CHINO BASIN WATERMASTER

9641 San Bernardino Road, Rancho Cucamonga, Ca 91730
Tel: 909.484.3888 Fax: 909.484.3890 www.cbwm.org

KENNETH R. MANNING
Chief Executive Officer

STAFF REPORT

DATE: **May 14, 2009**
May 19, 2009

TO: **Committee Members**

SUBJECT: **Consider Approval Application for a Storage Account by IEUA, TVMWD, and WMWD on behalf of Metropolitan Water District of Southern California for an additional 74,000.000 acre-feet in addition to the 100,000.000 acre-feet existing Storage Account**

SUMMARY

Recommendation - Staff recommends that any approval of the Application be conditioned upon compliance with the WEI Material Physical Injury Report discussed in the staff report. However, concerns exist about compliance of the Application with the Peace Agreement. Staff requests a recommendation from the Appropriative Pool as to how the Pool believes the Application should proceed through the Watermaster process.

I. INTRODUCTION

The Inland Empire Utilities Agency (IEUA), Three Valleys Municipal Water District (TVMWD), and Western Municipal Water District (WMWD), on behalf of the Metropolitan Water District of Southern California (Metropolitan), have submitted an Application under Article X of the Watermaster Rules and Regulations for a storage account in the amount of an additional 74,000.000 acre-feet in addition to the 100,000.000 acre-feet existing Storage Account.

This Application has been submitted in order to implement future amendments to the terms of the existing Groundwater Storage Program Funding Agreement by and among Metropolitan, IEUA, TVMWD, WMWD, and the Chino Basin Watermaster (Agreement No. 49960) that was approved by the Watermaster Board on October 23, 2003. These amendments are described in "Joint Participation Agreement No. 93343" between the Chino Desalter Authority ("CDA"), IEUA, WMWD and Metropolitan. This agreement was included in the submittal of the Application and provides for subsidies for the Chino II Desalter. Section

7.4 of Agreement No. 93343 specifies that if the expansion of the Dry Year Yield account is not approved by September 1, 2009, then the agreement to provide the subsidy for the Chino II Desalter will terminate.[1]

II. ARTICLE X APPLICATION RULES AND PROCEDURES

Under Watermaster's Rules and Regulations § 10.7, any person may request Watermaster's approval of an Agreement to participate in a Storage and Recovery Program by submitting an Application to Watermaster that, at a minimum, includes the following information:

(a) The identity of the person(s) that will Recharge, Store and Recover the water as well as its ultimate place of use;
(b) The quantity of water to be Stored and Recovered;
(c) The proposed schedule for the Recharge of water for storage, if any;
(d) The proposed schedule and method for Recovery;
(e) The location of the Recharge facilities through which the Stored Water will be recharged;
(f) The location of the Production facilities through which the Stored Water will be recovered;
(g) The water levels and water quality of the Groundwater in the areas likely to be affected by the Storage and Recovery, if known; and
(h) Any other information that Watermaster requires to be included.

Watermaster shall have no obligation to process incomplete Applications. (Rules § 10.3(a).) Watermaster staff has reviewed the Application and the previously approved Funding Agreement and finds that the information required by the Rules and Regulations has been provided as reasonably required to allow Watermaster to analyze the Application for its potential to cause Material Physical Injury.

Under Rules and Regulations § 8.1(h), each Groundwater Storage Agreement shall include but not be limited to the following components [Judgment Exhibit "I" ¶ 3.]:

(i) The quantities and the term of the storage right, which shall specifically exclude credit for any return flows;
(ii) A statement of the priorities of the storage right as against overlying, Safe Yield uses, and other storage rights;
(iii) The delivery rates, together with schedules and procedures for spreading, injection or in-lieu deliveries of Supplemental Water for direct use;
(iv) The calculation of storage water losses and annual accounting for water in storage; and
(v) The establishment and administration of withdrawal schedules, locations and methods.

Under the Rules and Regulations § 8.1(f)(ii), Watermaster may not approve an Application to store and Recover water if it is inconsistent with the terms of the Peace Agreement or will cause any Material Physical Injury to any party to the Judgment or the Basin. Any potential or threatened Material Physical Injury to any party to the Judgment or the Basin caused by the storage and Recovery of water shall be reasonably and fully mitigated as a condition of approval. In the event the Material Physical Injury cannot be mitigated, the request for storage and Recovery must be denied. (Peace Agreement § 5.2 (a) (iii).) Applications for the storage of Supplemental Water shall be processed in accordance with the provisions of Article X.

Under the Rules and Regulations section 10.13, following consideration of an Application by each Pool Committee, a Contest to the Application may be filed by any party to the Judgment. Contests shall be submitted a minimum of fourteen (14) days prior to the date scheduled for Advisory Committee consideration and possible action. Under section 10.11, an Application shall not be considered by the Advisory Committee until at least twenty-one (21) days after the last of the three Pool Committee meetings to consider the matter. Under section 10.17(a), Watermaster shall not deny an uncontested Application until it has referred the matter to a hearing officer.

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[1] Section 7.4 of Agreement No. 93343 also specifies that approval of an elimination of losses to the DYY account must be approved by September 1, 2009 in order to avoid termination of the subsidy. The issue of loss elimination does not appear to be addressed in the Application.

III. PEACE AGREEMENT

Peace Agreement section 5.2(c)(iv)(b) requires that Watermaster shall prioritize its efforts to regulate and condition the storage and recovery of water developed in a Storage and Recovery Program for the mutual benefit of the parties to the Judgment and give first priority to Storage and Recovery Programs that provide broad mutual benefits.

Peace Agreement section 7.4(b) describes the order of priority of various sources of funding to satisfy all unmet capital, operation and maintenance costs relative to the Chino II Desalter. The fourth source of funding is, "MWD subsidies or other funding without committing the storage space of the Chino Basin under any storage and recovery or conjunctive use agreement, such as that secured pursuant to Agreement Number 7658, between MWD, SAWPA, IEUA, WMWD and OCWD dated December 7, 1995, and entitled "Chino Basin Desalinization Program, Phase I, Joint Participation Agreement for Recovery and Utilization of Contaminated Groundwater."

IV. SUMMARY OF THE APPLICATION

The Application identifies the maximum quantity of the storage account to be an additional 74,000.000 acre-feet in addition to the 100,000.000 acre-feet existing storage account. This is within the targeted 500,000.000 acre-feet identified in the Peace Agreement as the Storage and Recovery Program.

The Application identifies the method of placement of water in storage as in-lieu delivery by Metropolitan and direct injection with aquifer storage and recovery wells. The specific amount of water to be delivered into storage will be determined according to availability by the Operating Committee under Agreement No. 49960 and future amendments to it. However, the maximum that can be placed into storage in any one year is 50,000.000 acre-feet (16,667.000 acre-feet in addition to the current 33,333.000 acre-feet).

Recapture from storage will be accomplished by pumping from wells. Likely, new wells will be constructed, as well as new treatment facilities for existing impaired wells. A list of new wells to be constructed under the Program will be included in future amendments to Agreement No. 49960. While these new facilities are constructed in order to provide the ability to recapture the water out of storage, it is recognized that the production of water out of the storage account will be determined by the Operating Committee by looking at the gross production from the participating entities and comparing this with past pumping. Under the Application, the maximum amount that can be recaptured from storage in any one year is 50,000.000 acre-feet (16,667.000 acre-feet addition to the current 33,333.000 acre-feet).

Specific commitments by the appropriators to take the in lieu deliveries of water and to shift to increased groundwater pumping to accomplish the recapture of water are detailed in the Local Agency Agreements which are being developed for approval by each of the local agencies.

In addition to Form 6, the Application also includes Form 2 (Recharge) and Form 4 (Recapture).

V. SUMMARY OF ANALYSIS OF POTENTIAL TO CAUSE MATERIAL PHYSICAL INJURY

In addition to providing a summary of the Application, Watermaster's notice of the Application is required to provide a reasonable preliminary analysis of the potential for the activities described in the Application to result in Material Physical Injury (Rules § 10.10)

In the latter half of 2008, an investigation was completed to evaluate the feasibility of the Expansion. This analysis was published as the *Chino Basin Dry-Year Yield Program Expansion Project Development Report* (Black & Veatch, 2008). Three expansion alternatives were developed and evaluated. Wildermuth Environmental Inc. (WEI), at the direction of the Watermaster, conducted a Material Physical Injury analysis on these expansion alternatives. The detailed Material Physical analysis is attached. The IEUA adopted a mitigated negative declaration for the Expansion in December 2008.

Based on WEI's analysis, Material Physical Injury—related to storage losses, groundwater level changes, and plume migration—will occur; however, this Material Physical Injury can be mitigated if the mitigation measures from the Mitigated Negative Declaration are substantially expanded and included in the DYY Program Expansion agreements.

VI. ANALYSIS AND STAFF RECOMMENDATION

At the April Pool meetings, Watermaster staff was made aware that one or more member of the Appropriative Pool may contest approval of the Application as a violation of the Peace Agreement section 7.4(b)(iv). Watermaster is not aware of any steps that have been taken by any of the Appropriative Pool members that are parties to Agreement No. 93343 or by any of the members of the Pool that may contest approval of the Application to find a resolution of the situation. Watermaster staff raised this issue as part of the March Pool agenda so that the relevant parties could confer about resolution.

It appears that the exchange described by the Joint Participation Agreement No. 93343 currently violates section 7.4(b)(iv) of the Peace Agreement. Given the current situation, staff would not likely be able to recommend approval of the Application to the Watermaster Board. Watermaster staff thus asks for a recommendation from the Appropriative Pool as to how it would like the Application to proceed through the Watermaster process.

In addition, Staff recommends that the Appropriative Pool recommend that if the Board ultimately approves the Application, that approval should be conditioned on implementation of WEI's recommendations regarding mitigation of potential Material Physical Injury.

CHINO BASIN WATERMASTER

NOTICE

OF

APPLICATION(S)

RECEIVED FOR

WATER TRANSACTION – STORAGE ACCOUNT

Date of Notice:

March 27, 2009

This notice is to advise interested persons that the attached application will come before the Watermaster Board on or after 90 days from the date of this notice.

NOTICE OF APPLICATION(S) RECEIVED

Date of Applications: **March 20, 2009** Date of this notice: **March 26, 2009**

Please take notice that the following Application has been received by Watermaster:

A. Notice of Application for a Storage Account by IEUA, TVMWD, and WMWD on behalf of Metropolitan Water District of Southern California for an additional 74,000.000 acre-feet in addition to the 100,000.000 acre-feet existing Storage Account

This ***Application*** will first be considered by each of the respective pool committees on the following dates:

Agricultural Pool:	May 19, 2009
Appropriative Pool:	May 14, 2009
Non-Agricultural Pool:	May 14, 2009

This ***Application*** will be scheduled for consideration by the Advisory Committee ***no earlier than ninety-days from the date of this notice and a minimum of twenty-one calendar days*** after the last pool committee reviews it.

After consideration by the Advisory Committee, the ***Application*** will be considered by the Board.

Unless the ***Application*** *is* amended, parties to the Judgment may file ***Contests*** to the ***Application*** with Watermaster ***within seven calendar days*** of when the last pool committee considers it. Any ***Contest*** must be in writing and state the basis of the ***Contest***.

Watermaster address:

Chino Basin Watermaster
9641 San Bernardino Road
Rancho Cucamonga, CA 91730

Tel: (909) 484-3888
Fax: (909) 484-3890

CHINO BASIN WATERMASTER

9641 San Bernardino Road, Rancho Cucamonga, Ca 91730
Tel: 909.484.3888 Fax: 909.484.3890 www.cbwm.org

KENNETH R. MANNING
Chief Executive Officer

DATE: **March 27, 2009**

TO: **Active Parties of Chino Basin Watermaster**

SUBJECT: **Summary and Analysis**
Notice of Application for a Storage Account by IEUA, TVMWD, and WMWD on behalf of Metropolitan Water District of Southern California for an additional 74,000.000 acre-feet in addition to the 100,000.000 acre-feet existing Storage Account

I. INTRODUCTION

The Inland Empire Utilities Agency (IEUA), Three Valleys Municipal Water District (TVMWD), and Western Municipal Water District (WMWD), on behalf of the Metropolitan Water District of Southern California (Metropolitan), have submitted an Application under Article X of the Watermaster Rules and Regulations for a storage account in the amount of an additional 74,000.000 acre-feet in addition to the 100,000.000 acre-feet existing Storage Account. This Application has been submitted in order to implement future amendments to the terms of the existing Groundwater Storage Program Funding Agreement by and among Metropolitan, IEUA, TVMWD, WMWD, and the Chino Basin Watermaster (Agreement No. 49960) that was approved by the Watermaster Board on October 23, 2003.

II. ARTICLE X APPLICATION RULES AND PROCEDURES

Under Watermaster's Rules and Regulations § 10.7, any person may request Watermaster's approval of an Agreement to participate in a Storage and Recovery Program by submitting an Application to Watermaster that, at a minimum, includes the following information:

(a) The identity of the person(s) that will Recharge, Store and Recover the water as well as its ultimate place of use;
(b) The quantity of water to be Stored and Recovered;
(c) The proposed schedule for the Recharge of water for storage, if any;
(d) The proposed schedule and method for Recovery;
(e) The location of the Recharge facilities through which the Stored Water will be recharged;
(f) The location of the Production facilities through which the Stored Water will be recovered;
(g) The water levels and water quality of the Groundwater in the areas likely to be affected by the Storage and Recovery, if known; and
(h) Any other information that Watermaster requires to be included.

Watermaster shall have no obligation to process incomplete Applications. (Rules § 10.3(a).) Watermaster staff has reviewed the Application and the previously approved Funding Agreement and finds that the information required by the Rules and Regulations has been provided as reasonably required to allow Watermaster to analyze the Application for its potential to cause Material Physical Injury.

Under Rules and Regulations § 8.1(h), each Groundwater Storage Agreement shall include but not be limited to the following components [Judgment Exhibit "I" ¶ 3.]:

(i) The quantities and the term of the storage right, which shall specifically exclude credit for any return flows;

(ii) A statement of the priorities of the storage right as against overlying, Safe Yield uses, and other storage rights;

(iii) The delivery rates, together with schedules and procedures for spreading, injection or in-lieu deliveries of Supplemental Water for direct use;

(iv) The calculation of storage water losses and annual accounting for water in storage; and

(v) The establishment and administration of withdrawal schedules, locations and methods.

Under the Rules and Regulations § 8.1(f)(ii), Watermaster may not approve an Application to store and Recover water if it is inconsistent with the terms of the Peace Agreement or will cause any Material Physical Injury to any party to the Judgment or the Basin. Any potential or threatened Material Physical Injury to any party to the Judgment or the Basin caused by the storage and Recovery of water shall be reasonably and fully mitigated as a condition of approval. In the event the Material Physical Injury cannot be mitigated, the request for storage and Recovery must be denied. (Peace Agreement § 5.2 (a) (iii).) Applications for the storage of Supplemental Water shall be processed in accordance with the provisions of Article X.

III. SUMMARY OF THE APPLICATION

The Application identifies the maximum quantity of the storage account to be an additional 74,000.000 acre-feet in addition to the 100,000.000 acre-feet existing storage account. This is within the targeted 500,000.000 acre-feet identified in the Peace Agreement as the Storage and Recovery Program.

The Application identifies the method of placement of water in storage as in-lieu delivery by Metropolitan and direct injection with aquifer storage and recovery wells. The specific amount of water to be delivered into storage will be determined according to availability by the Operating Committee under Agreement No. 49960 and future amendments to it. However, the maximum that can be placed into storage in any one year is 50,000.000 acre-feet (16,667.000 acre-feet in addition to the current 33,333.000 acre-feet).

Recapture from storage will be accomplished by pumping from wells. Likely, new wells will be constructed, as well as new treatment facilities for existing impaired wells. A list of new wells to be constructed under the Program will be included in future amendments to Agreement No. 49960. While these new facilities are constructed in order to provide the ability to recapture the water out of storage, it is recognized that the production of water out of the storage account will be determined by the Operating Committee by looking at the gross production from the participating entities and comparing this with past pumping. Under the Application, the maximum amount that can be recaptured from storage in any one year is 50,000.000 acre-feet (16,667.000 acre-feet addition to the current 33,333.000 acre-feet).

Specific commitments by the appropriators to take the in lieu deliveries of water and to shift to increased groundwater pumping to accomplish the recapture of water are detailed in the Local Agency Agreements which are being developed for approval by each of the local agencies.

In addition to Form 6, the Application also includes Form 2 (Recharge) and Form 4 (Recapture).

IV. SUMMARY OF ANALYSIS OF POTENTIAL TO CAUSE MATERIAL PHYSICAL INJURY

In addition to providing a summary of the Application, Watermaster's notice of the Application is required to provide a reasonable preliminary analysis of the potential for the activities described in the Application to result in Material Physical Injury (Rules § 10.10)

In the latter half of 2008, an investigation was completed to evaluate the feasibility of the Expansion. This analysis was published as the *Chino Basin Dry-Year Yield Program Expansion Project Development Report* (Black & Veatch, 2008). Three expansion alternatives were developed and evaluated. Wildermuth Environmental Inc. (WEI), at the direction of the Watermaster, conducted a Material Physical Injury analysis on these expansion alternatives. The detailed Material Physical analysis is attached. The IEUA adopted a mitigated negative declaration for the Expansion in December 2008.

