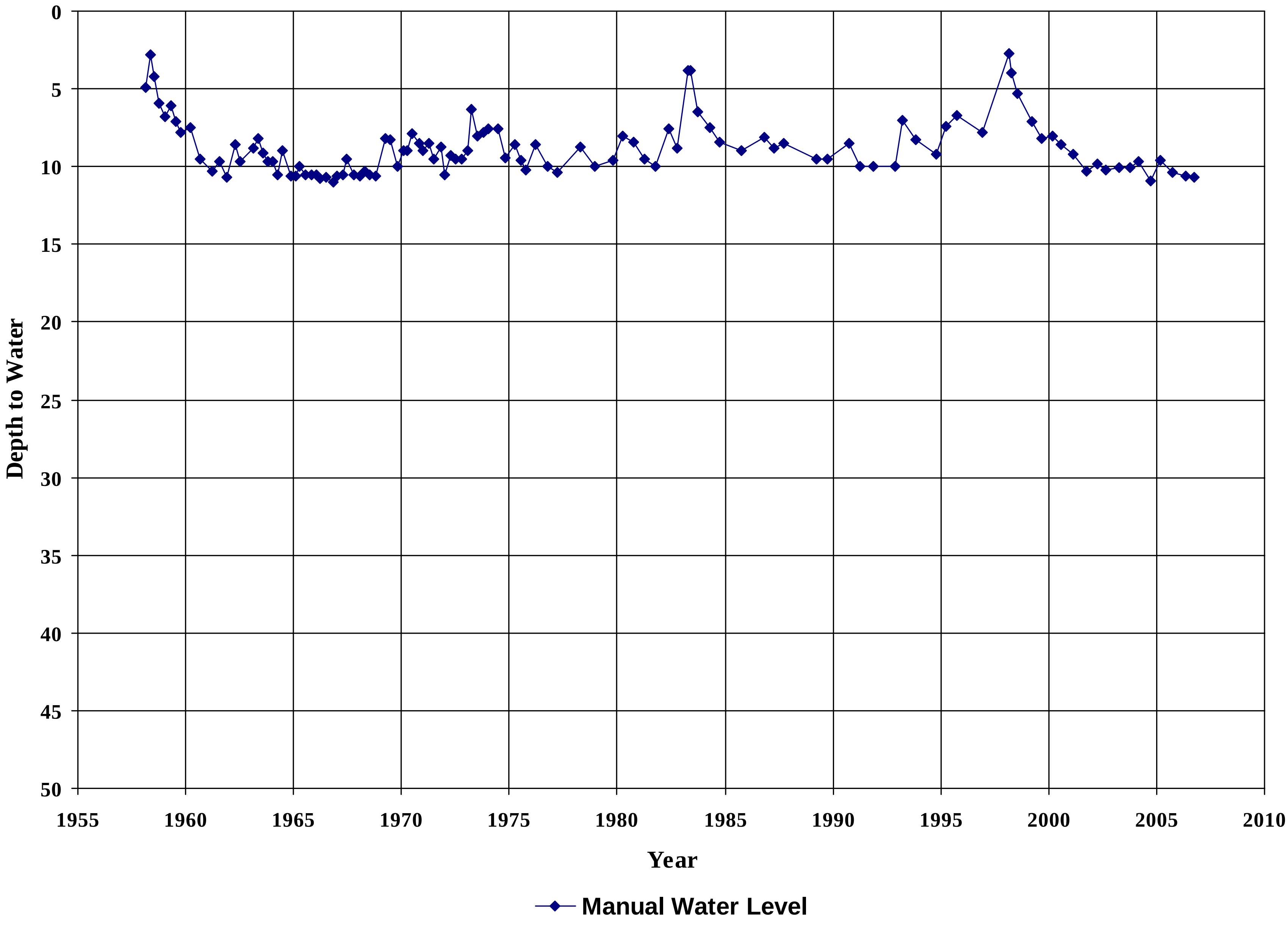
Water Level in ECCID 5-35

Well Depth: 20 ft



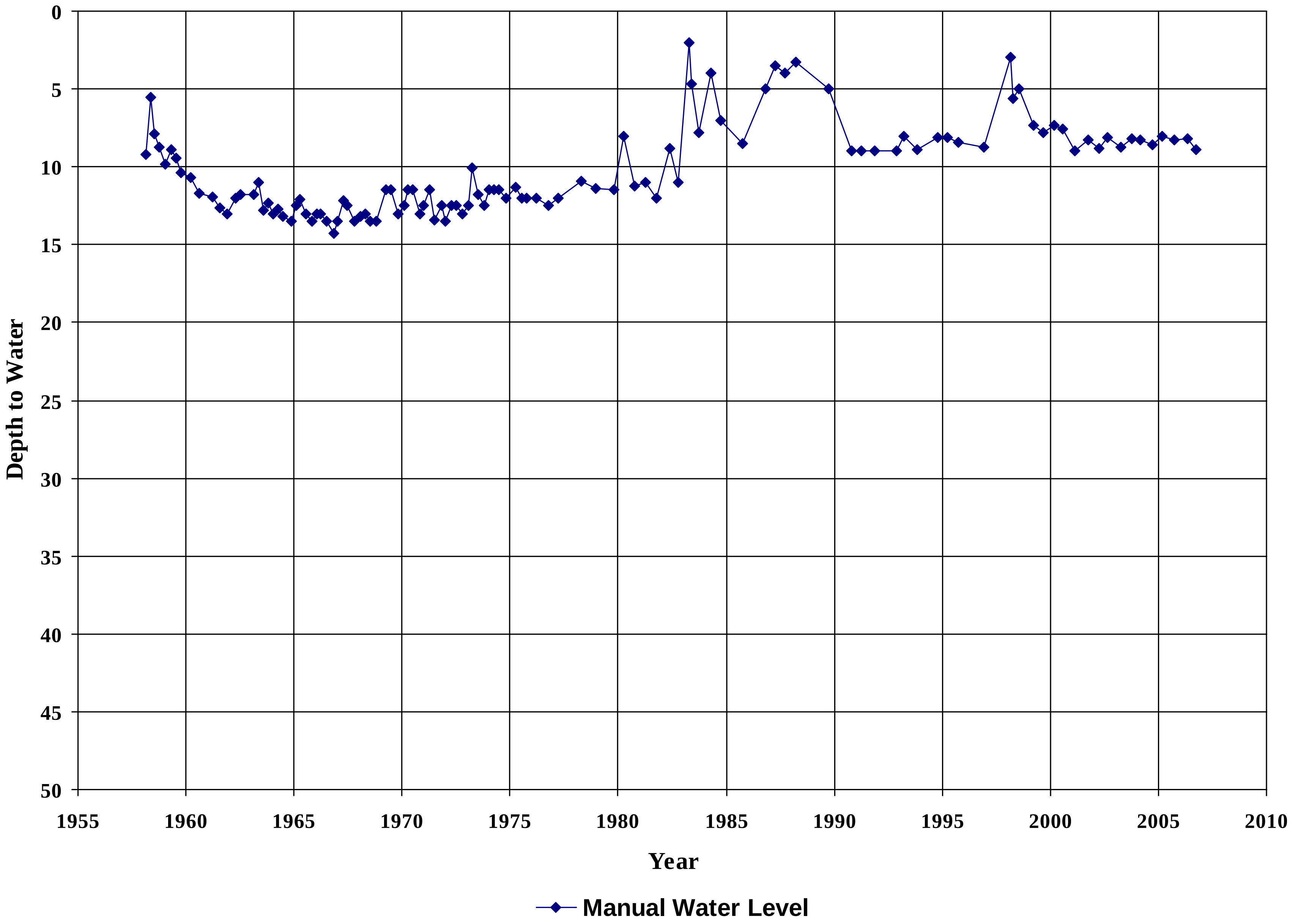
Water Level in ECCID 5-36

Well Depth: 20 ft



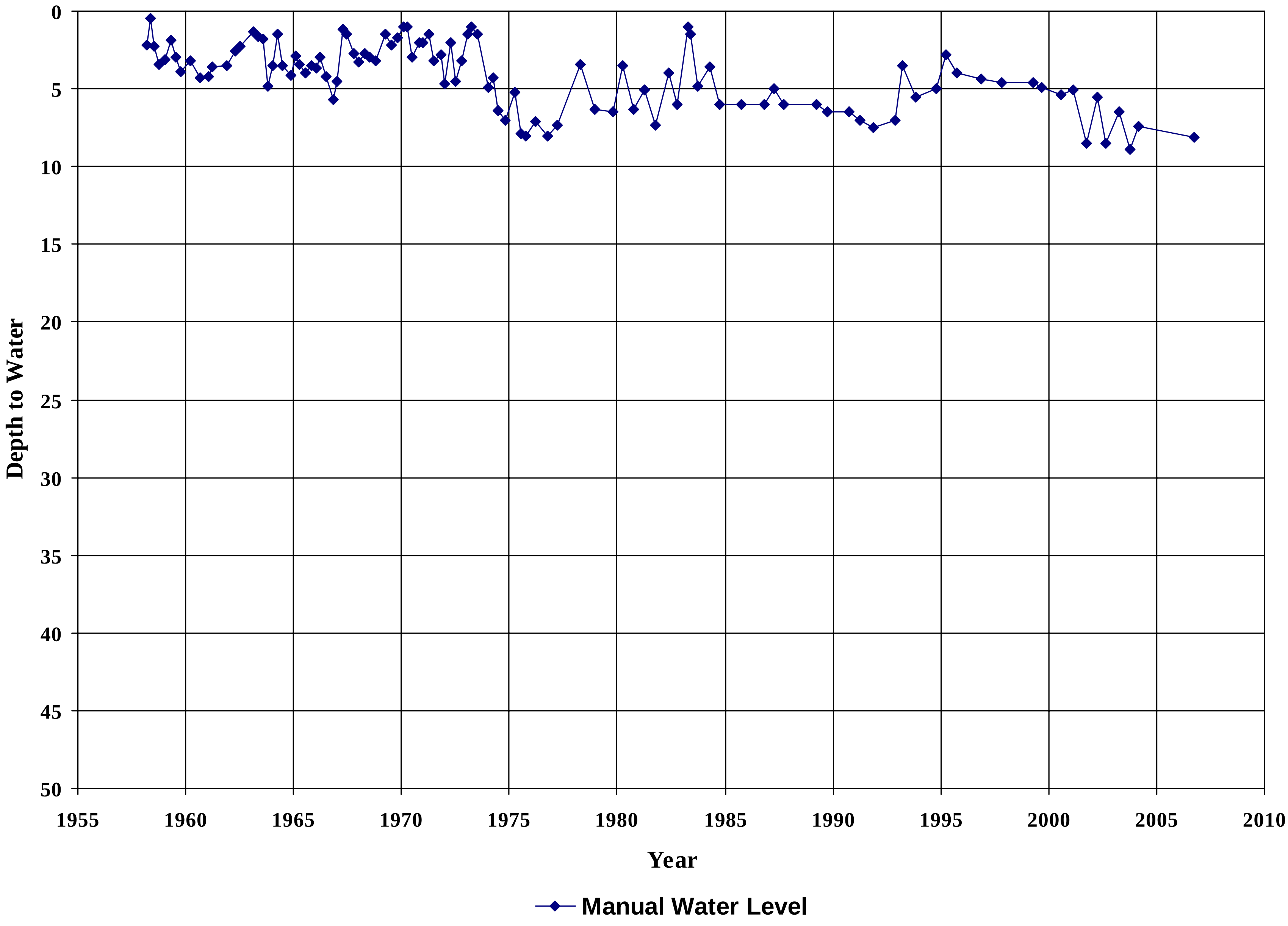
Water Level in ECCID 5-37

Well Depth: 20 ft

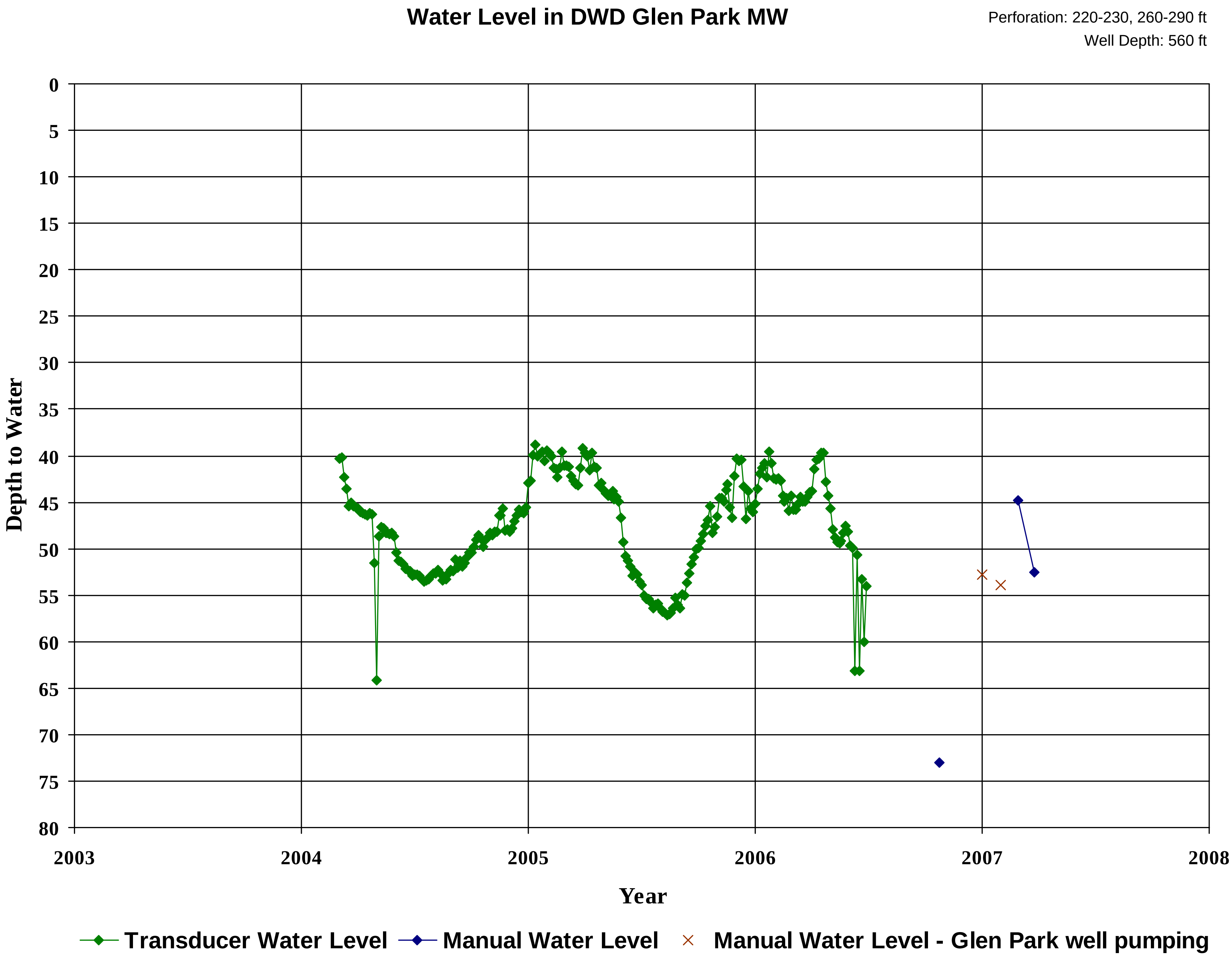


Water Level in ECCID 5-39

Well Depth: 20 ft

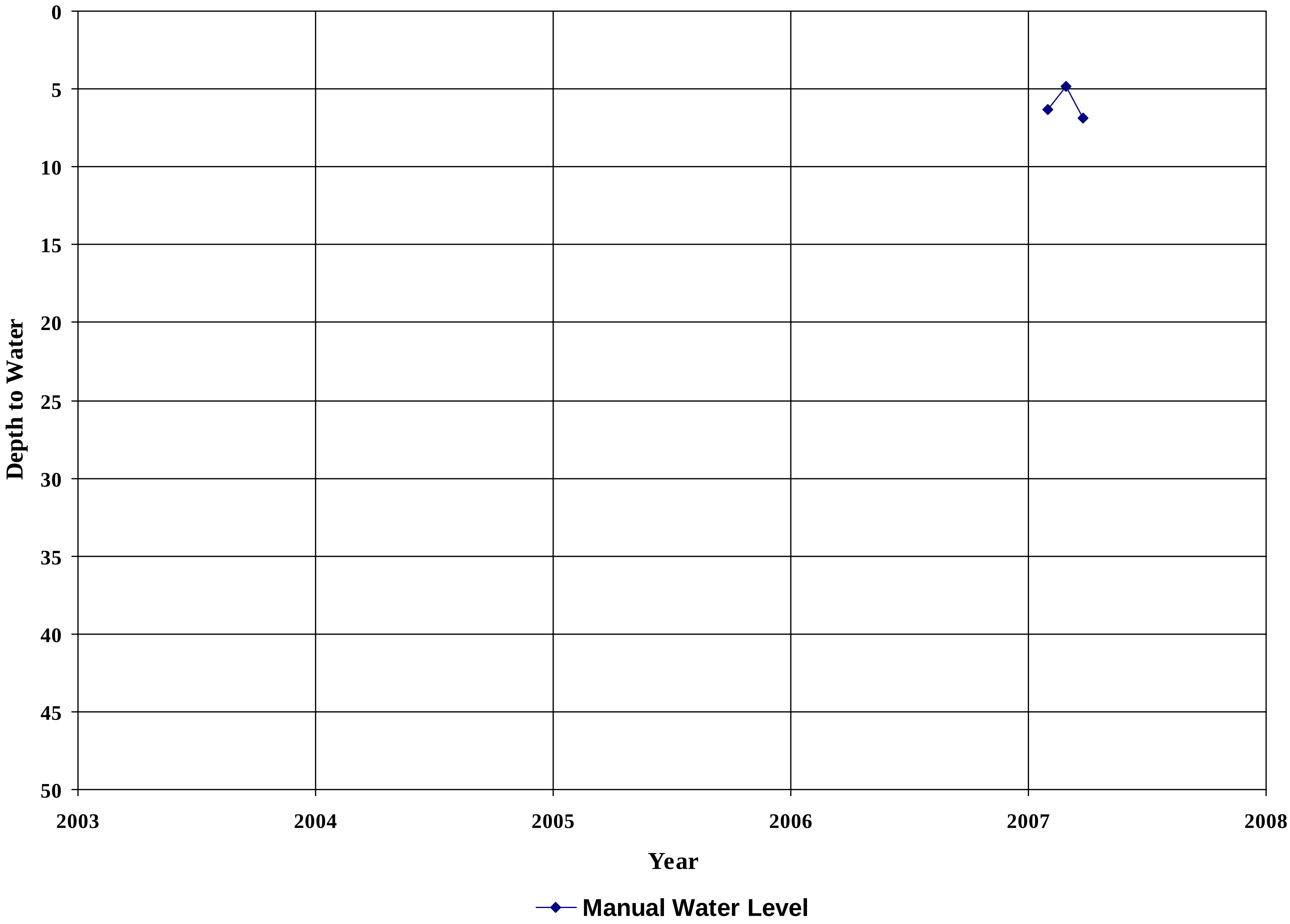


Deep Monitoring Well Network


Water Level in DWD Glen Park MW
Perforation: 220-230, 260-290 ft
Well Depth: 560 ft
Depth to Water
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
2003
2004
2005
2006
2007
2008
Year
Transducer Water Level
Manual Water Level
Manual Water Level - Glen Park well pumping

