Volume II D

Jurupa Community Services District

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1.0 INTRODUCTION

1.1 Overview

The Chino Groundwater Basin (Basin) Dry-Year Yield (DYY) Program Expansion (Program Expansion) is a comprehensive water resources management program to maximize conjunctive-use opportunities in the Basin. Program Expansion details are provided in a two-volume Project Development Report (PDR). Volume I traces the development of the original DYY Program, describes the Program Expansion, and presents the technical, financial, and institutional framework within which individual projects will move forward. Volume II consists of 10 lettered sub-volumes (A-J) defining facilities to be developed by the Program Expansion's ten participating appropriators. This Volume II D describes proposed facilities for Jurupa Community Services District (JCSD). Chapter 2 provides conceptual development of the groundwater production wells required for JCSD to participate in the Program Expansion. An Opinion of Probable Cost is also presented. This Introduction Chapter provides background information on the DYY Program, the Program Expansion, and the JCSD system.

1.2 Evolution of DYY Program and Program Expansion

The Program Expansion is being developed by the Chino Basin Watermaster (Watermaster) in association with the Inland Empire Utilities Agency (IEUA), Metropolitan Water District of Southern California (Metropolitan), Three Valleys Municipal Water District (TVMWD), and Western Municipal Water District (WMWD). Table 1-1 summarizes the history and evolution of the Expansion Program, which could provide an additional 17,000 acre-feet (acre-ft) of groundwater for dry-year use.

Table 1-1
Evolution of Chino Basin DYY Program Expansion*

Item	Description	Comments
Chino Basin Optimum Basin Management Program (OBMP)	Developed in response to a 1998 court ruling governing water use in the Basin (Chino Judgment). The Judgment was a continuation of a 1978 ruling providing a legal definition for the Basin and establishing a court-appointed Watermaster.	OBMP objectives are to enhance Basin water supplies, protect and enhance water quality, enhance Basin management, and provide equitable financing. Of the OBMP's nine Program Elements, three are applicable to the Expansion Program: Salt Management (7), Groundwater Storage Management (8), and Conjunctive-use (9).
DYY Program	Conjunctive-use program initiated in 2002 among Metropolitan, IEUA, Watermaster, and participating Basin appropriators. IEUA, which manages the distribution of imported water to Basin appropriators, acts as liaison between Watermaster and Metropolitan.	The Program provides for 100,000 acre-ft of water through in-lieu exchange and direct recharge of surplus Metropolitan imported supplies. Water can be "put" into and "taken" out of the Basin at a maximum rate of 25,000 acre-feet per year (afy) and 33,000 afy, respectively.
DYY Program Expansion	Expansion of 2002 DYY Program to produce up to 17,000 afy of additional groundwater for dry-year use, in-lieu of imported water.	Each of the participating appropriators will contribute a portion of the 17,000 acre-ft of additional dry-year yield or necessary "puts" into the Basin.

* Additional details are provided in PDR Volume I.

1.3 Documentation

IEUA assembled the consultant team for both the DYY Program and the Program Expansion. Both Programs have been accomplished through a series of cooperative activities working extensively with Watermaster and the Basin appropriators. From this collaboration, several reports, technical memoranda (TMs), and computer models were produced, which served as the framework of this PDR.

The PDR is organized into four volumes. Volumes I and II, prepared by Black & Veatch (B&V), provide general information on the DYY Program Expansion. Volume I presents background information on the Basin and Program operation, while Volume II presents design criteria specific to each participating agency. Volume III, the Preliminary Modeling Report prepared by Wildermuth Environmental, Inc. (WEI), presents results of a groundwater model used to evaluate the water resources impacts of the DYY Program on the Basin. Volume IV presents the California Environmental Quality Act (CEQA) documentation conducted for this project and was prepared by Tom Dodson & Associates (TDA).

1.4 Summary of Program Participants

Volume II describes the specific site requirements and design criteria for the proposed facilities required to provide the 17,000 acre-ft of additional dry-year yield. Table 1-2 lists the appropriators and the corresponding PDR volume which identifies their project-specific facilities. Construction of these facilities is required for full Program implementation.

Table 1-2
Summary of Program Participants and Facility Requirements

Agency/PDR Volume	Facility Requirements
Chino (II A)	▸ Regenerable ion exchange (IX) treatment at existing Well Nos. 3 and 12 ▸ Aquifer Storage and Recovery (ASR) Site at Well No. 14: Regenerable IX treatment at existing Well No. 14 and replacement of existing Chino agriculture well for injection
Chino Hills (II B)	▸ Convert existing Well No. 19 to ASR
Cucamonga Valley Water District (II C)	▸ Four new ASR wells
Jurupa Community Services District (II D)	▸ New Well No. 27 ("Galleano Well") ▸ New Well No. 28 ("Oda Well") ▸ New Well No. 29 ("IDI Well")
Monte Vista Water District (II E)	▸ New ASR well and regenerable IX treatment ▸ Rehabilitate existing Well No. 2 and regenerable IX treatment ▸ Regenerable IX treatment at existing ASR Well No. 4 and Well No. 27 ▸ Conveyance facilities to deliver water from Monte Vista Water District (MVWD) via Chino Hills to Walnut Valley Water District Service Areas
Ontario (II F)	▸ Conveyance facilities to establish interconnection with Cucamonga Valley Water District (CVWD)
Pomona (II G)	▸ Regenerable IX treatment at existing Reservoir No. 5 site
Upland (II H)	▸ New well in Six Basins
Three Valleys Municipal Water District (II I)	▸ Treated water pipeline from Water Facilities Authority (WFA) Water Treatment Plant (WTP) to Miramar WTP ▸ Turnout along Azusa-Devil Cyn Pipeline
Western Municipal Water District (II J)	▸ Conveyance facilities to establish interconnection between planned Riverside-Corona (RC) Feeder and JCSD service area ▸ Conveyance pipeline to establish interconnection between WMWD service area and Chino II Desalter

1.5 Conceptual Design Assumptions

Facilities described in Volume II were designed based upon information available and using the following general design assumptions:

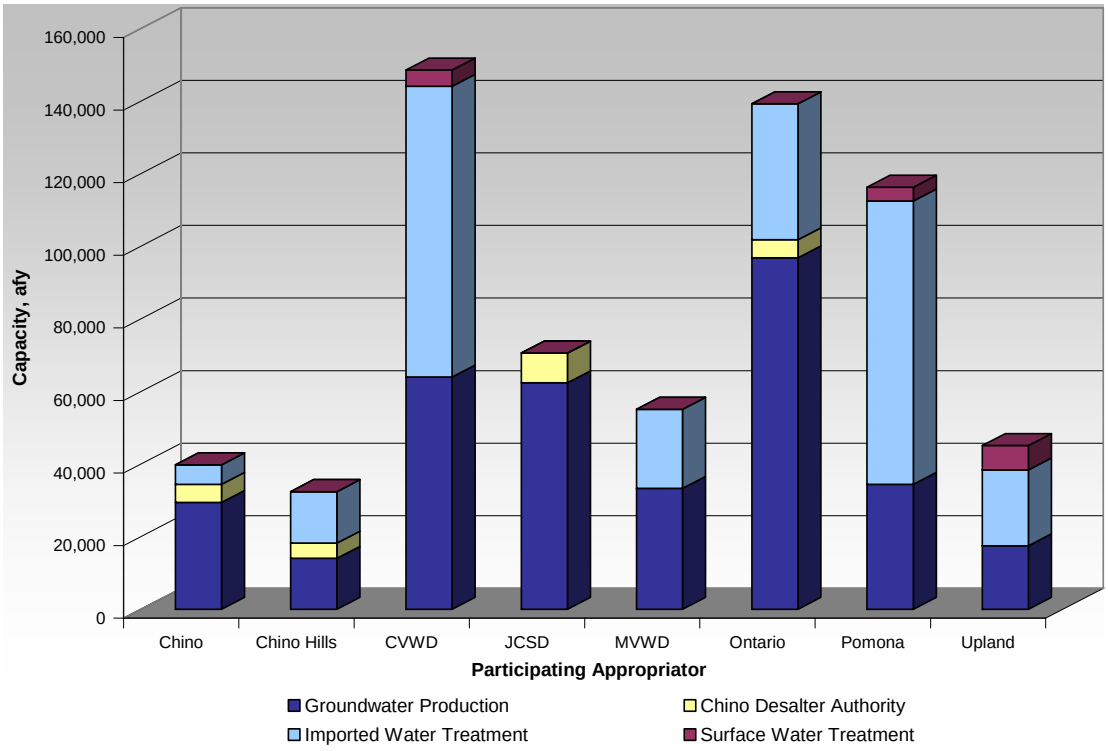
- Elevations were based upon United States Geological Survey (USGS) maps and maps obtained online from Google® Earth and are estimated to be accurate to within 10 percent of the actual elevation. Topographical surveys would be performed as part of the final design.
- Typical engineering calculations and assumptions were used to develop preliminary sizing for equipment and IX facilities. The final designs may vary slightly dependent upon results of the Title 22 water quality testing as well as detailed discussions with IX resin manufacturers.
- Conceptual designs assumed to not have significant permitting restrictions. Investigations of potential permit requirements for each project would be carried out during final design.