Based on WEI's analysis, Material Physical Injury—related to storage losses, groundwater level changes, and plume migration—will occur; however, this Material Physical Injury can be mitigated if the mitigation measures from the Mitigated Negative Declaration are substantially expanded and included in the DYY Program Expansion agreements.

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Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

6075 Kimball Ave, • Chino, CA 91708
P.O. Box 9020 • Chino, Hills, CA 91709
TEL (909) 993-1600 • FAX (909) 597-8875
www.leua.org

March 20, 2009

Mr. Kenneth Manning, Chief Executive Officer
Chino Basin Watermaster
8632 Archibald Ave, Suite 109
Rancho Cucamonga, CA 91730

Subject: Application for an additional 74,000 AF Storage and Recovery Program, to the existing approved 100,000 AF The Metropolitan Water District of Southern California (MWD) storage account, with MWD and the local Dry Year Yield Conjunctive Use Program (Expansion) participating agencies.

Dear Mr. Manning:

On behalf of The Metropolitan Water District of Southern California (MWD) and the Dry Year Yield Conjunctive Use Program (Expansion), Inland Empire Utilities Agency (IEUA), Three Valleys Municipal Water District (TVMWD) and Western Municipal Water District (WMWD) jointly submit this letter along with; Chino Basin Watermaster Forms 2, 4 and 6, "Agreement No. 49960, Dry Year Yield Conjunctive Use Program" and "Agreement No. 93343, Chino Basin Desalination Program (Phase II)."

These application documents are submitted consistent with the requirements for Regional Storage and Recovery Program Section 5.2 provisions of the Peace Agreement and the Rules and Regulations of Section 8.3. The requirements of Section 10.7 of the Rules and Regulations and are summarized below:

(A) MWD, through its member agencies, IEUA, TVMWD and WMWD, will provide imported water for storage and recovery via direct replenishment, injection (ASR wells), and in-lieu.

(B) Consistent with Agreement No. 49960, as amended in the future between MWD, TVMWD, IEUA and Chino Basin Watermaster, the amount of water placed into storage and recovered from storage will be administered through an Operating Committee.

(C) The ability to put water into the MWD account will be based on availability of imported water and also be consistent with Agreement No. 49960, as amended in the future.

(D) The schedule for recovery of MWD water will be based on the timing of a call from MWD, and the development of annual Operating Plans with participating agencies and will also be consistent with Agreement No. 49960, as amended in the future.

(E) The location of the Dry Year Yield Conjunctive Use Program (Expansion) groundwater recharge facilities have been CEQA certified by IEUA and are fully described in the report titled "Optimum Basin Management Program, Chino Basin Dry Year Yield Program Expansion Project Development Report," dated December 2008.

(F) The locations of the Dry Year Yield Conjunctive Use Program (Expansion) groundwater production facilities have been CEQA certified by IEUA and are fully described in the report titled "Optimum Basin Management Program, Chino Basin Dry Year Yield Program Expansion Project Development Report," dated December 2008.

(G) Water level and water quality information is documented in the "Optimum Basin Management Program, Chino Basin Dry Year Yield Program Expansion Project Development Report," dated December 2008.

The Inland Empire Utilities Agency certified the CEQA documentation on December 17, 2008. As part of the CEQA analysis, a four volume "Optimum Basin Management Program, Chino Basin Dry Year Yield Project Development Report" was published and should be incorporated with this letter application to Chino Basin Watermaster.

Sincerely,

INLAND EMPIRE UTILITIES AGENCY

By _____
Richard W. Atwater
General Manager

THREE VALLEYS MUNICIPAL WATER DISTRICT

By _____
Richard W. Hansen
General Manager

WESTERN MUNICIPAL WATER DISTRICT

By _____
John V. Rossi
General Manager

Cc: Brian Thomas (MWD)
Kathy Kunysz (MWD)

Attachments:

1. Chino Basin Watermaster Form 2 – Application for Recharge
2. Chino Basin Watermaster Form 4 – Application to Recapture Water in Storage
3. Chino Basin Watermaster Form 6 – Application to Participate in a Storage & Recovery Program
4. Agreement No. 49960, Dry Year Yield Conjunctive Use Program; and
5. Agreement No. 93343, Chino Basin Desalination Program (Phase II)
6. Optimum Basin Management Program, Chino Basin Dry Year Yield Program Expansion Project Development Report (December 2008) – 4 Volume CD

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Form 2

APPLICANT

Inland Empire Utilities Agency,
Three Valleys Municipal Water District, and
Western Municipal Water District on behalf of
Metropolitan Water District of Southern California — Name

March 9, 2009 — Date Requested

_____ — Date Approved

6075 Kimball Avenue — Street Address

74,000.00* Acre-feet — Amount Requested

_____ Acre-feet — Amount Approved

Chino	CA	91708	16,667.00 AFY**	12 Months
City	State	Zip Code	Projected Rate of Recapture	Projected Duration of Recapture

Telephone: (909) 993-1600 Facsimile: (909) 993-1983

* This would be an additional 74,000.00 AF added to an existing storage account of 100,000.00 AF, approved in 2003.
** This would be an additional 16,667.00 AF added to an existing recapture rate of 33,000.00 AFY, approved in 2003.

SOURCE OF SUPPLY

Water from:
[X] State Water Project — Source: Metropolitan Water District of Southern California
[ ] Colorado River
[ ] Local Supplemental
[ ] Recycled Water
[ ] Other, explain

METHOD OF RECHARGE

[X] PERCOLATION (Locations and methods of recharge are described in the CEQA documentation.)

[X] INJECTION

[X] EXCHANGE

WATER QUALITY AND WATER LEVELS

What is the Existing water quality and what are the existing water levels in the areas that are likely to be affected?
See Watermaster Summary and Analysis of Application and reports by Wildermuth Environmental.

MATERIAL PHYSICAL INJURY

Is the Applicant aware of any potential Material Physical Injury to a party to the Judgment or the Basin That may be caused by the action covered by the application? Yes [X] No [ ]
See CEQA documentation for mitigation measures.

If yes, what are the proposed mitigation measures, if any, that might reasonably be imposed to ensure that the action does not result in Material Physical Injury to a party to the Judgment or the Basin?

ADDITIONAL INFORMATION ATTACHED Yes [X] No [ ]

Inland Empire Utilities Agency

Three Valleys Municipal Water District

Western Municipal Water District
Applicants

TO BE COMPLETED BY WATERMASTER:

DATE OF APPROVAL FROM NON-AGRICULTURAL POOL: _____
DATE OF APPROVAL FROM AGRICULTURAL POOL: _____
DATE OF APPROVAL FROM APPROPRIATIVE POOL: _____
HEARING DATE, IF ANY: _____
DATE OF ADVISORY COMMITTEE APPROVAL: _____
DATE OF BOARD APPROVAL: _____

Form 2

MATERIAL PHYSICAL INJURY

Is the Applicant aware of any potential Material Physical Injury to a party to the Judgment or the Basin That may be caused by the action covered by the application? Yes [X] No [ ]
See CEQA documentation for mitigation measures.

If yes, what are the proposed mitigation measures, if any, that might reasonably be imposed to ensure that the action does not result in Material Physical Injury to a party to the Judgment or the Basin?

ADDITIONAL INFORMATION ATTACHED Yes [X] No [ ]

Inland Empire Utilities Agency

Three Valleys Municipal Water District

Western Municipal Water District
Applicants

TO BE COMPLETED BY WATERMASTER:

DATE OF APPROVAL FROM NON-AGRICULTURAL POOL: _____
DATE OF APPROVAL FROM AGRICULTURAL POOL: _____
DATE OF APPROVAL FROM APPROPRIATIVE POOL: _____
HEARING DATE, IF ANY: _____
DATE OF ADVISORY COMMITTEE APPROVAL: _____
DATE OF BOARD APPROVAL: _____

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APPLICATION OR AMENDMENT TO APPLICATION
TO
RECAPTURE WATER IN STORAGE

APPLICANT

Inland Empire Utilities Agency,
Three Valleys Municipal Water District, and
Western Municipal Water District on behalf of
Metropolitan Water District of Southern California — Name

March 9, 2009 — Date Requested

_____ — Date Approved

6075 Kimball Avenue — Street Address

74,000.00* Acre-feet — Amount Requested

_____ Acre-feet — Amount Approved

Chino	CA	91708	16,667.00 AFY**	12 Months
City	State	Zip Code	Projected Rate of Recapture	Projected Duration of Recapture

Telephone: (909) 993-1600 Facsimile: (909) 993-1983

* This would be an additional 74,000.00 AF added to an existing storage account of 100,000.00 AF, approved in 2003.
** This would be an additional 16,667.00 AF added to an existing recapture rate of 33,000.00 AFY, approved in 2003.

IS THIS AN AMENDMENT TO A PREVIOUSLY APPROVED APPLICATION? [X] YES [ ] NO
IF YES, ATTACH APPLICATION TO BE AMENDED

IDENTITY OF PERSON THAT STORED THE WATER: Metropolitan Water District of Southern California

PURPOSE OF RECAPTURE

[ ] Pump when other sources of supply are curtailed
[ ] Pump to meet current or future demand over and above production right
[ ] Pump as necessary to stabilize future assessment amounts
[X] Other, explain: Pump pursuant to call by Metropolitan of stored water

METHOD OF RECAPTURE (if by other than pumping) (e.g. exchange)

PLACE OF USE OF WATER TO BE RECAPTURED

Within service area of agencies participating in Metropolitan Funding Agreement (see attached shift obligation schedule).

LOCATION OF RECAPTURE FACILITIES (IF DIFFERENT FROM REGULAR PRODUCTION FACILITIES)

Facilities constructed pursuant to Metropolitan Funding Agreement.

Form 4

WATER QUALITY AND WATER LEVELS

What is the existing water quality and what are the existing water levels in the areas that are likely to be affected?
See Watermaster Summary and Analysis of Application and reports by Wildermuth Environmental.

MATERIAL PHYSICAL INJURY

Is the Applicant aware of any potential Material Physical Injury to a party to the Judgment or the Basin that may be caused by the action covered by the application? Yes [X] No [ ]
See CEQA documentation for mitigation measures.

If yes, what are the proposed mitigation measures, if any, that might reasonably be imposed to ensure that the action does not result in Material Physical Injury to a party to the Judgment or the Basin?

ADDITIONAL INFORMATION ATTACHED Yes [X] No [ ]

Inland Empire Utilities Agency

Three Valleys Municipal Water District

Western Municipal Water District
Applicants

TO BE COMPLETED BY WATERMASTER:

DATE OF APPROVAL FROM NON-AGRICULTURAL POOL: _____
DATE OF APPROVAL FROM AGRICULTURAL POOL: _____
DATE OF APPROVAL FROM APPROPRIATIVE POOL: _____
HEARING DATE, IF ANY: _____
DATE OF ADVISORY COMMITTEE APPROVAL: _____
DATE OF BOARD APPROVAL: _____ Agreement #_____

Form 4

WATER QUALITY AND WATER LEVELS

What is the existing water quality and what are the existing water levels in the areas that are likely to be affected?
See Watermaster Summary and Analysis of Application and reports by Wildermuth Environmental.

MATERIAL PHYSICAL INJURY

Is the Applicant aware of any potential Material Physical Injury to a party to the Judgment or the Basin that may be caused by the action covered by the application? Yes [X] No [ ]
See CEQA documentation for mitigation measures.

If yes, what are the proposed mitigation measures, if any, that might reasonably be imposed to ensure that the action does not result in Material Physical Injury to a party to the Judgment or the Basin?

ADDITIONAL INFORMATION ATTACHED Yes [X] No [ ]

Inland Empire Utilities Agency

Three Valleys Municipal Water District

Western Municipal Water District
Applicants

TO BE COMPLETED BY WATERMASTER:

DATE OF APPROVAL FROM NON-AGRICULTURAL POOL: _____
DATE OF APPROVAL FROM AGRICULTURAL POOL: _____
DATE OF APPROVAL FROM APPROPRIATIVE POOL: _____
HEARING DATE, IF ANY: _____
DATE OF ADVISORY COMMITTEE APPROVAL: _____
DATE OF BOARD APPROVAL: _____ Agreement #_____

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APPLICATION BY A PARTY TO THE JUDGMENT TO PARTICIPATE IN A STORAGE & RECOVERY PROGRAM

APPLICANT

Inland Empire Utilities Agency,
Three Valleys Municipal Water District, and
Western Municipal Water District on behalf of
Metropolitan Water District of Southern California — Name

March 9, 2009 — Date Requested

_____ — Date Approved

6075 Kimball Avenue — Street Address

74,000.00* Acre-feet — Amount Requested

_____ Acre-feet — Amount Approved

Chino — City

CA — State

91708 — Zip Code

Telephone: (909) 993-1600

Facsimile: (909) 993-1983

* This would be an additional 74,000.00 AF added to an existing storage account of 100,000.00 AF, approved in 2003.

TYPE OF WATER TO BE PLACED IN STORAGE

[ ] Recycled [X] Imported [ ] Both

METHOD AND LOCATION OF PLACEMENT IN STORAGE - Check and attach all that may apply

[X] Recharge (Form 2)
[ ] Transfer of Right to Water in Storage (Form 3)
[ ] Transfer from another Party to the Judgment (Form 5)

METHOD AND LOCATION OF RECAPTURE FROM STORAGE - Check and attach all that may apply

[X] Pump from wells (Form 4)
[ ] Transfer to another party to the Judgment (Form 3)

FEASIBILITY PLAN TO ACCOMPLISH STORAGE & RECOVERY PROGRAM ATTACHED?

Yes [ ] No [X] **Analyzed through approval process of Funding Agreement**

WATER QUALITY AND WATER LEVELS

What is the existing water quality and what are the existing water levels in the areas that are likely to be affected?

MATERIAL PHYSICAL INJURY

Is the Applicant aware of any potential Material Physical Injury to a party to the Judgment or the Basin that may be caused by the action covered by the application? Yes [X] No [ ]
See CEQA documentation for mitigation measures.

If yes, what are the proposed mitigation measures, if any, that might reasonably be imposed to ensure that the action does not result in Material Physical Injury to a party to the Judgment or the Basin?

CEQA Compliance completed and certified by applicants.

ADDITIONAL INFORMATION ATTACHED Yes[X] No [ ]

Inland Empire Utilities Agency

Three Valleys Municipal Water District

Western Municipal Water District
Applicants

TO BE COMPLETED BY WATERMASTER:

DATE OF APPROVAL FROM NON-AGRICULTURAL POOL: _____
DATE OF APPROVAL FROM AGRICULTURAL POOL: _____
DATE OF APPROVAL FROM APPROPRIATIVE POOL: _____
HEARING DATE, IF ANY: _____
DATE OF ADVISORY COMMITTEE APPROVAL: _____
DATE OF BOARD APPROVAL: _____

If yes, what are the proposed mitigation measures, if any, that might reasonably be imposed to ensure that the action does not result in Material Physical Injury to a party to the Judgment or the Basin?

CEQA Compliance completed and certified by applicants.

ADDITIONAL INFORMATION ATTACHED Yes[X] No [ ]

Inland Empire Utilities Agency

Three Valleys Municipal Water District

Western Municipal Water District
Applicants

TO BE COMPLETED BY WATERMASTER:

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DATE OF ADVISORY COMMITTEE APPROVAL: _____
DATE OF BOARD APPROVAL: _____

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ENVIRONMENTAL INC.

March 24, 2009

Chino Basin Watermaster
Attention: Kenneth R. Manning
Chief Executive Officer
9641 San Bernardino Road
Rancho Cucamonga, CA 91730

Subject: Analysis of Material Physical Injury from the Proposed Expansion of the Dry-Year Yield Program

Dear Mr. Manning:

The Dry-Year Yield Program (DYYP) is a groundwater storage and recovery program where supplemental water is stored in the Chino Basin during surplus years and extracted during years when the availability of supplemental water is limited. The Chino Basin DYYP was developed jointly by the Inland Empire Utilities Agency (IEUA) and the Metropolitan Water District of Southern California (MWDSC) with input from the Chino Basin Watermaster (Watermaster). The existing DYYP has a maximum storage capacity of 100,000 acre-ft with maximum puts of 25,000 acre-ft/yr and maximum takes of 33,000 acre-ft/yr. The proposed DYYP Expansion, or Expansion, evaluated herein is a 150,000 acre-ft storage program with 50,000 acre-ft/yr puts and 50,000 acre-ft/yr takes. The Expansion was developed jointly by the IEUA, the Three Valleys Municipal Water District (TVMWD), the Western Municipal Water District (WMWD), and the MWDSC.

In the latter half of 2008, an investigation was completed to evaluate the feasibility of the Expansion. This analysis was published as the *Chino Basin Dry-Year Yield Program Expansion Project Development Report* (Black & Veatch, 2008). Three expansion alternatives were developed and evaluated. Wildermuth Environmental, at the direction of the Watermaster, conducted a material physical injury analysis on these expansion alternatives. This material physical analysis is attached herein. The IEUA adopted a mitigated negative declaration for the Expansion in December 2008.