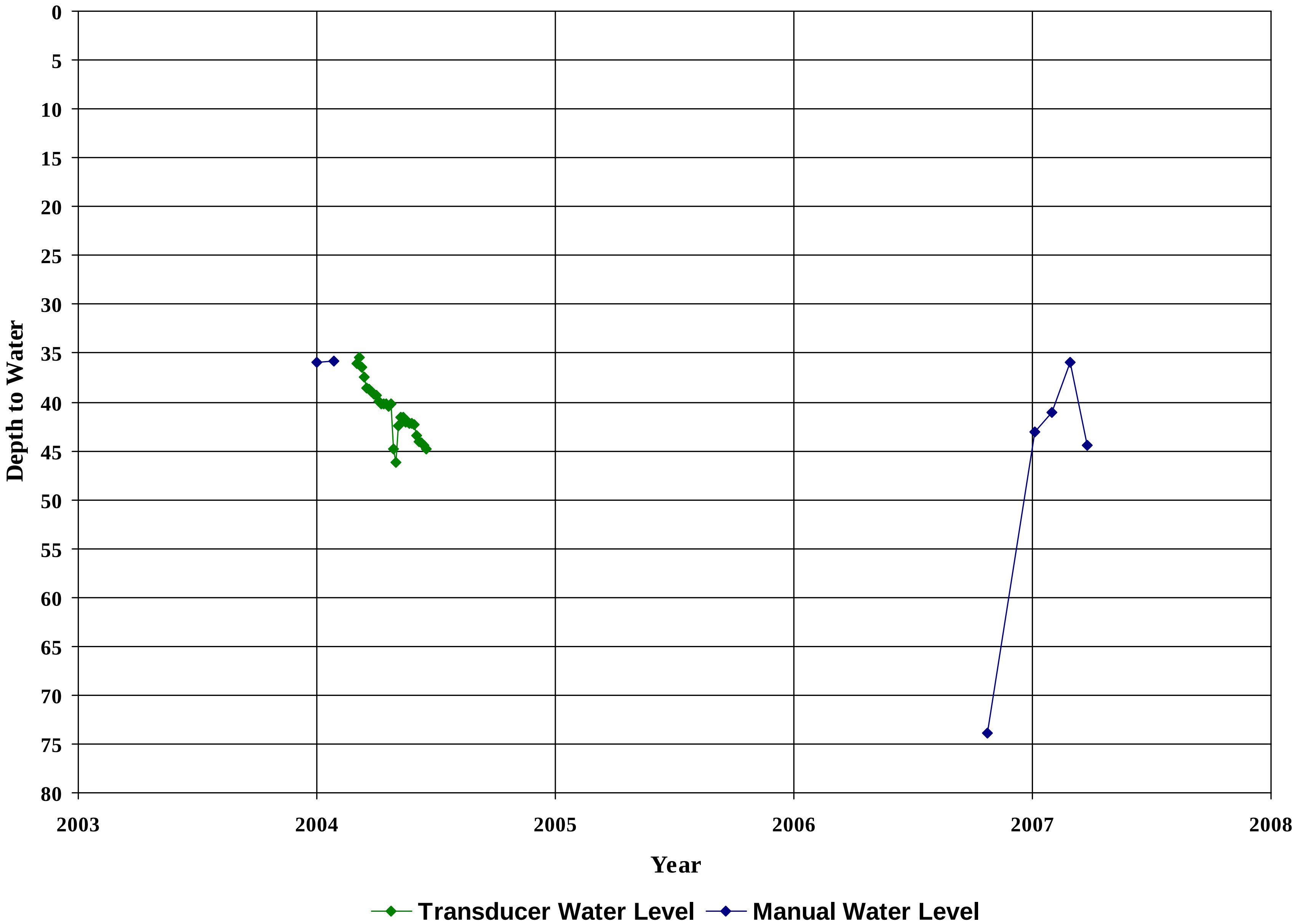
Water Level in South Park

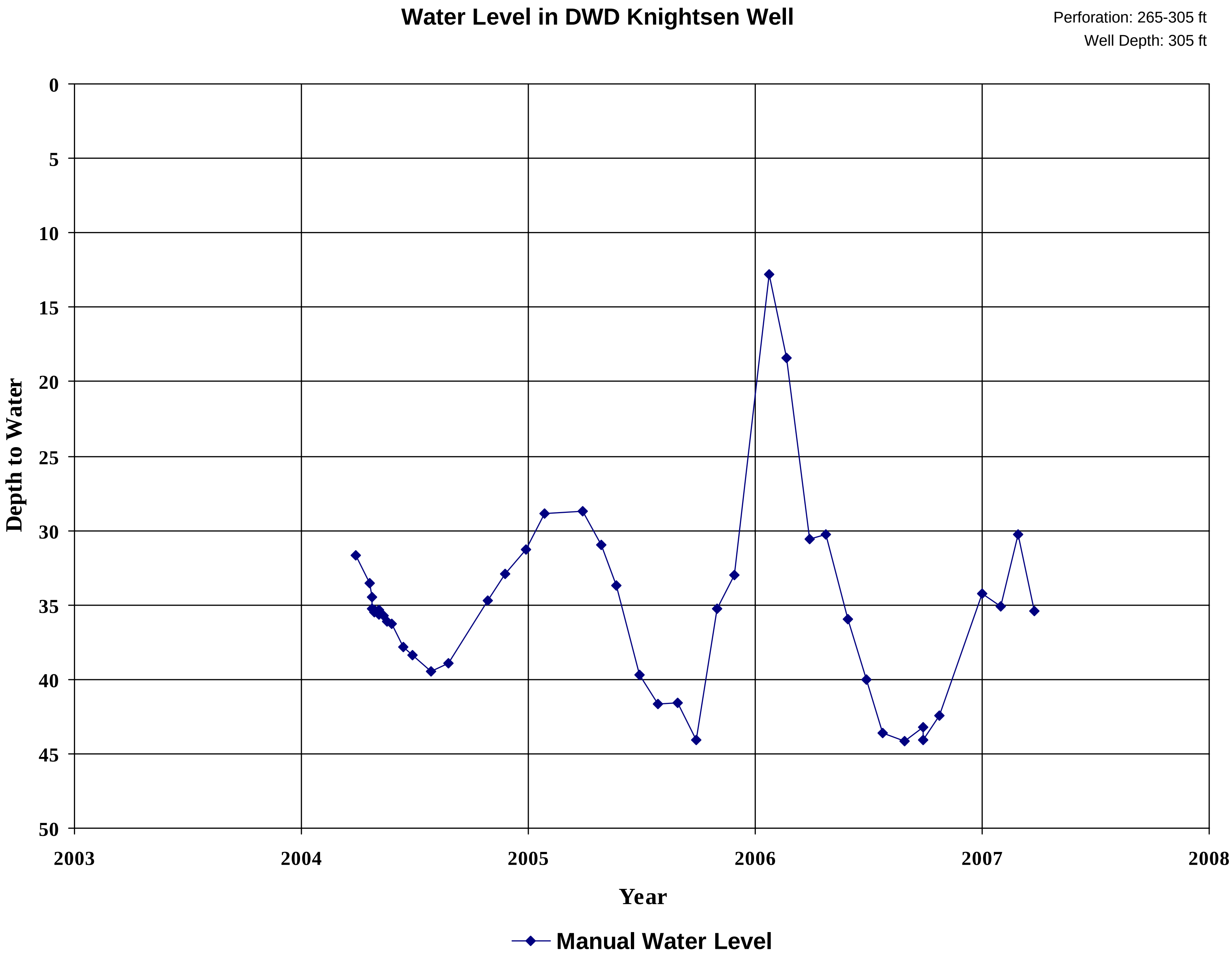
Perforation: 204-264, 284-299 ft
Well Depth: 323 ft



Water Level in DWD Creekside MW

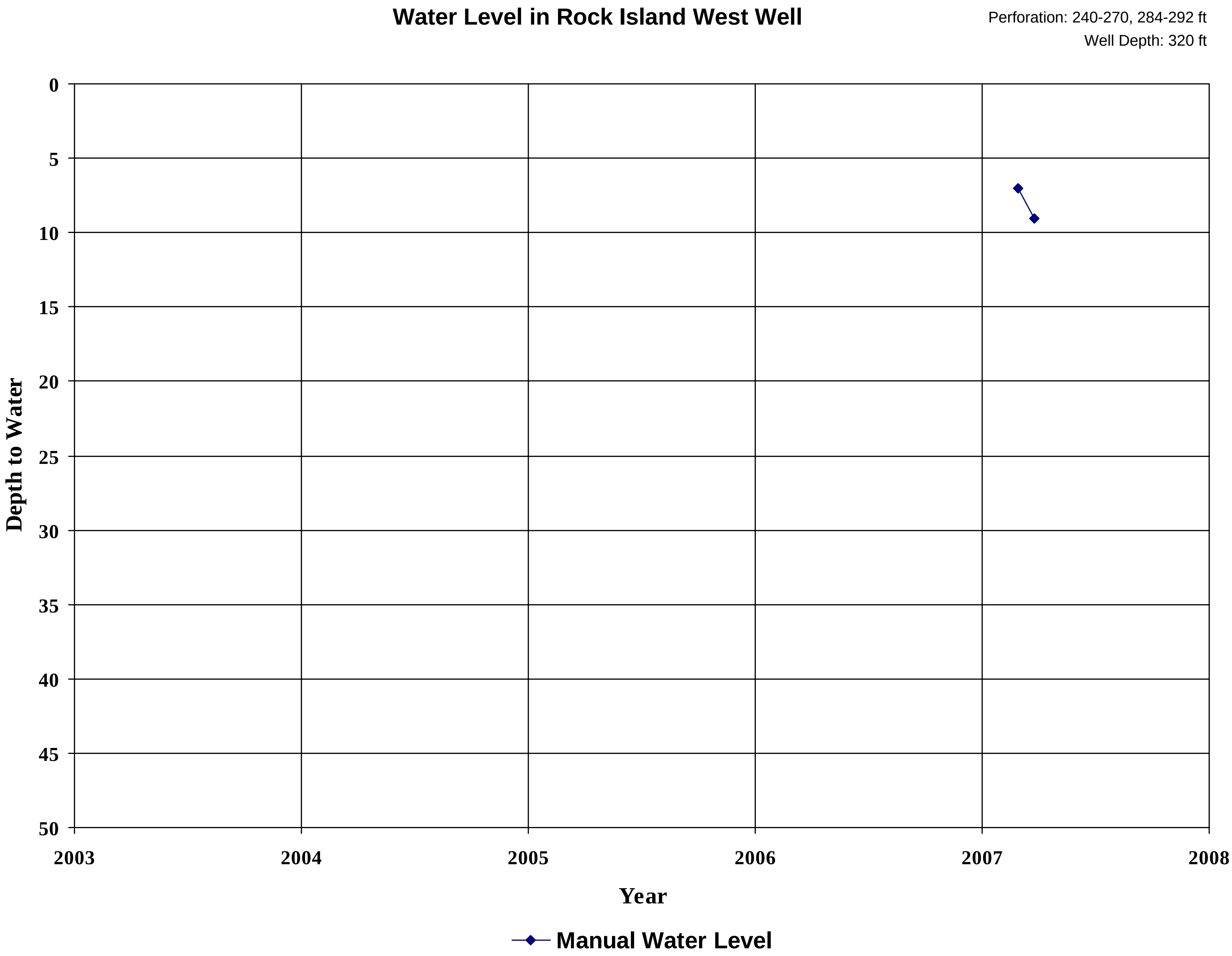
Perforation: 230-240 ft
Well Depth: 380 ft



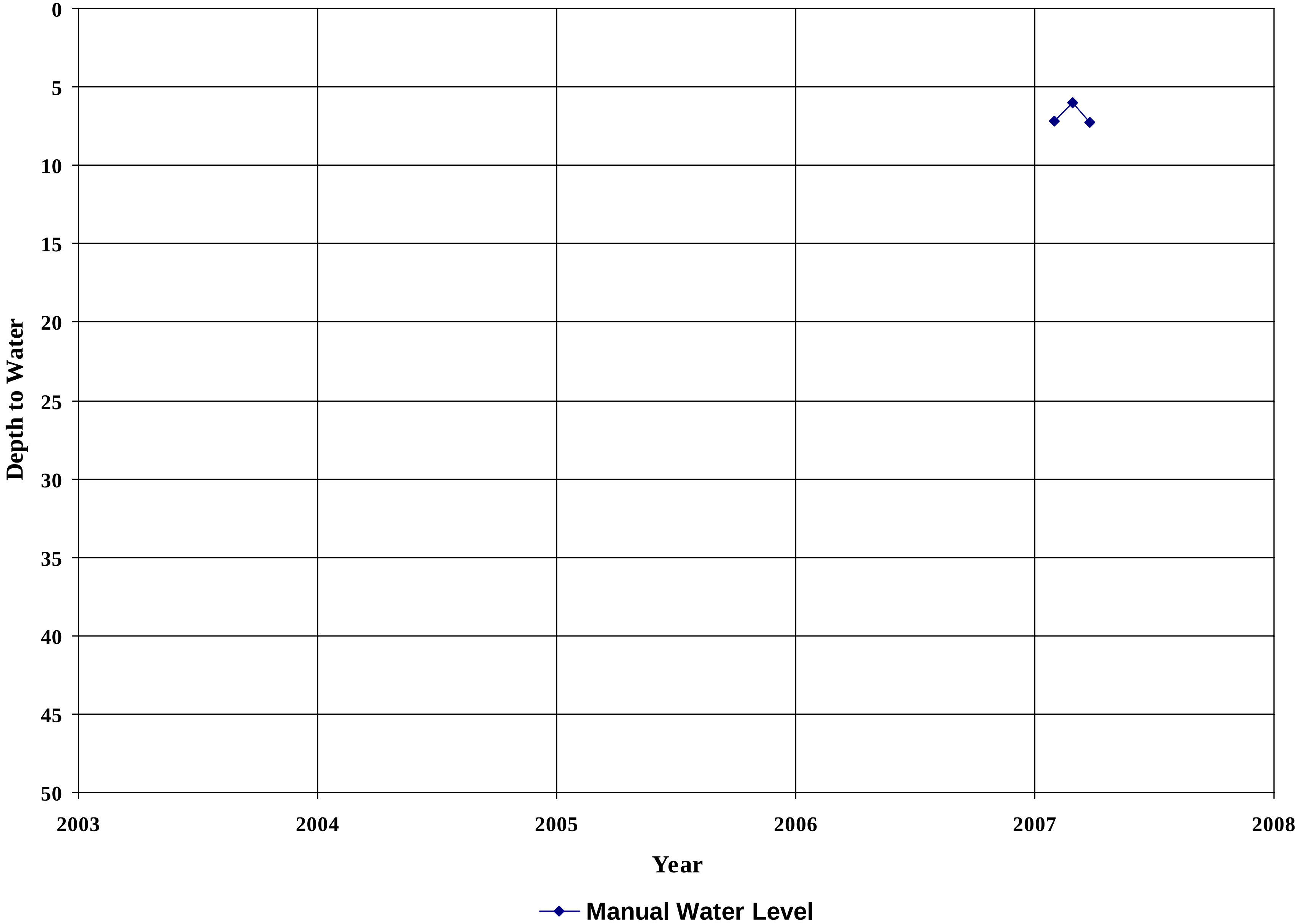


Water Level in DWD Knightsen Well
Perforation: 265-305 ft
Well Depth: 305 ft
Depth to Water
0
5
10
15
20
25
30
35
40
45
50
2003
2004
2005
2006
2007
2008
Year
Manual Water Level