- Brine discharge to the non-reclaimable waste (NRW) system was assumed to not have a significant impact on NRW system capacity. The available capacity of the NRW system would be evaluated during final design.
- Groundwater levels and flows, anticipated drawdown from well operation and location, and concentration of contaminants was based upon available data provided by WEI based upon their recent modeling efforts.
- Facilities to be constructed on agency or city property were assumed to not require additional land purchase. In addition, pipelines constructed in city or county streets were assumed to be within the right-of-way limits.
- The opinion of probable cost is intended to provide a budgetary estimate of the capital and operational costs. Detailed quantity and unit cost figures for the facilities would depend on specific manufacturer equipment and prices.

1.6 Facility Requirements

An investigation ("Asset Inventory") consisting of several meetings and site visits was conducted to determine the condition of existing facilities and production capacities of each participating appropriator. The Asset Inventory presents a comprehensive list of the facilities available for each appropriator and identifies each participating appropriator's groundwater production capabilities and imported water treatment capacity. The results of the Asset Inventory are discussed in Volume I, Appendix A. Figure 1-1 summarizes Asset Inventory results.

Figure 1-1
Water Resource Capacities for Participating Appropriators[(1)(2)]



Notes:
(1) Participating Appropriators include current Basin appropriators interested in participating in the DYY Program Expansion. This does not include agencies outside the Basin, such as TVMWD and WMWD.
(2) Does not include recycled water deliveries provided by IEUA.

Table 1-3 lists potential Program participants and each agency's potential "put" and/or "take" contribution. The combined "take" capacity of these agencies ranges from 15,000 to 17,000 afy. The combined "put" capacity of these agencies is approximately 12,300 to 16,800 afy of direct capacity plus Basin-wide in-lieu deliveries and surface spreading contributions.

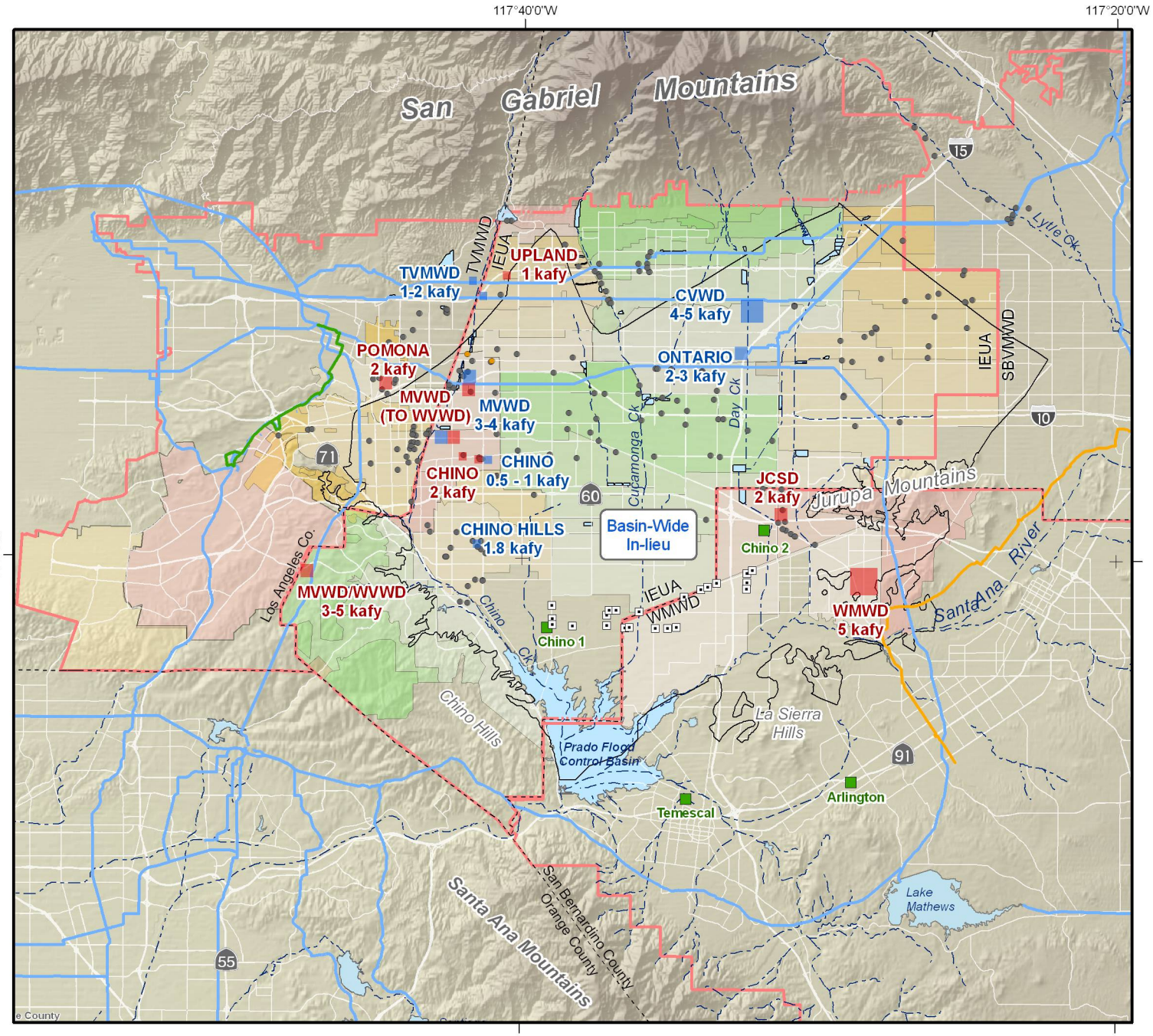
Table 1-3
Summary of Initial and Expanded DYY Program Participants and Proposed Put/Take Capacities

Agency	Initial DYY Program [1]		DYY Program Expansion [2]	
	Put Capacity (afy)	Take Capacity (afy)	Put Capacity (afy) [4]	Take Capacity (afy) [6]
Chino	(3)	1,159	500-1,000	2,000
Chino Hills[5]		1,448	1,800	0
Cucamonga Valley Water District		11,353	4,000-5,000	0
Jurupa Community Services District		2,000	0	2,000
Monte Vista Water District		3,963	3,000-4,000	3,000-5,000
Ontario		8,076	2,000-3,000	0
Pomona		2,000	0	2,000
Upland		3,001	0	1,000
Three Valleys Municipal Water District		0	1,000-2,000	0
Western Municipal Water District		0	0	5,000
Total	25,000	33,000	12,300 – 16,800	15,000 – 17,000

Notes:
(1) Initial 100,000 acre-ft DYY Program includes maximum 25,000 afy "put" over a four-year period of surplus water and a maximum 33,000 afy "take" over a three-year dry period.
(2) DYY Program Expansion includes increases in total storage, "put" capacity, and "take" capacity.
(3) "Puts" for the initial DYY Program are accomplished by a combination of direct recharge and in-lieu deliveries.
(4) Does not include basin-wide in-lieu deliveries and direct recharge.
(5) MVWD assumed Chino Hills' shift obligation of 1,448 afy per an amendment to the agreement between the agencies dated March 5, 2007.
(6) Post modeling, adjusted take capacities. See Volume III for details.