Per the Peace Agreement, material physical injury is defined as: "material injury that is attributable to Recharge, Transfer, storage and recovery, management, movement or Production of water or implementation of the Optimum Basin Management Plan including, but not limited to, degradation of water quality, liquefaction, land subsidence, increases in pump lift and adverse impacts associated with rising groundwater" (p. 8).

The criteria used to evaluate material physical injury for the Expansion include groundwater level changes, the increased potential for subsidence, losses from storage, changes in the direction and speed of known water quality anomalies, and the ability to maintain hydraulic control. These criteria were evaluated with an enhanced version of the 2007 Watermaster Model and MT3D. Based on our analysis, material physical injury—related to storage losses, groundwater level changes, and plume migration—will occur; however, this material physical injury can be mitigated. The results of the material physical injury analysis are summarized below.

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DYYP Expansion Alternatives

The Baseline Alternative, which represents the DYYP as it is currently being implemented, and three DYYP Expansion Alternatives are described below. The Expansion Alternatives attempt to bookend all potential DYYP Expansion concepts.

Baseline Alternative – Expansion of the Desalters, Reoperation, and the 100,000 acre-ft DYYP. The Baseline Alternative includes the planned expansion of the desalters and reoperation—as described in *2007 CBWM Groundwater Model Documentation and Evaluation of the Peace II Project Description* (WEI, 2007)—and the existing 100,000 acre-ft DYYP. Under the existing DYYP, the MWDSC, in consultation with Watermaster and the IEUA, makes surplus water available to the basin, which is then recharged via wet water recharge and in-lieu means (the put). Previously, the MWDSC could recharge up to 25,000 acre-ft/yr in the basin. However, due to the availability of surplus water (3 out of 10 years), the put requirement was increased to 33,000 acre-ft/yr under the direction of the IEUA. When the MWDSC makes a call, appropriators that participate in the program will reduce their demands on the MWDSC's imported supplies and could make up the difference in a number of ways. For modeling purposes, this difference was assumed to be made up solely by producing more groundwater from the MWDSC's storage account (the take). For the existing 100,000 acre-ft DYYP, the puts are assumed to occur via in-lieu means. The planning period begins with a three-year take period, as it is currently underway. A ten-year cycle is then assumed to repeat itself through 2035.

Alternative 1 – 150,000 acre-ft DYYP. This alternative is identical to the existing DYYP except the puts and takes increase to 50,000 acre-ft/yr and the maximum storage in the MWDSC DYYP storage account increases to 150,000 acre-ft.

Alternative 2 – 150,000 acre-ft DYYP with 100,000 acre-ft Negative Storage. This alternative is identical to Alternative 1 except the first two cycles are modified to allow for five consecutive take years with the volume in MWDSC storage account changing from +150,000 acre-ft to -100,000 acre-ft. The objective of this alternative is to estimate the impacts of allowing the MWDSC account to go negative for a period time and subsequently refilling it.

Alternative 3 – 150,000 acre-ft DYYP with 300,000 acre-ft Maximum Storage. This alternative is identical to Alternative 1 except the first two cycles are substantially modified to allow the MWDSC storage account to have significant quantities of water in storage and to increase the maximum volume in storage up to approximately 300,000 acre-ft. This alternative also includes small summer partial takes on the order of 6,250 acre-ft in certain years to reduce summer peaking on the Rialto Pipeline. The objective of this alternative is to estimate the impacts of allowing the MWDSC account to hold large quantities of water throughout the anticipated term of the DYYP Expansion contract.

Groundwater Level Changes

The Baseline Alternative is Alternative 1C of the Peace II Agreement (WEI, 2008). The Parties to the Judgment and the Peace II Agreement have indicated that they are willing to accept decreased

groundwater levels and associated increases in pumping energy expenses with the expectation of financial gains and certainties made possible by implementing the Peace II project description. The Baseline Alternative includes the existing DYYP and other Peace II related features. No material physical injury will occur from implementing the Baseline Alternative.

Groundwater production is projected to be maintained with the Expansion Alternatives; although, some changes in production and replenishment plans may be required. From a production perspective, as previously noted, no material physical injury is projected to occur from the decline in groundwater levels caused by the implementing the Baseline Alternative. The same is true for each of the Expansion Alternatives with two exceptions: the proposed take by Jurupa Community Services District (JCSD)/Western Municipal water District (WMWD) was reduced and the proposed take by the City of Chino Hills was eliminated. The total reduction in the proposed take was about 8,000 acre-ft/yr. These modifications were required to maintain projected production and to avoid incurring a material physical injury. It is our professional opinion that Chino Hills could participate in the take side of the Expansion if it modified its production plans to take more water from the shallow aquifer system. The JCSD could also participate by modifying its production plans and by improving groundwater replenishment in the JSCD area. Modifying the Chino Hills and JCSD production plans was beyond the scope of this material physical injury investigation. A comprehensive review of the sustainability of groundwater production and replenishment has been incorporated into the 2010 Recharge Master Plan Update.

Groundwater level declines are, by themselves, considered material physical injury in the Peace Agreement and need to be mitigated such that they are no longer "material." The *Chino Groundwater Basin Dry-Year Yield Program Expansion Initial Study* states that "[...] the mitigation identified for storage losses is deemed adequate to offset the groundwater level declines, based on the assumption that groundwater offsets (reduced takes or increased puts) will be directed to areas actually experiencing groundwater elevation declines as a result of implementing the DYY Expansion Project." The maximum groundwater level declines projected in the material physical injury analysis are shown in Figures 12a, 12b, and 12c in the attached report.

- For Expansion Alternative 1, during the lowest storage year, groundwater levels will be lower than those of the Baseline Alternative in slightly more than half the basin. The most impacted producers include the City of Pomona, the JCSD, and the MVWD.
- For Expansion Alternative 2, during the lowest storage year, groundwater levels will be lower than those of the Baseline Alternative in most of the basin. The most impacted producers include the Cities of Chino, Ontario, Pomona, and Upland, the MVWD, and the Fontana Water Company.
- For Expansion Alternative 3, during the lowest storage year, groundwater levels will be lower than those of the Baseline Alternative in a small area of the basin within the JCSD service area. Only the JCSD will be impacted groundwater level changes under this alternative.

It should also be noted that the Expansion Alternatives produce groundwater level increases in an area located in the north-central service area of the City of Ontario and the south-central service area of the CVWD during the lowest storage period.

It is our professional opinion that the projected declines are sustainable. That said, groundwater level declines are considered a material physical injury and will need to be mitigated. The Mitigated Negative Declaration presents the following mitigation measure:

> **"Mitigation Measure VII-2.** The stakeholders shall implement an adaptive management program in conjunction with the DYY Expansion Project. This adaptive management program shall be implemented concurrent with the DYY Expansion Project and the performance standard is to offset the actual loss of storage (measured or modeled by the Watermaster) by reduced takes or increased puts (or an alternative method deemed equivalent to reduced takes or increased puts) over each ten-year period of the DYY Expansion Project. To the extent feasible, the reduction in takes and puts, or an alternative, shall be offset in any portion of the Chino Basin that experiences a lowering of groundwater table that is attributable to the DYY Expansion Project."

The operable language in this mitigation measure, relative to groundwater level changes, is "To the extent feasible, the reduction in takes and puts, or an alternative, shall be offset in any portion of the Chino Basin that experiences a lowering of groundwater table that is attributable to the DYY Expansion Project." This mitigation measure assumes that Watermaster, a Chino Basin party, or another entity will be conducting monitoring, periodically reviewing monitoring data, and analyzing the basin with models to parse out the groundwater level changes of the DYYP Expansion from groundwater level changes that result from other basin management activities. This is a complex analysis that would need to be done more frequently than every ten years to assure sustainable production in the JCSD service area. The mitigation is unclear, and there is speculation that it may not be mitigated at all. To ensure that these investigations will be implemented and affective, the responsible entity should be stated clearly, and the costs, attributed to identifying groundwater level changes apart from groundwater level changes that result from other basin management activities, should be budgeted. The responsible parties and the scope of the proposed mitigation measure should be included in the agreements that implement the DYYP Expansion.

Changes in Subsidence Potential

WEI has been conducting subsidence investigations in Management Zone 1 (MZ1) for Watermaster since September 2000. The PA-7 piezometer is used in Watermaster's MZ1 Long Term Management Plan as the key monitoring location for drawdown-related subsidence. This plan states that basin management activities that maintain piezometric elevations greater than 400-feet at the PA-7 piezometer (corresponding to a depth-to-water of 245 feet) will not cause inelastic subsidence. For all Expansion alternatives, the projected lowest piezometric elevations are 23 to 48 feet higher than the subsidence threshold elevation of 400 ft for the managed area of MZ1; thus, no inelastic subsidence is projected to occur in this area. No material physical injury related to subsidence is projected to result from any of the Expansion alternatives.

Storage Losses

Storage losses will occur under Expansion Alternatives 1 and 3. These losses occur due to a decline in Santa Ana River recharge that results from increased groundwater levels in the basin. Through 2035, losses total about 1,500 acre-ft for Alternative 1 and about 40,000 acre-ft for Alternative 3. The material physical injury associated with storage losses was recognized in the Expansion Mitigated Negative Declaration. Moreover, the Mitigated Negative Declaration states that storage losses can be mitigated with either reduced takes or supplemental puts. The specific mitigation measure is provided below.

> **"Mitigation Measure VIII-2.** The stakeholders shall implement an adaptive management program in conjunction with the DYY Expansion Project. This adaptive management program shall be implemented concurrent with the DYY Expansion Project and the performance standard is to offset the actual loss of storage (measured or modeled by the Watermaster) by reduced takes or increased puts (or an alternative method deemed equivalent to reduced takes or increased puts) over each ten-year period of the DYY Expansion Project. To the extent feasible, the reduction in takes and puts, or an alternative, shall be offset in any portion of the Chino Basin that experiences a lowering of groundwater table that is attributable to the DYY Expansion Project."

It is our opinion that this mitigation measure, if implemented, can mitigate the projected material physical injury. As with groundwater level change mitigation, it assumes that Watermaster, a Chino Basin party, or another entity will be conducting monitoring, periodically reviewing monitoring data, and analyzing the basin with models to parse out the groundwater storage losses of the DYYP Expansion from storage losses that will occur as a result of other storage activities. This is a complex analysis that would need to be done more frequently than every ten years. To ensure that these investigations will be implemented and affective, the responsible entity should be stated clearly, and the costs, attributed to identifying these storage losses apart from storage losses that result from other storage activities, should be budgeted. The responsible parties and scope of the proposed mitigation measure should be included in the agreements that implement the DYYP Expansion.

Change in Direction and Speed of Water Quality Anomalies – Kaiser Plume

In the Baseline Alternative, and Expansion Alternatives 1 and 3, the leading edge of the Kaiser plume was projected to travel slightly more than 4 miles in a southwesterly direction over the projection period (2007 through 2035). In Expansion Alternatives 1 and 3, the downstream half of the plume decreased in size, compared to the Baseline Alternative, suggesting that projected Expansion production at City of Ontario Well 50 drew in more of the Kaiser plume than was projected to occur under the Baseline Alternative. Furthermore, this suggests that the Expansion may contribute to water quality degradation at City of Ontario Well 50, which is adjacent to the plume. This is a potential material physical injury and may require mitigation pursuant to the Peace Agreement.

The material physical injury associated with the Kaiser Plume was specifically recognized in the Expansion Mitigated Negative Declaration. Mitigation measures VII-11 and VIII-3, which address the material physical injury associated with the Expansion and the Kaiser Plume, are provided below.

> **"Mitigation Measure VII-11.** Hydrogeologic studies, including modeling, will be completed for each recharge site, including ASR wells, to define the recharge impacts on existing known contaminated plumes. If modeling and/or monitoring demonstrate that the rate of contaminated plume expansion or secondary effects associated with such expansion will adversely impact groundwater or water production capabilities, the recharge facility shall be moved to an alternative location where such impacts will not occur or else impacted production facilities will be replaced. In the event that proposed or existing facilities must be relocated outside of the scope of evaluation of this document, the associated environmental impacts will be evaluated in a subsequent project specific CEQA evaluation to allow a final determination on future project's specific impacts. Such review is appropriate and consistent with utilization of a program environmental document in accordance with Sections 15162 and 15168 of the State CEQA Guidelines."

> **"Mitigation Measure VIII-3.** If any well intercepts the Kaiser Plume, the responsible entity will install treatment processes at the affected well(s), or implement blending, or a combination of blending and treatment, to remove the plume pollutants to a level that meets potable/drinking water quality standards. If this cannot be achieved, these well(s) will be removed from production and replaced for each agency at an alternative location outside of the influence of the Kaiser Plume."

It is our opinion that these mitigation measures, if implemented, can mitigate the projected material physical injury. As with the previously discussed mitigation measures, these measures assume that Watermaster, a Chino Basin party, or another entity will be conducting monitoring, periodically reviewing monitoring data, and analyzing the basin with models to parse out the Kaiser plume impacts of the DYYP Expansion from Kaiser plume impacts that will occur as a result of other basin management activities. To ensure that these investigations will be implemented and affective, the responsible entity should be stated clearly, and the costs, attributed to identifying Kaiser plume impacts apart from Kaiser plume impacts that result from other basin management activities, should be budgeted. The responsible parties and scope of the proposed mitigation measures should be included in the agreements that implement the DYYP Expansion.

Hydraulic Control

Hydraulic control refers to the elimination or reduction of groundwater discharge from the Chino North Management Zone to the Santa Ana River to negligible levels. It is a requirement of the Watermaster and IEUA's recharge permit and a condition to gaining access to the assimilative capacity afforded by the maximum benefit based TDS and nitrogen objectives. Hydraulic control was demonstrated for the Baseline Alternative without the DYYP in 2023 in *Response to Condition*

Subsequent No. 3 from the Order Confirming Motion for Approval of the Peace II Documents (WEI, 2008). Hydraulic control was assessed from detailed groundwater elevation contour maps. Groundwater elevation contours in the southern end of Layer 1 of the Chino Basin were evaluated for the Baseline Alternative (2023), Alternative 1 (2030), Alternative 2 (2035), and Alternative 3 (2025) (all years correspond to high water level periods, resulting from the put and take timing of each respective alternative). (Hydraulic control is weakest when water levels are highest in the southern portion of the basin.) Hydraulic control is maintained for all Expansion alternatives.

Conclusion

Based on our analysis, material physical injury—related to storage losses, groundwater level changes, and plume migration—will occur; however, this material physical injury can be mitigated if the mitigation measures, cited above, from the Mitigated Negative Declaration are substantially expanded and included in the DYYP Expansion agreements. In our professional opinion, Watermaster should condition its approval of the IEUA's application to expand the DYYP on the development of specific mitigation requirements that will be included in the final agreements that implement the DYYP Expansion.

Please call either of us if you have any questions or need further assistance.

Very truly yours,

Wildermuth Environmental, Inc.

Thomas D. McCarthy, PE, PG
Associate Engineer

Mark J. Wildermuth, PE
Chairman

Cc.
Richard Atwater, Inland Empire Utilities Agency
Tom Dodson, Tom Dodson and Associates
Michael Fife, Brownstein Hyatt Farber Schreck

Encl.

References

Black and Veatch, (2008). *Optimum Basin Management Program, Chino Basin Dry-Year Yield Program Expansion Project Development Report, Volume I-IV.* Irvine: Author.

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December 15, 2008

Chino Basin Watermaster
Attention: Kenneth R. Manning
Chief Executive Officer
9641 San Bernardino Road
Rancho Cucamonga, CA 91730

Subject: Analysis of Material Physical Injury from the Proposed Expansion of the Dry-Year Yield Program

Dear Mr. Manning:

The objective of this investigation is to determine if there will be a material physical injury to the Chino Basin or a Party to the Judgment from the proposed expansion of the Dry-Year Yield Program (DYYP), hereafter referred to as the DYYP Expansion or Expansion. The criteria used to evaluate material physical injury include groundwater-level changes, the increased potential for subsidence, losses from storage, changes in the direction and speed of known water quality anomalies, and the ability to maintain hydraulic control.

The DYYP is a groundwater storage and recovery program where supplemental water is stored in the Chino Basin during surplus years and extracted during years when the availability of supplemental water is limited. The Chino Basin DYYP was developed jointly by the Chino Basin Watermaster (CBWM), the Inland Empire Utilities Agency (IEUA), and the Metropolitan Water District of Southern California (MWDSC). The DYYP has a maximum storage capacity of 100,000 acre-ft with maximum puts of 25,000 acre-ft/yr and maximum takes of 33,000 acre-ft/yr. The proposed DYYP Expansion evaluated herein is a 150,000 acre-ft storage program with 50,000 acre-ft/yr puts and 50,000 acre-ft/yr takes. The Expansion was developed jointly by the CBWM, the IEUA, the Three Valleys Municipal Water District (TVMWD), the Western Municipal Water District (WMWD), and the MWDSC.

The Black and Veatch Corporation (B&V) was the lead consultant in the development of the facility and related operating plans for DYYP Expansion alternatives. Starting in February 2008, B&V developed a series of preliminary dry-year yield plans with the participating water agencies. The investigation reported herein is an assessment of material physical injury from the specific facilities and operating plans articulated by B&V. The facility and operating plans for the DYYP Expansion have been documented by B&V in Volume I of the DYYP Project Development Report.