Perforation: 240-270, 284-292 ft
Well Depth: 320 ft

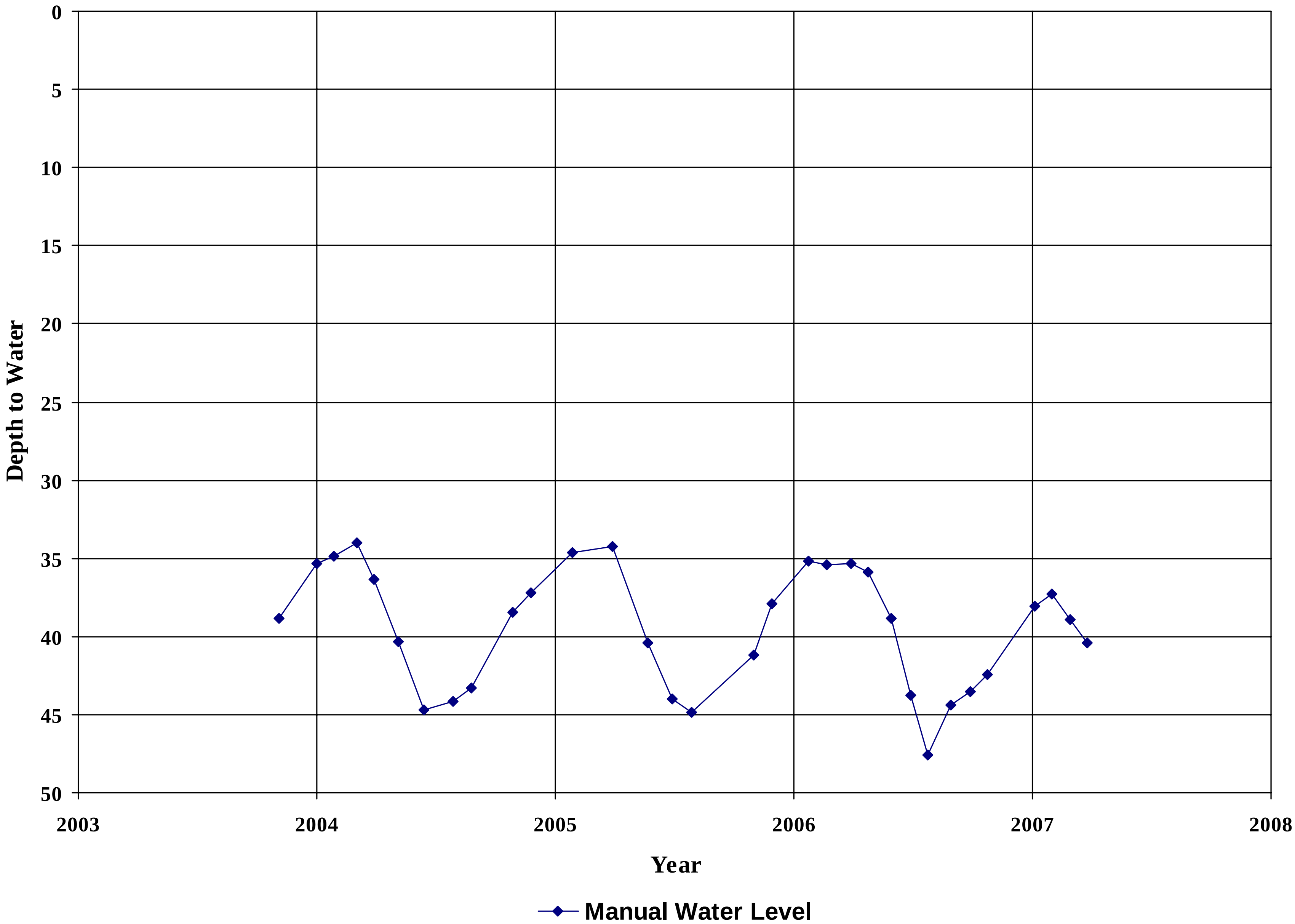


Water Level in Delta Mutual East Well

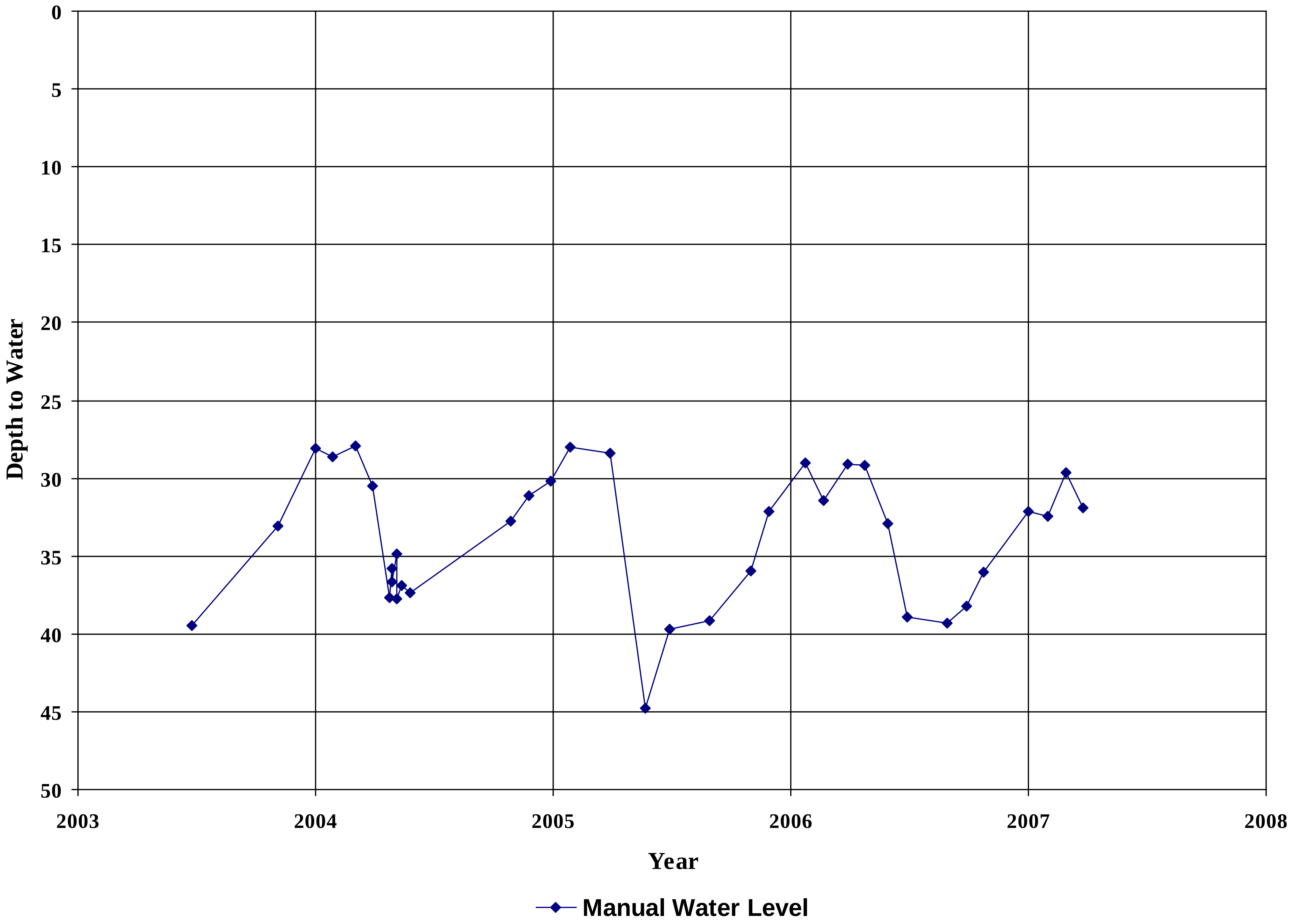


Water Level in 3239 Doyle

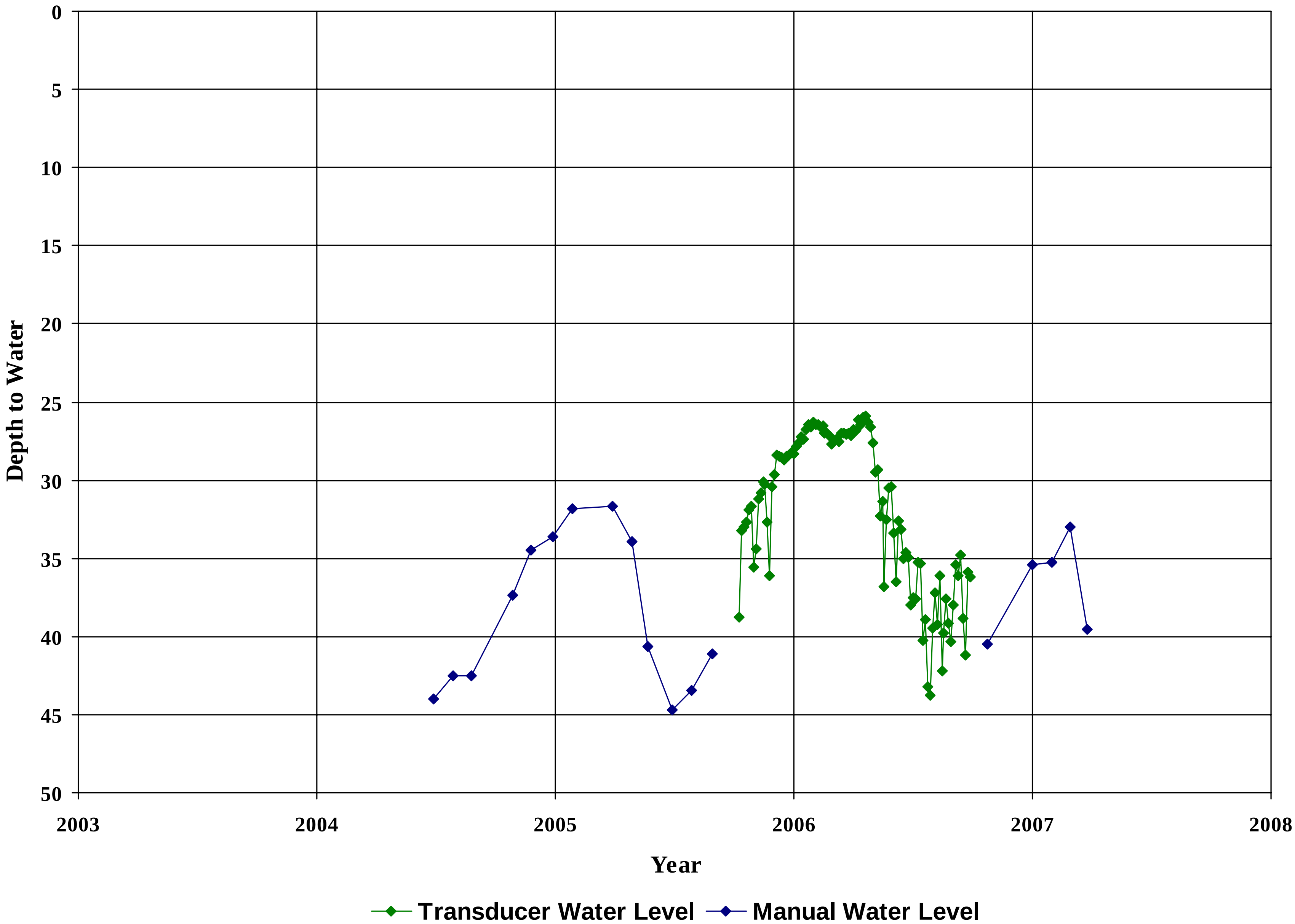
Well Depth: 125 ft



Water Level in 21 Lozoya

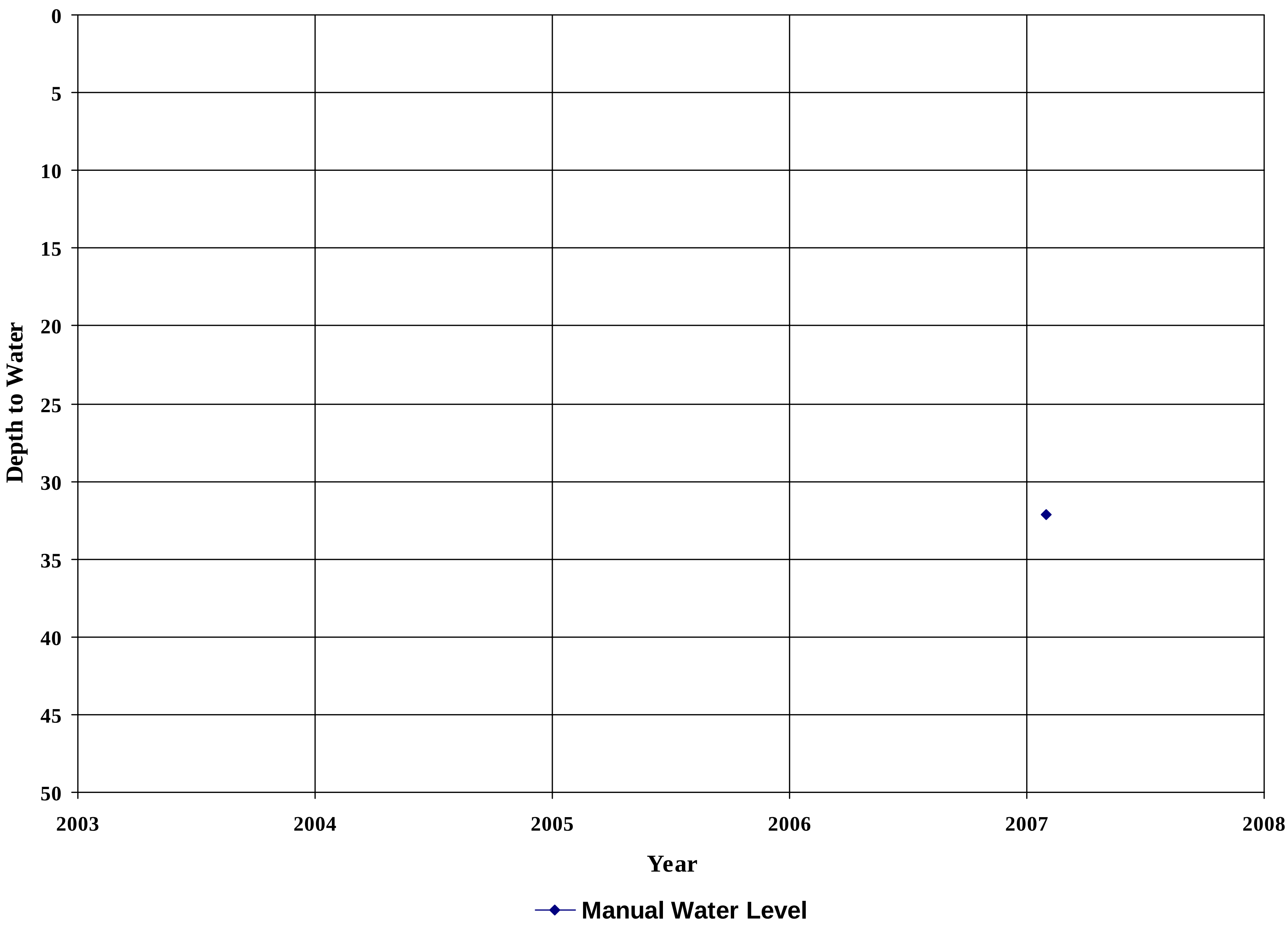


Water Level in 185 Lozoya



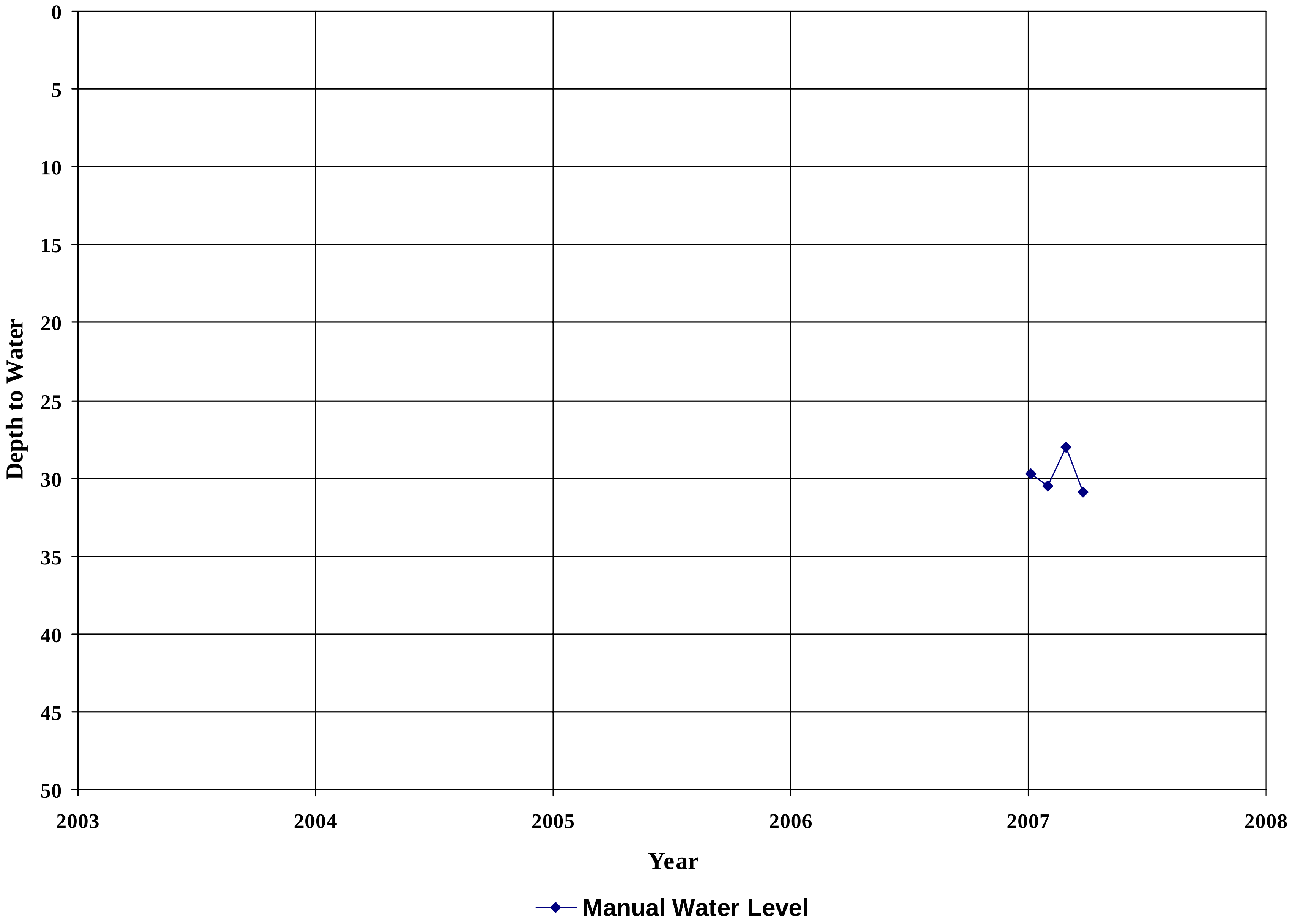
Water Level in Knightsen School District (#3)

Perforation: 395-415 ft
Well Depth: 415 ft



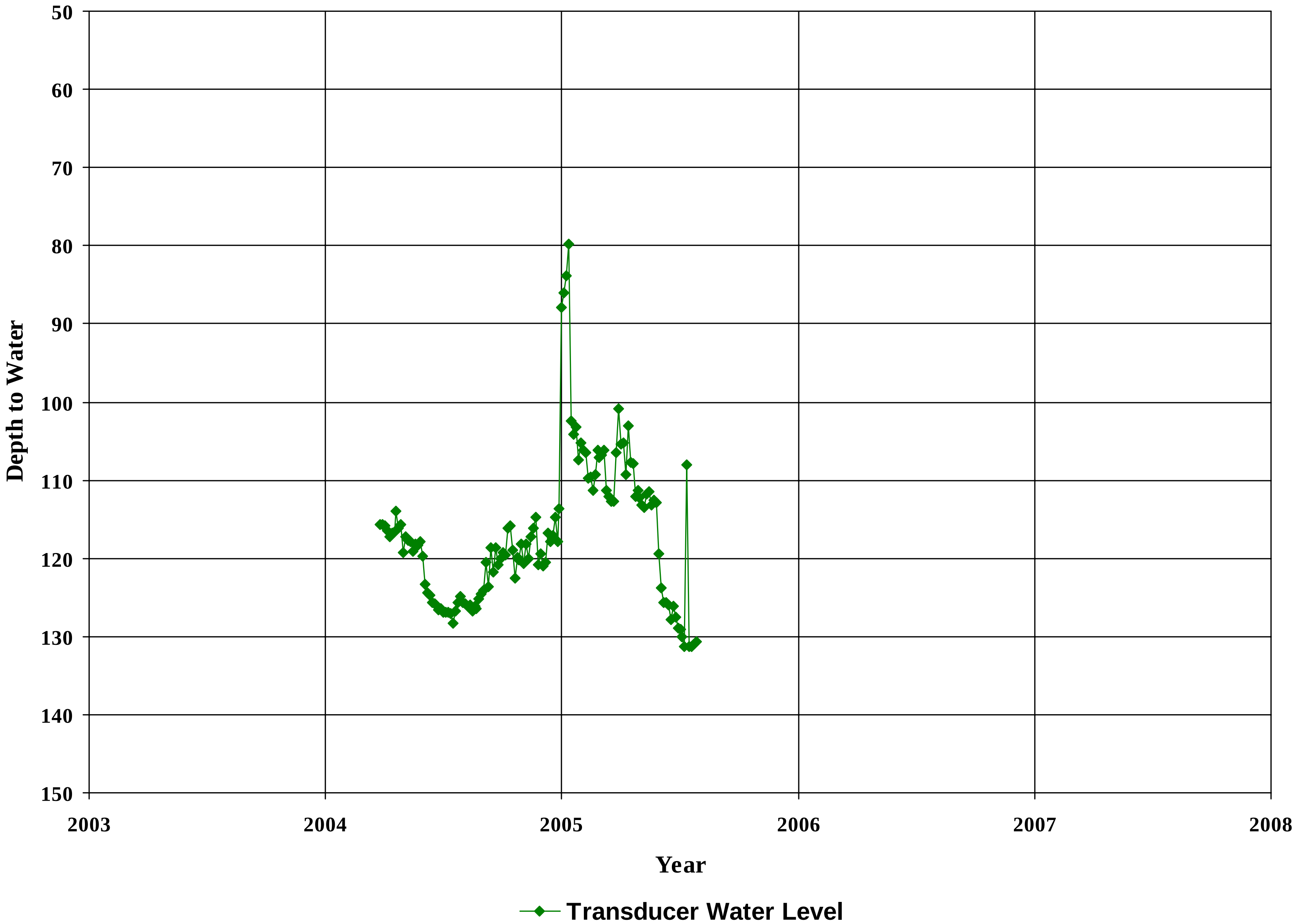
Water Level in Knightsen School Irrigation (#2)

Perforation: 167-191, 210-230 ft
Well Depth: 230 ft



Water Level in Brentwood MW-14 Deep

Perforation: 284-315 ft
Well Depth: 324 ft



Appendix C

Water Quality Data for Diablo Water District and Vicinity

Table C
Groundwater Quality Data for Diablo Water District

Well Owner and Name	Date	EC[1] (µmhos/cm)	TDS (mg/L)	pH	Total Alkalinity[2] (mg/L)	Cations: Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	Anions: SO_4 (mg/L)	Cl (mg/L)	HCO_3[2] (mg/L)	NO_3[2] (mg/L)	F (mg/L)	Trace Elements: As (µg/L)	Ba (ug/L)	B (ugL)	Cu (ug/L)	Fe (ug/L)	Mn (ug/L)	Se (µg/L)	Zn (ug/L)
		900/1600[a]	500/1000[a]	6.5-8.5[b]	--	--	--	--	--	250/500[a]	250[a]	--	45[c]	2[c]	10[d]	1000[c]	1000[e]	1300[c]	300[a]	50[a]	50[c]	5000[a]
GLEN PARK WELL	05/04/04	930	-	8	240	60	31	100	<2	160	72	-	<2	0.3	3	<100	-	<50	<100	<20	<5	<50
GLEN PARK WELL	07/05/06	993	620		-	-	-	-	-	-	-	-	-	-	-	-	1200	-	-	-	-	-
GLEN PARK WELL	10/19/06	-	-		-	-	-	-	-	-	-	-	-	-	-	-	1400	-	-	-	-	-
SOUTH PARK WELL STANDBY	06/06/06	940	560	7.7	270	56	24	100	1.4	110	88	330	<2	0.3	<2	<63	1800	<50	210	140	<5	<50
WELL 01 - STANDBY	01/07/92	1400	940	7.7	240	70	43	140	4.4	350	130	240	4.5	1.1	2.2	ND	800	2	52	145.4	2.4	ND
WELL 01 - STANDBY	07/13/92	1750	1090	7.8	240	110	57	170	5.1	430	160	240	15	0.3	ND	ND	900	ND	ND	76	ND	20
WELL 01 - STANDBY	10/06/92	-	1040	7.6	243	69	51	180	5.2	420	150	243	14	0.32	3.3	ND	900	ND	ND	58	ND	ND
WELL 01 - STANDBY	04/05/93	1440	920	7.8	230	88	43	140	4.7	360	140	230	6.5	ND	2.1	ND	ND	ND	ND	71	ND	34
WELL 01 - STANDBY	07/20/93	1550	1030	7.7	247	74	46	178	4.8	420	150	247	6.8	ND	3.9	ND	700	ND	25	180	ND	23
WELL 01 - STANDBY	10/05/93	1490	970	7.8	239	85	60	140	4.6	390	140	239	5.8	ND	3.1	ND	740	2.8	ND	150	ND	ND
WELL 01 - STANDBY	01/04/94	1460	930	7.7	236	82	37	160	4.7	360	140	236	3.3	0.21	5.2	ND	860	ND	ND	270	ND	ND
WELL 01 - STANDBY	04/05/94	1470	890	7.8	240	81	48	150	4.4	320	140	240	5.4	0.26	3.7	ND	650	8	ND	240	ND	ND
WELL 01 - STANDBY	12/08/97	1780	1020	7.64	245	85	53	150	4	390	180	245	10.3	0.34	<2	<100	920	<4	<100	62	<5	<50
WELL 01 - STANDBY	07/13/99	1730	1120	7.73	240	130	55	180	5	400	190	240	13	ND	-	ND	780	-	ND	-	-	ND
WELL 01 - STANDBY	08/08/00	1680	1080	7.55	234	119	58	184	6	360	200	234	6.6	0.33	4.2	<100	900	<50	<100	62	<5	<50

1. Electrical conductivity at 25 C

2. Total alkalinity reported as $CaCO_3$.

Water Qualily Limits
a) California Secondary MCL (recommended/upper level)
b) US EPA Secondary MCL
c) California Primary MCL
d) US EPA Primary MCL
e) California DHS Action Level for Drinking Water

SUMMARY OF WATER QUALITY DATA
DIABLO WATER DISTRICT AREA

ANALYTE	UNITS	MCL	Willow Park Marina		Knightsen[b]	Delta Coves			Rock Island Marina 6610			Brentwood Well 14				Glen Park	Creekside
			No. 1[a]	No. 2[a]		MW So.203[c]	MW So.328[c]	MW No.605[c]	Prod Well[d]	MW278[e]	MW630[e]	Production[f]	MW154[g]	MW240[g]	MW324[g]	MW[h]	MW250[i]
CATIONS																	
Calcium	mg/L		17	15	63.3	59	43	14	48	53	26	75	61	64	73	58	80
Magnesium	mg/L		13	11	27	35	21	5.5	20	21	14	38	21	24	34	34	46
Potassium	mg/L		3	2.8	1.5	3.6	3	2.1	1.7	1.5	3.4	3.5	1	2	4	2.3	3.9
Sodium	mg/L		260	230	88.7	130	320	240	110	99	330	180	54	62	140	100	170
Total Hardness	mg/L		120	100	264	290	190	59	140	250	150	340	240	260	320	290	390
ANIONS																	
Bicarbonate Alkalinity	mg/L		260	265	229	350	300	220	330	260	220						
Chloride	mg/L	250/500[2]	230	190	67	150	320	170	72	82	360	120	68	77	87	74	210
Fluoride	mg/L	2.0[1]	0.73	0.69	0.36			<0.1	0.3	0.28	<0.10	.4	.4	.4	.3	.3	0.4
Nitrate (as NO3)	mg/L	45[1]	<0.1	<0.1	5.5	<1.0	<1.0	<1.0	<2.0	<0.10	<0.10	5.3	9.2	9.5	9.2	3.3	4.2
Sulfate (as SO4)	mg/L	250/500[2]	150	130	130	89	200	190	92	100	240	300	39	56	230	160	270
Total Alkalinity	mg/L		260	265	229	280	240	180	270	260	220	210	210	220	230		199
PHYSICAL PARAMETERS																	
pH	pH units	6.5/8.5[4]	8.15	8.19	7.61	7.8	7.9	8.1	7.7	7.96	8.04					7.8	7.9
Specific Conductivity	µmhos/cm	900/1600[2]	1,460	1,310	890	1,200	1,800	1,300	890	900	1,800	1400	680	740	1200	920	1,500
Total Dissolved Solids	mg/L	500/1000[2]	874	778	520	690	1,100	770	560	560	1,100	880	390	460	740	570	910
Turbidity	NTU	5[2]	0.36	0.86	0.27		0.88		0.38	<0.16	<0.16						
INORGANICS																	
Aluminum	mg/L	1[1]/0.2[3]	0.055	0.066	<0.010		<0.05		<0.050	<0.050	<0.050						
Antimony	mg/L	0.006[1]	<0.003	<0.003	<0.001		<0.006		<0.006	<0.005	<0.005						
Arsenic	mg/L	0.05[1]	0.013	0.013	<0.003		0.01		<0.002	<0.005	<0.005						
Barium	mg/L	1[1]	<0.1	<0.1	0.0351		<0.1		<0.1	0.079	0.069						
Beryllium	mg/L	0.004[1]	<0.0002	<0.0002	<0.0005		<0.001		<0.001	<0.004	<0.004						
Boron	mg/L	1[3]	4	3.6	1.6					2.6	5.2	1.4	.4	.5	1.3		
Cadmium	mg/L	0.005[1]	<0.0001	<0.0001	<0.0005		<0.001		<0.001	<0.0005	<0.0005						
Chromium	mg/L	0.05[1]	0.016	<0.001	0.012		<0.01		<0.001	0.035	<0.010						
Copper	mg/L	1.0[2]	0.091	0.007	0.006	<0.050	<0.050	<0.050	<0.050	<0.010	<0.010						<0.050
Cyanide	mg/L	0.2[1]			<0.1		<0.005			<0.010	<0.010						
Iron	mg/L	0.3[2]	0.14	0.14	0.0112		<0.1	<0.1	0.23	0.074	<0.010	<0.100	<0.050	<0.050	0.090		<0.1
Lead	mg/L	0.015[3]	0.0053	<0.002	<0.001		<0.005		<0.005	0.003	0.003						
Manganese	mg/L	0.05[2]	0.11	0.1	0.037		0.2	0.088	0.15	0.13	0.13	<0.030	0.14	0.15	0.100		0.064
Mercury	mg/L	0.002[1]	<0.0002	<0.0002	<0.0002		<0.001		<0.001	<0.0002	<0.0002						
Nickel	mg/L	0.1[1]	0.039	<0.002	<0.005		0.015		0.011	<0.010	<0.010						
Selenium	mg/L	0.05[1]	<0.005	.0054	0.0050		<0.005		<0.005	<0.005	<0.005						
Silver	mg/L	0.1[2]	<0.0005	<0.0005	<0.0005	<0.010	<0.010	<0.010	<0.010	<0.001	<0.001						
Thallium	mg/L	0.002[1]	<0.001	<0.001	<0.0005		<0.001		<0.001	<0.001	<0.001						
Zinc	mg/L	5.0[2]	0.27	<0.050	0.0118	<0.050	<0.050	<0.050	<0.050	<0.020	<0.020						

[1] - *Primary MCL*
[2] - *Secondary MCL (recommended/upper range)*
[3] - *Action Level*
[4] - *Suggested lower/upper acceptable range*
< = ND at DLR

a - Contra Costa Water District (10/6/97 - sample date)
b - Contra Costa Water District (10/23/00 - sample date)
c - LSCE (8/19/03 - report date)
d - Diablo Water District (01/18/03 - report date)
e - Diablo Water District (01/30/02 - report date)
f - City of Brentwood (11/03/00 - report date)
g - City of Brentwood (04/26/99 - report date)
h - Diablo Water District (11/20/01 - report date)
i - Diablo Water District (4/25/03 - report date)

Appendix D

Current Groundwater Monitoring Program

Appendix D
Current Groundwater Monitoring Program[1]
Diablo Water District

Wells				Aquifer	Water Levels		Water Quality[2]		Production Metered
Type	Location	ID	Use		Manual	Transducer	General Mineral, Physical, Inorganics, Organics	Nitrate	SCADA[3]
DWD Wells	Glen Park	Glen Park Well	Production		-	-	Triennial	Annual	Yes
		Glen Park MW	Monitoring	Deep	Monthly	-	-	-	-
	Rose Avenue	Corporation Yard	Unused Production		-	-	every nine years	every nine years	-
	Summer Lake	North Well	Non-operational		-	-	-	-	-
		South Park	Stand-by Production	Deep	Monthly	-	Triennial	Annual	Yes
	Creekside	Creekside MW	Monitoring	Deep	Monthly	-	-	-	-
Community Water System Wells	Knightsen	Knightsen Well	Production	Deep	Monthly	-	Triennial	Annual	No
	Beacon West	Beacon West Well	Production		-	-	Triennial	Annual	No
	Rock Island Marina	East Well	Production		-	-	Triennial	Annual	Yes
		West Well	Production	Deep	Monthly	-	Triennial	Annual	Yes
	Willow Park Marina	Well 1	Production		-	-	Triennial	Annual	No
		Well 2	Production		-	-	Triennial	Annual	No
	Willow Mobile Home Park	Willow Mobile Home Park Well	Production		-	-	Triennial	Annual	No
	Delta Mutual	East Well	Production	Deep?	Monthly	-	Triennial	Annual	No
		West Well	Production			-	Triennial	Annual	No
Private	Private Domestic	3071 Doyle	Domestic	Shallow	Monthly	-	-	-	-
		3080 Doyle	Domestic	Shallow	Monthly	-	-	-	-
		3200 Doyle	Domestic	Shallow	Monthly	-	-	-	-
		3239 Doyle	Domestic	Deep?	Monthly	-	-	-	-
		3340 Doyle	Domestic	Shallow	Monthly	-	-	-	-
		21 Lozoya	Domestic	Deep?	Monthly	-	-	-	-
		185 Lozoya	Domestic	Deep?	Monthly	Yes	-	-	-
		3199 Crismore	Domestic	Shallow	Monthly	-	-	-	-
	Knightsen Elementary School	Knightsen School District (#3)	Domestic	Deep	Monthly	-	-	-	-
		Knightsen School Irrigation (#2)	Irrigation	Deep	Monthly	-	-	-	-