Figure 1-2 shows the locations of each agency's proposed facilities and/or locations where potential "puts" and "takes" could occur within the Basin. As the figure demonstrates, the "puts" and "takes" may be balanced on the east and west sides of the Basin. Through groundwater modeling, Program operations were evaluated to determine the potential for material physical injury to a party of the Chino Judgment or to the Chino Basin as required by the Peace Agreement, (refer to Volume III, Program Modeling Report).

Therefore, while the Basin has adequate storage capacity, any increases in groundwater production during dry years would likely require additional production capacity and/or groundwater treatment. Groundwater treatment during dry years will contribute to the long term sustainable use of the Basin. A further discussion of the Basin Operations Plan is provided in Volume I.



Proposed DYY Facilities

"PUT" Facility (12.3-16.8 kafy+basin-wide in-lieu)

"TAKE" Facility (15-17 kafy)

Imported Water Pipelines

Major Pipelines

Riverside Corona Feeder Pipeline

PWR Pipelines

Other Features

Appropriator Well

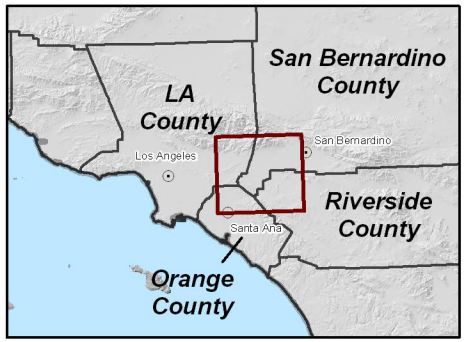
ASR Well

Desalter Well

Desalter Facility

Flood Control/Conservation Basins

Streams, Rivers, and Channels



Proposed DYY Participants and Put/Take Locations

Figure 1-2

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Author: MJC
Date: 20081209
File: Figure_1-2.mxd

0 1 2 3 4 Miles

0 2 4 KM

Prepared For:

BLACK & VEATCH Corporation

Inland Empire Utilities Agency

Western Municipal Water District

Three Valleys Municipal Water District

Chino Basin Watermaster

1.6.1 Water Resources, Historical Water Use, and Shift Obligation for JCSD

The Asset Inventory data summarizing JCSD's existing water resources capabilities is provided in Table 1-4. The complete Asset Inventory is provided in Appendix A of Volume I. The results of the Asset Inventory indicate that JCSD utilizes 7.3 million gallons per day (mgd) (8,200 afy) of treated water, pumps 52.8 mgd (59,197 afy) of water from the Basin and uses a total of 62.9 mgd (70,623 afy).

Table 1-4
Existing Water Resource Capacities for JCSD

Water Resource	JCSD Capacity, mgd (afy)
TREATED WATER	
Local Surface Water	
Subtotal	0 (0)
Imported Metropolitan Water	
Subtotal	0 (0)
Groundwater	
Chino I Desalter(1)	2.4 (2,700)
Chino II Desalter (2)	4.9 (5,500)
Subtotal	7.3 (8,200)
Total Treated Water	7.3 (8,200)
GROUNDWATER	
Chino Basin Wells(3)	52.8 (59,197)
Non-Chino Basin Wells(3)	2.8 (3,226)
Total Groundwater	55.6 (62,423)
TOTAL WATER RESOURCES	**62.9 (70,623)**

Notes:
(1) Values include the expected expansion of Chino I Desalter. Desalter I also supplies Santa Ana River Water Company.
(2) Desalter II also supplies City of Norco and Santa Ana River Water Company.
(3) Accounts for all well production capacity, regardless of water quality.

Historically the majority of JCSD's 70,623 acre-ft of water usage was Basin groundwater. Based on historical imports and on future growth projections, JCSD has elected to contribute 2,000 afy towards the 23,000 afy requirement of the DYY Program Expansion. To achieve its contribution obligation, JCSD has proposed to add additional production wells to increase its pumping capability, thus decreasing its take from the Chino I and Chino II Desalter as an in-lieu shift. The new facilities are described in more detail in Chapter 2.

1.6.2 Program Expansion Facility Requirements

The proposed facilities would be located within the 1110 ft pressure zone on a dedicated parcel of land (shown in Chapter 2) and would be surrounded by a concrete block wall. The well capacity of each new well is projected to be 3,500 gallons per minute (gpm), with a 400-600 horsepower (HP) range motor and a dedicated Motor Control Center (MCC).

The diameter of the wells would be 20 inches with a copper-bearing steel casing, 400 foot depth, and a screened interval beginning at approximately 280 feet.

1.6.2.1 Well 27 - Galleano Well

The site for the Galleano Well (Well No. 27) is 0.43 acres and is located on a small parcel south of Highway 60, north of Riverside Drive, east of Wineville Avenue, and west of Etiwanda Avenue. The zoning for this site is M-M (Manufacturing – Medium) and is designated as a LI (Light Industrial) area by the Jurupa Area Plan (JAP).

Extracted water would be delivered to the existing JCSD system through a new 30-inch transmission pipeline that would connect to a 30-inch, 870 ft pressure zone pipeline at the intersection of Wineville Avenue and Bellegrave Avenue. The well piping required to connect to the new transmission pipeline would be approximately 100-foot long, 16-inch diameter pipe, to reach the connection point in Riverside Drive. The 30-inch transmission pipeline to convey the flow from the site boundary to the existing 30-inch pipeline at Bellegrave Avenue is not included in this project.

1.6.2.2 Well 28 – Oda Well

The site for the Oda Well (Well No. 28) is 0.40 acres, and is located on a small parcel south of Highway 60, North of Riverside Drive, and west of Wineville Avenue. The zoning was determined to be IP (Industrial Park) and also labeled as an LI area by the JAP.

Extracted water would be delivered to the existing JCSD system through a new 30-inch transmission pipeline that would connect to a 30-inch, 870 foot pressure zone pipeline at the intersection of Wineville Avenue and Bellegrave Avenue. The well piping required to connect to the new transmission pipeline would be approximately 170-foot long, 16-inch diameter pipe, to reach the connection point in Riverside Drive. The 30-inch transmission pipeline to convey the flow from the site boundary to the existing 30-inch pipeline at Bellegrave Ave is not included in this project.

1.6.2.3 Well 29 – IDI Well

The site for the IDI Well (Well No. 29) is located on a small parcel east of Interstate 15, south of Highway 60, west of Wineville Avenue, and immediately north of Cantu Galleano Ranch Road. The well site is located near an agricultural and industrial area.

Extracted water would be delivered to the existing JCSD system through a new 30-inch transmission pipeline that would connect to a 30-inch, 870 foot pressure zone pipeline at the intersection of Wineville Avenue and Bellegrave Avenue. The well piping required to connect to the new transmission pipeline would be approximately 75-foot long, 16-inch diameter pipe, to reach the connection point in Cantu-Galleano Ranch Road. The 30-inch transmission pipeline to convey the flow from the site boundary to the existing 30-inch pipeline at Bellegrave Avenue is not included in this project.