To evaluate the criteria listed above, WEI staff utilized the 2007 Watermaster Model (Model). Figure 1 illustrates the extent of the groundwater model (model domain) and the Regional Water Quality Control Board (RWQCB) management zones. The model domain extends into the Temescal Basin as the two basins are hydraulically connected. The Model was used to evaluate a baseline alternative and three proposed Expansion alternatives.

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The Baseline Alternative (Baseline) is based on the Peace II Project Description with the existing 100,000 acre-ft DYYP. Moreover, the Baseline is equivalent to Alternative 1C, which was documented in *Response to Condition Subsequent No. 3 from the Order Confirming Motion for Approval of the Peace II Documents* (WEI, 2008). The Baseline was found to cause no material physical injury. The assessment of material injury herein is based on an evaluation of the criteria listed above as well as a comparison to the Baseline Alternative.

The development of the DYYP Expansion project included a determination of how participants would increase or decrease imported water purchases at predetermined amounts to meet program put and take objectives. During put years, the participating retailers would reduce their projected pumping by an amount equal to the put, and the MWDSC would supply a like amount of water to participating retailers as a direct surface water delivery. In a take year, the participating retailers would increase their pumping over their projected amount equal to the take, and the MWDSC would reduce their delivery of surface water by a like amount. Table 1 lists the initial proposed takes, which were determined in a series of meetings with participating agencies. Several preliminary Model simulations were completed to determine the feasibly of these proposed takes. The conclusion of the preliminary simulations is also provided in Table 1. Due to hydraulic limitations, the proposed take for the City of Chino Hills and the WMWD could not be maintained. The City of Chino Hills proposed take was reduced from 2,000 acre-ft/yr to 0 acre-ft/yr. The WMWD proposed take was reduced from 10,000 acre-ft per year to 5,000 acre-ft/yr. These feasible takes are included in the analysis presented herein. With regard to the Chino Hills take, the take was reduced as precautionary piezometric elevations to prevent inelastic subsidence (at piezometer PA-7) could not be maintained. However, the model assumptions for City of Chino Hills were reflective of a conservative scenario relative to "deep well" pumping. In fact, the City of Chino Hills has subsequently shifted 1,448 acre-ft/yr DYY production out of the MZ-1 managed zone. Additionally, the City of Chino Hills contemplates a broader use of shallow well production than initially modeled. This will also be accomplished in conjunction with further monitoring and groundwater basin testing. It is our professional opinion that Chino Hills can participate in the take side of the Expansion Program if its pumping plans take more water from the shallow aquifer system than modeled. Optimizing the Chino Hills pumping plan is beyond the scope of this investigation. This optimization should be included in a subsequent basin-wide analysis of pumping and recharge plans performed by the appropriators and the CBWM. The WMWD take was reduced until groundwater pumping in the JCSD well field could be maintained.

Dry Year Yield Evaluation Criteria

Per the Peace Agreement, material physical injury is defined as: "material injury that is attributable to Recharge, Transfer, storage and recovery, management, movement or Production of water or implementation of the Optimum Basin Management Plan (OBMP) (WEI 1999), including, but not limited to, degradation of water quality, liquefaction, land subsidence, increases in pump lift and adverse impacts associated with rising groundwater" (p. 8).

As indicated above, each proposed Expansion alternative was evaluated with the Model to determine groundwater-level changes at selected representative locations in the basin and the basin

as a whole, the increased potential for subsidence through the lowering of piezometric levels in vicinity of the City of Chino, losses of water in storage due to operating the basin at greater storage levels, the change in direction and speed of known water quality anomalies due to the superposition of the put and take periods on otherwise expected basin operations, and the ability to maintain hydraulic control when operating the basin at greater storage levels. The planning period used in this analysis consists of the 27-year period from October 2008 through September 2035. This period corresponds to the 25-year period of the proposed Expansion agreement, which ranges from 2010 through 2035. Groundwater modeling was completed for 2006 through 2060 with the impacts reported for through 2035. The impacts of each alternative were assessed by comparing the model simulation results to the Baseline Alternative. Specifically, information was extracted from the model results to produce:

- Water budget tables to determine outflow from the Chino North Management Zone to the Prado Basin Management Zone and the Santa Ana River, new recharge from the Santa Ana River, and the change in water in storage.
- Maps showing the areal distribution of groundwater elevations and the change in groundwater elevations caused by each proposed Expansion alternative.
- Hydrographs showing projected water level time histories at selected representative wells in the Chino Basin. This includes the PA-7 piezometer located at the CBWM subsidence monitoring station in Ayala Park. The PA-7 piezometer is used to assess the potential for subsidence in the area of subsidence concern within the City of Chino.
- Maps that show plume migration tracks for the dry-year yield Baseline and Expansion over the planning period.
- Detailed groundwater level and flow system maps of the southern part of the basin to assess the state of hydraulic control.

Dry-Year Yield Program Expansion Description

Eight Chino Basin appropriators are anticipated to participate in the Expansion, including the Cities of Chino, Chino Hills, Pomona, Ontario, and Upland; the Cucamonga Valley Water District (CVWD); the Jurupa Community Services District (JCSD); and the Monte Vista Water District (MVWD). The Three Valleys Municipal Water District (TVMWD) and the Western Municipal Water District (WMWD) are also expected to participate through coordination with Chino Basin appropriators. Program participants would increase or decrease imported water purchases at a predetermined amount to meet program put and take objectives. During put years, participating retailers would reduce their projected pumping by an amount equal to the put, and MWDSC would supply a like amount of water to participating retailers as a direct surface water delivery. In take years, the participating retailers would increase their pumping over their projected amount equal to the take, and the MWDSC would reduce their delivery of surface water by a like amount; demands that would have otherwise been met by MWDSC surface water deliveries are met by groundwater extracted from the program storage account.

Tables 2 and 3 list the program participants' existing and anticipated expansion put and/or take contributions. The combined put capacity of these agencies is 50,000 acre-ft/yr. As shown in Table 2, the total committed in-lieu put capacity is approximately 42,500 acre-ft/yr. The 7,500 difference between the committed put and the modeled put is assumed to consist of either additional in-lieu

deliveries or wet water recharge. For modeling purposes, this was assumed to consist solely of additional in-lieu deliveries, which were assigned to all participants on a pro-rata basis. Approximately 17,000 acre-ft/yr of the put capacity occurs via aquifer storage and recovery (ASR) injection wells and the remaining approximately 33,000 acre-ft/yr occurs via in-lieu deliveries. The locations of the new ASR wells are shown in Figure 2. During put years, these wells operate as injection wells, and during take and hold years, they operate as extraction wells. The total in-lieu put capacity is approximately the same as the in-lieu capacity of the existing program (33,000 acre-ft/yr). The TVMWD is not a Chino Basin appropriator; therefore, its puts were assigned to the City of Pomona and the City of Upland. As shown in Table 3, the combined take capacity modeled for these agencies is 50,000 acre-ft/yr (inclusive of the existing program). The WMWD is not a Chino Basin appropriator; therefore, its takes were assigned to the JCSD.

Projected Groundwater Production for the Planning Period

The IEUA developed a preliminary groundwater pumping plan (IEUA, 2008a) for the Chino Basin during the summer of 2008. This plan, which is based on the current and future water supply plans provided by the groundwater producers for the period of 2008 through 2035, is the basis of the groundwater pumping plan used in this investigation. The producers' water supply plans include existing and new master-planned wells, planned groundwater treatment facilities, an expanded OBMP desalter program, and the assumption that CBWM will secure access to enough replenishment facilities and water to enable the producers to pump what they need. The groundwater pumping plan was vetted early through the CBWM process and was accepted by the appropriators in September 2008.

Table 4 lists projected groundwater production by party for the period of 2006/07 through 2034/35. The total production of the appropriators during the projection period averages about 180,000 acre-ft/yr and ranges from a low of about 140,000 acre-ft/yr to a high of about 210,000 acre-ft/yr. The total production for the Chino Basin during this period averages about 195,500 acre-ft/yr and ranges from a low of about 170,000 acre-ft/yr to a high of about 220,000 acre-ft/yr. Adjustments were made in some of the individual appropriator pumping plans to reduce well interference and regional drawdown in the center of the basin. The appropriators and the CBWM should conduct a basin-wide analysis of pumping and recharge plans to optimize pumping and groundwater levels. The optimization would consist of determining pumping and recharge operations that minimize drawdown using wells that pump from specific aquifers, wells in specific locations within the basin, and or constructing new wells.

Projected Groundwater Recharge and Replenishment

Replenishment water is recharged to the Chino Basin by the CBWM pursuant to the 1978 Chino Basin Judgment (Case No. RCV 51010, Chino Basin Municipal Water District vs. City of Chino et al.) and the Peace Agreement. Table 5 lists the future replenishment obligation and replenishment water estimates for the Baseline and Expansion Alternatives. The allocation of recharge to individual facilities is based on the requirement to balance recharge and discharge as described in the OBMP Peace Agreement. The CBWM purchases replenishment water when one or more parties overproduces. Typically, the CBWM purchases water from the MWDSC at a replenishment rate, which is made available to the CBWM when the MWDSC has surplus imported water. The

availability of replenishment water from the MWDSC has been substantially reduced due to environmental and judicial constraints and drought. There is no official forecast available from MWDSC to characterize the availability of replenishment water. However, MWDSC staff has presented relevant information to its member agencies, as part of an ongoing Regional Groundwater Workshop process (Brandon Goshi, August 29 and October 30 2008), showing the impacts of different water supply and demand scenarios on the availability of surplus water for groundwater replenishment and regional storage purposes. The same information was presented by MWDSC staff at the Chino Basin Watermaster Strategic Planning Meeting (Grace Chan, September 29 2008). These presentations showed that, under the Interim Remedy Order to protect Delta Smelt (U.S. District Court Judge Oliver Wanger, NRDC vs. Kempthorne 2007), surplus water may only be available in approximately three out of ten years. The primary State Water Project supply assumptions underlying this finding is documented in the 2007 State Water Project Delivery Reliability Report from the California Department of Water Resources (DWR, 2007). Although MWDSC staff also presented the impacts of potential improvements to the State Water Project supplies that may occur in the future, it has been assumed for modeling purposes that replenishment water will be available to CBWM in three of ten years and that this water will be provided to the CBWM in the quantities necessary to meet cumulative unmet replenishment obligation limited by the recharge capacity in existing recharge basins. Deliveries of this water were assumed to occur when the MWDSC is doing a put into its DYYP storage account. A 5,000 acre-ft/yr in-lieu program was also assumed to extend the recharge capacity to the amount required to satisfy replenishment obligations.

The estimated volume of new storm water recharged during the planning period is 11,646 acre-ft/yr, which is based on the actual operations of the stormwater recharge facilities in the Chino Basin. This value was used in the Peace II material physical injury analysis.

The volume of recycled water recharged during the planning period is based on IEUA recycled water plans (IEUA, 2007) and discussions with IEUA staff (IEUA, 2008b). Recycled water recharge increases from approximately 1,300 acre-ft in 2006 to 24,000 acre-ft in 2035. Table 5 shows recycled water recharge for the planning period. The availability of recycled water for recharge was based on the following assumptions:

- The IEUA will gain approval to transition from its existing 5-year volumetric average recycled water content of approximately 33% permit condition to a 10-year volumetric average recycled water content of 50% permit condition.
- Imported water will be available 3 out of 10 years for dilution.

When imported water is available, the volume used for replenishment was calculated based on the available recharge capacity and the cumulative unmet replenishment obligation. The available capacity was determined after accounting for storm water and recycled water. The volume of recycled water was determined iteratively with the estimated volume of imported water to satisfy recycled water contribution constraints. No imported water is assumed to be purchased unless there is an unmet replenishment obligation.

Alternative Descriptions

The Baseline Alternative, which represents the DYYP as it is currently being implemented, and three DYYP Expansion Alternatives are described below. The three Expansion Alternatives attempt to bookend all currently envisioned DYYP Expansion concepts.

Baseline Alternative – Expansion of the Desalters, Reoperation, and the 100,000 acre-ft DYYP. The Baseline Alternative includes the planned expansion of the desalters and reoperation—as described in *2007 CBWM Groundwater Model Documentation and Evaluation of the Peace II Project Description* (WEI, 2007a) —and the existing 100,000 acre-ft DYYP. In the existing DYYP, the MWDSC, in consultation with the CBWM and the IEUA, makes surplus water available to the basin, which is then recharged via wet water recharge and in-lieu means (the put). Previously, the MWDSC could recharge up to 25,000 acre-ft/yr in the basin. However, due to the availability of surplus water (3 out of 10 years), the put requirement was increased to 33,000 acre-ft/yr under the direction of the IEUA. When the MWDSC makes a call, appropriators that participate in the program will reduce their demands on the MWDSC's imported supplies and could make up the difference in a number of ways. For modeling purposes, this difference was assumed to be solely by producing more groundwater from Metropolitan's storage account (the take). The puts and takes are listed in Tables 2 and 3, respectively. For the existing 100,000 acre-ft DYYP, the puts are assumed to occur via in-lieu means. This is the preferred method of the appropriators, and it frees up wet water recharge capacity for future replenishment. The take commitments are contractual commitments between the appropriators listed in Table 3 and the IEUA. Figure 3a illustrates the time history of groundwater pumping and storage in the Baseline Alternative through the end of the Peace Agreement. A ten- year cycle was assumed with the first three years being put years, the next four years being hold years and the last three years being take years. The planning period starts off with a three-year take period, as it is currently underway. The ten-year cycle is assumed to repeat itself through 2035.

Alternative 1 – 150,000 acre-ft DYYP. This alternative is identical to the existing DYYP except the puts and takes increase to 50,000 acre-ft/yr and the maximum storage in the MWDSC DYYP storage account is 150,000 acre-ft. The groundwater production modifications required to accomplish the increased puts and takes are shown in Tables 2 and 3. Figure 3b illustrates the time history of groundwater pumping and storage for Alternative 1.

Alternative 2 – 150,000 acre-ft DYYP with 100,000 acre-ft Negative Storage. This alternative is identical to Alternative 1 except the first two cycles are modified to allow five consecutive take years with volume in MWDSC storage account changing from +150,000 acre-ft to -100,000 acre-ft. The objective of this alternative is to estimate the impacts of allowing the MWDSC account to go negative for a period time and subsequently refilling it. Figure 3c illustrates the time history of groundwater pumping and storage for Alternative 2.

Alternative 3 – 150,000 acre-ft DYYP with 300,000 acre-ft Maximum Storage. This alternative is identical to Alternative 1 except the first two cycles are substantially modified to allow the MWDSC storage account to have significant quantities of water in storage and to increase the maximum volume in storage up to approximately 300,000 acre-ft. This alternative also includes small summer (or partial) takes on the order of 6,250 acre-ft in certain years to reduce summer peaking on

the Rialto Pipeline. The objective of this alternative is to estimate the impacts of allowing the MWDSC account to hold large quantities of water throughout the anticipated term of the DYYP Expansion contract. Of particular interest are the impacts on water in storage and hydraulic control. Figure 3d illustrates the time history of groundwater pumping and storage for Alternative 3. The 6,250 acre-ft summer takes are visible apart from the large programmatic takes.

Material Physical Injury Analysis

Hydrologic Balance and Storage

The hydrologic water budgets for Chino North, Chino South, Chino East, and Prado Management Zones for the Baseline Alternative, Alternative 1, Alternative 2, and Alternative 3 are shown in Tables 6 through 9, respectively. Overall, the budgets are very similar. The greatest differences lie in how basin storage changes over time and how the basin interacts with the Santa Ana River. Water budget as used herein refers to the accounting of recharge, discharge and water in storage.

There are several recharge and discharge components listed in Tables 6 through 9. A key difference in the water budgets is the inflow from stream recharge and outflow to rising groundwater. The net difference between rising groundwater and stream recharge can be seen in the Santa Ana River discharge at Prado Dam and in basin storage.

Table 10 shows the estimated time history of Santa Ana River discharge for the Baseline and three Expansion Alternatives. Table 10 also shows the difference in surface water discharge caused by the Expansion. Figure 4a illustrates the change in Santa Ana River recharge to the Chino Basin for each alternative relative to the Baseline.

The hydrologic balance for Alternative 1 is almost identical to the baseline with subtle differences showing up in slightly increased streambed recharge in Chino South Management Zone (MZ) and the time history of storage. The hydrologic balance for Alternative 2 is shows decreased streambed recharge in Chino South MZ. This is caused by drawdown associated with negative DYYP storage program. The hydrologic balance for Alternative 3 is shows significant decreased streambed recharge in Chino South MZ. The specific amount of change for each alternative relative to the Baseline is listed below:

- For Alternative 1, the cumulative discharge for the Santa Ana River is increased by a total of about 1,500 acre-ft by 2035.

- For Alternative 2, the cumulative discharge for the Santa Ana River is reduced by a total of about 32,700 acre-ft by 2035 and is equivalent to an average decrease of about a 2 cubic feet per second (cfs) in the Santa Ana River discharge, or about one half of one percent of the total discharge in the Santa Ana River.

- For Alternative 3, the cumulative discharge for the Santa Ana River is increased by a total of about 35,900 acre-ft by 2035 and is equivalent to an average increase of about a 2 cfs in the

Santa Ana River discharge, or also about one half of one percent of the total discharge in the Santa Ana River.