1. The water level Monitoring Program includes seven wells monitored by others; six shallow ECCID piezometers (5-22, 5-33, 5-35, 5-36, 5-37, and 5-39), and one deep well Brentwood MW-14.
2. Does not include weekly monitoring of the distribution system for coliform bacteria, chloride residual, etc..
3. SCADA: Supervisory Control and Data Acquisition

Appendix E

Well Construction Information, Diablo Water District and Vicinity

Appendix E
Well Construction Information
Diablo Water District and Vicinity

Well Type	Location Name(s) (ownership)	Well ID	Use/ Status	Owned by DWD	Operated by DWD	Well log No.	Year Drilled	Total Depth (feet)	Casing (in)	Perf-oration (feet bgs)	Seal ft bgs	Cap-acity (gpm)	Specific Capacity gpm/ft	No. of Connec-tions	Metered	Future Inter-tie with Main Water System?	Notes
DWD Wells	Glen Park	Glen Park Well	Primary Supply for DWD	Yes	Yes		5/1/2004	315	16	230-245 260-300	200	700-1,400	10-15		yes	yes	
		Glen Park MW	Monitoring Well				2001	560	8	220-230 260-290	190			-	-	-	
	Rose Avenue Corporation Yard	Corporation Yard Well	Standby Production				7/11/77	170	12	100-		1,100					
	Summer Lake (previously Cyprus Lakes)	North Well	Non-Operation Production				6/30/2005	308	16	206-246 266-281	135		30	n/a			Used as stand-by well only due to high Fe-Mn.
		South Park Well	Stand-by Production				6/15/2005	323	16	204-264 284-299	140		27.5	n/a		yes	Mn=140 ug/L (6/05), 2ndary MCL=50 ug/L
		South Park MW	190			E013881	6/9/2004	190		170-180	160			-	-	-	Mn=250 ug/L (6/04), 2ndary MCL=50 ug/L
			260					260		215-255							Mn=200 ug/L (6/04), 2ndary MCL=50 ug/L
			380					380		360-370							Mn=150 ug/L (6/04), 2ndary MCL=50 ug/L As=12 ug/L (6/04), MCL=10 ug/L
		North MW	165			E013882	5/27/04	165	2	150-160	130						Mn=330 ug/L (6/04), 2ndary MCL=50 ug/L
			235					235	2	220-230							Mn=220 ug/L (6/04), 2ndary MCL=50 ug/L
			290					290	2	270-280							Mn=220 ug/L (6/04), 2ndary MCL=50 ug/L
	Creekside	Creekside MW	Monitoring			E002337	4/8/2003	380	2	230-240	188						
Community Water System	Knightsen M-25	Knightsen Well	Production	Yes	Yes		11/15/1990	305	10	235-55 275-95	150			13	no	no	
	Beacon West M-26	Beacon West Well	Production	Yes	Yes	327495	1991	260	8	230-260	225			22	no	no	
	Rock Island Marina Subdivision 6610	East Well (#1)	Production	Undetermined at this time	Undetermined at this time	802087	12/20/02	324	12	240-270 284-292	208		30	70	yes	no	Has current Fe-Mn treatment system.
		West Well (#2)	Production			802086	12/20/02	320	12	240-270 284-292	203		30		yes		
		MW-shallow	Monitoring				12/2001	278	2	248-268							
		MW-deep	Monitoring				12/2001	630	2	555-565 610-620	205			NA	NA	NA	
	Willow Park Marina M-27 Subdivision 4490	Well 1	Production	Yes	Yes	323222	9/13/1989	400	8	250-310	240			100	no	no	No current treatment system. Possible future As treatment.
		Well 2	Production			323223	9/21/1989	340	8	250-310	240						Wells located within about 50' of each other.
	Willow Mobile Home Park M-28	Willow Mobile Home Park Well	Production	No	Yes	413188	10/6/1992	410	8	292-332	200						
	Delta Mutual	West	Production	No	Yes									100			
		East	Production														DWD contracted for maintenance
Brentwood Wells	Well 6		Production	No	No		1987	305	16	250-300	222	750	30				
	Well 7		Production				1988	300	16	265-295	178	750	10				
	Well 8		Production				1993	325	16	225-315	210	1,000	20				
	Well 9		Emerg. & Park Irrigation				4/22/1993	230	8	210-230	200	300					Domestic well for park irrigation, high nitrates, blend to use in emergency.
	Well 14	Well 14	Production			716526	11/3/2000	340	16	285-315	245	1,000	13				
		MW-1 (deep)	Monitoring				1999?	324	2	284-314	98						
		MW-2 (int.)	Monitoring					240	2	200-210 220-230							
		MW-3 (shallow)	Monitoring					154	2	114-144							
	Well 15	Well 15	Production			804384	8/2004	345	12	239-259 289-324	188		3.1				
Private Wells Monitored by DWD	Knightsen Elementary School	Knightsen School Domestic (#3)	Production			725554	03/29/05	415	6	395-415	350						Supply for school
		Knightsen School Irrigation (#2)	Irrigation			427852	4/9/92	230	8	167-191 210-230	165						
	Private	3080 Doyle	Domestic			no		60									Well depth from field notes
		3239 Doyle	Domestic			no		(PSD 125)									Well depth from field notes
ECCID Monitoring Wells	East Contra Costa Irrigation District	ECCID 5-22	Monitoring	No	No			20									Shallow wells monitored by ECCID twice a year, spring and fall.
		ECCID 5-33	Monitoring					20									
		ECCID 5-35	Monitoring					20									
		ECCID 5-36	Monitoring					20									
		ECCID 5-37	Monitoring					20									
		ECCID 5-39	Monitoring					20									

Appendix F

Contra Costa County Well Construction Ordinance and Permit Guidelines

LEGAL NOTICE LEGAL NOTICE LEGAL NOTICE

FILED

JUN 11, 1985

PHIL BATCHELOR
CLERK BOARD OF SUPERVISORS
CONTRA COSTA CO.
By ... Deputy

Proposed regulations of the Contra Costa County Health Officer governing installation of a small water system, and an individual water system, for domestic use pursuant to Chapter 414-4 of the Ordinance Code of Contra Costa County.

Adopted by: William Walker MD
William Walker, M.D.
Health Officer
Contra Costa County

June 12, 1985
Date

June 26, 1985
Effective Date

These regulations were filed with the Clerk of the Board of Supervisors and posted in the Department of Health Services on June 12, 1985.

These regulations are to make more certain specific sections of the Contra Costa County Ordinance Code. Not all of the ordinance sections are described in these regulations as parts of the ordinance require no further explanation. Ordinance text is not reprinted herein.

414-4.20 GENERAL

1. Application for all proposed Subdivisions (Major and/or Minor) must comply with the following:

   a. Each parcel must have an "on site" producing well having a minimum yield of three (3) gallons per minute with a bacterial and chemical quality in compliance with the State standards for a pure, wholesome and potable water supply. (Title 22, Section 64433). If the chemical analysis exceeds the State standards for "maximum contaminant levels" for water potability, a statement must be attached and "run with the property deed" advising of these levels

-or-

b. Have verifiable water availability data from adjacent parcels presented by the applicant or knowledge of the same, known by this Division concerning water quality and quantity per (a) above

-and-

Have a statement that "attaches and runs with the deed" indicating that a water well shall be installed on the subject parcel complying with the general requirements stated above prior to obtaining a Building Department permit for construction.

c. In addition to the above, a hydro-geological evaluation may be required in known or suspected water short areas. This will include seasonal as well as yearly variations.

(1) The purpose for requesting hydrogeological evaluations is to determine the total projected numbers of dwelling units that can be supplied with drinking water from existing aquifers. The two primary circumstances that would generally require hydrogeological evaluations are:

(1.1) Where a proposed major subdivision contemplating the addition of large numbers of dwelling units on individual wells would substantially increase the density within an existing drainage basin. Hydrogeological data relevant to recharge of aquifers and projected yield would become essential not only to support approval of large major subdivisions under these circumstances, but also to ensure that the water supplies serving existing structures would not be depleted by the proposed increased demand.

(1.2) In those cases where density is increasing in particular drainage basins due to the build out of previously approved subdivisions using individual wells for water supplies and existing well yields begin to evidence declines due to the increased demand. In these circumstances, or in water short basins, hydrogeological studies would be appropriate as a condition for subsequent development to provide sufficient data to protect existing uses and assure sufficient yield for proposed uses. Specific reasons will be stated in support of requested hydrogeological evaluations in each case.

414-1.202 APPROVED WATER SUPPLY SYSTEM

The requirements of Titles 17 and 22 of the California Administrative Code apply to small water systems and individual systems are not subject to these requirements.

414-1.204 LICENSED WELL DRILLER

The class of license required shall be determined by the State of California licensing agency. The Health Officer shall refer any inquiries regarding the licensing requirements to the licensing agency in writing. The decision of the licensing agency shall be the sole criteria for the Health Officer's acceptance or rejection of any license.

414-1.206 ABANDONED WELL

The Health Officer shall maintain a log of all known abandoned or inactive wells. The owner of the well shall be required annually to declare his intentions to use the well again or the well shall be permanently abandoned.

414-1.208 SMALL WATER SYSTEMS

Fees for applications to construct a small water system are an amount equal to three times the annual license fee for the proposed system plus individual permit fees for any new well(s) included as part of the proposed system. The charge that is based on the annual license fee shall be considered as a deposit to cover the Health Officer's costs of plan checking and making construction inspections. Any money remaining in the deposit fund on completion of construction shall be refunded to the applicant.

414-1.210 SMALL WATER SYSTEM - APPROVED SOURCES

The Health Officer's approval or denial of the water source shall be based on laboratory analysis of the water. If the water does not meet the requirements for domestic water, the applicant or operator shall provide water from an alternate source meeting the requirements or install treatment facilities acceptable to the Health Officer.

414-1.212 SMALL WATER SYSTEM - DISTRIBUTION

(d) Backflow protection. Backflow protection devices shall be installed when the property has an auxiliary source of water. Any other sources of real or potential backflow from auxiliary water sources or other contaminants shall be eliminated as directed by the Health Officer.

(f) Location of pipes. Water mains shall not be installed in the same trench as sanitary sewers. Water lines from buildings to the water meter or street main may be installed in the same trench as the house sewer when the sewer is constructed of material approved for use under the building. The standards adopted by the State Department of Health Services for separation of water mains and sewers, and the Uniform Plumbing Code Regulations for building sewer and water lines are adopted as a part of these regulations.

414-1.214 INDIVIDUAL WATER SYSTEMS

Chemical - physical analysis of the water may be required when there is evidence the water may not be suitable for domestic use. If tests indicate the water contains contaminants that pose a direct and immediate hazard to health, the water will not be approved for domestic use. When the water contains secondary constituents in excess of recommended standards, the Health Officer shall notify the property owner in writing but use of the water as a source of supply for an individual system may not be disapproved.

414-1.216 QUANTITY

Yield tests shall be required when there is no historical evidence to document well yield. Yield tests shall include the rate of water discharged and measurements of drawdown in the well.

On low yield wells where recharge and discharge reach equilibrium within thirty minutes of the beginning of the test, the rate of discharge shall be measured for four hours and be accompanied by hourly measurements of drawdown to verify the static or dynamic level of water in the well column does not fluctuate.

High yield wells are defined as those wells that will sustain a yield of at least twice the minimum quantity required for the proposed property development. On high yield wells, where recharge and discharge do not reach equilibrium until one hour after the beginning of the test, measurement of pump discharge may be limited to one hour after equilibrium is reached with a minimum of two measurements of drawdown at 30 minute intervals. Yield tests shall be reported on a form provided by the Health Officer. See attached Exhibit "B". Other methods of determining well yield may be accepted when the production requirements for the well are signifcantly less than the probable yield of the well as determined by a bailer test or historical data of the area where the well is located. The historical data must be acceptable to the Health Officer. The data must also be supported by a pump test for the specific well being evaluated. The pump test shall be for a minimum of two hours and the volume discharged shall be reported to the Health Officer.

414-1.218 WELLS - PERMIT REQUIRED

(a) The applicant for a permit shall specify who will perform the basic well construction which includes drilling, casing, sealing the annular space and providing a secure cover or cap for the well. The applicant shall also specify the party responsible for well development which includes yield tests and water quality analysis if required by the Health Officer and installation of the pump, sanitary seal, and concrete platform.

(b) The Health Officer shall provide permit cards that will allow for signoff or approval of the two phases of well installation described in the preceding. The Health Officer shall maintain a log of permits issued and investigate each application 12 months after issuance of a permit if the party responsible for Phase 2 has not requested a final inspection during the 12 months following permit issuance. See the attached Exhibit "A".

(c) A copy of the Department of Water Resources reporting form will be acceptable to meet the requirement for certification of the protection of the aquifers penetrated during construction of the well. The DWR form is required prior to the signoff of Phase I - Construction. The Department of Health Services shall submit copies of yield tests (pump tests) when completed prior to final approval of well permit (Phase II) upon receipt to DWR, when required by that state agency.

414-1.220 WELLS-SITE

No well shall be located any closer to the areas identified below except on written approval of the Health Officer. Other hazards will be evaluated and well setback requirements will be established by the Health Officer as needed.

With the exception of property lines, all distances are upslope from the well:	Private Wells	Public Wells
Property Line (unsewered area)	50 feet	50 feet
Septic Tank	100 feet	100 feet
Sewer Lines	50 feet	50 feet
Stream, Ditch, or Drainage Channel	50 feet	50 feet
Subsurface Leaching Device	100 feet	100 feet
Livestock Area	25 feet	25 feet

414-1.222 WELLS - PROTECTION

1. No additives shall be used in drilling mud that have not been approved by the State Department of Health Services. Chlorination of wells shall be done as described in Appendix C, Department of Water Resources Bulletin 74-81.
2. All well casings shall be new and meet the following requirements:
   a. Well casing shall be strong enough to resist the forces imposed on it during installation and service life.

b. Additives to accelerate the curing of cement shall not be used when thermoplastic casing is used.

c. Bentonite (up to 8 percent) shall be added to cement seals to reduce the heat of hydration when thermoplastic casing is used.

d. All casing shall meet the conditions described in Section 12, State of California, Department of Water Resources, Bulletin 74-81.

3. Sealing of the annular space shall be performed in strict compliance with the requirements described in Section 9, California Department of Resources Bulletin 74-81. The Health Officer shall be notified at least 24 hours in advance of the installation of the seal. The seal shall be placed in one continuous mass starting from the bottom of the space to be grouted and continuing upward. The depth of the seal shall be as described below:

   a. All wells shall be sealed to prevent contamination from surface sources. The minimum depth of the seal for this purpose shall be fifty (50) feet. For wells drilled to a shallow depth, where a (50) foot seal is not possible, the Health Officer shall determine the depth of the seal after consultation with the driller and a review of all pertinent information.

   b. All wells shall be sealed to prevent the interchange of water between aquifers when this interchange would result in degradation of the quality of water in one or more aquifers. One example is where high nitrate levels have been identified in the more shallow aquifers.

   c. Wells installed in areas where the producing aquifer or strata is not overlain with impervious material, shall be sealed to the producing aquifer. This requirement is particularly applicable to, but may not be limited to, delta peat/sand formations.

4. A completed copy of the latest revision of DWR Form 188, submitted to the Health Officer, shall serve as the driller's certification of the protection of the aquifers penetrated during drilling and completion of the well.

414-1.224 ABANDONMENT OF WELLS

a. Temporary abandonment (inactive).

The well must have no defects which will allow the degradation or contamination of the water quality in the well or in the water bearing formations penetrated by the well.

The top of the casing shall be securely capped.

The well shall be marked so it can be clearly seen.

The area around the well shall be kept clear of brush or debris.

b. Permanent abandonment.

All wells shall be destroyed in such a way that they will not act as a conduit for the infiltration of surface drainage or shallow depth groundwaters into groundwater aquifers. Shallow depth groundwater is water that is found above the first usable aquifer.

1. Obstructions shall be removed, if possible, prior to filling the hole. If the obstruction is hardware, and cannot be removed, a tremie pipe will have to be passed below the obstruction to place sealing material to the full depth of the well.
2. The casing shall be perforated, as necessary, to seal any annular space or voids.
3. In dug wells, as much of the lining as possible shall be removed prior to filling the well.
4. Wells shall be filled from the bottom up. The method used shall not allow for free fall, dilution or separation of the sealing material.

5. All wells shall be filled so as to prevent interaquifer flow through the well or around the outside of the casing. The casing shall be perforated to its full depth.

6. Special care must be exercised in wells having a significant producing flow. In such cases, the casing must be perforated opposite the area to be sealed and the sealing material forced into the surrounding formation under pressure.

7. Gravel packed wells shall be sealed so as to force the sealing material into the gravel pack under pressure.

8. The person sealing the well shall verify that the volume of material placed in the hole is at least equal to the volume of the empty hole.

9. Sealing materials used shall be impervious. Acceptable materials include:

   a. Bentonite

   b. Neat cement- one bag of cement to 5 to 7 gallons of water.

   c. Cement grout - two parts of sand and one part of Portland cement to 5 to 7 gallons of water.

   d. Concrete - the mixture shall contain a minimum five sacks of Portland cement per cubic yard.

10. Native soils shall not be used as sealing material.

11. Materials containing organic matter shall not be used.

12. All abandoned wells shall have a hole excavated around the well casing to a depth of six feet. The well casing shall be removed to this depth and the sealing material shall be allowed to spill over and provide a cap at least one foot thick over the cut end of the casing.

13. If there is an annular space between the casing and the hole, the upper 50 feet of casing must be removed. If this is not possible, the casing must be ripped from a depth of 50 feet for a distance of five feet upward. The ripped portion shall then be filled by pressure grouting to form a grout plug in the annular space. The casing shall then be ripped above the grout plug and pressure grouting repeated until grout returns to the surface in the area between the drilled hole and the well casing.

414-1.226 ENFORCEMENT - PUBLICATION OF REGULATIONS

The Health Officer shall distribute copies of proposed changes in regulations to the drilling industry and other interested parties requesting notification in writing. Copies of proposed regulations shall be mailed to the requesting parties thirty (30) days prior to filing the regulations with the Clerk of the Board of Supervisors. The letter transmitting the proposed regulations to the well drilling industry shall indicate the date the regulations will be filed with the Clerk of the Board.

414-1.228 WATER WELL DRILLERS - REPORTING FORM

The Health Officer shall provide the well drilling industry with reporting forms that may be used to report violations of the water supply ordinance and Health Officer's regulations. The use of these forms is not mandated by these regulations. See the attached Exhibit "C".

EXHIBIT "A"

WELL PERMIT

Contra Costa County Health Services Department

Date of Permit: ____________ Permit Expires: ____________

Basic Well Construction (Phase 1)

Drilling ____________

Casing ____________

Sealing ____________

Capping ____________

DWR ____________

Well Development (Phase 2)

Yield Test ____________

Water Quality Analysis ____________

Pump Installation ____________

Sanitary Seal ____________

Concrete Platform ____________

The inspector shall note N.A. (not applicable) for items not required for this installation.

EXHIBIT "C"

To: WELL DRILLERS

Re: Groundwater Sources

The Contra Costa County Water Supply Ordinance strongly emphasizes the need for protection of the County's groundwater sources from degradation that could result from inadequately constructed, defective, or improperly abandoned wells. To assure appropriate surveillance of the construction and abandonment of water wells requires the support of the well drilling industry and other concerned citizens. The lower portion of this form can be used to report your concerns and any incidents involving wells that you feel should be investigated by Health Services staff to assure protection of groundwater supplies.

East-Central County
To: Contra Costa County Health Services
Environmental Health Division
1111 Ward Street
Martinez, CA 94553

West County
To: Richmond Health Center
Environmental Health Division
100 - 38th Street
Richmond, CA 94805

1. Date and nature of problem observed:

____

____

____

2. Exact location of incident:

____

____

3. Your name, address and phone number:

____

____

(It is not necessary that you complete Item 3. This information is necessary if you desire a report describing the results of the staff investigation.)

EXHIBIT "B"

WATER WELL PUMP TEST REPORT

Contra Costa County Health Services Department

Name of Well Permit Applicant: ______________________________

Name of Property Owner: ______________________________

Parcel Number: ______________________________

Mailing Address: ______________________________

Date of Test: ______________________________

Time Test Was Started: ______________________________

Time Required to Reach Equilibrium
Between Recharge and Discharge: ______________________________

Total Time Pump Test Was Continued
After Equilibrium Was Reached: ______________________________

Drawdown Measurements Including Distance to Water Level and Time of Day:

	Time	Drawdown
1.		
2.		
3.		
4.		
5.		
6.		

Ordinance Code of Contra Costa County, California

Title 4. Division 414
Approved Water Supply Systems

Effective Date: August 1981

CHAPTER 414-4 APPROVED WATER SUPPLY SYSTEMS

ARTICLE 414-4.2 GENERAL

414-4.201 GENERAL. WATER SUPPLY SYSTEM – APPROVAL REQUIRED. Any person proposing to subdivide or develop any property needing water for domestic purposes shall demonstrate an approved water supply and obtain written approval from the health officer for such development.

414-4.202 PURPOSE AND DISCLAIMER. This chapter is enacted to provide for the protection of the County's groundwater sources from degradation that could result from inadequately constructed, defective, or improperly abandoned wells, to provide for regulation of small water systems in accordance with federal standards as mandated by the State, and to require submission of tentative subdivision maps and building permit applications to the Health officer for him to review the availability of an approved water supply prior to the recordation of final maps and issuance of building permits. Notwithstanding the foregoing, by enacting this chapter, the County of Contra Costa neither assumes or undertakes any obligations or responsibilities of any kind to assure, guarantee, preserve, or otherwise guard the adequacy, potability, or any other qualitative or quantitative feature of the County's groundwater sources in any manner whatsoever, and no cause of action against the County, its agents, directors, or employees shall be deemed to accrue under any theory whatsoever on the basis of the enactment of this chapter or any subsequent amendment thereto.

414-4.203 DEFINITIONS. As used in this chapter, the following words and phrases shall have the meanings given in this chapter:

414-4.205 APPROVED WATER SUPPLY SYSTEM means any system, approved by the health officer, or the California Department of Health Services, as meeting the requirements of Titles 17 and 22, the California Administrative Code.

414-4.207 CROSS-CONNECTION means any actual or potential unprotected connection as defined in Title 17, California Administrative Code.

414-4.209 CUSTOMER SYSTEM includes those parts of the facilities beyond the termination of the utility system which are used to convey water to points of use.

414-4.211 DISTRIBUTION SYSTEM includes the facilities and conduits used for the delivery of water from the source to the customer's system.