1.7 Abbreviations and Acronyms

The following abbreviations/acronyms are used in this report:

acre-ft	acre-feet
AFD	adjustable frequency drive
afy	acre-feet per year
AOPs	advanced oxidation processes
ASR	aquifer storage and recovery
B&V	Black & Veatch
Basin	Chino Basin
BAT	best available technology
bgs	below ground surface
ft/day	feet per day
CEQA	California Environmental Quality Act
CVWD	Cucamonga Valley Water District
DYY	Dry-Year Yield
DYY Program	initial Chino Basin Dry-Year Yield Program
DYY Program Expansion	Chino Basin Dry-Year Yield Program Expansion
gpm	gallons per minute
gpm/ft	gallons per minute per foot
HP	horse power
IEUA	Inland Empire Utilities Agency
IP	Industrial Park
IX	Ion Exchange
JAP	Jurupa Action Plan
JCSD	Jurupa Community Services District
Judgment	Chino Basin Municipal Water District vs. the City of Chino et al. (1978)
LACSD	Los Angeles County Sanitation District
LI	Light Industrial
MCC	motor control center
mgd	million gallons per day
Metropolitan	Metropolitan Water District of Southern California
M-M	Manufacturing-Medium
MVWD	Monte Vista Water District
NRW	Non-Reclaimable Waste or Wastewater
OBMP	Optimum Basin Management Program
PDR	project development report
Program	DYY Program, DYY Program Expansion
Program Expansion	Chino Basin Dry-Year Yield Program Expansion
RC	Riverside-Corona
TDA	Tom Dodson & Associates
TDH	total dynamic head
TEFC	totally enclosed fan-cooled
TM	technical memorandum

TVMWD	Three Valleys Municipal Water District
USGS	United States Geological Survey
Watermaster	Chino Basin Watermaster
WEI	Wildermuth Environmental, Inc.
WFA	Water Facilities Authority
WTP	water treatment plant
WMWD	Western Municipal Water District

1.8 References

General references are listed in Volume I, Section 1.9. Agency-specific references for the facilities listed in this Volume II D are shown below.

[JCSD, 2008] *Evaluation of Alternative Raw Water Sources and Transmission Facilities*, prepared for Jurupa Community Services District, Boyle Engineering Corporation, February 2008.

[JCSD, 2008] *General Pump Summary Well 10*, prepared for Jurupa Community Services District, Pacific Surveys, February 2008.

[JCSD, 2008] *Initial Study/Mitigated Negative Declaration for Jurupa Community Services District's Proposed Galleano and Oda Wells and Pipeline Project*, prepared for Jurupa Community Services District, Webb Associates, June 2008.

[JCSD, 2008] *Proposal for Design Engineering Services for the Drilling of Proposed Galleano and Oda Wells*, prepared for Jurupa Community Services District, Webb Associates, June 2008.

[JCSD, 2008] *Proposal to Provide Geohydrologic Services Related to Construction of Wells*, prepared for Jurupa Community Services District, Geoscience, June 2008.

[JCSD, 2006] *Technical Cross Section Well 25*, prepared for Jurupa Community Services District, Boyle Engineering Corporation, July 2006.

[JCSD, 2006] *Drinking Water Source Protection Permit for Jurupa Community Serviced District Well 25*, prepared for Jurupa Community Services District, Geoscience, July 2006.

[JCSD, 1991] *Well Data Sky Well No. 1*, Jurupa Community Services District, July 1991.

[JCSD, 1984] *Well Data Sky Well No. 3*, Jurupa Community Services District, October 1984.

[JCSD, 1977] *Well Data Sky Well No. 2*, Jurupa Community Services District, June 1977.

2.0 GROUNDWATER PRODUCTION WELLS

2.1 Overview

This chapter describes the location and facilities for the addition of three groundwater production wells which would enable JCSD to meet its proposed DYY Program Expansion shift obligation. All three wells are located in the 1,110 ft pressure zone and will pump flows through a new conveyance pipeline to a connection at Bellegrave Avenue and Wineville Road in the 870 ft pressure zone; Figure 2-1 presents a vicinity map for the well locations.

Land acquisition for the new wells will necessitate continuation of ongoing negotiations with property owners to finalize locations. The Galleano Well (Well No. 27) is located south of Highway 60, north of Riverside Drive, east of Wineville Avenue, and west of Etiwanda Avenue. The Oda Well (Well No. 28) is located on a small parcel south of Highway 60, North of Riverside Drive, and west of Wineville Avenue. The IDI Well (Well No. 29) is located east of Interstate 15, south of Highway 60, west of Wineville Avenue, and immediately north of Cantu Galleano Ranch Road.

2.2 Groundwater Supply and Water Quality

2.2.1 Historical Groundwater and Operating Conditions

Historic groundwater elevations and operating conditions were investigated for several area wells to approximate the static and dynamic groundwater elevations for the new wells. The information presented in the following chapters was derived from drilling and testing logs for area wells provided by JCSD and the Watermaster.

Table 2-1 presents the historic groundwater elevations and capacities for existing wells in the vicinity of the new well locations. Available data from historical use records of the wells was investigated and reviewed to confirm the production rate, drawdown, specific capacity, and screened interval for the proposed new wells. The data in Table 2-1 was used to develop the operating conditions of the new wells.

Additional weight was given to wells in closer proximity and with more recent data available. A constant hydraulic gradient was assumed and static water elevations from Sky Well No. 3 and Well No. 25 were used as the closest in vicinity to define the change in water surface elevation. Static water levels in the new wells were found by locating the wells on the gradient and determining the change in elevation by distance from Well No. 25 at the top of the slope.

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Chino Basin Dry Year Yield Program Expansion Project

Jurupa Community Services District – Galleano, IDI & Oda Wells

Figure 2-1

Table 2-1
Historical Operating Conditions [1]

Operating Conditions	Sky Well No. 1	Sky Well No. 2	Sky Well No. 3	Well No. 25
Production Capacity, gpm	1,000	300	500	4,000
Est. Avg. Static Groundwater Elev., ft bgs [2]	91	122	139	192
Estimated Average Drawdown, feet [3]	25	6	4	42
Approximate Specific Capacity, gpm/ft [4]	40	50	125	95

Notes:
(1) Estimated groundwater and drawdown water level data provided by JCSD, 2008, via the most recent testing logs and well drilling reports.
(2) Feet, below ground surface (bgs).
(3) Drawdown is the difference between static and dynamic groundwater elevations.
(4) Gallons per minute per foot of drawdown.

2.2.2 Expected Operating Conditions and Well Performance

Table 2-2 presents the anticipated operating conditions and performance for the new wells based on the data from Table 2-1. For planning purposes, each new well would have a production capacity of approximately 3,500 gpm. The static groundwater levels for the proposed wells were found using linear extrapolation between the Sky Well No. 3 and Well No. 25 and assuming a constant change in depth of the groundwater table.

Table 2-2
Anticipated Operating Conditions

Conditions	IDI	ODA	Galleano
General Conditions			
Basis for Operating Conditions, Well No.	Sky 1-3/25	Sky 1-3/25	Sky 1-3/25
Distance from Basis Well Above, miles	<2.5	<2.5	<2.5
Location (Intersection)	Riverside/ Wineville	Riverside/ Wineville	Cantu-Galleano Ranch/ Wineville
Site Elevation, feet amsl [1]	740	790	785
Well HGL/Delivery Zone, feet amsl	870	870	870
Operating Conditions			
Production Capacity, gpm	3,500	3,500	3,500
Est. Avg. Static Groundwater Elev., ft bgs	152	179	179
Assumed Specific Capacity, gpm/ft	88	88	88
Calculated Estimated Drawdown, feet	40	40	40

Notes:
(1) Above mean sea level (amsl).

2.2.3 Anticipated Water Quality

Based on water quality data in the area, JCSD does not anticipate needing treatment at this time except standard disinfection using sodium hypochlorite at the wellhead. It is recommended that water quality testing for drinking water, pursuant to the California Code of Regulations Title 22, be conducted after drilling to establish the actual water quality of each well.