Figure shows cumulative change in storage for each alternative. 4b also illustrates when water levels for each alternative are at their lowest, when the cumulative change in storage is greatest, and when there is no water in the DYYP Expansion storage account. For the planning period, this is 2030 for all alternatives with the exception of Alternative 2 and Alternative 3. Alternative 3 has water in the DYYP storage account throughout the planning period; and approximately 100,000 acre-ft in 2030. Alternative 2 is at its lowest cumulative storage in 2021.

The total storage in the Chino Basin declined similarly for each Alternative relative to the Baseline; however, the storage levels varied more abruptly due to the put and take periods. The decline in storage was at a lower rate during put periods and dropped more steeply during take periods. Figure 4b illustrates the change in storage over the planning period for each alternative. The planning period cumulative change in storage is approximately -407,000 acre-ft for the Baseline, -359,000 acre-ft for Alternative 1, -311,000 acre-ft for Alternative 2, and -359,000 acre-ft for Alternative 3. In 2030, when all storage accounts for have a zero balance except Alternative 3, the change in storage is –459,600, -462,000, -410,000, and –388,500 for Alternative 1, Alternative 2 and Alternative 3, respectively. A. When corrected for the amount of water in the DYYP storage account in 2030, Alternative 3 has a change in storage of -494,500. Note that the change in storage for the Baseline Alternative and Alternative 1 are very similar, within less than 1 percent of each other. Alternative 2 gains more water from the Santa Ana River than the other alternatives and therefore has less cumulative change in storage, approximately 11 percent less than the Baseline Alternative. Alternative 3 does not gain as much water from the Santa Ana River than the other alternatives. When correcting for DYYP water in the storage account in 2030, Alternative 3 has more cumulative change in storage, approximately 8 percent more than the Baseline Alternative.

Alternative 1 results in a negligible change in storage relative to the Baseline Alternative. Alternative 2 has the greatest difference in Santa Ana River discharge and change in storage when compared to the Baseline. During the negative storage period of Alternative 2, groundwater levels are depressed relative to the Baseline Alternative levels, and this causes greater recharge from the Santa Ana River.

Alternative 3 results in less Santa Ana River recharge compared to the Baseline Alternative because groundwater levels are higher over the planning period compared to groundwater levels in the Baseline Alternative. This has the effect of losses from storage that result from changes in River recharge that were not accounted for in the planning simulations. These losses would have to be mitigated to ensure no material physical injury.

Changes in Groundwater Levels

Figure 5 shows the locations of selected wells for which groundwater level time history were projected for the Expansion Alternatives. The hydrographs for these wells, which are included with this report as Figures 6a through 6j, show how water levels are projected to change over the planning period. The groundwater elevations in 2008 (initial condition) and 2035 were mapped for layers 1, 2, and 3 for each planning alternative. The 2008 groundwater elevations for layers 1, 2, and 3 are illustrated in Figures 7a though 7c. The initial conditions are the same for all alternatives.

Figures 8a through 8c show the Baseline Alternative at the end of the planning period (2035) for layers 1, 2, and 3.

The maximum change in groundwater levels for the Expansion Alternatives is assumed to occur when DYYP storage is exhausted near the end of the planning period (2030) or, in the case of Alternative 2, at the point where DYYP storage reaches its most negative value (2021). Figure 4b illustrates the cumulative change in storage for each alternative. The point of lowest cumulative change in storage is 2030 for the Baseline Alternative and Alternatives 1 and 3. The point of lowest cumulative storage change for Alternative 2 is 2021. The 2030 groundwater elevations for Alternative 1 layers 1, 2, and 3 are shown in Figures 9a through 9c. The 2021 groundwater elevations for Alternative 2 layers 1, 2, and 3 are shown in Figures 10a through 10c. And, the 2030 groundwater elevations for Alternative 3 layers 1, 2, and 3 are shown in Figures 11a though 11c.

Once the lowest groundwater levels were identified for each Expansion Alternative, the differences between the low groundwater levels of the Baseline Alternative and the Expansion Alternatives were calculated. Figures 12a and 12b compare the low groundwater levels for Alternatives 1 and 3 to the Baseline Alternative in 2030. Figures 12c and 12d compare the low groundwater levels for Alternative 2 to the Baseline Alternative in 2021 and 2030.

Table 10 summarizes the water level changes by alternative. The first *Baseline 2030* columns list the groundwater level changes for the Baseline Alternative from 2008 through 2030 by retail water service area. The average change is area-weighted, and the maximum and minimum changes are specific to model cells in the retail service area. *The Alternative 1 2030 + Baseline* columns list similar statistics for the difference between the Baseline Alternative and Alternative 1 in 2030. For example, the average groundwater level change in the CVWD service area for the Baseline is -37 feet, and the difference in 2030 for the average groundwater level between Alternative 1 and the Baseline is an increase of 3 feet over the retail service area. This table contains similar information for Alternatives 2 and 3.

The groundwater elevation changes are not uniform across the basin, and therefore, some retail agencies will experience greater lift and related energy expenses from the proposed Expansion. Note the following localized changes in groundwater elevations for the Baseline Alternative:

- Through fall 2030, groundwater elevations in the MVWD and City of Pomona production area are projected to change by about -15 to -20 feet in layer 1, -40 to -44 feet in layer 2, and -44 to -53 feet in layer 3.
- Through fall 2030, groundwater elevations in the MZ1 subsidence area (the production area for the Cities of Chino and Chino Hills) are projected to change by about -20 feet in layer 1, -38 feet in layer
- 2, and -40 feet in layer 3. The groundwater levels in layers 2 and 3 are above the subsidence threshold, and therefore, new inelastic subsidence is not expected to occur for the Baseline Alternative.
- Through fall 2030 groundwater elevations in the CVWD service area are projected to change by about -37 feet in all layers. A significant pumping depression develops at the cluster of CVWD production wells approximately 0.5 miles north of the Turner Recharge Basins. Through fall 2030,

groundwater elevations in the CVWD service area are projected to change by about -19 feet in all layers.

- Through fall 2030, groundwater elevations in the City of Ontario service area are projected to change by about -40 to -45 feet in all layers.
- Through fall 2030, groundwater elevations in the JCSD production area are projected to change by about -24 to -18 feet in all layers.
- Through fall 2030, groundwater elevations in the FWC production area are projected to change by about -26 feet in layers 1 and 2 and by about -8 feet in layer 3.

Water levels in Layer 1 for Alternatives 1 and 3 are slightly higher than the Baseline in 2030. For layers 2 and 3 water levels are still higher in Cucamonga and Fontana, but tend to be lower over the majority of the Chino Basin. Figures 12c through 12d show how each alterative varies from the baseline. Areas of concentrated put, including part of the CVWD service area, show an increase in groundwater levels, and areas where the take is concentrated, such as Pomona and MVWD, show consistent water level declines regardless of the Expansion Alternative.

The projected groundwater declines that result from the Expansion Alternatives are generally small and sustainable. That said, groundwater level declines are considered material physical injury in the Peace Agreement and will need to be mitigated. A discussion of mitigation is beyond the scope of this investigation.

Changes in Subsidence Potential

WEI has been conducting subsidence investigations in MZ1 for the CBWM since September 2000. As part of this process, WEI has reviewed recent historical subsidence across the basin using InSAR, ground level surveys, controlled pumping tests, and a rigorous review of basin hydrogeology. Figure 13 shows the location of recent subsidence in MZ1 (1996-2000) and defines the southern and central sub-areas of subsidence within MZ1. Figure 14 shows the projected the piezometric elevations at the PA-7 piezometer for all planning alternatives.

The PA-7 piezometer is used in the CBWM's MZ1 Long Term Management Plan. In this plan, basin management activities that maintain piezometric elevations greater than 400-feet at the PA-7 piezometer (corresponding to a depth to water of 245 feet) will not cause inelastic subsidence. In all cases, the projected lowest piezometric elevations are 23 to 48 feet higher than the subsidence threshold elevation of 400 ft for the managed area of MZ1; thus, no inelastic subsidence is projected to occur in this area. No material physical injury related to subsidence from any of the planning alternatives is projected to occur.

Change in Movement of Water Quality Anomalies

Previous Chino Basin water quality discussions (WEI, 2003; WEI, 2007b) have described specific water quality conditions across the entire basin and detailed existing contaminant plumes. These plumes are briefly discussed below. Following this discussion, the Expansion Alternatives' effects on said plumes are articulated.

Chino Airport. The Chino Airport is located approximately four miles east of the City of Chino and six miles south of Ontario International Airport, and occupying about 895 acres. From the early 1940s until 1948, the airport was owned by the Federal Government and used for flight training and aircraft storage. The County of San Bernardino acquired the airport in 1948 and has since operated and/or leased portions of the facility. Past and present businesses and activities at the airport since 1948 have included the modification of military aircraft; crop-dusting; aircraft-engine repair; aircraft painting, stripping, and washing; dispensing of fire-retardant chemicals to fight forest fires; and general aircraft maintenance. The use of organic solvents for various manufacturing and industrial purposes is widespread throughout the airport's history (RWQCB, 1990). From 1986 to 1988, a number of groundwater quality investigations were performed in the vicinity of Chino Airport. Analytical results from groundwater sampling revealed the presence of VOCs above MCLs in six wells down gradient of Chino Airport. The most common VOC detected above its MCL was TCE with concentrations in contaminated wells ranging from 6 to 75 µg/L. The plume is elongate in shape, up to 3,600 feet wide, and extends approximately 14,200 feet from the airport's northern boundary in a south to southwestern direction.

General Electric Flatiron Facility. The General Electric Flatiron Facility (Flatiron Facility) occupied the site at 234 East Main Street, Ontario, California from the early 1900s to 1982. Its operations primarily consisted of manufacturing clothes irons. Currently, the site is occupied by an industrial park. The RWQCB issued an investigative order to General Electric (GE) in 1987 after an inactive well in the City of Ontario was found to contain TCE and chromium above drinking water standards. Analytical results from groundwater sampling have indicated that VOCs and total dissolved chromium are the major groundwater contaminants in this plume. The most common VOC detected at levels significantly above its MCL is TCE, which reached a measured maximum concentration of 3,700 µg/L. Other VOCs—including PCE, toluene, and total xylenes, are periodically detected—but commonly below MCLs (Geomatrix Consultants, 1997). The plume is up to 3,400 feet wide and extends about 9,000 feet south-southwest (hydraulically down gradient) from the southern border of the site. From 2001 to 2006, the maximum TCE concentration in groundwater detected at an individual well within the Flatiron Facility plume was 3,200 µg/L.

General Electric Test Cell Facility. The GE Engine Maintenance Center Test Cell Facility (Test Cell Facility) is located at 1923 East Avon, Ontario, California. The primary operations at the Test Cell Facility include the testing and maintenance of aircraft engines. A soil and groundwater investigation, followed by a subsequent quarterly groundwater monitoring program, began in 1991 (Dames & Moore, 1996). The results of these investigations showed that VOCs exist in the soil and groundwater beneath the Test Cell Facility and that the released VOCs have migrated offsite. Analytical results from subsequent investigations indicated that the most common and abundant VOC detected in groundwater beneath the Test Cell Facility was TCE. The historical maximum TCE concentration measured at an onsite monitoring well (directly beneath the Test Cell Facility) was 1,240 µg/L. The historical maximum TCE concentration measured at an offsite monitoring well (down gradient) was 190 µg/L (BDM International, 1997). Other VOCs that have been detected include PCE; cis-1,2-DCE; 1,2-dicholoropropane; 1,1-DCE; 1,1-DCA; benzene; toluene; xylenes; and others. The plume is elongate in shape, up to 2,400 feet wide, and extends approximately 10,300 feet from the Test Cell Facility in a southwesterly direction. From 2001 to 2006, the maximum TCE and PCE concentrations in groundwater detected at an individual well within the Test Cell Facility plume were 900 µg/L and 17 µg/L, respectively.

Kaiser Steel Fontana Steel Site. Between 1943 and 1983, the Kaiser Steel Corporation (Kaiser) operated an integrated steel manufacturing facility in Fontana. During the first 30 years of the facility's operation (1945-1974), a portion of Kaiser's brine wastewater was discharged to surface impoundments and allowed to percolate into the soil. In the early 1970s, the surface impoundments were lined to eliminate percolation to groundwater (Mark J. Wildermuth, 1991). In July 1983, Kaiser initiated a groundwater investigation that revealed the presence of a plume of degraded groundwater under the facility. In August 1987, the RWQCB issued CAO Number 87-121, which required additional groundwater investigations and remediation activities. The results of these investigations showed that the major constituents of release to groundwater were inorganic dissolved solids and low molecular weight organic compounds. The wells sampled during the groundwater investigations had TDS concentrations ranging from 500 to 1,200 mg/L and TOC concentrations ranging from 1 to 70 mg/L. As of November 1991, the plume had migrated almost entirely off the Kaiser site. Based on a limited number of wells, including City of Ontario Well No. 30, the plume is up to 3,400 feet wide and extends about 17,500 feet from northeast to southwest.

Milliken Landfill. The Milliken Sanitary Landfill (MSL) is a Class III Municipal Solid Waste Management Unit, located near the intersections of Milliken Avenue and Mission Boulevard in the City of Ontario. This facility is owned by the County of San Bernardino and managed by the County's Waste System Division. The facility was opened in 1958 and continues to accept waste within an approximate 140-acre portion of the 196-acre permitted area (GeoLogic Associates, 1998). Groundwater monitoring at the MSL began in 1987 with five monitoring wells as part of a Solid Waste Assessment Test investigation (IT, 1989). The results of this investigation indicated that the MSL had released organic and inorganic compounds to the underlying groundwater. Due to the presence of such compounds, the MSL conducted an Evaluation Monitoring Program (EMP) investigation. Following the completion of the EMP, a total of 29 monitoring wells were drilled to evaluate the nature and extent of the groundwater impacts identified in the vicinity of the MSL (GeoLogic Associates, 1998). Analytical results from groundwater sampling have indicated that VOCs are the major constituents of release. The most common VOCs detected are TCE, PCE, and dichlorodifluoromethane. Other VOCs detected above their MCLs include vinyl chloride; benzene; 1,1-dichloroethane; and 1,2-dichloropropane. The historical maximum total VOC concentration detected at an individual monitoring well is 159.6 µg/L (GeoLogic Associates, 1998). The plume is up to 1,800 feet wide and extends about 2,100 feet south of the MSL's southern border. From 2001 to 2006, the maximum TCE and PCE concentrations detected at an individual well within the MSL plume were 96 µg/L and 44 µg/L, respectively.

Ontario International Airport. A VOC plume, primarily containing TCE, exists south of the Ontario Airport. This plume extends approximately from State Route 60 on the north and Haven Avenue on the east to Cloverdale Road on the south and South Grove Avenue on the west. In July 2005, Draft CAOs were issued by the RWQCB. These CAOs were presented to the companies they named in August 2005. From 2001 to 2006, the maximum TCE concentration detected at an individual well within this plume was 38 µg/L. The plume is up to 17,700 feet wide and 20,450 feet long.

Pomona Area Plume. This is an undocumented VOC plume in the Pomona area. This plume extends approximately from Holt Boulevard on the north and East End Avenue on the east to

Philadelphia Street on the south and Towne Avenue on the west. From 2000 to 2008, the maximum TCE concentration within this plume was 46 µg/L. The plume is up to 5,000 feet wide and 7,900 feet long.

Figure 15 illustrates the locations of groundwater contaminant plumes in Chino Basin at the beginning of the planning period and their estimated locations at the end of the planning period for the Baseline and DYYP Alternatives. The migration of the plumes through the planning period is very similar for each Alternative.

The current locations of the plumes were mapped from recent data. These locations were assumed to be the initial plume locations at the start of the planning period. Initial concentrations were prepared as input files for MT3D (Zheng and Wang, 1999). MT3D is a 3-dimensional solute transport model code for simulation of advection, dispersion, and chemical reactions of dissolved constituents in groundwater systems. This code, in conjunction with the Model, was used to simulate the movement of the plumes.

With the exception of the Kaiser plume, the plume locations are virtually identical for all the Alternatives, indicating that the change in direction and speed of movement of these plumes caused by the DYYP Expansion is not significant will not contribute to material physical injury. The modeling results suggest that there may be material physical injury from the Expansion alternatives for some wells owned by the City of Ontario.