414-4.213 FURNISH OR SUPPLY has its usual meaning, except that it does not include furnishing or supplying water to a user for domestic purposes other than for human consumption if the user receives the water, by pipe or otherwise, directly from an open irrigation canal system; nevertheless, it does include furnishing or supplying water to any small water system, connected by an integrated pipe system owned and operated by the supplier.

414-4.215 HEALTH OFFICER, unless otherwise modified, means the health officer of this County, his/her medical deputies, his/her Environmental Health Inspectors, and his/her other duly authorized representatives.

414-4.217 INDIVIDUAL WATER SYSTEM means an approved water source and system of piping designed to provide water for domestic use and which serves (a) one single family residence; or (b) two single family residences on one parcel; or (c) one structure serving less than 25 persons more than 60 calendar days per year.

414-4.219 SITE EVALUATION means the investigation of a lot or subdivision to determine the feasibility of using an individual water system or a small water system.

414-4.221 SMALL WATER SYSTEM means a system which furnishes water for domestic purposes to from two through one hundred ninety-nine service connections and shall include "Public Water Systems" as defined in California Health and Safety Code Section 4010.1 and its applicable regulations under Title 22 of the California Administrative Code. Two single family residences on one parcel shall not be considered a small water system.

414-4.223 SOURCE FACILITIES include all components of the facilities used in the production, treatment, storage, and delivery of water to the distribution system.

414-4.225 WATER SOURCE means a source of water supply for any water system, including, without limitation, wells, springs, ponds, lakes, surface streams, irrigation ditches or canals, and potable water obtained from other sources including large public water systems.

414-4.227 USER means any person using water for domestic purposes, except any person processing water or selling, serving, hauling, furnishing, or supplying water to the public in any manner.

414-4.229 UTILITY SYSTEM means a water system consisting of source facilities, treatment facilities, and distribution system, and includes all other facilities of the water system under the complete control of the supplier, up to the point where the customer's system begins.

414-4.231 WELL means any well, public or private, including without limitation, wells serving County and State small water systems, individual domestic use wells, industrial wells, agricultural wells, recharge or injection wells, air conditioning wells, horizontal wells, permanent test wells, dewatering wells and cathodic protection wells.

414-4.233 LICENSED WELL DRILLER means a person licensed in accordance with the provisions of the Contractors License Law (Chapter 9, Division 3, of the Business and Professional Code) to drill water wells.

414-4.235 WELL DRILLING means the act(s) by any person, including without limitation, the property owner and/or licensed well driller, to dig, drill, bore, excavate, or drive a well.

414-4.237 DOMESTIC USE means water that is intended for human consumption. The terms *domestic purposes* and *human consumption* mean the same as domestic use when they appear in this chapter.

414-4.239 ABANDONED WELL means a well which has not been used for a period of one year, unless the owner has declared his intention to use the well again. Wells that are to be used again shall be adequately protected, and marked, and the area around the well shall be kept clear.

414-4.241 SUBDIVISION MAPS

(a) *Tentative Maps.* Pursuant to Title 9, a copy of any submitted tentative subdivision map shall be forwarded to, and filed with the health officer for investigation of domestic water supply. The tentative map shall show proposed provisions for sewage disposal, source of approved water supply, number of lots, the size of each lot, and contour lines at intervals of five (5) feet or less.

(b) *Health Officer Approval.* The health officer shall review the filed tentative map for compliance with this chapter and in a timely manner report his conclusions thereon, together with any conditions recommended to insure such compliance, to the planning department and advisory agency.

(c) *Final and Parcel Maps.* Final and parcel maps shall not be recorded unless the conditions recommended by the health officer and established by the advisory agency on approval of the tentative map have been satisfied.

ARTICLE 414-4.4 SMALL WATER SYSTEMS

414-4.401 SMALL WATER SYSTEMS – PERMIT REQUIRED

(a) Every person proposing to install, construct, and/or operate a small water system shall first apply to the health officer for approval of the water source and utility system. The application shall be accompanied by complete plans and specifications with appropriate fees.

(b) The health officer shall approve, conditionally approve, or deny the application on the basis of compliance with this chapter and the health officer's regulations.

(c) Upon approval of the completed installation of the water system by the health officer, he shall issue a water supply permit and a public health license to operate the system.

414-4.403 SMALL WATER SYSTEM – INVESTIGATION, SITE EVALUATION. Upon receipt of an application for the construction or operation of a small water system the health officer shall make the necessary investigation and/or site evaluation of the proposed or existing system and all other circumstances and conditions the health officer deems material. The health officer may order repairs, alterations, or additions to the proposed or existing system to insure that the water furnished or supplied shall at all times meet the requirements of Sections 414-4.413, 414-4.415 and 414-4.417 herein. The health officer may require any permit holder or applicant to make a complete report on the condition and operation of the small water system owned, operated, or contracted for by the permit holder or applicant.

414-4.405 SMALL WATER SYSTEM – BACK-FLOW PREVENTION. Every person furnishing or supplying water to users shall prevent water from unapproved sources, or any substance, from entering the small water system.

414-4.407 SMALL WATER SYSTEM – DESIGN AND CONSTRUCTION. All small water systems shall be designed and constructed so as to comply with applicable A.W.W.A. Standards and generally accepted engineering practices.

414-4.409 SMALL WATER SYSTEM – APPROVED SOURCES REQUIRED. All water sources for small water systems shall comply with the requirements of Title 22, the California Administrative Code and may be used only after approval of the health officer.

414-4.411 SMALL WATER SYSTEM – DISTRIBUTION RESERVOIRS. Distribution reservoirs shall be adequately protected against contamination. Adequately ventilated housing may be required by the health officer to protect the facilities from the elements and unauthorized entry.

414-4.413 SMALL WATER SYSTEM – DISTRIBUTION SYSTEM.

(a) *Pressure-Quantity.* The distribution system shall be of adequate size and designed in conjunction with related facilities to maintain a minimum water pressure of twenty (20) pounds per square inch at every point during periods of maximum normal demand. The quantity of water delivered to the distribution system shall be sufficient to supply adequately, dependably, and safely the total requirements of all users under maximum consumption.

(b) *Flushing.* Dead-end runs shall be provided with means of flushing, and shall be flushed frequently enough to assure that the water will be kept safe, wholesome, and potable for human consumption. The design of the small water systems shall provide for elimination of dead-end runs wherever practicable.

(c) *Materials.* Materials used in the distribution system shall be able to withstand with ample safety factors, all internal and external forces to which they may be subjected.

(d) *Back-flow protection.* Each service connection from an approved water supply system shall be protected against backflow of water from a non-approved system.

(e) *Fire hydrants.* Fire hydrants shall conform to requirements of local authority.

(f) *Location of pipes.* No water pipe shall be laid in the same trench with sanitary sewers.

(g) *Disinfection of pipes.* All pipes or conduits, or parts, newly constructed or repaired before being placed in service, shall be completely disinfected in accordance with American Water Works Association Procedures for Disinfecting Water Mains.

(h) *Marking of pipes.* Where the premises contain dual or multiple water systems and piping, the exposed portions of pipes shall be painted, branded, or marked at sufficient intervals to distinguish the pipes which carry water safe for human consumption.

414-4.415 SMALL WATER SYSTEM – OPERATION AND MAINTENANCE.

(a) *Personnel.* All personnel responsible for operation and maintenance shall have sufficient experience and training to qualify them properly their duties. When water is treated the water system shall be operated by personnel having special skills in the appropriate areas and acceptable to the health officer.

(b) *Maps and Records.* Complete and current maps of the utility system shall be maintained. Complete and current records shall be kept showing results of bacteriological and chemical analyses of water and other data required by the health officer.

(c) *Maintenance*. Facilities and equipment of the utility shall be kept clean and in good working condition. Leaks shall be repaired as soon as practicable. Proper equipment, tools, and repair parts shall be available in good condition for all types of emergency repairs.

414-4.417 SMALL WATER SYSTEMS – QUALITY, QUANTITY.

(a) *Quality*. All water systems shall meet the primary Drinking Water Standards contained in Title 22 of the California Administrative Code. The secondary Drinking Water Standards contained in Title 22 of the California Administrative Code shall be met by all public water systems, subject to any current waivers or other authorized exception. All examinations of water required by this ordinance shall be performed by a laboratory approved by the California Department of Health Services.

(b) *Quantity*. Sufficient water shall be available from the water sources and distribution reservoirs to supply adequately, dependably and safely the total requirements of all users under maximum daily demand conditions. Requirements for a small water system shall be determined from the total source capacity, total storage volume and the total number of service connections. The procedures for determining quantity shall be in accordance with the specifications contained in Division 4, Chapter 16, Article 2, Title 22 of the California Administrative Code.

ARTICLE 414-4.6 INDIVIDUAL WATER SYSTEMS

414-4.601 INDIVIDUAL WATER SYSTEM – QUALITY, QUANTITY.

A. Quality:

1. *Bacteriological*. The water from an individual system, installed for domestic use, shall be examined by the health officer on completion of the system. Subsequent testing shall be performed by a laboratory approved by the California Department of Health Services and at the expense of the owner of the individual water system. The water tested shall be bacteriologically acceptable for domestic use.

2. *Chemical*. An analysis for specific organic or inorganic chemical constituents in the water may be required when there is evidence that such constituents may be present and which are considered by the health officer to be a risk to human health.

3. *Physical*. Tests for odor, color, turbidity, pH or other physical properties of the water may be required when there is evidence the water may not be acceptable or potable for human consumption.

B. Quantity:

Applications for building permits or certificates of occupancy for a structure requiring an individual water supply system, shall prior to their issuance be submitted to the health officer for review to determine if the water supply source will provide minimum of quantities in accordance with the following:

1. *Wells*. Sustained yield or pumping tests may be required by the health officer. The well yield shall be determined from pumping tests or historical data acceptable to the health officer. The well or wells shall yield a minimum three (3) gallons per minute and minimum storage capacity of one thousand (1000) gallons in a storage tank shall be provided. No storage is required if the well yield is five (5) gallons per minute or greater. Sustained yield tests, when required, shall be conducted in accordance with the procedures described in Title 22, Section 64563 of the California Administrative Code.

2. *Other surface sources.* Yields and required storage capacity shall meet the same minimum requirements as for wells. Adequate documentation that the surface sources are perennial shall be provided.

C. Director of Building Inspection:

When the building inspection director is advised by the health officer that it has not been demonstrated that a water source exists complying with this chapter and that such lack is a danger to or likely to cause public health problems, he may withhold issuance of the requested building permit or certificate for a structure.

414-4.603 INDIVIDUAL WATER SYSTEM – LOT AREA, VARIANCES.

(a) *Lot Area.* The health officer shall require each structure that needs both an individual water system and an individual sewage disposal system to be on a lot whose area, exclusive of natural impediment and surface and underground easements, is at least forty-thousand (40,000) square feet.

(b) *Variances.* The health officer may grant variances from Subsection (a) when he finds the following conditions to be met:

1. The lot otherwise will comply with the requirements of this Division and the health officer's regulations; and

2. The variance will neither create, nor contribute to the creation of a public nuisance.

414-4.605 INDIVIDUAL WATER SYSTEM – INVESTIGATION, SITE EVALUATION. The health officer shall make the necessary investigation and/or site evaluation of the proposed development and all other circumstances and approve, or deny the proposed development on the basis of compliance with this chapter and corresponding regulations.

ARTICLE 414-4.8 WELLS

414-4.801 WELLS – PERMIT REQUIRED.

(a) Every person proposed to dig, drill, bore, or drive any water well, or rebore, deepen, cut new perforations in, or seal the aquifers of any existing well, before commencing work, shall apply to the health officer for approval of the well site and method of installation and construction and for a permit to do the work. If a well driller is hired it is his responsibility to see that a permit is obtained. The application shall be on forms furnished by the health officer and shall contain the information he may require.

(b) The permit shall expire on the one hundred eightieth (180) calendar day after date of issuance if the work has not been started and reasonable progress toward completion is not maintained, but the health officer may extend the expiration date when delay is warranted.

(c) The health officer shall approve, conditionally approve, or deny the application and issue or withhold the permit accordingly, on the basis of compliance with this chapter and his regulations.

(d) Upon completion of the drilling, repairs, alterations, or additions of the well and before a final approval of the well for use, a log of the well shall be submitted to the health officer. Where minor or insignificant repairs, alterations or additions are made, the health officer may waive the requirement for a log.

414-4.803 WELLS – REPAIRS, ALTERATIONS OR ADDITIONS. The health officer may order repairs, alterations, or additions to the existing source or system to insure that the water furnished or supplied shall at all times be pure, wholesome and potable and without danger to human health.

414-4.805 WELLS – SITE. The site of every well shall be adequately drained and located a safe distance from any sources of pollution or contamination; this distance is dependent upon the character of the soil, location of pollution sources, and slope of the ground.

414-4.807 WELLS – PROTECTION.

(a) Adequate means shall be provided to protect the well from contamination during construction, reconstruction, or alteration. Newly constructed or repaired wells and necessary distribution systems shall be adequately chlorinated following construction or repair work.

(b) Surface construction which protect the well from contamination shall be provided when determined necessary by the health officer.

(c) The health officer shall be notified at least twenty-four (24) hours in advance of the installation of the seal of the annular space between the casing and excavation. All wells shall be sealed in accordance with the procedures outlined in Part 2, Section Nine of California Department of Resources Bulletin Number 74. All wells shall be sealed to the depth of the first impervious soil formation in addition to all other requirements of Bulletin Number 74.

(d) The well driller shall complete a certification of the protection of the underground aquifers he has penetrated during drilling and competition of the well. The certification shall be made on a form provided by the health officer and shall be signed by the well driller under penalty of perjury and shall indicate the contractor or driller license number. The work performed in the protection of the underground aquifers shall be done in conformance with California Department of Water Resources Bulletin Number 74, found well drilling practice, current published data or other references documented with the certification.

414-4.809 WELLS – ABANDONED. To prevent the contamination of ground waters and other dangers, every person wholly or partially responsible for abandoning a well or having entire or partial right of ownership or possession of the land or premises on which an abandoned well is situated shall destroy the well as specified in Part III, Section 23 of the State of California, Department of Water Resources, Bulletin Number 74.

ARTICLE 414-4.10 ENFORCEMENT

414-4.1001 ENFORCEMENT – PROHIBITIONS.

(a) No person subdividing and/or developing any property needing water for domestic use shall so use the property until he has demonstrated an approved water supply.

(b) No person shall drill a water well whether for domestic use, irrigation, agricultural or other purposes, without first applying for and receiving a valid, unrevoked, unsuspended permit to do so from the health officer.

(c) No person shall drill, reconstruct, repair or destroy a well for hire unless he is licensed well driller.

(d) No person shall operate a small water system without filing a written application with the health officer and receiving and possessing a valid, unrevoked, unsuspended water supply permit and public health license.

(e) No person shall maintain a cross-connection with a small water system operated for domestic use.

(f) No person shall supply water for domestic use until the results of the tests required by the health officer of bacteriological, chemical and physical analyses, performed by a laboratory certified by the State Department of Health Services, are submitted to the health officer and show that the water meets state safe drinking water quality standards and all other criteria established by the health officer through his regulations.

(g) No person shall modify, add to, or change an approved water supply system without the prior written approval of the health officer.

414-4.1003 ENFORCEMENT – PUBLICATION OF REGULATIONS. The health officer may make and publish regulations to make more detailed or specific the provisions of the chapter. These regulations shall become effective two (2) weeks after filing with the clerk of the Board of Supervisors and posting in the County Health Department. The health officer shall be responsible for the execution of this chapter.

414-5.1005 ENFORCEMENT – RIGHT OF ENTRY. To enforce this chapter, the health officer may enter and inspect any premises, operations or work regulated hereby, at reasonable times and with such notice to the owner, occupant, operator, applicant, licensee, or permittee, as is reasonable and practicable under the circumstances. In conducting such inspections the health officer is authorized to proceed pursuant to the Code of Civil Procedure Sections 1822.50 and following.

414-4.1007 ENFORCEMENT – NUISANCE ABATEMENT. Any installation made or condition existing in violation or this chapter or of standards or regulations established under Section 414-4.1003 is declared to be a public nuisance, and its maintenance, operation, and existence may be abated in a civil action.

(a) *Notice; Hearing*. Except in instances of necessity or emergency, when the health officer declares a public nuisance, he shall promptly so notify the owner of the property by certified mail to the owner's address on the assessment roll. The notice shall state the condition and reason for the declaration, and shall also state that the owner of the property has thirty (30) days after the mailing of the notice within which to abate the nuisance, failing which the health officer may have the nuisance abated and the owner shall be liable for the cost thereof. The notice shall also state that if owner objects to the health officer's declaration, the owner may request a hearing before the health officer to determine whether a public nuisance exists. The notice shall further indicate that the request for the hearing must be received by the health officer prior to the expiration of the time set for abatement, and the hearing shall be held within thirty (30) days after the request is received by the health officer. County abatement is suspended by the filing of a request for hearing, pending the final decision of the health officer.

(b) *Costs*. If the health officer has a nuisance abated, the health officer shall promptly so notify the property owner, including a statement of costs and of the owner's rights to a hearing thereon. The notice mailing and the time period for hearing requests and hearing shall be those in subsection (a). Upon fixing the costs (after hearing or in absence of request therefore), the health officer shall proceed according to law to impose the costs on and collect them from the property owner and/or the property. These procedures do not affect the county's right to collect these costs from any other person responsible therefore under law.

414-4.1009 ENFORCEMENT – EMERGENCY ACTION. Where the health officer, makes a written finding that the public health is endangered by some act, omission, or condition regulated by this chapter, in connection with any premises or operation licensed under this chapter, the health officer may order the immediate cessation of the act, abatement of the condition, or action to correct the condition. The health officer may order the temporary emergency suspension of the applicable permit and its removal from the person or premises, and the health officer may post notice of this action in a conspicuous place. Emergency suspension, as distinct from any other action authorized by law, is effective for a period of five days, including the first day on which the permit is suspended. During that period, any activity regulated by this chapter is unlawful. At the end of that period, or sooner if a finding is made that the public health is no longer endangered, the permit becomes valid again unless a hearing is ordered.

414-4.1011 ENFORCEMENT – PERMIT SUSPENSION. Where a written complaint is filed with the health officer that some applicable law or regulation is being violated by any person, premises or operation required to be licensed under this chapter, the health officer may order a hearing, and after hearing may suspend the permit for not more than ninety (90) days, or until the health officer is assured of compliance with applicable laws or regulations, whichever is less, and the health officer may post notice of this action in a conspicuous place. At the end of the period, or when the health officer is satisfied of compliance, the permit becomes valid again. During that period any activity regulated by this chapter is unlawful.

414-4.1013 ENFORCEMENT – PERMIT REVOCATION. A permit maybe revoked and confiscated if it has been suspended once and if violations of this chapter or other applicable laws or regulations or acts or omissions endangering the public health continue, or if the health officer or one of the health officer's medical deputies makes a written finding that correction of the situation is impracticable and that public health is endangered thereby. The health officer may post notice of this action in a conspicuous place.

414-4.1015 ENFORCEMENT – HEARINGS. In cases of hearings under Section 414-4.1011, notice must be written and delivered to the person involved or in charge of the premises or operation at least forty-eight (48) hours before the hearing. Other hearings ordered by the health officer must be preceded by written notice, personally delivered or mailed to the person to whom the permit was issued at the latest address on file with the health officer not less than five (5) nor more than fifteen (15) days before the hearing date. These hearing shall be in the main office of the County Health Department, unless some other location is specified in the notice. These hearings shall be conducted by the health officer or one of the health officer's medical deputies, and may not be continued or postponed for longer than ten (10) days from the original date without consent of the permittee.

414-4.1017 ENFORCEMENT – APPEALS.

(a) A person objecting to or disagreeing with any decision made pursuant to Sections 414-4.403 and 414-4.605, and /or the pertinent regulations thereto, may appeal the decision to the health officer. All requests for this appeal hearing shall be in writing and must received by the health officer within ten (10) days after notice of the decision was mailed. All requests for the appeal hearing must be accompanied by the appropriate fee. A hearing on the appeal shall be held within fifteen (15) days after the request for appeal is received by the health officer.

(b) Appeals may be taken from the results of any hearing held pursuant to Sections 414-4.109, 414-4.1011, 414-4.1013, 414-4.1015 and Subsection (a) to the Board of Supervisors by a written notice of appeal stating fully the matters or action appealed from and the grounds for the appeal. The notice shall be filed with the clerk of the Board within fifteen (15) days of the action appealed from. The Board shall then schedule the appeal for a hearing within thirty (30) days of the filing of the notice of appeal.

414-4.1019 ENFORCEMENT – PENALTIES. Any person violating this chapter or regulations issued hereunder, by failing to submit plans, obtain necessary inspections and approvals, or pay fees, or by commencing or continuing construction or remodeling in violation hereof, shall pay triple the appropriate fee as a penalty and remain subject to other applicable penalties and enforcement procedures authorized by the state law and/or this code.

414-4.1021 ENFORCEMENT – OTHER REQUIREMENTS. A permit or license issued under this chapter does not relieve the permittee or licensee from compliance with applicable federal, state, or local laws and regulations or other required permits or licenses.

414-4.1023 GUARANTEE OF PERFORMANCE.

(a) *Performance Bond.* Prior to the issuance of a permit, the applicant shall post with the health officer a cash deposit or bond guaranteeing compliance with the terms of this Chapter and the applicable permit, such bond to be in an amount deemed necessary by the health officer to remedy improper work but not in excess of five thousand dollars ($5,000.00).

(b) *Continuous Performance Bond.* In lieu of furnishing a separate bond for each permit as provided above, a licensed contractor may deposit with the health officer a surety bond or cash deposit in the amount of five thousand dollars ($5,000.00), which bond or cash deposit shall be available to the county to remedy any improper work done by the contractor pursuant to any permit issued under this chapter.

ARTICLE 414-4.12 FEES

414-4.1201 GENERAL. The following non-refundable fees shall be paid to health officer at the time of filing for or requesting an investigation, test, inspection or permit required by this Chapter. No fees are required when the health officer receives from the applicant a written statement by a district or city governing body indicating that an approved domestic water supply is available and adequate to handle the additional volume of water required for the proposed improvement.

CONTRA COSTA
HEALTH SERVICES

Contra Costa Environmental Health
2120 Diamond Blvd., Suite 200
Concord, CA 94520
Phone: (925) 646-5225
Fax: (925) 646-5168

ENVIRONMENTAL AND GEOTECHNICAL WELLS AND SOIL BORINGS

Introduction

This handout is intended as a general guideline for processing permits for environmental and geotechnical wells and soil borings. This includes, but is not limited to, cone penetrometers, inclinometers, piezometers, extraction wells, recovery wells, monitoring wells, temporary wells, hydropunch soil borings and soil borings drilled for geotechnical purposes (whether or not groundwater is encountered). It is not intended as a substitute for familiarity with applicable laws and regulations.

Well Permits

A permit is required to construct or destroy an environmental or geotechnical well or soil boring. Each well or boring requires a separate permit. Permit applications are available from Contra Costa Environmental Health. Permits are non-transferable and valid for six months.