If the groundwater raw water quality is determined to require treatment, then the water will be conveyed to the Roger D Teagarden IX Plant for treatment prior to entering the distribution system; this could necessitate plant expansion that would require funding.

2.3 Well Drilling and Development

Before the new wells can be drilled and developed, each site would need to be cleared and graded. Once each site has been prepared, a new pilot bore hole would be drilled and then reamed to the specified diameter. Selection of screening elevation and seal depths would be determined during final design.

Casing would be installed the full length of the well and would be copper-bearing steel, with a minimum wall thickness of 5/16-inch. Total length of louvered casing (i.e., screening) and the depth interval where it would be installed would be determined during final design. Gravel pack would be installed along entire length of screening depth interval. A cement grout seal would be installed from ground level to a minimum specified depth.

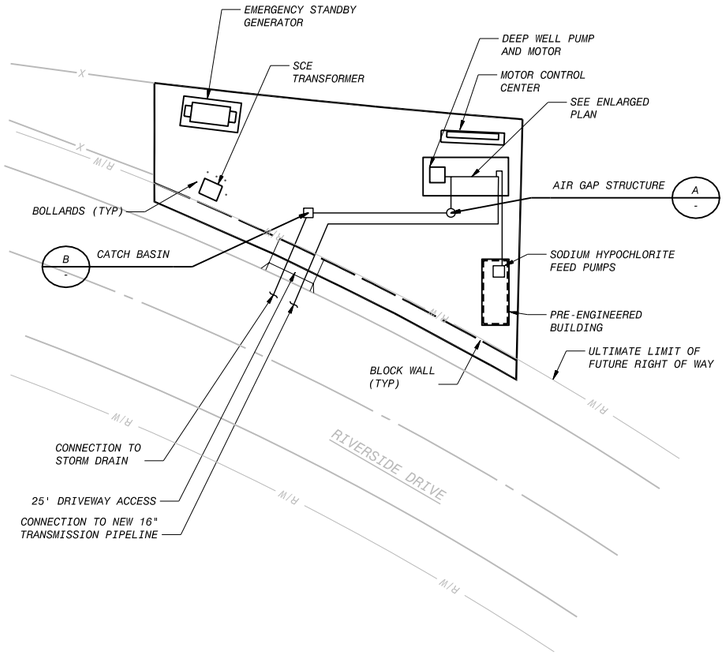
Requirements for a sounding pipe, permanent gravel feed line, or air vent tube would be evaluated during final design.

2.4 Well Facilities and Wellhead Equipment

New wellhead facilities would be provided including a wellhead pump and motor and electrical and control equipment. Discharge and blow-off piping as shown on Figures 2-2 through 2-4 would be installed as would storage facilities, power generation facilities and an onsite transformer.

2.4.1 Well Pump and Motor

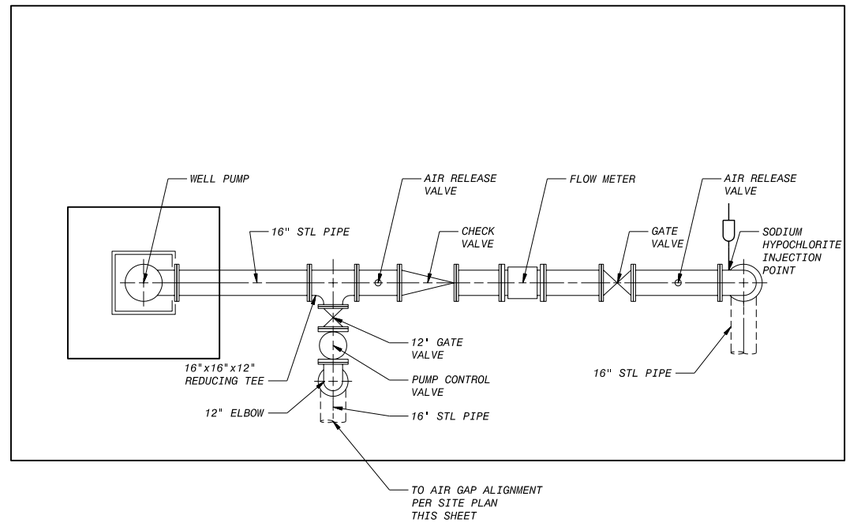
The wellhead pump at each well would be a multistage vertical turbine with an electric motor located above ground. The drive shaft would be water lubricated, and a pre-lubrication of the line shaft bearings would be provided during the pump startup. Based on the anticipated operating conditions, preliminary pump performance design criteria were developed for the expected production as presented in Table 2-3.



SITE PLAN

40' 20' 0 40' 80'

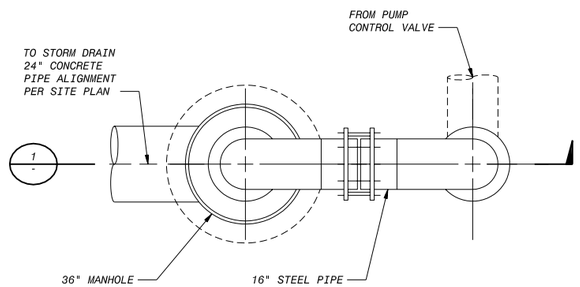
1"=80'



ENLARGED PLAN

4' 2' 0 4' 8'

1/8"=1'-0"

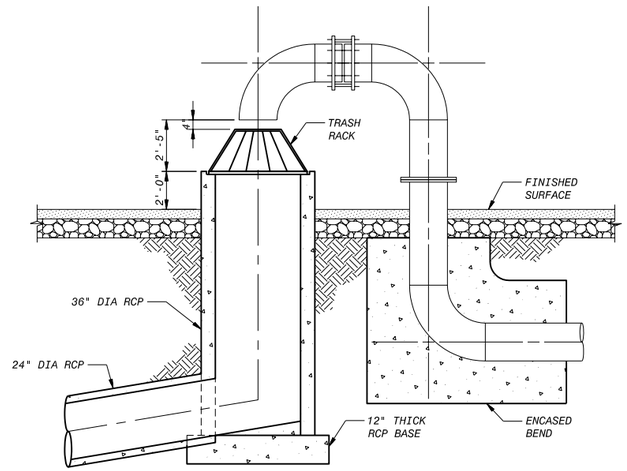


AIR GAP STRUCTURE

DETAIL A

12" 6" 0 1' 2' 3' 4' 5'

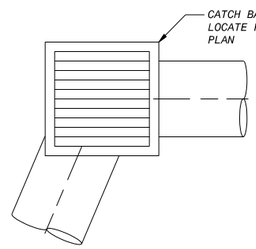
1/4"=1'-0"



SECTION 1

4' 2' 0 4' 8'

1/8"=1'-0"



CATCH BASIN

DETAIL B

12" 6" 0 1' 2' 3' 4' 5'

1/4"=1'-0"