The simulation results for the Baseline and Expansion Alternatives are discussed below for each contaminant plume:

- Chino Airport – At the beginning of the planning period, the Chino Airport plume underlies and extends southwest of the Chino Airport. In the simulations for the Baseline and Expansion Alternatives, the leading edge of the plume traveled approximately 1.25 miles in the southeasterly direction. The migration of the plume in both alternatives is nearly identical. The primary factors affecting plume migration in the simulations are the regional hydraulic gradient and local Chino Creek Well Field groundwater pumping. At the end of the planning period, the plume location is south and east of Pine and Euclid Avenues, underlying the northern reaches of the Prado Flood Control Basin. The County of San Bernardino is under a Cleanup and Abatement order to remediate this plume.
- General Electric Flatiron Facility – At the beginning of the planning period, the GE Flatiron plume extends south of Mission Boulevard along Euclid Avenue. In the simulations for the Baseline and Expansion Alternatives, the leading edge of the plume traveled approximately 0.4 miles in the easterly direction and 0.6 miles in the southerly direction. There is a negligible difference between the Baseline and Expansion Alternatives plume locations in 2035. The primary factors affecting plume migration in the simulations are the regional hydraulic gradient, local groundwater pumping, and recharge at the Ely Basins. The recharge at Ely Basins deflects the plume to the northwest. GE is under a Cleanup and Abatement order to remediate this plume. It is unlikely that the plume will be allowed to migrate as shown herein.
- General Electric Test Cell Facility – At the beginning of the planning period, the GE Test Cell plume is located south of Ontario Airport, extending southwest of Mission Boulevard to Grove Avenue. In

the simulations for the Baseline and Expansion Alternatives, the leading edge of the plume traveled approximately 0.7 miles in the southeasterly direction around the Ely Basins. There is a negligible difference between the Baseline and Expansion Alternatives plume locations in 2035. The primary factors affecting plume migration in the simulations are the regional hydraulic gradient, local groundwater pumping, and recharge at the Ely Basins. At the end of the planning period, the leading edge of the plume directly underlies State Highway 60 just east of Grove Avenue. GE is under a Cleanup and Abatement order to remediate this plume.

- Kaiser Steel Fontana Steel Site – The location of the Kaiser plume, as shown in Figure 15, was estimated using past modeling studies (through the mid-1980s) and updated through 2008. Kaiser stopped monitoring in the early 1990s. Thus, the projection described herein is approximate. At the beginning of the planning period, the elongated Kaiser plume extends in a southwesterly direction from the former Kaiser Steel site to Mission Boulevard. With the Baseline Alternative, the leading edge of the plume traveled approximately 4.2 miles in the southwesterly direction. With the Expansion Alternatives, the leading edge of the plume traveled approximately 4.2 miles, 3.9 miles, and 4.5 miles in the southwesterly direction for Alternative 1, Alternative 2, and Alternative 3, respectively. City of Ontario Well 50 will be impacted by the Baseline Alternative and each of the Expansion Alternatives. The primary factors affecting plume migration in the simulations are the regional hydraulic gradient and groundwater pumping at wells owned by the City of Ontario, JCSD, and the Chino Desalter Authority. At the end of the planning period, for both the Baseline and Alternatives, the plume is aligned along the west side of Interstate 15 between South Archibald Avenue and South Milliken Avenue, north and south of Highway 60.
- Milliken Landfill – At the beginning of the planning period, the Milliken Landfill plume extends southwest from the landfill site, just north of Mission Boulevard. In the simulations for the Baseline and Expansion Alternatives, the leading edge of the plume traveled approximately 1.3 miles in the southerly direction. There is a negligible difference between the Baseline and Alternative plume locations in 2035. The primary factors affecting plume migration in the simulation are the regional hydraulic gradient and local groundwater pumping. At the end of the planning period, for the Baseline and Expansion Alternatives, the plume is located just southeast of the intersection of East Chino Avenue and Haven Avenue.
- Ontario International Airport – At the beginning of the planning period, the plume underlies a broad area south of Riverside Drive, north of Kimball Avenue, west of Grove Avenue, and east of Archibald Avenue. In the Baseline, the leading edge of the plume did not travel south of its initial (current) position. There is a negligible difference between the Baseline and Expansion Alternative plume locations in 2035. The primary factors affecting plume migration in the simulation are the regional hydraulic gradient and local groundwater pumping, specifically pumping at the Chino-1 Desalter Well Field—the plume is consumed in part by production at the Chino-1 Desalter well field and does not migrate past this well field.
- Pomona Area Plume – At the beginning of the planning period, the plume underlies an area south of Holt Boulevard and north of Philadelphia Street. For the Baseline and all Alternatives, the plume moves approximately 0.5 miles south. There is a negligible difference between the Baseline and the Alternative plume locations in 2035. The primary factors affecting plume migration in the simulation are the regional hydraulic gradient and local groundwater pumping, specifically City of Pomona pumping.

Hydraulic Control

Hydraulic control refers to the elimination or reduction of groundwater discharge from the Chino North MZ to the Santa Ana River to negligible levels. It is a requirement of CBWM and the IEUA's recycled water recharge permit and a condition to gaining access to the assimilative capacity for TDS and nitrogen afforded by the maximum benefit based TDS and nitrogen objectives. Hydraulic control was assessed herein from detailed groundwater elevation contour maps. Hydraulic control was demonstrated for the Baseline Alternative without the DYYP in 2023 in *Response to Condition Subsequent No. 3 from the Order Confirming Motion for Approval of the Peace II Documents* (WEI, 2008). Therefore, the Baseline Alternative (herein with DYYP) was evaluated for hydraulic control in 2023 to determine if it is consistent with the Peace II modeling work.

Hydraulic control is weakest when water levels are highest in the southern portion of the basin. Differences in Santa Ana River recharge are driven by the elevation of groundwater in the southern portion of the basin: lower recharge indicates a period of high groundwater levels, and conversely, greater recharge indicates a period of lower groundwater levels. Figure 4a shows projected Santa Ana River recharge for Alternatives 1, 2, and 3.

Figures 16a through 16d show the groundwater elevation contours for the southern end of the Chino Basin for Layer 1 for the Baseline (2023), Alternative 1 (2030), Alternative 2 (2035), and Alternative 3 (2025), respectively. These maps also show the direction of groundwater flow in the form of unit vectors. These vectors are plotted for every fourth model cell. All planning alternatives result in complete hydraulic control: there are no indications that groundwater from the Chino North Management Zone will discharge to the Santa Ana River.

Conclusions

The objective of this investigation is to determine if the proposed DYYP Expansion will result in material physical injury to the Chino Basin or a party to the Judgment. The criteria used to evaluate material physical injury include groundwater level changes, the increased potential for subsidence, losses due to increased storage, changes in direction and speed of known water quality anomalies, and the ability to maintain hydraulic control. These criteria were evaluated with an enhanced version of the 2007 Watermaster Model and MT3D. Based on our analysis, material physical injury related to storage losses, groundwater level changes, and plume migration will occur; however, this material physical injury can be mitigated.

Storage Losses

Losses from storage will occur as a result of increasing the storage in the basin for Alternative 3. The loss of water in storage is projected to range from about 40,000 acre-ft. This loss in storage water can be mitigated with either reduced takes or by supplemental puts to replace water lost from storage. At present, further discussion of the mitigation is beyond the scope of this investigation.

Groundwater Levels

The Baseline Alternative is essentially Alternative 1C of the Peace II Agreement. The Parties to the Judgment and the Peace II agreement have indicated that they are willing to accept an increase in energy expenses with the expectation of other financial gains and certainties made possible by implementing the Peace II project description, which includes the existing DYYP and other Peace II related agreements. Therefore, no material physical injury is projected to occur from the decline in groundwater levels caused by implementing the Baseline Alternative.

Groundwater production is projected to be maintained with the Baseline and Alternatives; although, some changes in production and replenishment plans may be required. From a production perspective, no material physical injury is projected to occur from the decline in groundwater levels caused by the implementing the Baseline Alternative. The same is true for each of the Expansion Alternatives. Recall that the plan for puts and takes that was analyzed herein reduced the anticipated take for the JCSD/WMWD component and eliminated the take for Chino Hills. These modifications were required to maintain projected pumping and not incur a material physical injury. It is our professional opinion that Chino Hills could participate in the take side of the Expansion Program if it modified its pumping plans to take more water from the shallow aquifer system. Optimizing the Chino Hills pumping plan is beyond the scope of this investigation. This optimization should be included in a subsequent basin-wide analysis of pumping and recharge plans performed by the appropriators and the Watermaster. This subsequent investigation may also indicate that the JCSD/WMWD take could be increased.

The projected groundwater declines in parts of the basin from the Expansion Alternatives are generally small and sustainable. That said, groundwater level declines are by themselves considered material physical injury in the Peace Agreement and need to be mitigated such that they are no longer "material." A discussion of the mitigation is beyond the scope of this investigation.

Change in Direction and Speed of Water Quality Anomalies – Kaiser Plume

In the Baseline Alternative, Alternative 1, and Alternative 3 the leading edge of the Kaiser plume traveled slightly more than 4 miles in a southwesterly direction. In Alternative 1 and Alternative 3, the bottom half of the plume decreased in size, compared to the Baseline Alternative, suggesting that the projected Expansion pumping at City of Ontario well drew in more of the Kaiser plume than was projected to occur in the Baseline Alternative. This suggests that the Expansion may contribute to water quality degradation at the City of Ontario well adjacent to the plume. This is a potential material physical injury that will require mitigation pursuant to the Peace Agreement. A discussion of the mitigation is beyond the scope of this investigation.

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Please call either of us if you have any questions or need further assistance.

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Encl.

Table 1
Proposed Pumping Adjustments for Takes

Agency	Existing Program Takes (1) (acre-ft/yr)	Proposed Expansion Program Takes (2) (acre-ft/yr)	Proposed Total Takes (1) + (2) = (3) (acre-ft/yr)	Feasible Expansion Program Takes (4) (acre-ft/yr)	Feasible Total Takes (1) + (4) = (5) (acre-ft/yr)
City of Chino	1,159	2,000	3,159	2,000	3,159
City of Chino Hills	1,448	2,000	3,448	0	1,448
City of Ontario	8,076	0	8,076	0	8,076
City of Pomona	2,000	2,000	4,000	2,000	4,000
City of Upland	3,001	1,000	4,001	1,000	4,001
Cucamonga Valley Water District	11,353	0	11,353	0	11,353
Fontana Water Company	0	0	0	0	0
Jurupa Community Services District[1]	2,000	2,000	4,000	2,000	4,000
Monte Vista Water District	3,963	5,000	8,963	5,000	8,963
Three Valleys MWD	0	0	0	0	0
Western Municipal Water District[1]	0	10,000	10,000	5,000	5,000
Total	33,000	24,000	57,000	17,000	50,000

1. Western Municipal Water District take performed by Jurupa Community Services District. The feasible take from the Jurupa Community Services District well field is a total of 9,000 acre-ft.

Table 2
Pumping Adjustments for Puts

Agency	Existing Program		Expanded Program			Total Program	
	4 Years (acre-ft/yr)	Converted to 3 Years (acre-ft/yr)	Expansion puts (acre-ft/yr)	Additional Puts[1] (acre-ft/yr)	Total Puts (acre-ft/yr)	Total ASR puts (acre-ft/yr)	Total In-Lieu Puts (acre-ft/yr)
City of Chino	2,519	3,359	1,000	111	1,111	3,710	809
City of Chino Hills	1,319	1,758	0	0	0	1,823	0
City of Ontario	7,601	10,135	3,000	333	3,333	0	13,615
City of Pomona [2]	7,004	9,339	1,000	111	1,111	0	10,717
City of Upland [2,3]	1,283	1,711	1,000	111	1,111	0	2,711
Cucamonga Valley Water District	2,260	3,014	5,000	556	5,556	7,000	1,307
Fontana Water Company	0	0	0	0	0	0	0
Jurupa Community Services District	0	0	0	0	0	0	0
Monte Vista Water District	3,013	4,017	4,000	444	4,444	4,000	4,310
Three Valleys MWD[2]	0	0	0	0	0	0	0
Sub Totals	*25,000*		*15,000*	*1,667*		*16,533*	*33,467*
Total		33,333			16,667	50,000	

1. Additional puts required to meet 50,000 would be recharged wet water or additional in-lieu. For modeling purposes, this additional put was assumed to be in-lieu and distributed to participating agencies on a pro-rata basis.

2. For modeling purposes, Three Valleys MWD "puts" were distributed to the Cities of Pomona and Upland.

3. When Upland pumping was too low to offset with in-lieu, addition in-lieu was distributed to other agencies on a pro-rata basis.

Table 3
Pumping Adjustments for Takes

Agency	Existing DYY Program Takes	Expanded Program Takes	
		Expansion Takes	Total Takes
	(acre-ft/yr)	(acre-ft/yr)	(acre-ft/yr)
City of Chino	1,159	2,000	3,159
City of Chino Hills	1,448	0	1,448
City of Ontario	8,076	0	8,076
City of Pomona	2,000	2,000	4,000
City of Upland	3,001	1,000	4,001
Cucamonga Valley Water District	11,353	0	11,353
Fontana Water Company	0	0	0
Jurupa Community Services District[1]	2,000	2,000	9,000
Monte Vista Water District	3,963	5,000	8,963
Three Valleys MWD	0	0	0
Western Municipal Water District[1]	0	5,000	0
Total	33,000	17,000	50,000

1. Western Municipal Water District take performed by Jurupa Community Services District. JCSD's take is 4,000 acre-ft/yr and Western's take is 5,000 acre-ft/yr.

2. Take adjustments were made without optimization of pumping plans. It is possible that Chino Hills and WMWD could participate at higher takes with modifications to pumping plans (wells used and or aquifers pumped from).

Table 4
Groundwater Pumping Projection for the Chino Basin - DYY Expansion Program
(acre-ft/yr)

Producer	Pumping Projection[1] 2009/10 (acre-ft/yr)	2014/15 (acre-ft/yr)	2019/20 (acre-ft/yr)	2024/25 (acre-ft/yr)	2029/30 (acre-ft/yr)	2034/35 (acre-ft/yr)
Overlying Agricultural Pool	21,~~82~~	13,251	5,010	5,010	5,010	5,010
Overlying Non-Agricultural Pool						
San Bernardino Cty (Chino Airport)	0	0	0	0	0	0
Ameron Inc	0	0	0	0	0	0
California Steel Industries Inc	1,284	1,284	1,284	1,284	1,284	1,284
Swan Lake Mobile Home Park	0	0	0	0	0	0
Vulcan Materials Company	5	5	5	5	5	5
Space Center Mira Loma Inc.	0	0	0	0	0	0
Angelica Textile Service	29	29	29	29	29	29
Sunkist Growers Inc	147	147	147	147	147	147
Praxair Inc	0	0	0	0	0	0
General Electric Company	451	451	451	451	451	451
California Speedway	621	621	621	621	621	621
Reliant Energy Etiwanda	705	705	705	705	705	705
Subtotal Overlying Non-Agricultural Pool Production	3,2~~47~~	3,2~~47~~	3,2~~47~~	3,2~~47~~	3,2~~47~~	3,2~~47~~
Appropriative Pool						
Arrowhead Mountain Spring Water Company	263	318	335	308	308	308
Chino Desalter Authority	26,356	39,400	39,400	39,400	39,400	39,400
City of Chino	9,971	10,844	11,811	12,777	12,963	12,963
City of Chino Hills[2]	4,823	4,823	4,823	4,823	4,823	4,823
City of Norco	0	0	0	0	0	0
City of Ontario	28,796	27,211	32,360	37,508	42,658	42,658
City of Pomona	13,000	13,000	13,000	13,000	13,000	13,000
City of Upland	1,284	2,140	2,140	2,140	2,140	2,140
Cucamonga Valley Water District	16,598	21,229	26,729	32,229	37,729	37,729
Fontana Union Water Company	0	0	0	0	0	0
Fontana Water Company	13,500	10,000	11,000	11,500	12,000	12,500
Jurupa Community Services District[2]	20,087	18,123	21,616	21,419	21,419	21,419
Inland Empire Utilities Agency	0	0	0	0	0	0
Marygold Mutual Water Company	0	0	0	0	0	0
Metropolitan Water District of Southern California	0	0	0	0	0	0
Monte Vista Irrigation Company	0	0	0	0	0	0
Monte Vista Water District	16,000	17,000	18,500	20,000	21,500	21,500
Mutual Water Company of Glen Avon Heights	0	0	0	0	0	0
Niagara	657	795	838	770	770	770
San Antonio Water Company	894	1,149	1,282	1,244	1,244	1,244
San Bernardino County (Olympic Facility)	13	16	17	15	15	15
Santa Ana River Water Company	263	318	335	308	308	308
Golden State Water Company	329	397	419	385	385	385
West End Consolidated Water Company	0	0	0	0	0	0
West Valley Water District	0	0	0	0	0	0
Subtotal Appropriators	152,83~~4~~	166,763	18~~4~~80~~4~~	197,827	210,663	211,163
Total Production	177,567	183,255	192,855	206,078	218,914	219,414

1. All production data from IEUA (2008) unless otherwise noted.
2. Black and Veatch, 2008

Table 5
Supplemental Water Deliveries
(acre-ft)