Well Drillers

Contra Costa County requires that any well work be performed by a licensed well contractor (C-57 licensee) who has proof of Worker's Compensation Insurance and a $5,000 performance bond on file with the Environmental Health office.

Permit Processing

1. Well permit applications should be filled out as completely as possible to facilitate permit processing. The applications should include proposed well construction, a detailed map or plot plan and be accompanied with the appropriate permit fees. The information provided will be used to determine the suitability of the well site(s) and proposed method of work. If necessary, a site visit may be conducted to verify that the well locations are acceptable. The map or plot plan should indicate distances between the proposed wells/borings from structures and/or known or potential sources of contamination.

2. Applications for well destructions should include a copy of the Well Completion Report for the well construction, if available.

Construction and Destruction

Once the permit has been issued the authorized work can begin. A copy of the approved permit and map should be kept at the job site for reference.

Upon the setting of the well, Contra Costa Environmental Health will inspect the installation of the annular seal. Generally, annular seal depths should be a minimum of 10 feet to 50 feet, depending on the depth of the well. The seal material must be cement or concrete in accordance with Bulletin 74-81 or an approved bentonite that is specifically formulated as an annular sealing material and mixed to the manufacturer's specifications. If bentonite is used, the final two feet must be an approved cement or concrete mixture. Contact this office for a list of approved materials.

The seal material must be tremmied when using bentonite or sealing annular spaces or cavities 30 feet or greater in depth or in the presence of water. The placement of sealing material for borings, hydropunch sampling, cone penetrometer testing and well destructions will be inspected. For well destructions the top fifty (50) feet of casing must first be removed.

The geologist and/or the well contractor are responsible for contacting Contra Costa Environmental Health to schedule inspection appointments. The greater the advance notice the more likely a mutually convenient appointment time can be arranged. 24 hours notice with confirmation verbally or in writing with the respective specialist is necessary to schedule field inspections.

Final Approval

After Contra Costa Environmental Health has approved the installation of an annular seal or the destruction of a well, a Well Completion Report (DWR form 188) signed by the responsible geologist or well driller must be submitted to this office. A boring log is required for borings, hydropunch sampling and cone penetrometer testing.

Upon satisfactory inspection of work and approval of the reports, final approval of the wells/borings will be granted.

INITIAL APPROVED _______
☐ CONDITIONS

CONTRA COSTA
HEALTH SERVICES

CONTRA COSTA
ENVIRONMENTAL HEALTH DIVISION
2120 DIAMOND BOULEVARD, SUITE 200
CONCORD, CA 94520
(925) 646-5225
www.cocoeh.org

Well System

WELL PERMIT APPLICATION

Type of Work:
- ☐ New Well (69) _______
- ☐ Repair (69)
- ☐ Abandonment (68)
- ☐ CPT / Inclinometer (01)
- ☐ Soil Boring (01)
- ☐ Piezometer w/ casing (67)
- ☐ Piezometer w/o casing (66)
- ☐ Flow Test (99)

Proposed Use:
- ☐ Domestic
- ☐ Public / Small Water System
- ☐ Agricultural
- ☐ Industrial
- ☐ Monitoring
- ☐ Other _______

Sewage Disposal (off-site):
- ☐ Septic System
- ☐ Sewer System _______

(ATTACH PLOT PLAN – For instructions see "The Well Permit Process" handout)

PLEASE PRINT CLEARLY. *REQUIRED FIELDS MUST BE COMPLETED.

*Legal Owner's Name		
*Owner Address		
*City/ State/ Zip	Country	Owner Telephone
*Owner Billing Address (if different from above)		
*Site Name (if different from owner address)	*Assessor's Parcel #	Subdivision/Minor Subdivision #
*Site Address (if different from owner address)		Lot/Parcel #
*Contractor's Name	*License #	*Site Telephone
*Contractor's Mailing Address		*Contact Person's Telephone
*Consultant/Mailing Address		*Consultant's Telephone

*Construction/Destruction Specifications

Diameter of well casing _______ Casing Material _______ Gauge _______ Annular seal depth (50 feet minimum) _______

# of Soil Borings _______ Borehole Diameter _______ Boring Depth (b.g.s.*) _______

Gravel/Sand packed ☐ Yes ☐ No Conductor casing ☐ Yes ☐ No Depth _______ Diameter_______

Type of material for annular seal/destruction (specify mix or product): ☐ Bentonite ☐ Concrete ☐ Cement

Method of drilling/destruction/Other: _______

Variance ☐ Yes ☐ No (Required for water well seals less than 50 feet b.g.s./monitoring well seals less than 10 feet b.g.s.)
*b.g.s. = below ground surface

Performance Bond Requirement. (Contra Costa County Ordinance, Title 4 Health and Safety, Article 414-4.10; Section 414-4.1023 (a))
Prior to the issuance of a permit, the applicant shall post with the health officer a cash deposit or bond guaranteeing compliance with the terms of this chapter and the applicable permit, such bond to be in an amount deemed necessary by the health officer to remedy improper work but not in excess of five thousand dollars.

I hereby certify that the above information and submitted plans are true and correct and that the proposed work will comply with all permit conditions and applicable laws and regulations. I agree to obtain all required inspections, maintain a copy of the approved permit and plans at the job site until final approval, and obtain written authorization prior to deviating from the approved permit or plans, or placing the well in service. The issuance of this permit by Contra Costa Environmental Health Division does not guarantee a satisfactory and an indefinite operation of any well system.

Signature of Contractor (C–57 Licensee) _______ Date _______

FOR OFFICE USE ONLY

Facility ID#:	PR#:	P/E#: 43 ____	Census Tract:	REHS:
Amount Due: $ _______ Amount Paid: $ _______		Receipt #:	Received By:	
Check #: / CASH / Credit Card: ☐ MC ☐ VISA		Date Received:	Supervisor:	

FOR OFFICIAL USE ONLY

WELL WORKBOOK

APN: ______/______/______ SUBDIVISION/MINOR SUBDIVISION #: ______________ LOT/PARCEL #: __________

Type of Work: ❑ New Well ❑ Repair ❑ Abandonment ❑ Soil Boring ❑ Piezometer ❑ Inclinometer
❑ Cone Penetrometer (CPT) ❑ Other ______________________________

Proposed Use: ❑ Domestic ❑ Public ❑ Agriculture ❑ Industrial ❑ Monitoring
❑ Small Water System* ❑ Cathodic ❑ Dewatering
❑ Other ______________________________

***Small Water System Type:** ❑ Well ❑ Reservoir ❑ Distribution System ❑ Treatment Facility

GPS: Longitude ____________________ Latitude ____________________

Well Variance Granted: ❑ Approved ❑ Denied ❑ Not Applicable

❑ WELL CONSTRUCTION INSPECTION __________ (Inspector's Initial)

Total Depth __________ feet Bore Hole Diameter __________ inches Well Casing Diameter __________ inches
Gravel/Sand Pack Depth __________ feet Annular Seal Depth __________ feet
Conductor Casing Depth __________ feet Conductor Casing Diameter __________ feet
Static Water Level __________ feet ❑ Unknown Static Water Level
Annular Seal Material ____________________

All "Depths" are below ground surface (bgs).

❑ WELL DESTRUCTION INSPECTION __________ (Inspector's Initial)

Number of Wells __________ Method of Destruction: ❑ Overdrilling ❑ Perforation
Type of Casing: ❑ PVC ❑ Steel ❑ Other ____________________
Type of Well: ❑ Cable Driven ❑ Gravel/Sand With Annular Seal ❑ Monitoring ❑ Cathodic
❑ Other ____________________
Well Diameter __________ feet Depth of Well __________ feet
Depth of Seal __________ feet Sealing Material ____________________
Well Casing (bgs) __________ feet Casing Diameter __________ feet
Seal Material Quantity/Mix ____________________

All "Depths" are below ground surface (bgs).

❑ SOIL BORINGS INSPECTION __________ (Inspector's Initial)

Parcel Use: ❑ Vacant ❑ Contaminated ❑ Industrial ❑ Commercial ❑ Other ______________
Number of Borings __________ Diameter of Boreholes __________ inches Boring Depth __________ feet
Depth of Seal __________ feet Static Water Level __________ feet
Seal Material Quantity/Mix ____________________

All "Depths" are below ground surface (bgs).

❑ MONITORING WELL INSPECTION __________ (Inspector's Initial)

Number of Monitoring Wells on Parcel: __________ Duration of Wells: __________ Months or __________ years
Depth of Well: __________ feet Depth of Gravel/Sand Pack __________ feet Depth of Seal __________ feet
If more than one well, give the number of wells with in each depth range:
Number of Wells _____ at Well Depth _____ feet Number of Wells _____ at Well Depth _____ feet
Number of Wells _____ at Well Depth _____ feet Number of Wells _____ at Well Depth _____ feet
Conductor Casing Depth __________ feet Conductor Casing Diameter __________ feet
Static Water Level __________ feet ❑ Unknown Static Water Level
Seal Material Quantity/Mix ____________________

All "Depths" are below ground surface (bgs).

❑ WELL FLOW TEST OBSERVATION __________ (Inspector's Initial)

Well Depth __________ feet Water Level (Before Test) __________ feet
Flow Test Start Time __________ a.m./p.m. Stabilized Water Level __________ feet at __________ a.m./p.m. start time
End of Flow Test __________ a.m./p.m. Final Water Level __________ feet Recovery Time __________
Flow Rate (Last hour average) __________ g.p.m.

❑ WATER QUALITY __________ (Inspector's Initial)

Bacteriological Test: ❑ Positive ❑ Negative

Chemical Analysis: Specify ______________________________ ❑ Acceptable ❑ Not Acceptable

Well Final Approval by: ______________________________ Date: ______________

PLACE OR ATTACH
PLOT PLAN
HEALTH AND SAFETY PLAN

CONDITIONS

FIELD NOTES

ILLUSTRATION

Contra Costa Environmental Health
2120 Diamond Blvd., Suite 200
Concord, CA 94520
Phone: (925) 646-5225
Fax: (925) 646-5168

CONTRA COSTA
HEALTH SERVICES

ANNULAR SEAL AND WELL DESTRUCTION MATERIALS

BENTONITE

Material/Manufacturer	Mixture (Ration)	Notes on Usage
BENSEAL/Baroid Drilling Products	50 lbs/20 gallons water	Must be used with Aqua-Grout Catalyst. Amount of catalyst depends on desired set time. Do not use a centrifugal pump for mixing.
VOLCLAY GROUT/CETCO, Inc.	50 lbs/23 gallons water	No initiator necessary. Mix with Venturi type jet hopper or commercial grout mixer.
ENVIROPLUG GROUT/WYO-BEN, Inc.	50 lbs/14 gallons water	Slurry will resemble "pancake batter" with small lumps. Double diaphragm pump recommended for mixing.

BENTONITE CHIPS – currently only authorized for use below the interval to be sealed.

Bentonite Notes:

1. The bentonite slurry must be mixed on-site from the original manufacturer's packaging.
2. Bentonite slurries must be pumped from the bottom up through a tremie pipe or hose.
3. Water used to mix bentonite slurry must be of potable quality.
4. Allow seal to settle for at least 24 hours before installing well slab.
5. Cannot be used in areas of heavy petroleum product contamination or high salt concentration.

CONCRETE/CEMENT

Neat Cement	94 lbs Portland cement/ 4 ½ - 6 ½ gal water	Will be fairly thick mixture.
Sand Cement	188 lbs (max) sand/94 lbs Portland Cement/7gallons water	Equivalent to "10.3 sack" mix.
Concrete	6 sacks Portland cement per cubic yard (Class A concrete) 5 sacks Portland cement per cubic yard (Class B concrete) 8 sacks Portland cement per cubic yard with 3/8" aggregate. Note: May require special cement pumping equipment.	

Concrete/Cement Notes:

1. Additives may be used in cement/concrete if approved by Contra Costa Environmental Health. Additives include bentonite (up to 5% by volume) and hydrated lime (up to 10% by volume). Additives must meet ASTM C494: "Standard Specification for Chemical Admixtures for Concrete". Mix bentonite in water before adding cement/concrete.
2. Cement must meet ASTM C150, "Standard Specification for Portland Cement".
3. Cement or concrete must be from "Ready-Mix" Company with weight slip or mixed on-site from original manufacturer's packaging.
4. Water used to mix cement/concrete must be of potable quality.
5. The size of any aggregate must be less than 1/5 the radial thickness of the annular seal. Aggregate must meet ASTM C33 "Standard Specification for Concrete Aggregate".

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Contra Costa Environmental Health
2120 Diamond Blvd., Suite 200
Concord, CA 94520
Phone: (925) 646-5225
Fax: (925) 646-5168

THE WELL PERMIT PROCESS

In order to protect our groundwater resources state and local governments have established minimum standards for well constructions and destructions. These standards are necessary for public health protection and to preserve the quality of underground waters for current and future users.

A permit from the Environmental Health Division is required to construct, reconstruct or destroy a well within Contra Costa County. Wells include water wells, monitoring wells, cathodic protection wells and soil borings. State and local regulations require that any well work be performed by a licensed well contractor(C-57 license) who has proof of worker's compensation insurance and a performance bond on file with the Division.

The following is a chronological summary of the permit process:

I. <u>Application, Plot Plan and Permit Fee</u>

To apply for a well permit, submit a completed application, plot plan and permit fee to Contra Costa Environmental Health. Application forms are available at the Environmental Health office. If you have any questions about completing the application or preparing an acceptable plot plan, please contact our office for assistance.

The application and plot plan are used to determine the suitability of the well site and proposed method of work. Of special concern is the location of the well in relation to the possible sources of contamination and items a minimum setback distance. Both the subject and surrounding properties are considered when reviewing items requiring setbacks.

The plot plan must show the well location, property lines, sewer lines, septic systems, animal enclosures, fuel tanks, other potential contamination sources and features associated with a minimum separation distance (see attachment).

NOTE: For well destruction permit applications, the plot plan only needs to show the well location in relation to some fixed reference points (i.e. property lines or structures). If the well log is available, please submit it with the destruction permit application.

II. <u>Site Review</u>

If deemed necessary, Environmental Health will conduct a site visit to verify that the well location is acceptable.

III. <u>Permit Processing</u>

After sufficient information has been provided, Environmental Health will review the proposal to determine if it complies with applicable laws and regulations. Based on this review a permit will be issued, denied, or modification requested. If approved, a copy of the permit will be sent to the well contractor and property owner.

IV. <u>Construction and Destruction</u>

Once the permit has been issued the authorized work can begin. A copy of the approved permit and plot plan must be kept somewhere on the job site. This is to ensure that it is available for reference by the work crew should questions arise.

Upon completion of the well Contra Costa Environmental Health will inspect the installation of the annular seal. For well destructions the placement of sealing material will be inspected. The well contractor is responsible for contacting this Division to schedule inspection appointments. The greater the advance notice the more likely a mutually convenient appointment time can be arranged.

V. Final Construction Approval

After the annular seal has been installed the following must be completed prior to receiving final construction approval and placing the well into service:

1. Inspection of the well slab and surface construction features. After these have been installed contact Environmental Health arrange for an inspection.

2. Water analysis for coliform bacteria by a state certified laboratory. The laboratory performing the analysis must collect and transport the sample and verify that raw untreated well water was collected. Arrange for the laboratory to submit copies of all analyses results to Contra Costa Environmental Health. A list of state certified laboratories is available from our office.

   NOTE: This requirement is not necessary for monitoring wells.

3. Other water analyses if required by Contra Costa Environmental Health. You will be notified in writing of any additional water testing requirements other than for coliform bacteria.

4. Pump test if required by Contra Costa Environmental Health. You will be notified in writing if a test for sustained yield of the well is necessary.

5. Submittal of Well Driller's Report. The well contractor must submit a copy of the report to Contra Costa Environmental Health, the well owner, and the State Department of Water Resources.

VI. Final Destruction Approval

After the well has been destroyed the well contractor must submit a copy of the Well Driller's Report to Contra Costa Environmental Health, the well owner and the State Department of Water Resources prior to receiving final destruction approval.

CONTRA COSTA
HEALTH SERVICES

Contra Costa Environmental Health
2120 Diamond Blvd., Suite 200
Concord, CA 94520
Phone: (925) 646-5225
Fax: (925) 646-5168

WELL DESTRUCTION GUIDELINES

In order to protect groundwater resources for current and future users, the elimination of abandoned, unused or defective wells is necessary. State and local regulations govern the procedure for eliminating these wells. These requirements are applicable to abandoned wells, test holes, dry holes, cone petronometers, hydropunches and soil borings. A permit from Contra Costa Environmental Health is required to destroy a well in Contra Costa County. The law requires that such work be performed by a licensed, insured and bonded well contractor (C-57 license). **NOTE:** There is no permit fee required to destroy an existing water well if a new well is drilled. The following is a chronological summary of the destruction process:

1. Application, Plot Plan and Permit Fee
To apply for a well destruction permit, submit a completed application, plot plan, and permit fee to Contra Costa Environmental Health. Application forms are available at the Division's office. Instructions for preparing the plot plan are on the reverse side of the application. If you have any questions about completing the application or preparing any acceptable plot plan, please contact this office for assistance.

2. Permit Processing
Environmental Health staff will review the permit application and if acceptable a permit will be issued.

3. Destruction Procedure
Once the permit has been issued the authorized work can begin. A copy of the approved permit must be kept somewhere on the job site. This is to ensure that it is available for reference by the work crew should questions arise:

   A general outline of the process is as follows:

   a. Remove any obstructions from the well.
   b. Perforate or remove the well casing to the bottom of the well.
   c. Excavate around the casing to a depth of 6 feet.
   d. Place approved sealing material in the well extending from the bottom to the surface. Environmental Health staff will inspect this stage of the work. The well contractor is responsible for contacting Contra Costa Environmental Health to schedule inspection appointments. The greater the advance notice, the more likely a mutually convenient inspection appointment can be arranged.

   NOTE: Some well destructions will require deeper perforations and depth of sealing material.

4. Final Approval
Upon satisfactory completion of the work permitted and submittal of a Well Completion Report (DWR 188 form) a final destruction approval will be given.

Appendix F

CCWD Supply Reliability Analysis

CONTRA COSTA
WATER DISTRICT

1331 Concord Avenue
P.O. Box H2O
Concord, CA 94524
(925) 688-8000 FAX (925) 688-8122
www.ccwater.com

February 7, 2011

Mr. Mike Yeraka
General Manager
Diablo Water District
2107 Main Street
Oakley, CA 94561

Subject: Urban Water Management Plan – Supply Reliability Analysis and SBx7-7 Requirements

Dear Mr. Yeraka:

The Contra Costa Water District (District) is currently preparing an update to its Urban Water Management Plan (UWMP). In conformance with California Water Code Division 5, Part 2.6, Section 10635, the District has prepared an assessment of its water supply reliability. This analysis is being provided to all wholesale municipal customers of the District for use in the preparation of their UWMPs.

Enclosed are two tables that include water supply reliability information. Table 1 presents the existing sources of supply and their expected availability under various supply conditions over the next 25 years.

Table 2 provides a comparison between projected water supply and demand over the next 25 years. The water supply reliability goal approved by the District's Board of Directors is to meet 100 percent of demand in normal years and at least 85 percent of demand during drought conditions. The remaining 15 percent would be met by a combination of short-term water purchases and a voluntary short-term conservation program.

Additionally, the District and its wholesale municipal customers are required to comply with SBx7-7, which sets a goal of achieving a 20 percent statewide reduction in urban per capita water use and requires water suppliers to report interim and 2020 water use targets in their 2010 UWMPs. Water suppliers can comply with SBx7-7 individually and/or through a regional alliance. As discussed during our meeting in July 2010, the District is preparing a "20 by 2020" analysis for our regional alliance, which consists of the District and its wholesale municipal customers (Cities of Martinez, Antioch, and Pittsburg, Diablo Water District, and Golden State Water

Company). Each agency is required to report its individual water use target in its 2010 UWMP, and include a statement that the agency is a member of the District's regional alliance. This allows the agency to comply with SBx7-7 on an individual or regional basis. The District will submit a letter to DWR stating that a regional alliance has been formed along with a list of members. We will contact you prior to sending the letter to DWR.

We will follow up this letter with a phone call to you to discuss any questions or concerns you may have about the enclosed information. If you have any questions prior to hearing from our office, please feel free to contact me at (925) 688-8310.

Sincerely,

Jeff Quimby

Jeff Quimby
Principal Engineer

KL/JQ/rlr

Enclosures

TABLE 1. PROJECTED WATER SUPPLY										
Condition [a]	CVP[b]	Industrial Diversions	Mallard Slough [c]	Antioch Diversions[d]	Groundwater [e]	ECCID Purchases	Los Vaqueros Supply[f]	Recycled Water	Conservation Savings [g]	Total Firm Supply
	(af/yr)	(af/yr)	(af/yr)	(af/yr)	(af/yr)	(af/yr)	(af/yr)	(af/yr)	(af/yr)	(af/yr)
Near-Term										
Normal	170,000	10,000	3,100	6,400	3,000	6,000	-	8,500	11,900	218,900
Single-Year Drought	127,500	0	0	0	3,000	10,000	10,000	8,500	11,900	170,900
Multi-Year Drought (yr 1)	144,500	0	0	0	3,000	10,000	10,000	8,500	11,900	187,900
Multi-Year Drought (yr 2)	127,500	0	0	0	3,000	10,000	10,000	8,500	11,900	170,900
Multi-Year Drought (yr 3)	110,500	0	0	0	3,000	10,000	10,000	8,500	11,900	153,900
2015										
Normal	183,000	10,000	3,100	6,400	3,000	7,100	-	10,500	14,500	237,600
Single-Year Drought	137,250	0	0	0	3,000	11,100	10,000	10,500	14,500	186,400
Multi-Year Drought (yr 1)	155,550	0	0	0	3,000	11,100	10,000	10,500	14,500	204,700
Multi-Year Drought (yr 2)	137,250	0	0	0	3,000	11,100	10,000	10,500	14,500	186,400
Multi-Year Drought (yr 3)	118,950	0	0	0	3,000	11,100	10,000	10,500	14,500	168,100
2020										
Normal	195,000	10,000	3,100	6,400	3,000	8,200	-	12,500	17,200	255,400
Single-Year Drought	146,250	0	0	0	3,000	12,200	10,000	12,500	17,200	201,200
Multi-Year Drought (yr 1)	165,750	0	0	0	3,000	12,200	10,000	12,500	17,200	220,700
Multi-Year Drought (yr 2)	146,250	0	0	0	3,000	12,200	10,000	12,500	17,200	201,200
Multi-Year Drought (yr 3)	126,750	0	0	0	3,000	12,200	10,000	12,500	17,200	181,700
2025										
Normal	195,000	10,000	3,100	6,400	3,000	8,200	-	13,300	19,500	258,500
Single-Year Drought	146,250	0	0	0	3,000	12,200	10,000	13,300	19,500	204,300
Multi-Year Drought (yr 1)	165,750	0	0	0	3,000	12,200	10,000	13,300	19,500	223,800
Multi-Year Drought (yr 2)	146,250	0	0	0	3,000	12,200	10,000	13,300	19,500	204,300
Multi-Year Drought (yr 3)	126,750	0	0	0	3,000	12,200	10,000	13,300	19,500	184,800
2030										
Normal	195,000	10,000	3,100	6,400	3,000	8,200	-	14,100	21,700	261,500
Single-Year Drought	146,250	0	0	0	3,000	12,200	10,000	14,100	21,700	207,300
Multi-Year Drought (yr 1)	165,750	0	0	0	3,000	12,200	10,000	14,100	21,700	226,800
Multi-Year Drought (yr 2)	146,250	0	0	0	3,000	12,200	10,000	14,100	21,700	207,300
Multi-Year Drought (yr 3)	126,750	0	0	0	3,000	12,200	10,000	14,100	21,700	187,800
2035										
Normal	195,000	10,000	3,100	6,400	3,000	8,200	-	14,800	23,700	264,200
Single-Year Drought	146,250	0	0	0	3,000	12,200	10,000	14,800	23,700	210,000
Multi-Year Drought (yr 1)	165,750	0	0	0	3,000	12,200	10,000	14,800	23,700	229,500
Multi-Year Drought (yr 2)	146,250	0	0	0	3,000	12,200	10,000	14,800	23,700	210,000
Multi-Year Drought (yr 3)	126,750	0	0	0	3,000	12,200	10,000	14,800	23,700	190,500

a) Basis of water year data is as follows: Normal (Average) represents a below normal or wetter year on the Sacramento River Hydrologic Region 40-30-30 Water Supply Index. Single-Year drought represents 1977 conditions. Multiple-Year drought sequence represents 1987-1992 conditions.
b) The CVP conditions used for supply planning are defined as follows: Normal is Adjusted Historical Use. Single Year Drought supply is 75 percent of Historical Use. Multi-year drought (year 1) supply is 85 percent of Historical Use. Multi-Year Drought (year 2) is 75 percent of Historical Use. Multi-Year Drought (year 3) is 65 percent of Historical Use.
c) Mallard Slough average annual diversion over 15 year period (1995 - 2009).
d) Antioch Diversions is average annual diversion over 11 year period since pumping plant improvements (1999-2009).
e) Groundwater represents production from Mallard Wells, municipal customer owned wells, and miscellaneous other wells in the District's service area.
f) Anticipated water supply reliability benefit resulting from expansion of Los Vaqueros Reservoir.
g) Anticipated conservation savings, including both active and passive conservation.