CONCEPTUAL - NOT FOR CONSTRUCTION

NO.	BY	CK	APP	DATE	REVISIONS AND RECORD OF ISSUE

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Irvine, California

CHINO BASIN DYY PROGRAM EXPANSION PROJECT
PROJECT DEVELOPMENT REPORT

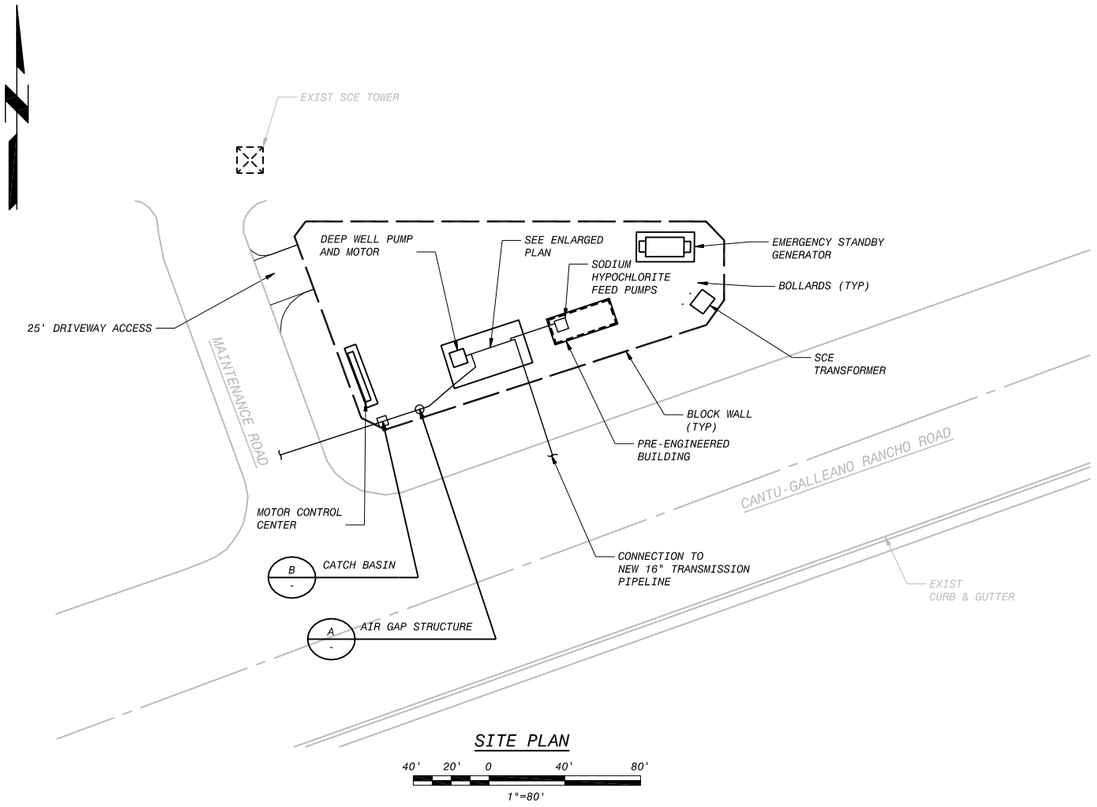
JURUPA COMMUNITY SERVICES DISTRICT
WELL SITE NO. 27 (GALLEANO WELL)
SITE AND YARD PIPING PLAN

DESIGNED:	HMS
DETAILED:	AAH
CHECKED:	
APPROVED:	
DATE:	

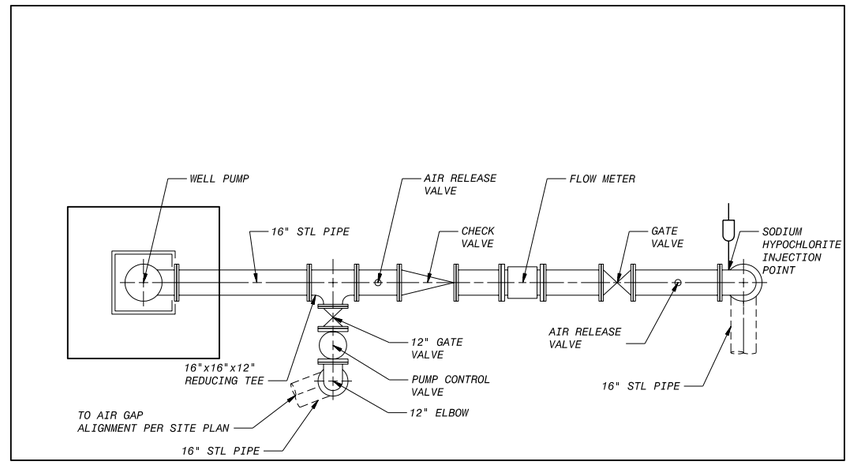
PROJECT NO.
160374

FIGURE 2-2

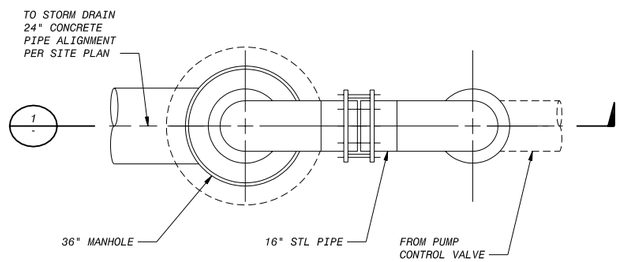
FD160374
D160374



SITE PLAN



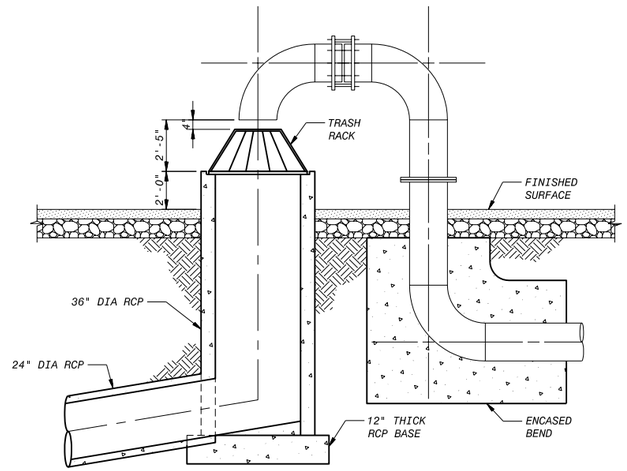
ENLARGED PLAN



AIR GAP STRUCTURE

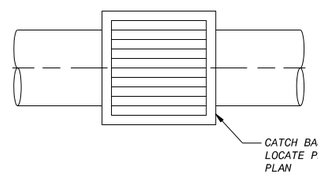
DETAIL A

12" 6" 0 1' 2' 3' 4' 5'
1/4"=1'-0"



SECTION 1

4' 2' 0 4' 8'
1/8"=1'-0"



CATCH BASIN

DETAIL B

12" 6" 0 1' 2' 3' 4' 5'
1/4"=1'-0"

CONCEPTUAL - NOT FOR CONSTRUCTION

NO.	BY	CK	APP
REVISIONS AND RECORD OF ISSUE			
DATE			

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CHINO BASIN DYY PROGRAM EXPANSION PROJECT
PROJECT DEVELOPMENT REPORT

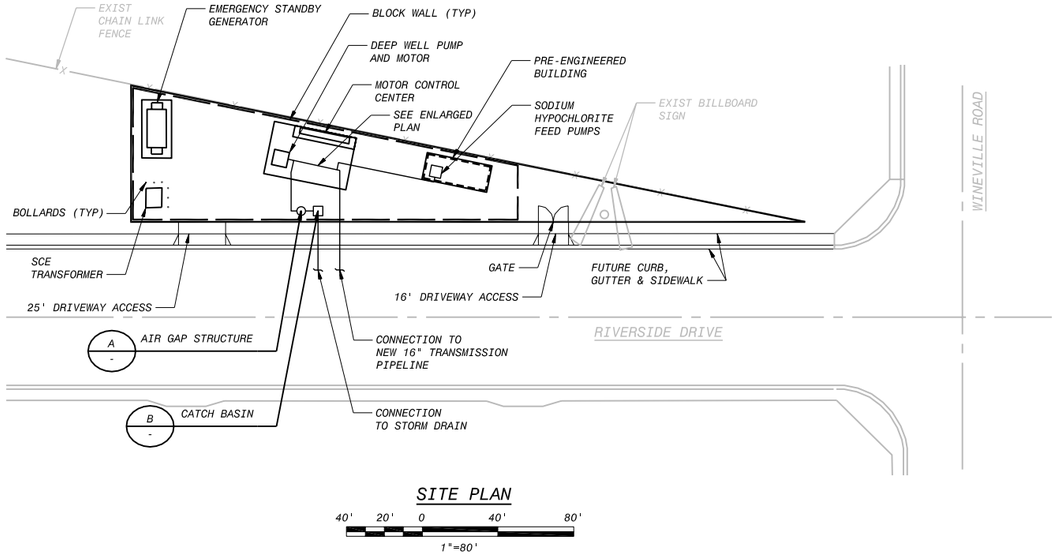
JURUPA COMMUNITY SERVICES DISTRICT
WELL SITE NO. 29 (IDI WELL)
SITE AND YARD PIPING PLAN