Year	Recycled Water Recharge Used to Reduce Replenishment[1]	Overproduction and Replenishment				
		Net Replenishment Obligation	In-Lieu Deliveries	MWDSC Replenishment Supply	Total Wet Water Recharge	Cumulative Unmet Replenishment Obligation
2006	1,303	-29,339	0	24,759	24,759	-29,339
2007	6,000	-18,977	0	0	0	-73,076
2008	8,000	-17,889	0	0	0	-90,964
2009	8,786	-3,564	0	0	0	-94,528
2010	9,571	-1,261	0	0	0	-95,789
2011	10,357	964	0	0	0	-94,825
2012	11,143	-4,545	0	0	0	-99,371
2013	11,929	-3,148	0	0	0	-102,519
2014	13,500	22,061	0	0	0	-80,457
2015	13,500	27,885	0	0	0	-52,572
2016	13,500	26,332	0	0	0	-26,240
2017	15,000	23,290	5,000	21,809	26,809	-2,950
2018	15,000	22,047	0	0	0	-7,712
2019	15,000	21,038	0	0	0	13,326
2020	15,000	20,151	0	0	0	33,478
2021	15,000	20,478	0	0	0	53,956
2022	15,000	20,843	0	0	0	74,799
2023	16,000	20,469	0	0	0	95,268
2024	16,000	21,296	5,000	82,670	87,670	116,563
2025	22,000	16,195	5,000	76,670	81,670	45,088
2026	22,000	16,886	5,000	20,063	25,063	-19,696
2027	24,000	15,361	5,000	15,361	20,361	-29,398
2028	24,000	15,757	0	0	0	-34,002
2029	24,000	16,184	0	0	0	-17,818
2030	24,000	28,668	0	0	0	10,850
2031	24,000	29,159	0	0	0	40,009
2032	24,000	29,601	0	0	0	69,610
2033	24,000	29,982	0	0	0	99,592
2034	24,000	30,339	5,000	74,670	79,670	129,931
2035	24,000	31,200	5,000	74,670	79,670	81,460
Total	489,589	427,462	35,000	390,672	425,672	na
Average	16,320	14,249	1,167	13,022	14,189	-2,911
Max	24,000	31,200	5,000	82,670	87,670	129,931
Min	1,303	-29,339	0	0	0	-102,519

1. The Replenishment obligation has been reduced do to recycled water recharge.

Table 6
Water Budget for Chino North, Chino East, Chino South, and Prado Basin Management Zones
Baseline Alternative
(acre-ft)

Year	Inflows							Outflows					Inflow-Outflow
					Artificial Recharge								
	Boundary Inflow	Temescal to PBMZ	Deep Percolation	Stream Recharge	Storm	Imported and Recycled Water Replenishment	Subtotal Inflows	Net Pumping	PBMZ to Temescal	ET	Rising Groundwater	Subtotal Outflow	
2006	32,703	6,084	86,301	26,237	11,646	26,110	189,081	153,537	1,883	14,788	15,622	185,830	3,251
2007	32,703	6,262	82,093	29,478	11,646	6,011	168,194	168,334	1,837	14,447	13,981	198,599	-30,406
2008	32,703	5,992	83,012	31,393	11,646	8,014	172,760	205,094	1,792	14,268	13,295	234,450	-61,690
2009	32,703	5,619	83,671	33,084	11,646	8,798	175,521	209,107	1,767	14,063	12,640	237,577	-62,056
2010	32,703	5,212	82,149	34,653	11,646	9,585	175,948	212,373	1,753	13,853	12,049	240,027	-64,078
2011	32,703	4,807	81,849	35,936	11,646	10,372	177,313	146,784	1,740	13,658	11,550	173,732	3,581
2012	32,703	4,409	79,176	36,981	11,646	11,159	176,074	147,431	1,730	13,483	11,125	173,768	2,306
2013	32,703	4,044	78,266	38,119	11,646	11,945	176,723	148,076	1,716	13,275	10,645	173,713	3,011
2014	32,703	3,710	77,834	39,137	11,646	13,519	178,549	182,079	1,704	13,111	10,269	207,163	-28,614
2015	32,703	3,401	77,243	40,249	11,646	13,519	178,760	182,645	1,694	12,980	9,943	207,261	-28,501
2016	32,703	3,113	76,195	41,228	11,646	14,169	179,053	181,675	1,685	12,874	9,695	205,929	-26,876
2017	32,703	2,848	75,760	41,881	11,646	43,255	208,093	176,174	1,677	12,795	9,513	200,159	7,933
2018	32,703	2,604	74,231	42,448	11,646	15,021	178,653	213,258	1,671	12,729	9,363	237,022	-58,369
2019	32,703	2,380	73,530	43,158	11,646	15,021	178,439	212,503	1,666	12,658	9,196	236,022	-57,584
2020	32,703	2,176	71,573	43,982	11,646	15,021	177,101	211,747	1,665	12,587	9,021	235,020	-57,919
2021	32,703	1,993	71,111	44,634	11,646	15,021	177,107	146,037	1,671	12,536	8,898	169,143	7,964
2022	32,703	1,828	70,147	44,953	11,646	15,021	176,298	146,563	1,686	12,513	8,850	169,612	6,686
2023	32,703	1,686	68,771	45,106	11,646	16,023	175,935	147,089	1,712	12,497	8,824	170,121	5,813
2024	32,703	1,564	67,886	45,423	11,646	16,023	175,245	176,014	1,750	12,469	8,761	198,994	-23,749
2025	32,703	1,459	66,933	45,838	11,646	98,727	257,306	176,538	1,794	12,423	8,661	199,417	57,890
2026	32,703	1,369	66,057	46,066	11,646	98,727	256,568	176,761	1,835	12,370	8,576	199,542	57,027
2027	32,703	1,287	65,443	46,095	11,646	98,727	255,901	176,761	1,877	12,328	8,517	199,484	56,417
2028	32,703	1,212	64,549	46,199	11,646	24,034	180,342	214,599	1,925	12,295	8,466	237,285	-56,943
2029	32,703	1,146	64,037	46,612	11,646	24,034	180,177	214,003	1,971	12,243	8,362	236,579	-56,403
2030	32,703	1,086	63,214	47,213	11,646	24,034	179,895	215,769	2,015	12,176	8,227	238,187	-58,292
2031	32,703	1,031	62,919	47,624	11,646	24,034	179,957	149,939	2,058	12,124	8,128	172,249	7,708
2032	32,703	981	62,540	47,702	11,646	24,034	179,606	149,939	2,103	12,109	8,114	172,265	7,341
2033	32,703	937	62,017	47,596	11,646	24,034	178,932	149,939	2,146	12,105	8,117	172,307	6,625
2034	32,703	896	61,798	47,606	11,646	24,034	178,683	178,051	2,188	12,087	8,096	200,422	-21,739
2035	32,703	859	61,535	47,854	11,646	98,727	253,325	178,552	2,226	12,043	8,012	200,833	52,492
Total	981,081	81,993	2,161,841	1,254,485	349,388	846,753	5,675,540	5,347,372	54,936	385,888	294,518	6,082,714	-407,174
Average	32,703	2,733	72,061	41,816	11,646	28,225	189,185	178,246	1,831	12,863	9,817	202,757	-13,572
Maximum	32,703	6,262	86,301	47,854	11,646	98,727	257,306	215,769	2,226	14,788	15,622	240,027	57,890
Minimum	32,703	859	61,535	26,237	11,646	6,011	168,194	146,037	1,665	12,043	8,012	169,143	-64,078

Table 7
Water Budget for Chino North, Chino East, Chino South, and Prado Basin Management Zones
Alternative 1 - 150,000 acre-ft DYYP

(acre-ft)

Year	Inflows							Outflows					Inflow-Outflow
					Artificial Recharge								
	Boundary Inflow	Temescal to PBMZ	Deep Percolation	Stream Recharge	Storm	Imported and Recycled Water Replenishment	Subtotal Inflows	Net Pumping	PBMZ to Temescal	ET	Rising Groundwater	Subtotal Outflow	
2006	32,703	6,084	86,301	26,232	11,646	26,110	189,076	153,518	1,883	14,788	15,622	185,811	3,264
2007	32,703	6,262	82,093	29,463	11,646	6,011	168,178	168,315	1,837	14,445	13,976	198,573	-30,395
2008	32,703	5,992	83,012	31,380	11,646	8,014	172,748	205,551	1,792	14,255	13,251	234,849	-62,101
2009	32,703	5,620	83,671	33,085	11,646	8,798	175,522	209,563	1,767	14,034	12,538	237,901	-62,378
2010	32,703	5,212	82,149	34,678	11,646	9,585	175,973	212,828	1,752	13,812	11,921	240,313	-64,340
2011	32,703	4,808	81,849	35,947	11,646	10,372	177,325	130,084	1,739	13,620	11,443	156,886	20,438
2012	32,703	4,409	79,176	36,954	11,646	11,159	176,047	130,731	1,730	13,461	11,072	156,995	19,052
2013	32,703	4,044	78,266	37,989	11,646	11,945	176,593	131,377	1,716	13,270	10,644	157,007	19,586
2014	32,703	3,709	77,834	38,861	11,646	13,519	178,271	182,059	1,705	13,118	10,301	207,182	-28,911
2015	32,703	3,400	77,243	39,798	11,646	13,519	178,308	182,626	1,694	12,998	10,012	207,329	-29,022
2016	32,703	3,112	76,195	40,644	11,646	14,169	178,469	181,870	1,685	12,904	9,792	206,251	-27,782
2017	32,703	2,846	75,760	41,196	11,646	43,255	207,406	176,154	1,678	12,833	9,634	200,299	7,107
2018	32,703	2,603	74,231	41,855	11,646	15,021	178,059	229,739	1,672	12,764	9,468	253,643	-75,584
2019	32,703	2,381	73,530	43,008	11,646	15,021	178,290	228,982	1,666	12,668	9,208	252,525	-74,235
2020	32,703	2,178	71,573	44,336	11,646	15,021	177,457	228,226	1,665	12,565	8,940	251,396	-73,939
2021	32,703	1,994	71,111	45,304	11,646	15,021	177,779	129,336	1,670	12,493	8,775	152,274	25,505
2022	32,703	1,829	70,147	45,594	11,646	15,021	176,940	129,861	1,685	12,467	8,736	152,749	24,191
2023	32,703	1,687	68,771	45,549	11,646	16,023	176,378	130,387	1,711	12,459	8,739	153,296	23,082
2024	32,703	1,564	67,886	45,615	11,646	16,023	175,437	175,992	1,749	12,445	8,711	198,897	-23,460
2025	32,703	1,459	66,933	45,737	11,646	98,727	257,205	176,516	1,794	12,417	8,654	199,381	57,824
2026	32,703	1,368	66,057	45,759	11,646	98,727	256,261	176,739	1,835	12,378	8,597	199,549	56,712
2027	32,703	1,286	65,443	45,604	11,646	98,727	255,410	176,739	1,878	12,351	8,572	199,540	55,870
2028	32,703	1,212	64,549	45,731	11,646	24,034	179,875	231,078	1,925	12,318	8,515	253,836	-73,961
2029	32,703	1,146	64,037	46,545	11,646	24,034	180,111	231,078	1,971	12,246	8,351	253,646	-73,535
2030	32,703	1,086	63,214	47,664	11,646	24,034	180,347	233,042	2,014	12,149	8,145	255,350	-75,003
2031	32,703	1,032	62,919	48,390	11,646	24,034	180,724	133,626	2,056	12,075	8,013	155,770	24,954
2032	32,703	982	62,540	48,457	11,646	24,034	180,362	133,626	2,101	12,053	8,002	155,782	24,580
2033	32,703	937	62,017	48,160	11,646	24,034	179,496	133,626	2,145	12,058	8,031	155,860	23,637
2034	32,703	896	61,799	47,895	11,646	24,034	178,972	178,707	2,187	12,057	8,041	200,993	-22,021
2035	32,703	859	61,535	47,718	11,646	98,727	253,189	179,207	2,226	12,042	8,017	201,492	51,697
Total	981,081	81,994	2,161,842	1,255,150	349,388	846,753	5,676,208	5,301,182	54,928	385,543	293,721	6,035,375	-359,167
Average	32,703	2,733	72,061	41,838	11,646	28,225	189,207	176,706	1,831	12,851	9,791	201,179	-11,972
Maximum	32,703	6,262	86,301	48,457	11,646	98,727	257,205	233,042	2,226	14,788	15,622	255,350	57,824
Minimum	32,703	859	61,535	26,232	11,646	6,011	168,178	129,336	1,665	12,042	8,002	152,274	-75,584

Table 8
Water Budget for Chino North, Chino East, Chino South, and Prado Basin Management Zones
Alternative 2 - 150,000 acre-ft DYYP with 100,000 acre-ft Negative Storage
(acre-ft)

Year	Inflows							Outflows					Inflow-Outflow
					Artificial Recharge								
	Boundary Inflow	Temescal to PBMZ	Deep Percolation	Stream Recharge	Storm	Imported and Recycled Water Replenishment	Subtotal Inflows	Net Pumping	PBMZ to Temescal	ET	Rising Groundwater	Subtotal Outflow	
2006	32,703	6,084	86,301	26,232	11,646	26,110	189,076	153,518	1,883	14,788	15,622	185,811	3,264
2007	32,703	6,262	82,093	29,463	11,646	6,011	168,178	168,315	1,837	14,445	13,976	198,573	-30,395
2008	32,703	5,992	83,012	31,380	11,646	8,014	172,748	205,551	1,792	14,255	13,251	234,849	-62,101
2009	32,703	5,620	83,671	33,085	11,646	8,798	175,522	209,563	1,767	14,034	12,538	237,901	-62,378
2010	32,703	5,212	82,149	34,678	11,646	9,585	175,973	212,828	1,752	13,812	11,921	240,313	-64,340
2011	32,703	4,808	81,849	35,947	11,646	10,372	177,325	130,084	1,739	13,620	11,443	156,886	20,438
2012	32,703	4,409	79,176	36,954	11,646	11,159	176,047	130,731	1,730	13,461	11,072	156,995	19,052
2013	32,703	4,044	78,266	37,989	11,646	11,945	176,593	131,377	1,716	13,270	10,644	157,007	19,586
2014	32,703	3,709	77,834	39,164	11,646	13,519	178,574	231,440	1,704	13,099	10,234	256,478	-77,904
2015	32,703	3,402	77,243	40,993	11,646	13,519	179,505	232,007	1,693	12,922	9,756	256,378	-76,873
2016	32,703	3,116	76,195	42,861	11,646	14,169	180,691	231,251	1,684	12,754	9,334	255,023	-74,333
2017	32,703	2,852	75,760	44,440	11,646	43,255	210,656	230,495	1,676	12,605	8,999	253,774	-43,118
2018	32,703	2,610	74,231	45,801	11,646	15,021	182,012	229,739	1,669	12,474	8,724	252,606	-70,594
2019	32,703	2,387	73,530	46,727	11,646	15,021	182,015	174,644	1,663	12,376	8,538	197,222	-15,207
2020	32,703	2,181	71,573	47,039	11,646	15,021	180,163	173,890	1,662	12,328	8,460	196,340	-16,177
2021	32,703	1,994	71,111	47,146	11,646	15,021	179,621	157,985	1,668	12,311	8,429	180,392	-772
2022	32,703	1,829	70,147	47,256	11,646	15,021	178,602	129,861	1,683	12,303	8,414	152,262	26,340
2023	32,703	1,686	68,771	47,267	11,646	16,023	178,095	130,387	1,709	12,302	8,416	152,813	25,282
2024	32,703	1,563	67,886	47,281	11,646	16,023	177,101	147,343	1,747	12,301	8,413	169,805	7,296
2025	32,703	1,458	66,933	47,261	11,646	98,727	258,728	176,516	1,792	12,290	8,391	198,988	59,740
2026	32,703	1,367	66,057	47,115	11,646	98,727	257,616	176,739	1,834	12,265	8,363	199,201	58,415
2027	32,703	1,285	65,443	46,879	11,646	98,727	256,684	176,739	1,876	12,244	8,346	199,205	57,478
2028	32,703	1,210	64,549	46,648	11,646	24,034	180,790	176,739	1,924	12,237	8,349	199,248	-18,459
2029	32,703	1,144	64,037	46,780	11,646	24,034	180,343	231,078	1,971	12,209	8,298	253,556	-73,212
2030	32,703	1,084	63,214	47,365	11,646	24,034	180,046	178,706	2,015	12,156	8,179	201,056	-21,010
2031	32,703	1,030	62,919	47,555	11,646	24,034	179,887	162,276	2,059	12,119	8,126	184,580	-4,693
2032	32,703	980	62,540	47,637	11,646	24,034	179,539	162,276	2,104	12,101	8,106	184,587	-5,048
2033	32,703	935	62,017	47,619	11,646	24,034	178,954	133,626	2,147	12,091	8,095	155,959	22,995
2034	32,703	895	61,799	47,511	11,646	24,034	178,587	150,056	2,189	12,086	8,097	172,428	6,159
2035	32,703	858	61,535	47,226	11,646	98,727	252,696	150,557	2,228	12,084	8,107	172,976	79,720
Total	981,081	82,001	2,161,842	1,281,302	349,388	846,753	5,702,367	5,286,318	54,914	383,341	288,640	6,013,213	-310,846
Average	32,703	2,733	72,061	42,710	11,646	28,225	190,079	176,211	1,830	12,778	9,621	200,440	-10,362
Maximum	32,703	6,262	86,301	47,637	11,646	98,727	258,728	232,007	2,228	14,788	15,622	256,478	79,720
Minimum	32,703	858	61,535	26,232	11,646	6,011	168,178	129,861	1,662	12,084	8,095	152,262	-77,904

Table 9
Water Budget for Chino North, Chino East, Chino South, and Prado Basin Management Zones
Alternative 3 - 150,000 acre-ft DYYP with 300,000 acre-ft Maximum Storage
(acre-ft)