TABLE 2. PROJECTED SUPPLY AND DEMAND COMPARISON

Condition	TOTAL CCWD Demand	NET CCWD Demand[a]	Adjusted Available Supply[a]	Planned Purchases[b]	Supply Deficit	% of Demand[c]
	(af/yr)	(af/yr)	(af/yr)	(af/yr)	(af/yr)	
Near-Term						
Normal	166,460	146,060	198,500	-	-	0%
Single-Year Drought	166,460	146,060	150,500	-	-	0%
Multi-Year Drought (yr 1)	166,460	146,060	167,500	-	-	0%
Multi-Year Drought (yr 2)	166,460	146,060	150,500	-	-	0%
Multi-Year Drought (yr 3)	166,460	146,060	133,500	-	12,560	9%
2015						
Normal	180,610	155,610	212,600	-	-	0%
Single-Year Drought	180,610	155,610	161,350	-	-	0%
Multi-Year Drought (yr 1)	180,610	155,610	179,650	-	-	0%
Multi-Year Drought (yr 2)	180,610	155,610	161,350	-	-	0%
Multi-Year Drought (yr 3)	180,610	155,610	143,050	-	12,560	8%
2020						
Normal	194,550	164,850	225,700	-	-	0%
Single-Year Drought	194,550	164,850	171,450	-	-	0%
Multi-Year Drought (yr 1)	194,550	164,850	190,950	-	-	0%
Multi-Year Drought (yr 2)	194,550	164,850	171,450	-	-	0%
Multi-Year Drought (yr 3)	194,550	164,850	151,950	-	12,900	8%
2025						
Normal	206,010	173,210	225,700	-	-	0%
Single-Year Drought	206,010	173,210	171,450	-	1,760	1%
Multi-Year Drought (yr 1)	206,010	173,210	190,950	-	-	0%
Multi-Year Drought (yr 2)	206,010	173,210	171,450	-	1,760	1%
Multi-Year Drought (yr 3)	206,010	173,210	151,950	-	21,260	12%
2030						
Normal	218,160	182,360	225,700	3,100	-	0%
Single-Year Drought	218,160	182,360	171,450	3,100	7,810	4%
Multi-Year Drought (yr 1)	218,160	182,360	190,950	3,100	-	0%
Multi-Year Drought (yr 2)	218,160	182,360	171,450	3,100	7,810	4%
Multi-Year Drought (yr 3)	218,160	182,360	151,950	3,100	27,310	15%
2035						
Normal	225,890	187,390	225,700	7,300	-	0%
Single-Year Drought	225,890	187,390	171,450	7,300	8,640	5%
Multi-Year Drought (yr 1)	225,890	187,390	190,950	7,300	-	0%
Multi-Year Drought (yr 2)	225,890	187,390	171,450	7,300	8,640	5%
Multi-Year Drought (yr 3)	225,890	187,390	151,950	7,300	28,140	15%

a) Net CCWD demand and Adjusted Available Supply excludes recycled water and conservation savings.

b) Planned purchases consistent with the District's Future Water Supply Implementation Program. The water supply reliability goal adopted by the Board of Directors is to meet at least 85 percent of demand during drought conditions and 100 percent of demand in normal years. The remaining 15 percent would be met by a combination of short-term water purchases and a voluntary short-term conservation program.

Appendix G
Diablo Water District Emergency Plan

EMERGENCY PLAN
OF
DIABLO WATER DISTRICT
APRIL 2011

In the event of an interruption of water supply beyond the control of the District's staff or a local emergency declared by an adjoining city or a state of emergency declared by the Governor or his staff, Diablo Water District's Emergency Plan will become effective. The emergency management plan of the District will follow the SEMS guidelines as required by law. Upon notice or knowledge of such event, District employees are to immediately report to work once the emergency needs of the employee's family have been met, regardless of holiday or vacation schedule and notify the following:

District's Engineering Consultants
Camp, Dresser & McKee, Inc. 925-933-2900

State and County Health Services
State of California Health Services – General Phone.................................. 510-540-2158

Betty Graham, District Engineer	Work	510-620-3454
	Evening	510-501-6856
Eric Swing	Work	510-620-3604
	Evening	510-390-3644

Contra Costa County Environmental Health Department............................. 925-646-5225
(After hours phone sheriff (228-8282) and ask for the Health Officer on-call)

Contra Costa County Sheriff (Non-Emergency) 925-228-8282
(Emergency) **Do not call from cell phones** 911

Contra Costa County Office of Emergency Services 925-646-4461
After Hours (24 Hrs) (ask for alert duty officer).. 925-228-5000
Fax 925-646-1120

State Warning Center

State of California Office of Emergency Services….(24 Hours).................. 916-845-8911

Coastal Region Office of Emergency Services …….(24 Hours)................. 510-286-0895

Contra Costa Water District……(24 Hours).. 925-688-8374

Randall-Bold Water Treatment Plant 925-625-6600
Randall-Bold Water Treatment Fax 925-625-4658

Diablo Water District's Directors
Kenny Crockett... 925-625-2527
Howard Hobbs... 925-757-2457
Edward Garcia 925-625-2609
Richard Head 925-625-5655
Enrico Cinquini 925-625-2527

Oakley Police Department (24 Hours) 925-646-2441

East Contra Costa County Fire Protection District....................................... 925-634-3400
Emergency 911
Non-Emergency (business) ....(24 Hours)……………...... 925-625-9276

For emergency repairs, names of contractors and suppliers are on file at both the office and the corporation yard and are contained in this Emergency Plan on Pages 8 through 15.

Raw water and treated water supplies to Diablo Water District can be interrupted due to saline degradation, chemical spills, natural disaster or criminal acts.

For the purpose of developing emergency plans, respective to the length of the water supply outage, the outline for response has been divided into Level I and Level II criteria. Level I and Level II water supply outages shall be as declared by the General Manager, Superintendent of Operations or employee on-call, respectively. Employee on call shall contact the General Manager and Superintendent if a Level I or Level II water supply outage is imminent.

The main objective is to maintain fire flow supply. The calculation to determine a Level I or Level II response is, 1) the time of year [winter/summer]; 2) extent of breakage/repair involved; and 3) available supply/demand.

As a first action, the worst case scenario as to the duration shall be estimated by the District's staff and engineers in consultation with Contra Costa Water District and the appropriate state, county and local offices.

<u>LEVEL I / Short-Term Water Supply Outage</u> - Duration of time of 72 hours or less that water supply may fall short of desired quantity and/or pressure, such that the District's usable storage could be reduced to 33% capacity before the end of approximately 72 hours.

1 - Notify the following agencies of the nature of the outage stressing water conservation:

Radio Station KCBS (740 AM).. 415-765-4000
TV Station KOVR, Sacramento 800/374-8813
TV Station KOVR, Stockton..209/466-6985
East County Times 925-757-2525
East County Times (Keith Bennetts, Asst. City Editor) Fax.............. 925-706-2305
East County Times (Keith Bennetts, Asst. City Editor) Phone……….925-779-7136

Notify the local fire departments and let them know we are endeavoring to maintain fire flow.

Emergency... 911
Dispatch for all Fire Departments (non-emergency – 24 Hours)........ 925-625-9276

2 - In the event of a raw water outage, request Contra Costa Water District to backflow water from Contra Loma Reservoir.

Antioch Operations Center (CCWD)…… 925-679-3500
Emergency ……….(24 Hours) 925-688-8374
(the on-call supervisor will be notified)

Pat Panus (R-B Superintendent)	(Wk)	925-625-6601 or 925-688-8094
	(Hm)	925-706-2911
	(Pager)	925-210-5694
	(Cell)	925-525-2566
	(Fax)	925-625-4658
John Parsons (R-B Supervisor)	(Wk)	925-625-6603
	(Hm)	925-753-1840
	(Cell)	925-525-2520

3 - Conserve treated water by reducing and maintaining a minimum pressure in system, of 25 psi or per calculation from instrument located at the Corporation Yard (50# approximately). This may require valving off Reservoir No. 2 outflow to reduce loss of reservoir storage.

4 - Should the outage be due to broken water mains, valve off the areas that are affected. See as-built drawings in map file at office listed alphabetically or by subdivision number. To isolate 24" main, refer to Figure 1 on page 17 and Figure 2 on page 18.

In the event of a main break that poses a threat to the railroad call and report immediately to:

Stop Train Emergency Number................................1-800-285-2164
Burlington Northern /Santa Fe Communications................. 1-800-333-2383

5 - Operate the District's well and request R-B (925-625-6600) to increase production as needed; if necessary, to maintain maximum levels in reservoirs.

Diablo Water District has begun using Diablo Water District Well No. 1 on emergency basis. Notify State of California Department of Health and begin bacteria testing of this well.

6 - Should interconnection facilities with the City of Antioch be available, supplement the Diablo Water District supply with Antioch supply using the following procedure:

- Advise City of Antioch, Director of Public Works of intentions and time of planned valve opening interconnecting the systems.

  Antioch Maintenance Services 925-779-6950
  After Hours – Emergency 925-778-2441
  Ron Bernal, Director of Public Works 925-779-6820
  Phil Barlow, Superintendent of Water/Wastewater 925-779-6952
  Vince Darone, Water Treatment Plant Antioch 925-779-7029

- The area to be valved off will be predicated by the volume of water Antioch will be able to supply.

LEVEL II / Long-Term Water Supply Outage - unknown length of time when water supply may fall short of desired quantity and or pressure, such that the District's storage could be reduced to less than 25%.

1 - Take all of the steps described under short-term outage potential. See Pages 3 through 5. Continue to have Reservoir 2 outflow restricted to conserve water.

2 - Maintain a minimum of 1,000,000 gallons storage for fire protection if possible.

3 - Call Contra Costa County Office of Emergency Services at 925-646-4461 or at the 24 hour emergency number 925-228-5000 and ask for our alert duty officer and apprise him/her of the water supply outage.

4 - Ban use of water for all non-essential uses. This may require going house to house and notifying customers.

5 - Board of Directors adopt regulations on emergency water use.

6 - Send out news bulletins periodically to keep the public updated on the problem. Call East County Times at 925-757-2525, or fax to Keith Bennetts, Asst. City Editor, at 925-706-2305.

<u>CHLORINATION PROCEDURE TO BE IMPLEMENTED IN REPAIRING BROKEN WATER MAINS</u>:

1 - Trench treatment: liberal quantities of hypochlorite applied to open trench area will lessen the danger of pollution.

2 - Main disinfection: scrubbing with hypochlorite solution.

3 - Flush main, should water be available, until discolored water is eliminated.

4 - Sample for bacteria testing in affected area.

<u>II-WARN OMNIBUS MUTUAL AID AGREEMENT</u> - Diablo Water District is a member of II-WARN (Water Agency Response Network Region II) and has an Omnibus Mutual Aid Agreement with more than fifty water agencies. This agreement provides Diablo Water District the opportunity to call upon water agencies in Region II for

additional manpower and/or equipment during an emergency. The agreement with contact names and phone numbers is located at the corporation yard in the main office in a binder and is also located at the administration office in a file. Additionally, an equipment database is on the computer at the corporation yard to help you decide which water agency to call upon for a particular piece of equipment.

Appendix H

Diablo Water District Regulation No. 8,
Water Conservation

REGULATION NO. 8

WATER CONSERVATION

Section 1. Purpose

The purpose of this regulation is to assure that all water furnished by the District is put to reasonable beneficial use, to prevent unreasonable use or waste of water, and to promote efficient use and conservation of water.

Section 2. Prevention of Waste or Unreasonable use

All users of water furnished by the District are required to take all reasonable action to prevent waste of water. The District shall have the right, following notice and/or hearing, to impose upon any water service connection such conditions as the District determines to be necessary to prevent unreasonable use or waste of water.

Section 3. Conservation Measures by Customers

All users of water furnished by the District are required to take all reasonable action to conserve water. Among the actions recommended are the following.

a. Periodically examine all plumbing systems to detect any leaks and repair leaks immediately upon detection.

b. Prevent water from running off premises into street gutters.

c. Install flow restrictors or replace all showerheads to limit flow to not more than 2.5 gallons per minute.

d. Install displacement devices in toilet tanks to reduce water use to 3 gallons per flush or replace older toilets with those that use 1.6 gallons per flush or less.

e. Install aerators or laminar flow devices on kitchen and lavatory facets to reduce maximum flow to 1.5 gallons per minute.

f. Minimize the amount of turf used in landscape areas and use drought-tolerant (low water-using) plants.

Section 4. <u>Conservation Measures of District</u>

a. The District shall vigorously pursue at all times a program for the conservation of water consisting in such cost-effective measures as are from time to time authorized by the Board of Directors.

b. All Water service, except through hydrants for fire fighting, shall be metered.

c. The General Manager is authorized and directed to do the following:

(1) Make audits as frequently as he deems necessary of the quantities of water received by the District and the quantities of water delivered to water users in order to detect systems leaks. The result of such audits shall be

reported to the Board of Directors no less frequently than annually.

(2) Cooperate with local school districts in developing education programs on efficient water use.

(3) Make available at the District's office, public library and other public places, printed materials on the need for, and methods of, water conservation.

Section 5. <u>New Landscaping</u>

During times when water restriction measures are not in place, no area in the District shall be landscaped, planted or irrigated unless the landscape plan and irrigation system makes efficient use of a minimum quantity of water and is installed, operated and maintained in accordance with plans that comply with all ordinances and regulations of the County of Contra Costa, including but not limited to Ordinance Number 90-59, Water Conservation Landscaping in New Developments.

Appendix I

Diablo Water District 2008 CUWCC Report

Base Year Data

Reporting Unit: Diablo Water District

Form Status:
% Complete

1. Your **BASE YEAR is (base year)**. 2008

NOTE: Many calculations in determining credit history and coverage requirements are contingent on your BASE YEAR, which is calculated based on the following criteria. If a Signatory signed the MOU in 1997 or earlier, then the Base Year is 1997. If a Signatory signed the MOU after 1997, then the Base Year is the year the MOU was signed. The same holds true for USBR Contractors, except the date their Base Year is calculated from is the date that their Plan was noticed in the Federal Register.

BMP 1

2. Number of single-family customers in (base year)	9677
3. Number of multi-family units in (base year)	41

BMPs 2 and 14

4. Number of single-family housing units constructed prior to 1992	5104
5. Number of multi-family units prior to 1992	-0-

BMP 4

6. Number of unmetered accounts in (base year)	2

BMPs 5 and 9

7. Number of commercial accounts in (base year)	116
8. Number of industrial accounts in (base year)	2
9. Number of institutional accounts in (base year)	-0-
10. Number of mixed used meters in (base year)	n/a
11. Total water use (AF) by commercial, industrial and institutional accounts in (base year)	206

BMP 14

12. Average number of toilets per single-family household	2.2
13. Average number of toilets per multi-family household	1.2
14. Five-year average resale rate of single-family households	2.1
15. Five-year average resale rate of multi-family households	5.3
16. Average persons per single-family household	2.9
17. Average persons per multi-family household	2.3

Water Supply & Reuse

Reporting Unit: Diablo Water District   Year: 2008

Water Supply Source Information

Supply Source Name	Quantity (AF) Supplied	Supply Type
	Total AF:	
Contra Costa Water Dist.	5191	Surface
Groundwater	927	Well
	Total AF: 6118	

Accounts & Water Use

Reporting Unit Name: Diablo Water District

Form Status: % Complete

Year: 2008

A. Service Area Population Information:

1. Total service area population

B. Number of Accounts and Water Deliveries (AF)

Type	Metered		Unmetered	
	No. of Accounts	Water Deliveries (AF)	No. of Accounts	Water Deliveries (AF)
1. Single-Family	9677	5615	-0-	-0-
2. Multi-Family	41	incl w/SF	-0-	-0-
3. Commercial	116	incl w/SF	2	0.5
4. Industrial	2	206	-0-	-0-
5. Institutional	-0-	-0-	-0-	-0-
6. Dedicated Irrigation	108	incl w/SF	-0-	-0-
7. Recycled Water	-0-	-0-	-0-	-0-
8. Other	2	53	-0-	-0-
9. Unaccounted	NA		NA	
Total	9946	5874	2	0.5
	Metered		**Unmetered**	

BMP 01: Water Survey Programs for Single-Family and Multi-Family Residential Customers

Reporting Unit: Diablo Water Dist. BMP Form Status: % Complete Year: 2008

A. Implementation

1. Based on your signed MOU date, (Date) , your Agency STRATEGY DUE DATE is:	(date) n/a
2. Has your agency developed and implemented a targeting/ marketing strategy for SINGLE-FAMILY residential water use surveys?	Yes (through CCWD)
a. If YES, when was it implemented?	7/1/2000
3. Has your agency developed and implemented a targeting/ marketing strategy for MULTI-FAMILY residential water use surveys?	Yes (through CCWD)
a. If YES, when was it implemented?	7/1/2000

B. Water Survey Data

Survey Counts:	Single Family Accounts	Multi-Family Units
1. Number of surveys offered:	-0-	-0-
2. Number of surveys completed:	1	-0-
Indoor Survey:		
3. Check for leaks, including toilets, faucets and meter checks	Yes	Yes
4. Check showerhead flow rates, aerator flow rates, and offer to replace or recommend replacement, if necessary	Yes	Yes
5. Check toilet flow rates and offer to install or recommend installation of displacement device or direct customer to ULFT replacement program, as neccesary; replace leaking toilet flapper, as necessary	Yes	Yes
Outdoor Survey:		
6. Check irrigation system and timers	Yes	Yes
7. Review or develop customer irrigation schedule	Yes	Yes
8. Measure landscaped area (Recommended but not required for surveys)	No	Yes
9. Measure total irrigable area (Recommended but not required for surveys)	No	Yes
10. Which measurement method is typically used (Recommended but not required for surveys)	Image Based	
11. Were customers provided with information packets that included evaluation results and water savings recommendations?	Yes	Yes
12. Have the number of surveys offered and completed, survey results, and survey costs been tracked?	Yes	Yes
a. If yes, in what form are surveys tracked?	Database (CCWD)	
b. Describe how your agency tracks this information.	MS Access (CCWD)	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

    a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 02: Residential Plumbing Retrofit

Reporting Unit: Diablo Water Dist BMP Form Status: **% Complete** Year: 2008

A. Implementation

1. Is there an enforceable ordinance in effect in your service area requiring replacement of high-flow showerheads and other water use fixtures with their low-flow counterparts? NO (CCWD)

   a. If YES, list local jurisdictions in your service area and code or ordinance in each:

2. Has your agency satisfied the 75% saturation requirement for single-family housing units? Yes

3. Estimated percent of single-family households with low-flow showerheads: 80 %

4. Has your agency satisfied the 75% saturation requirement for multi-family housing units? Yes

5. Estimated percent of multi-family households with low-flow showerheads: 80 %

6. If YES to 2 OR 4 above, please describe how saturation was determined, including the dates and results of any survey research.

   See FY07 Comments (CCWD)

B. Low-Flow Device Distribution Information

1. Has your agency developed a targeting/ marketing strategy for distributing low-flow devices? Yes

   a. If YES, when did your agency begin implementing this strategy? 7/1/1991 (CCWD)

   b. Describe your targeting/ marketing strategy. See Comments below

Low-Flow Devices Distributed/ Installed	SF Accounts	MF Units
2. Number of low-flow showerheads distributed:	11	-0-
3. Number of toilet-displacement devices distributed:	-0-	-0-
4. Number of toilet flappers distributed:	-0-	-0-
5. Number of faucet aerators distributed:	2	-0-

6. Does your agency track the distribution and cost of low-flow devices? Yes

   a. If YES, in what format are low-flow devices tracked? Database (CCWD)

   b. If yes, describe your tracking and distribution system : MS Access (CCWD)

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? NO

   a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments Our marketing strategy consists of notifying our customers through notices on the bills, our website with a link to CCWD's website notifying customers of water saving tips and rebate programs. We offer devices such as showerheads, kitchen aerators, bathroom aerators, dye tablets, and the Waterwise Gardening CD ROM at our District office.