DESIGNED: HMS
DETAILED: AAH
CHECKED:
APPROVED:
DATE:

PROJECT NO.
160374

FIGURE 2-3

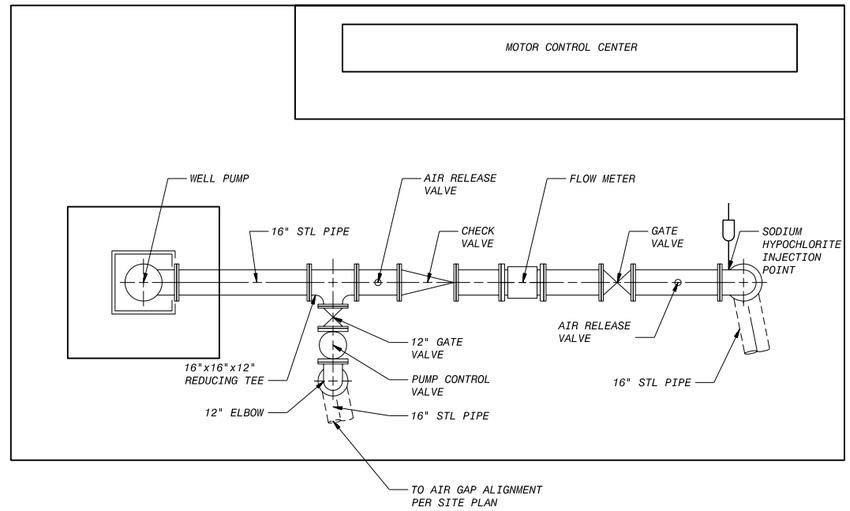
FD160374
D160374



SITE PLAN

40' 20' 0 40' 80'

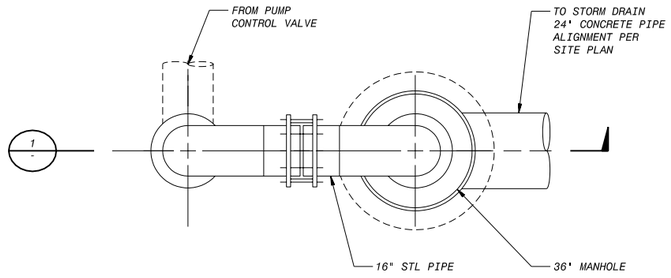
1"=80'



ENLARGED PLAN

4' 2' 0 4' 8'

1/8"=1'-0"

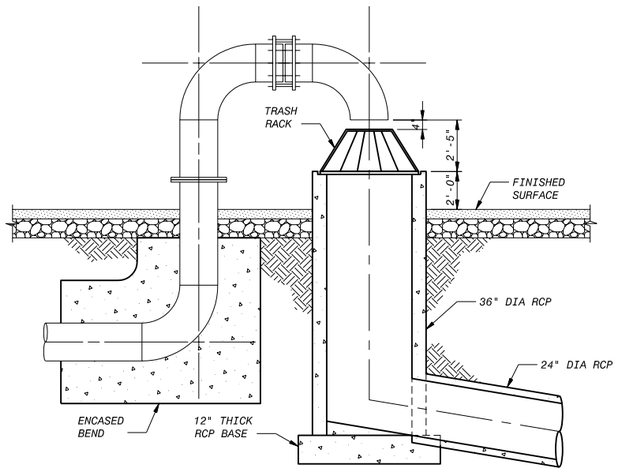


AIR GAP STRUCTURE

DETAIL A

12" 6" 0 1' 2' 3' 4' 5'

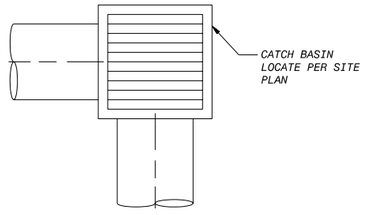
1/4"=1'-0"



SECTION 1

4' 2' 0 4' 8'

1/8"=1'-0"



CATCH BASIN

DETAIL B

12" 6" 0 1' 2' 3' 4' 5'

1/4"=1'-0"

CONCEPTUAL - NOT FOR CONSTRUCTION

NO.	BY	CK	APP	DATE	REVISIONS AND RECORD OF ISSUE

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Irvine, California

CHINO BASIN DYY PROGRAM EXPANSION PROJECT
PROJECT DEVELOPMENT REPORT

JURUPA COMMUNITY SERVICES DISTRICT
WELL SITE NO. 28 (ODA WELL)
SITE AND YARD PIPING PLAN

DESIGNED: HMS
DETAILED:
CHECKED:
APPROVED:
DATE:

PROJECT NO.
160374

FIGURE 2-4

FD160374
D160374

Table 2-3
Assumed Pump Performance

Description	IDI	ODA	GALLEANO
Pump			
Type	Deep Well Turbine	Deep Well Turbine	Deep Well Turbine
Capacity, gpm	3,500	3,500	3,500
Total Static Head, feet	1022	1049	1049
Total System Head (TSH), feet (1)	1060	1125	1140
No. of Stages	10	10	10
Pump Efficiency, percent	80	80	80
Discharge Column Diameter, in	16	16	16
Motor			
Type	TEFC (2) High efficiency	TEFC (2) High efficiency	TEFC (2) High efficiency
Nominal Motor Horsepower, HP	400	400	400
Motor Drive	AFD (3)	AFD (3)	AFD (3)
Maximum Motor Speed, rpm	1770	1770	1770

Notes:
(1) TSH - Includes frictional losses, frictional losses approximated for new transmission pipeline to Bellegrave Avenue
(2) TEFC - Totally enclosed fan cooled.
(3) AFD - Adjustable frequency drive.

2.4.2 Discharge and Blow-off Piping

Conveyance piping for this project would include on-site discharge and blow-off piping. The 30-inch transmission pipeline needed to connect to the existing distribution system at Bellegrave Avenue as shown on Figure 2-2 is not included in this project.

Wellhead piping and appurtenances would be 16-inch mortar lined and coated steel pipe and shall include control valves and flowmeter as shown on Figures 2-2 through 2-4, requirements for restraint, support, and slab would be evaluated during final design.

The blow-off piping would be 12-inch and 16-inch epoxy lined steel pipe located above ground and 24-inch reinforced concrete pipe below ground, routed for discharge to local storm water drainage during startup and a catch basin with an air gap on site.

2.5 Disinfection Facilities

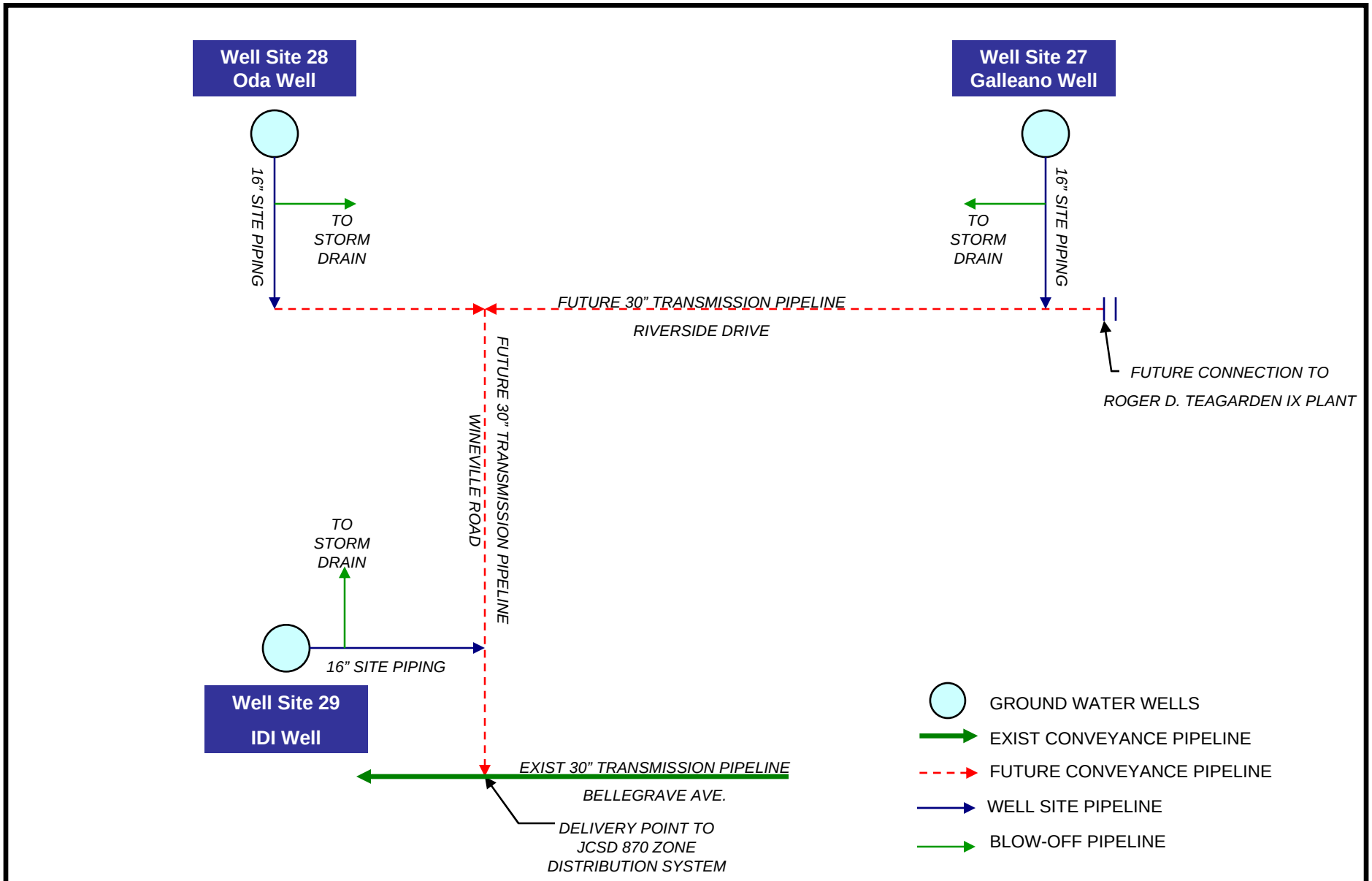
On-site disinfection would be required to satisfy chlorine demand and maintain a residual. For the purposes of this PDR and for preparing cost estimates, it was assumed that a sodium hypochlorite system similar to that already used by JCSD at other sites would be the disinfection method for the Galleano, Oda, and IDI well facilities. This would be reassessed during the final design stage.

2.6 Operations and Hydraulic Conditions

The proposed new wells would be sized to pump groundwater from the 1,110 ft pressure zone through a new transmission line to the existing distribution system in the 870 ft pressure zone, as shown on Figure 2-5.

The TSH required would include the static head needed to pump the groundwater to the 870 foot pressure zone. Losses attributed to pipe friction, and fittings (bends, valves, flowmeters, etc.) in both the pump piping and 30-inch transmission pipeline and entrance loss into the existing system are also accounted for in the TDH requirement.

The TSH required for the new wells would range between 1,060 and 1,140 feet as shown in Table 2-3; a standard 400 HP well motor would be adequate for all three wells.



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Chino Basin Dry Year Yield Program Expansion Project

Jurupa Community Services District – System Schematic

Figure 2-5

3.0 OPINION OF PROBABLE COST

3.1 Overview

This chapter presents the opinion of probable cost for the facilities described in this Volume IID of the PDR. General cost assumptions and the opinion of probable capital and annual operations and maintenance (O&M) costs are presented below.

The opinion of probable cost was based on conceptual-level unit cost criteria intended to provide a budgetary estimate of each facility's capital and annual O&M costs. Table 3-1 summarizes the estimated capital and annual O&M costs for the District's proposed facilities. As shown in the table, the total opinion of probable capital and annual O&M costs for new facilities would be $11,526,000 and $1,310,000, respectively.

Table 3-1
Summary of Opinion of Probable Capital and Annual O&M Costs

Component	Cost
Capital Cost	
Construction Cost	$8,732,000
Contingency (1)	$1,746,000
Engineering/Administration/CM (2)	$1,048,000
Total Capital Cost	**$11,526,000**
Midpoint of Construction Cost (3)	$12,595,000
Annual Cost	
Annual O&M Cost	$1,310,000
Annualized Capital Cost (4)	$985,000
Total Annual Cost	**$2,295,000**

Notes:
(1) Based on 20 percent contingency.
(2) Based on 12 percent engineering/administration/construction management (CM).
(3) Assumes midpoint of construction in year 2012 at 3 percent escalation rate.
(4) Assumes amortization period of 25 years and discount rate of 6 percent.

3.2 General Cost Assumptions

The conceptual-level opinion of probable capital and O&M costs developed in this PDR were derived from quotes received from equipment manufacturers, a survey of bid pricing from participating agency facilities previously or currently under construction, and bid results or construction cost estimates from similar and recent B&V projects. Volume I, Chapter 9, presents a summary of the basis for the unit costs used in this PDR.

Volume I, Chapter 9, also presents the construction, annual O&M, general, and financing unit cost criteria used to develop the cost estimates provided in this chapter.

3.3 Capital Cost

Table 3-2 presents the opinion of probable capital cost for construction of the District's new facilities. As shown, the total estimated capital cost for the facilities would be $11,526,000. Midpoint of construction costs are also provided and indicate the constructions costs in year 2012 using a 3 percent escalation rate.

Table 3-2
Summary of Opinion of Probable Capital Cost

Component/Facility Detail	Cost
Well Facilities [(1)]: 3 New Production Wells	
Drilling/Casing/Cap	$2,700,000
Equipping	$3,000,000
Emergency Generator	$825,000
Disinfection System	$600,000
Pumphouse/Electrical Building	$750,000
Land	$615,000
Conveyance Facilities	
Pipeline: 345 feet @ 16" Diameter	$83,000
General Costs	
General Requirements [(2)]	159,000
Total Construction Cost	$8,732,000
Contingency [(3)]	$1,746,000
Engineering/Administration/CM [(4)]	$1,048,000
Total Capital Cost	**$11,526,000**
Total Midpoint of Construction Cost [(5)]	$12,595,000

Notes:
(1) Includes any new production, ASR, and injection wells and well conversion/rehabilitation costs.
(2) Includes general requirements costs for all facilities (except land and SARI/NRWS).
(3) Based on 20 percent contingency.
(4) Based on 12 percent engineering/administration/CM.
(5) Assumes midpoint of construction in year 2012 at 3 percent escalation rate.

3.4 Annual O&M Cost

Table 3-3 presents the opinion of probable annual O&M cost for the District's new facilities. As shown, the total estimated annual O&M cost for the facilities would be $1,310,000.

Table 3-3
Summary of Opinion of Probable Annual O&M Cost

Component/Facility Detail	Cost
Well Facilities [(1)]: 3 New Production Wells (500 HP Each)	
Power	$1,235,000
Miscellaneous Maintenance	$75,000
Total Annual O&M Cost	$1,310,000
Annualized Capital Cost [(2)]	$985,000
Total Annual Cost	**$2,295,000**

Notes:
(1) Includes any new production, ASR, and injection wells and well conversion/rehabilitation costs.
(2) Assumes amortization period of 25 years and discount rate of 6 percent.