BMP 03: System Water Audits, Leak Detection and Repair

Reporting Unit: Diablo Water Dist. BMP Form Status: % Complete Year: 2008

A. Implementation

1. Does your agency own or operate a water distribution system? Yes

2. Has your agency completed a pre-screening system audit for this reporting year? Yes CCWD

3. If YES, enter the values (AF/Year) used to calculate verifiable use as a percent of total production:

   a. Determine metered sales (AF) 5873

   b. Determine other system verifiable uses (AF) -0-

   c. Determine total supply into the system (AF) 6118

   d. Using the numbers above, if (Metered Sales + Other Verifiable Uses) / Total Supply is < 0.9 then a full-scale system audit is required. 0.00 0.96

4. Does your agency keep necessary data on file to verify the values entered in question 3? Yes

5. Did your agency complete a full-scale audit during this report year? No

6. Does your agency maintain in-house records of audit results or completed AWWA M36 audit worksheets for the completed audit which could be forwarded to CUWCC? Yes (CCWD)

7. Does your agency operate a system leak detection program? No

   a. If yes, describe the leak detection program:

B. Survey Data

1. Total number of miles of distribution system line. 157

2. Number of miles of distribution system line surveyed. -0-

C. "At Least As Effective As"

1. Is your agency implementing an "at least as effective as" variant of this BMP? No

   a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 04: Metering with Commodity Rates for all New Connections and Retrofit of Existing

Reporting Unit: Diablo Water Dist | BMP Form Status: % Complete | Year: 2008

A. Implementation

1. Does your agency have any unmetered service connections? Yes
   a. If YES, has your agency completed a meter retrofit plan? In the process of complying
   b. If YES, number of previously unmetered accounts fitted with meters during report year: -0-
2. Are all new service connections being metered and billed by volume of use? Yes
3. Are all new service connections being billed volumetrically with meters? Yes
4. Has your agency completed and submitted electronically to the Council a written plan, policy or program to test, repair and replace meters? Yes (CCWD)
5. Please fill out the following matrix:

Account Type	Number of Metered Accounts	Number of Metered Accounts Read	Number of Metered Accounts Billed by Volume	Billing Frequency Per Year	Number of Volume Estimates
a. Single Family	9677	9677	9677	12	-0-
b. Multi-Family	41	41	41	12	-0-
c. Commercial	116	116	116	12	-0-
d. Industrial	2	2	2	12	-0-
e. Institutional	-0-	-0-	-0-	-0-	-0-
f. Landscape Irrigation	108	108	108	12	-0-

B. Feasibility Study

1. Has your agency conducted a feasibility study to assess the merits of a program to provide incentives to switch mixed-use accounts to dedicated landscape meters? No
   a. If YES, when was the feasibility study conducted? (mm/dd/yy)
   b. Describe the feasibility study:
2. Number of CII accounts with mixed-use meters: 8
3. Number of CII accounts with mixed-use meters retrofitted with dedicated irrigation meters during reporting period. -0-

C. "At Least As Effective As"

1. Is your agency implementing an "at least as effective as" variant of this BMP? NO
   a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 05: Large Landscape Conservation Programs and Incentives

Reporting Unit: Diablo Water District | BMP Form Status: **% Complete** | Year: 2008

A. Water Use Budgets

1. Number of Dedicated Irrigation Meter Accounts:	108
2. Number of Dedicated Irrigation Meter Accounts with Water Budgets:	-0-
3. Budgeted Use for Irrigation Meter Accounts with Water Budgets (AF) during reporting year:	-0-
4. Actual Use for Irrigation Meter Accounts with Water Budgets (AF) during reporting year:	-0-
5. Does your agency provide water use notices to accounts with budgets each billing cycle?	No

B. Landscape Surveys

1. Has your agency developed a marketing / targeting strategy for landscape surveys?	Yes (CCWD)
a. If YES, when did your agency begin implementing this strategy?	7/1/1990

b. Description of marketing / targeting strategy: Marketing for this program is primarily done through referrals from property management and landscape management companies. The Water Budget mailings prompt customers to contact CCWD to perform the surveys.

2. Number of Surveys Offered during reporting year.	-0-
3. Number of Surveys Completed during reporting year.	-0-

4. Indicate which of the following Landscape Elements are part of your survey:

a. Irrigation System Check	Yes
b. Distribution Uniformity Analysis	Yes
c. Review / Develop Irrigation Schedules	Yes
d. Measure Landscape Area	Yes
e. Measure Total Irrigable Area	Yes
f. Provide Customer Report / Information	Yes
5. Do you track survey offers and results?	Yes

6. Does your agency provide follow-up surveys for previously completed surveys?

a. If YES, describe below: Follow-up surveys are conducted by CCWD. Surveys requested by customers to get clarification regarding some aspect of the initial survey.

C. Other BMP 5 Actions

1. An agency can provide mixed-use accounts with ETo-based landscape budgets in lieu of a large landscape survey program. Does your agency provide mixed-use accounts with landscape budgets?	No
2. Number of CII mixed-use accounts with landscape budgets.	-0-

Number of CII accounts with mixed-use meters retrofitted with dedicated irrigation meters during reporting period. (From BMP 4 report)

Total number of change-outs from mixed-use to dedicated irrigation meters since Base Year.

3. Do you offer landscape irrigation training? Yes

4. Does your agency offer financial incentives to improve landscape water use efficiency? Yes

Type of Financial Incentive:	Budget (Dollars/ Year)	Number Awarded to Customers	Total Amount Awarded
a. Rebates	-0-	1	$200
b. Loans	-0-	-0-	-0-
c. Grants	-0-	-0-	-0-

5. Do you provide landscape water use efficiency information to new customers and customers changing services? No

a. If YES, describe below:

6. Do you have irrigated landscaping at your facilities? Yes

a. If yes, is it water-efficient? Yes

b. If yes, does it have dedicated irrigation metering? Yes

7. Do you provide customer notices at the start of the irrigation season? Yes

8. Do you provide customer notices at the end of the irrigation season? Yes

D. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? NO

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

E. Comments

BMP 06: High-Efficiency Washing Machine Rebate Programs

Reporting Unit: Diablo Water Dist BMP Form Status: % Complete Year: 2008

A. Coverage Goal

	Single Family	Multi-Family
1. Number of **residential** dwelling units in the agency service area.	0 9677	0 41
2. Coverage Goal =	= 0 Points	

B. Implementation

1. Does your agency offer rebates for **residential** high-efficiency washers? Yes (through CCWD)

HEW Water Factor	Number of Financial Incentives Issued	Total Value of Financial Incentives: Retail Water Agency	Wholesaler/ Grants (if applicable)	Energy Utility (if applicable)	TOTAL	POINTS AWARDED
2. **Greater than 8.5 but not exceeding 9.5** (1 point)	-0-	$ 0	$ 0	$ 0	$ 0	
3. **Greater than 6.0 but not exceeding 8.5** (2 points)	-0-	$ 0	$ 0	$ 0	$ 0	
4. **Less than or equal to 6.0** (3 points)	119	$ 0 $20,825	$ 0	$ 0	$ 0	357
TOTALS:		$20,825 **$ 0**	**$ 0**	**$ 0**	**$ 0**	357 **0**

C. Past Credit Points

For HEW incentives issued before July 1, 2004, select ONE of the following TWO options:

- Method One: Points based on HEW Water Factor
- Method Two: Agency earns 1 point for each HEW.

Method One: Points based on HEW Water Factor

HEW Water Factor	Number of Financial Incentives Issued	Total Value of Water Agency Financial Incentives	POINTS AWARDED
1. **Greater than 8.5 but not exceeding 9.5** (1 point each)		$ 0	
2. **Greater than 6.0 but not exceeding 8.5**		$ 0	

(2 points each)

3. **Less than or equal to 6.0** (3 points each) — $ 0

PAST CREDIT TOTALS:	**$ 0**	**0**

D. Rebate Program Expenditures

1. Average or Estimated Administration and Overhead — $ 0

2. Is the financial incentive offered per HEW at least equal to the marginal benefits of the water savings per HEW?

E. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?

   a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

F. Comments

BMP 07: Public Information Programs

Reporting Unit: Diablo Water Dist | BMP Form Status: % Complete | Year: 2008

A. Implementation

1. How is your public information program implemented? In-house and through CCWD

2. Describe the program and how it's organized: See Comments below

3. Indicate which and how many of the following activities are included in your public information program:

Public Information Program Activity in Retail Service Area	Yes/No	Number of Events
a. Paid Advertising	Yes	10 (CCWD)
b. Public Service Announcement	Yes	300 (CCWD)
c. Bill Inserts / Newsletters / Brochures	Yes	2 (DWD) 7 (CCWD)
d. Bill showing water usage in comparison to previous year's usage	Yes	Monthly
e. Demonstration Gardens	Yes	2 (CCWD)
f. Special Events, Media Events	Yes	2 (DWD) 19 (CCWD)
g. Speaker's Bureau	Yes	15 (CCWD)
h. Program to coordinate with other government agencies, industry and public interest groups and media	Yes	

B. Conservation Information Program Expenditures

1. Annual Expenditures (Excluding Staffing) Covered by CCWD

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

   a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

A large portion of our Public Information Programs are performed by Contra Costa Water District through their Public Affairs Department and their Conservation Department. The promotion of water conservation is communicated through a variety of materials including direct mailings, paid advertising, bill inserts, On-Tap customer newsletters, brochures, water bill messages, demonstration gardens, media events and an active speakers bureau. In addition, Diablo Water District also provides bill inserts, customer newsletters, brochures, water bill messages, and information provided at local events.

BMP 08: School Education Programs

Reporting Unit: Diablo Water District   BMP Form Status: % Complete   Year: 2008

A. Implementation

1. How is your public information program implemented?
   CCWD provides the information regarding this program

2. Please provide information on your region-wide school programs (by grade level):

Grade	Are grade-appropriate materials distributed?	No. of class presentations	No. of students reached	No. of teachers' workshops
Grades K-3rd	Yes	53	2214	-0-
Grades 4th-6th	Yes	29	1968	-0-
Grades 7th-8th	No	-0-	-0-	-0-
High School	No	-0-	-0-	-0-

4. Did your Agency's materials meet state education framework requirements? Yes

5. When did your Agency begin implementing this program? 7/1/1980

B. School Education Program Expenditures

1. Annual Expenditures (Excluding Staffing) Paid through CCWD

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

   a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 09: Conservation Programs for CII Accounts

Reporting Unit: Diablo Water District

BMP Form Status: **% Complete**

Year: 2008

A. Implementation

1. Has your agency identified and ranked COMMERCIAL customers according to use?	Yes
2. Has your agency identified and ranked INDUSTRIAL customers according to use?	Yes
3. Has your agency identified and ranked INSTITUTIONAL customers according to use?	Yes

Option A: CII Water Use Survey and Customer Incentives Program

4. Is your agency operating a CII water use survey and customer incentives program for the purpose of complying with BMP 9 under this option? If so, please describe activity during reporting period: Yes (through CCWD)

CII Surveys	Commercial Accounts	Industrial Accounts	Institutional Accounts
a. Number of New Surveys Offered	-0-	-0-	-0-
b. Number of New Surveys Completed	-0-	-0-	-0-
c. Number of Site Follow-ups of Previous Surveys (within 1 yr)	-0-	-0-	-0-
d. Number of Phone Follow-ups of Previous Surveys (within 1 yr)	-0-	-0-	-0-
CII Survey Components	**Commercial Accounts**	**Industrial Accounts**	**Institutional Accounts**
e. Site Visit	-0-	-0-	-0-
f. Evaluation of all water-using apparatus and processes	-0-	-0-	-0-
g. Customer report identifying recommended efficiency measures, paybacks and agency incentives	-0-	-0-	-0-
Agency CII Customer Incentives	**Budget ($/Year)**	**# Awarded to Customers**	**Total $ Amount Awarded**
h. Rebates	-0-	-0-	-0-
i. Loans	-0-	-0-	-0-
j. Grants	-0-	-0-	-0-
k. Others	-0-	-0-	-0-

Option B: CII Conservation Program Targets

5. Does your agency track CII program interventions and water savings for the purpose of complying with BMP 9 under this option?	No
6. Does your agency document and maintain records on how savings were realized and the method of calculation for estimated savings?	No

7. **System Calculated** annual savings (AF/yr):

CII Programs	# Device Installations
a. Ultra Low Flush Toilets	
b. Dual Flush Toilets	
c. High Efficiency Toilets	
d. High Efficiency Urinals	
e. Non-Water Urinals	
f. Commercial Clothes Washers (coin-op only; not industrial)	
g. Cooling Tower Controllers	
h. Food Steamers	
i. Ice Machines	
j. Pre-Rinse Spray Valves	
k. Steam Sterilizer Retrofits	
l. X-ray Film Processors	

8. **Estimated** annual savings (AF/yr) from agency programs not including the devices listed in Option B. 7., above:

CII Programs	Annual Savings (AF/yr)
a. Site-verified actions taken by agency:	
b. Non-site-verified actions taken by agency:	

B. Conservation Program Expenditures for CII Accounts

	This Year	Next Year
1. Budgeted Expenditures	Covered through CCWD	
2. Actual Expenditures		

C. "At Least As Effective As"

1. Is your agency implementing an "at least as effective as" variant of this BMP?	No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 11: Conservation Pricing

Reporting Unit:	Diablo Water District	BMP Form Status: **% Complete**	Year:	2008

A. Implementation

Water Service Rate Structure Data by Customer Class

1. Single Family Residential		
a. Rate Structure		Uniform
b. Total Revenue from Volumetric Rates	$	6,065,817
c. Total Revenue from Customer Meter/Service (Fixed) Charges	$	1,039,310
2. Multi-Family Residential		
a. Rate Structure		Uniform
b. Total Revenue from Volumetric Rates	$	Included with SF
c. Total Revenue from Customer Meter/Service (Fixed) Charges	$	Included with SF
3. Commercial		
a. Rate Structure		Uniform
b. Total Revenue from Volumetric Rates	$	Included with SF
c. Total Revenue from Customer Meter/Service (Fixed) Charges	$	Included with SF
4. Industrial		
a. Rate Structure		Uniform
b. Total Revenue from Volumetric Rates	$	222,540
c. Total Revenue from Customer Meter/Service (Fixed) Charges	$	12,000
5. Institutional / Government		
a. Rate Structure		N/A
b. Total Revenue from Volumetric Rates	$	
c. Total Revenue from Customer Meter/Service (Fixed) Charges	$	
6. Dedicated Irrigation (potable)		
a. Rate Structure		Uniform
b. Total Revenue from Volumetric Rates	$	Included with SF
c. Total Revenue from Customer Meter/Service (Fixed) Charges	$	Included with SF
7. Recycled-Reclaimed		
a. Rate Structure		N/A
b. Total Revenue from Volumetric Rates	$	
c. Total Revenue from Customer Meter/Service (Fixed) Charges	$	
8. Raw		
a. Rate Structure		N/A
b. Total Revenue from Volumetric Rates	$	

c. Total Revenue from Customer Meter/Service (Fixed) Charges $

9. Other

a. Rate Structure Uniform

b. Total Revenue from Volumetric Rates $ 57,255

c. Total Revenue from Customer Meter/Service (Fixed) Charges $ 4,800

B. Implementation Options

Select Either Option 1 or Option 2:

V= 6,345,612
M= 1,056,110
6,345,612/7,401,722=

0.85%

1. Option 1: Use Annual Revenue As Reported
V/(V+M) >= 70%

V = Total annual revenue from volumetric rates
M = Total annual revenue from customer meter/service (fixed) charges

2. Option 2: Use Canadian Water & Wastewater Association Rate Design Model
V/(V+M) >= V'/(V'+M')
V = Total annual revenue from volumetric rates
M = Total annual revenue from customer meter/service (fixed) charges
V' = The uniform volume rate based on the signatory's long-run incremental cost of service
M' = The associated meter charge

a. If you selected Option 2, has your agency submitted to the Council a completed Canadian Water & Wastewater Association rate design model?

b. Value for **V'** (uniform volume rate based on agency's long-run incremental cost of service) as determined by the Canadian Water & Wastewater Association rate design model:

c. Value for **M'** (meter charge associated with V' uniform volume rate) as determined by the Canadian Water & Wastewater Association rate design model:

C. Retail Wastewater (Sewer) Rate Structure Data by Customer Class

1. Does your agency provide sewer service? (If YES, answer questions 2 - 7 below, else continue to section D.) No

2. Single Family Residential

a. Sewer Rate Structure

b. Annual Revenue Requirement $

c. Total Revenue from Customer Commodity Charges $

3. Multi-Family Residential

a. Sewer Rate Structure

b. Annual Revenue Requirement $

c. Total Revenue from Customer Commodity $

Charges

4. Commercial

a. Sewer Rate Structure	
b. Annual Revenue Requirement	$
c. Total Revenue from Customer Commodity Charges	$

5. Industrial

a. Sewer Rate Structure	
b. Annual Revenue Requirement	$
c. Total Revenue from Customer Commodity Charges	$

6. Institutional / Government

a. Sewer Rate Structure	
b. Annual Revenue Requirement	$
c. Total Revenue from Customer Commodity Charges	$

7. Recycled-reclaimed water

a. Sewer Rate Structure	
b. Annual Revenue Requirement	$
c. Total Revenue from Customer Commodity Charges	$

D. "At Least As Effective As"

1. Is your agency implementing an "at least as effective as" variant of this BMP?

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

E. Comments

BMP 12: Conservation Coordinator

Reporting Unit: Diablo Water Dist BMP Form Status: **% Complete** Year: 2008

A. Implementation

1. Does your Agency have a conservation coordinator? Yes
2. Is a coordinator position supplied by another agency with which you cooperate in a regional conservation program ? Yes
   - a. Partner agency's name: Contra Costa Water District (CCWD)
3. If your agency supplies the conservation coordinator:
   - a. What percent is this conservation coordinator's position? 20 %
   - b. Coordinator's Name Paul Urenda and Christine Belleci
   - c. Coordinator's Title Superintendent of Operations and Administrative Assist.
   - d. Coordinator's Experience in Number of Years P. Urenda (20 years) C. Belleci (2 years)
   - e. Date Coordinator's position was created (mm/dd/yyyy) Separate position not created. Listed under Job Descriptions
4. Number of conservation staff (FTEs), including Conservation Coordinator. 2

B. Conservation Staff Program Expenditures

1. Staffing Expenditures (In-house Only)
2. BMP Program Implementation Expenditures

C. "At Least As Effective As"

1. Is your agency implementing an "at least as effective as" variant of this BMP? No
   - a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 13: Water Waste Prohibition

Reporting Unit: Diablo Water Dist   BMP Form Status: % Complete   Year: 2008

A. Requirements for Documenting BMP Implementation

1. Is a water waste prohibition ordinance in effect in your service area? Yes

   a. If YES, describe the ordinance:

   DWD Regulations 8 and 9 Attached

2. Is a copy of the most current ordinance(s) on file with CUWCC? No

   a. List local jurisdictions in your service area in the first text box and water waste ordinance citations in each jurisdiction in the second text box:

   Oakley   Regulations 8 and 9

B. Implementation

1. Indicate which of the water uses listed below are prohibited by your agency or service area.

a. Gutter flooding	Yes
b. Single-pass cooling systems for new connections	Yes
c. Non-recirculating systems in all new conveyor or car wash systems	Yes
d. Non-recirculating systems in all new commercial laundry systems	Yes
e. Non-recirculating systems in all new decorative fountains	Yes
f. Other, please name	No

2. Describe measures that prohibit water uses listed above: Refer to Regulations 8 and 9

Water Softeners:

3. Indicate which of the following measures your agency has supported in developing state law:

a. Allow the sale of more efficient, demand-initiated regenerating DIR models.	Yes
b. Develop minimum appliance efficiency standards that:	Yes
i.) Increase the regeneration efficiency standard to at least 3,350 grains of hardness removed per pound of common salt used.	Yes
ii.) Implement an identified maximum number of gallons discharged per gallon of soft water produced.	Yes
c. Allow local agencies, including municipalities and special districts, to set more stringent standards and/or to ban on-site regeneration of water softeners if it is demonstrated and found by the agency governing board that there is an adverse effect on the reclaimed water or groundwater supply.	Yes

4. Does your agency include water softener checks in home water audit programs? Yes

5. Does your agency include information about DIR and exchange-type water softeners in educational efforts to encourage replacement of less efficient timer models? Yes

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant No

of this BMP?

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 14: Residential ULFT Replacement Programs

Reporting Unit: Diablo Water Dist BMP Form Status: Year: 2008

% Complete

A. Implementation

Number of Non-Efficient Toilets Replaced With 1.6 gpf Toilets During Report Year

	Single-Family Accounts	Multi-Family Units
1. Does your Agency have program(s) for replacing high-water-using toilets with ultra-low flush toilets?	No	No
Replacement Method	**SF Accounts**	**MF Units**
2. Rebate	-0-	-0-
3. Direct Install	-0-	-0-
4. CBO Distribution	-0-	-0-
5. Other	-0-	-0-
Total	-0-	-0-

Number of Non-Efficient Toilets Replaced With 1.28 gpf High-Efficiency Toilets (HETs) During Report Year

	Single-Family Accounts	Multi-Family Units
6. Does your Agency have program(s) for replacing high-water-using toilets with ultra-low flush toilets?	Yes	Yes
Replacement Method	**SF Accounts**	**MF Units**
7. Rebate	13	-0-
8. Direct Install	-0-	-0-
9. CBO Distribution	-0-	-0-
10. Other	-0-	-0-
Total	13	-0-

Number of Non-Efficient Toilets Replaced With 1.2 gpf HETs (Dual-Flush) During Report Year

	Single-Family Accounts	Multi-Family Units
11. Does your Agency have program(s) for replacing high-water-using toilets with ultra-low flush toilets?	No	No
Replacement Method	**SF Accounts**	**MF Units**
12. Rebate	-0-	-0-
13. Direct Install	-0-	-0-
14. CBO Distribution	-0-	-0-
15. Other	-0-	-0-
	-0-	-0-

Total

16. Describe your agency's ULFT, HET, and/or Dual-Flush Toilet programs for single-family residences. See Comments below

17. Describe your agency's ULFT, HET, and/or Dual-Flush Toilet programs for multi-family residences. The MF Direct install program provided 1.0 gpf pressure assist HETs.

18. Is a toilet retrofit on resale ordinance in effect for your service area? No

19. List local jurisdictions in your service area in the left box and ordinance citations in each jurisdiction in the right box:

B. Residential ULFT Program Expenditures

1. Estimated cost per replacement: $ 225

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

Most of the MF HETs were 1.0 gpf pressure assisted toilets. Some of the SF HETs were dual flush toilets.

16. Residential customers can receive a $175 rebate for replacing a high volume (=/>3.5 gpf) with an HET. Goat is both immediate savings and long term market transformation. These rebates are provided through CCWD.

Appendix J

Department of Water Resources AB 1420

Self-Certification Statement

Dwr

DEPARTMENT OF WATER RESOURCES
1416 NINTH STREET, P.O. BOX 942836
SACRAMENTO, CA 94236-0001
(916) 653-5791

FCEIV
JUN 14 2010
LO WATER DISTRICT

June 10, 2010

Mr. Mike Yeraka
Diablo Water District
2107 Main Street
Post Office Box 127
Oakley, California 94561

Dear Mr. Yeraka:

The Department of Water Resources (DWR) has reviewed the Diablo Water District (DWD) Self-Certification Statement – Table 1 submitted on May 27, 2010, regarding implementation of the Urban Best Management Practices (BMPs).

The purpose of DWR's review is to determine eligibility of DWD to receive water management grant or loan funds. DWR has followed the *Draft AB 1420 Compliance Requirements* dated June 1, 2009. For detailed information, please visit http://www.water.ca.gov/wateruseefficiency/finance/.

Based on DWR's review of the information in Table 1, DWD has and is currently implementing the BMPs consistent with AB 1420 and, therefore, is eligible to receive water management grant or loan funds.

DWR reserves the right to request additional information and documentation, including reports from DWD to substantiate the accuracy of the information provided in Table 1. DWR may reverse or modify its eligibility determination and notify you and the funding agency if inaccuracies are found in the supporting documentation or in Table 1.

If you have any questions, please contact me at (916) 651-9666 or Jodi Evans at (916) 651-7026.

Sincerely,

B. Davidoff

Baryohay Davidoff
Water Use Efficiency Section Chief

www.cdm.com