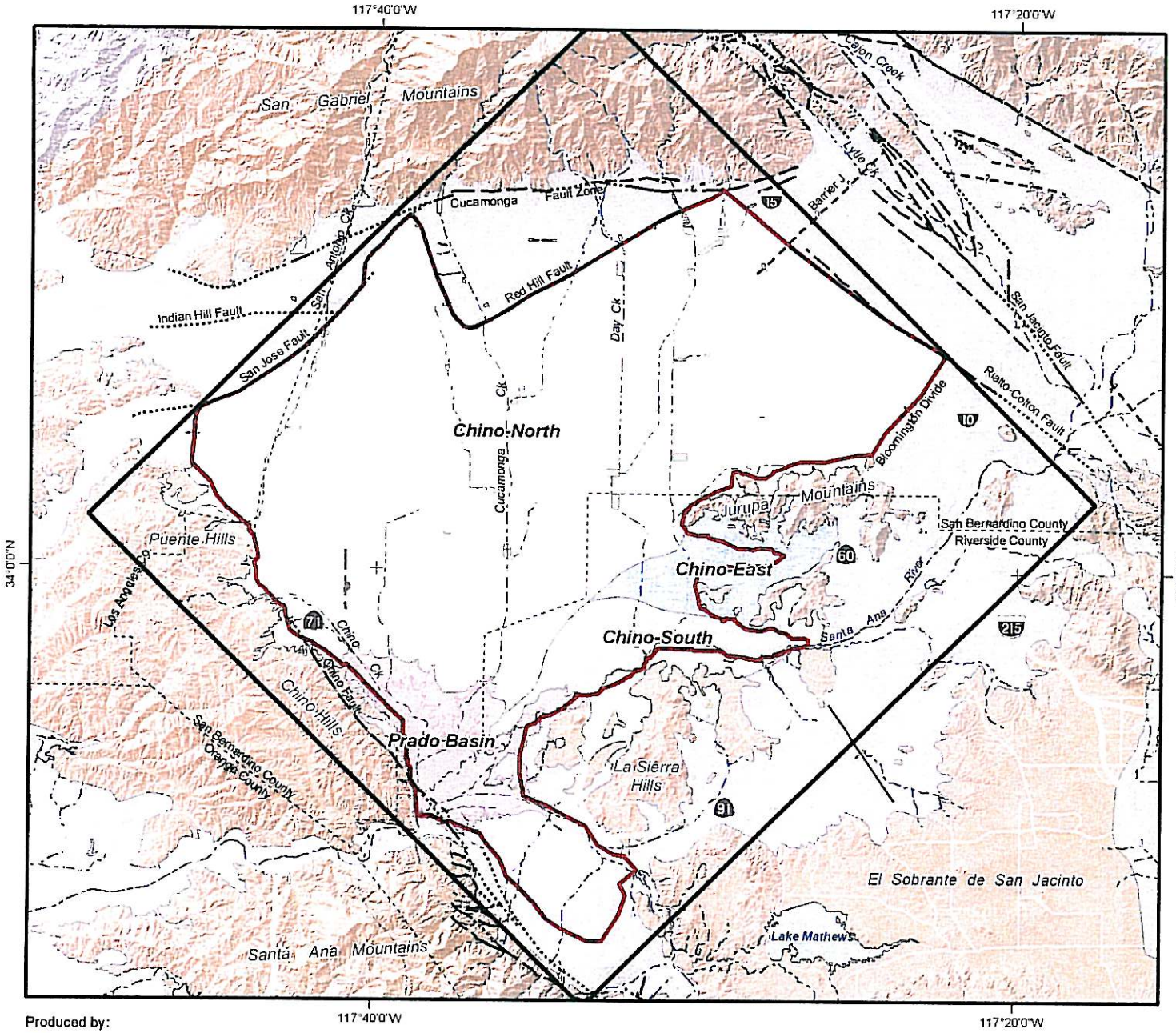
Year	Inflows							Outflows					Inflow-Outflow
					Artificial Recharge								
	Boundary Inflow	Temescal to PBMZ	Deep Percolation	Stream Recharge	Storm	Imported and Recycled Water Replenishment	Subtotal Inflows	Net Pumping	PBMZ to Temescal	ET	Rising Groundwater	Subtotal Outflow	
2006	32,703	6,084	86,301	26,232	11,646	26,110	189,076	153,518	1,883	14,788	15,622	185,811	3,264
2007	32,703	6,262	82,093	29,463	11,646	6,011	168,178	168,315	1,837	14,445	13,976	198,573	-30,395
2008	32,703	5,991	83,012	31,352	11,646	8,014	172,719	205,073	1,792	14,265	13,285	234,414	-61,695
2009	32,703	5,619	83,671	33,015	11,646	8,798	175,452	209,084	1,767	14,059	12,625	237,534	-62,083
2010	32,703	5,212	82,149	34,563	11,646	9,585	175,858	212,349	1,753	13,848	12,040	239,990	-64,132
2011	32,703	4,807	81,849	35,855	11,646	10,372	177,232	130,084	1,740	13,655	11,548	157,027	20,205
2012	32,703	4,409	79,176	36,894	11,646	11,159	175,986	130,731	1,730	13,484	11,138	157,084	18,903
2013	32,703	4,044	78,266	37,951	11,646	11,945	176,556	131,377	1,716	13,284	10,681	157,059	19,497
2014	32,703	3,709	77,834	38,816	11,646	13,519	178,227	182,059	1,705	13,129	10,333	207,225	-28,999
2015	32,703	3,400	77,243	39,743	11,646	13,519	178,253	182,626	1,694	13,009	10,040	207,369	-29,116
2016	32,703	3,111	76,195	40,583	11,646	14,169	178,408	181,870	1,685	12,916	9,819	206,290	-27,882
2017	32,703	2,846	75,760	41,160	11,646	43,255	207,370	182,146	1,678	12,843	9,655	206,322	1,048
2018	32,703	2,603	74,231	41,615	11,646	15,021	177,819	186,349	1,672	12,787	9,533	210,340	-32,521
2019	32,703	2,380	73,530	42,040	11,646	15,021	177,320	185,592	1,667	12,738	9,421	209,418	-32,098
2020	32,703	2,174	71,573	42,436	11,646	15,021	175,554	178,845	1,667	12,699	9,329	202,539	-26,985
2021	32,703	1,989	71,111	42,718	11,646	15,021	175,189	129,336	1,673	12,680	9,284	152,972	22,216
2022	32,703	1,826	70,147	42,844	11,646	15,021	174,187	129,861	1,688	12,677	9,286	153,513	20,674
2023	32,703	1,685	68,771	42,851	11,646	16,023	173,678	130,387	1,715	12,674	9,298	154,074	19,604
2024	32,703	1,562	67,886	43,024	11,646	16,023	172,845	181,983	1,753	12,657	9,255	205,649	-32,804
2025	32,703	1,459	66,933	43,347	11,646	98,727	254,815	182,507	1,798	12,617	9,154	206,076	48,739
2026	32,703	1,369	66,057	43,544	11,646	98,727	254,046	182,731	1,839	12,566	9,063	206,199	47,847
2027	32,703	1,287	65,443	43,604	11,646	98,727	253,411	182,730	1,882	12,523	8,994	206,129	47,282
2028	32,703	1,213	64,549	43,912	11,646	24,034	178,056	231,078	1,929	12,475	8,894	254,376	-76,320
2029	32,703	1,148	64,037	44,852	11,646	24,034	178,419	231,078	1,973	12,391	8,675	254,117	-75,698
2030	32,703	1,088	63,214	46,057	11,646	24,034	178,741	233,042	2,016	12,286	8,430	255,774	-77,033
2031	32,703	1,033	62,919	46,874	11,646	24,034	179,209	133,626	2,058	12,207	8,270	156,161	23,048
2032	32,703	983	62,540	47,087	11,646	24,034	178,993	167,230	2,103	12,172	8,230	189,735	-10,742
2033	32,703	938	62,017	47,159	11,646	24,034	178,497	167,230	2,146	12,142	8,189	189,707	-11,210
2034	32,703	898	61,799	47,316	11,646	24,034	178,395	178,707	2,187	12,106	8,129	201,129	-22,733
2035	32,703	860	61,535	47,403	11,646	98,727	252,875	179,207	2,226	12,070	8,067	201,570	51,304
Total	981,081	81,988	2,161,842	1,224,309	349,388	846,753	5,645,361	5,260,751	54,970	388,190	300,265	6,004,176	-358,815
Average	32,703	2,733	72,061	40,810	11,646	28,225	188,179	175,358	1,832	12,940	10,009	200,139	-11,960
Maximum	32,703	6,262	86,301	47,403	11,646	98,727	254,815	233,042	2,226	14,788	15,622	255,774	51,304
Minimum	32,703	860	61,535	26,232	11,646	6,011	168,178	129,336	1,667	12,070	8,067	152,972	-77,033

Table 10
Comparison of Projected Annual Discharge at Prado Dam Through 2035

(acre-ft)

Year	Santa Ana River Discharge at Prado[1]				Difference		
	Baseline	Alternative 1	Alternative 2	Alternative 3	Baseline - Alterntive 1	Baseline - Alterntive 2	Baseline - Alterntive 3
2006	237,156	237,161	237,161	237,161	-5	-5	-5
2007	237,412	237,422	237,422	237,422	-10	-10	-10
2008	241,895	241,862	241,862	241,925	32	32	-30
2009	245,326	245,222	245,222	245,379	104	104	-53
2010	248,942	248,789	248,789	249,023	153	153	-82
2011	251,523	251,405	251,405	251,603	118	118	-79
2012	257,244	257,219	257,219	257,345	25	25	-101
2013	261,405	261,533	261,533	261,608	-129	-129	-203
2014	265,787	266,096	265,726	266,172	-309	61	-385
2015	268,603	269,124	267,673	269,207	-521	931	-603
2016	274,677	275,358	272,683	275,446	-681	1,995	-769
2017	279,619	280,426	276,546	280,483	-807	3,073	-864
2018	284,680	285,378	280,688	285,683	-698	3,992	-1,003
2019	287,948	288,110	283,721	289,291	-162	4,227	-1,343
2020	294,358	293,923	290,741	296,212	435	3,617	-1,854
2021	299,361	298,567	296,380	301,662	794	2,982	-2,301
2022	304,771	304,016	302,032	307,316	756	2,740	-2,545
2023	308,629	308,100	306,060	311,358	529	2,569	-2,729
2024	315,766	315,524	313,561	318,659	242	2,205	-2,893
2025	320,363	320,456	318,669	323,347	-94	1,694	-2,984
2026	320,049	320,377	318,787	323,058	-328	1,262	-3,010
2027	318,168	318,712	317,212	321,135	-545	956	-2,967
2028	319,807	320,323	319,240	322,522	-517	567	-2,715
2029	319,290	319,346	319,057	321,362	-56	233	-2,072
2030	318,554	318,020	318,353	319,913	534	201	-1,359
2031	316,249	315,367	316,315	317,141	881	-66	-892
2032	317,951	317,084	318,009	318,683	867	-57	-732
2033	318,060	317,410	318,015	318,570	650	45	-510
2034	318,029	317,686	318,125	318,352	343	-96	-323
2035	315,903	316,044	316,625	316,410	-141	-723	-507
Total	8,192,956	8,191,479	8,160,246	8,228,863	1,477	32,711	-35,907
Average	292,606	292,553	291,437	293,888	53	1,168	-1,282
Max	320,363	320,456	319,240	323,347	881	4,227	-30
Min	241,895	241,862	241,862	241,925	-807	-723	-3,010

1. Expected value discharge.



Main Features

MODFLOW Groundwater Flow Model Boundary

Model Grid
Each grid cell has a dimension of 60 x 60 meters
(Grid cells are to small to represent at map scale)

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

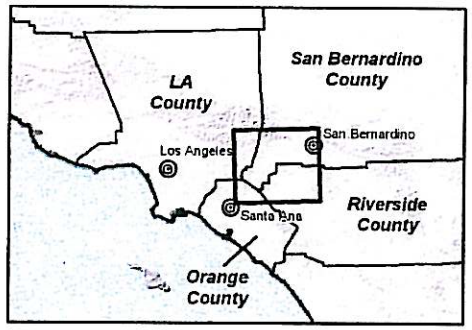
Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks

Faults

- Location Certain
- Location Approximate
- Location Concealed
- Location Uncertain
- Approximate Location of Groundwater Barrier

Other Features

- Groundwater Divides
- Flood Control/Conservation Basins
- Streams, Rivers, and Channels



Map of Model Domain and Chino Basin Management Zones

Figure 1

Produced by:

WILDERMUTH ENVIRONMENTAL INC

23692 Birtcher Drive
Lake Forest, CA 92630
949.420.3030
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Author: MJC
Date: 20081024
File: Figure_1.mxd

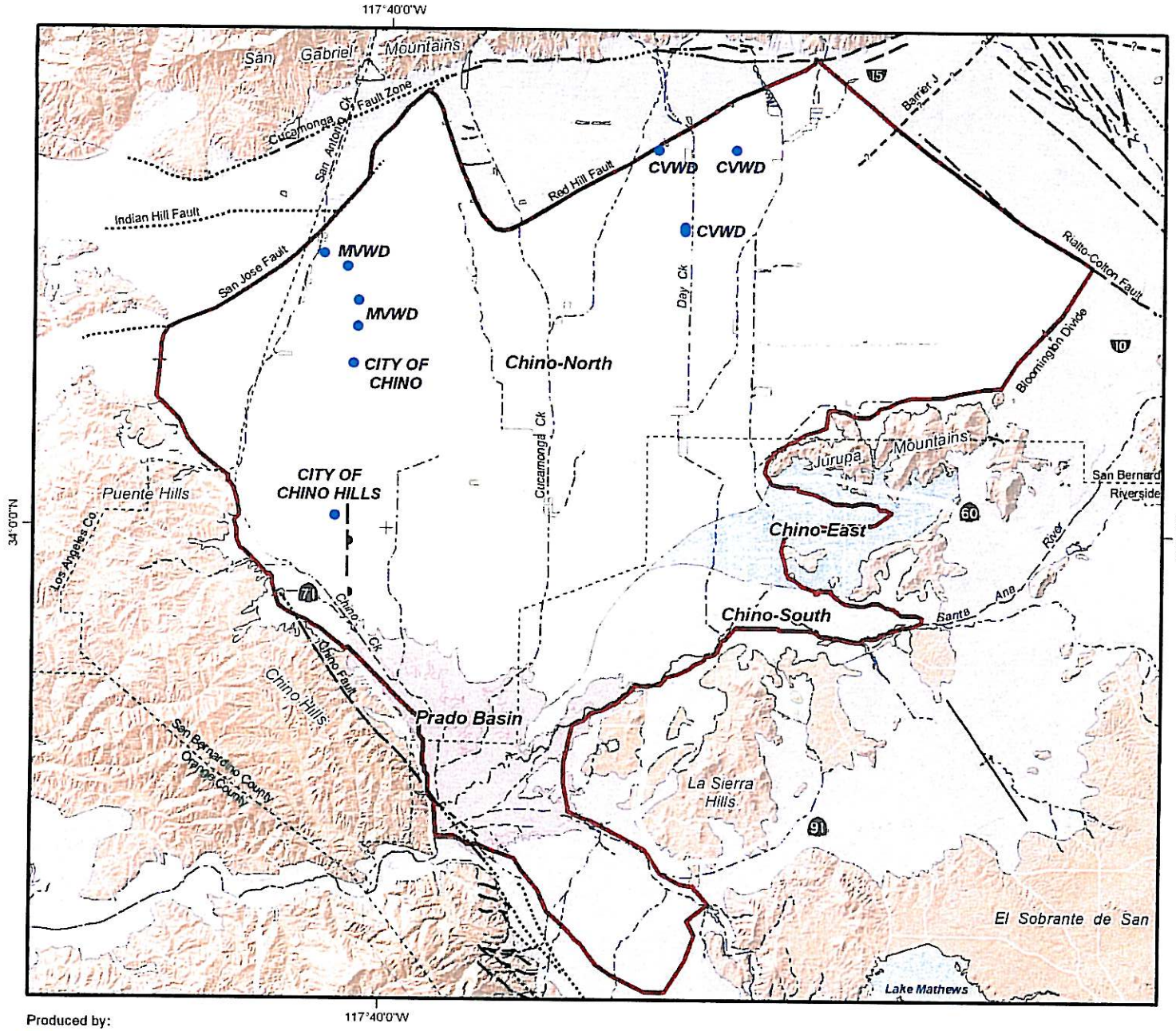
0 1 2 3 4 5 Miles

0 2 4 6 KM

BLACK & VEATCH

Inland Empire

Chino Basin Dry-Year Yield Program Expansion Impact Analysis



Main Features

- New Aquifer Storage and Recovery Well
- MODFLOW Groundwater Flow Model Boundary

Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

- Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks

Faults

- Location Certain
- Location Approximate
- Location Concealed
- Location Uncertain
- Approximate Location of Groundwater Barrier

Other Features

- Groundwater Divides
- Flood Control/Conservation Basins
- Streams, Rivers, and Channels

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949 420 3030
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Author: MJC
Date: 20081024
File: Figure_2.mxd

0 2 4 Miles
0 2 4 6 KM

BLACK & VEATCH Corporation
Inland Empire Utilities Agency
Western Municipal Water District
Three Valleys Municipal Water District

Chino Basin Dry-Year Yield Program Expansion Impact Analysis

Location Map of New Aquifer Storage and Recovery Wells

Figure 2

Figure 3a
Baseline Alternative, Pumping and Storage Over Time

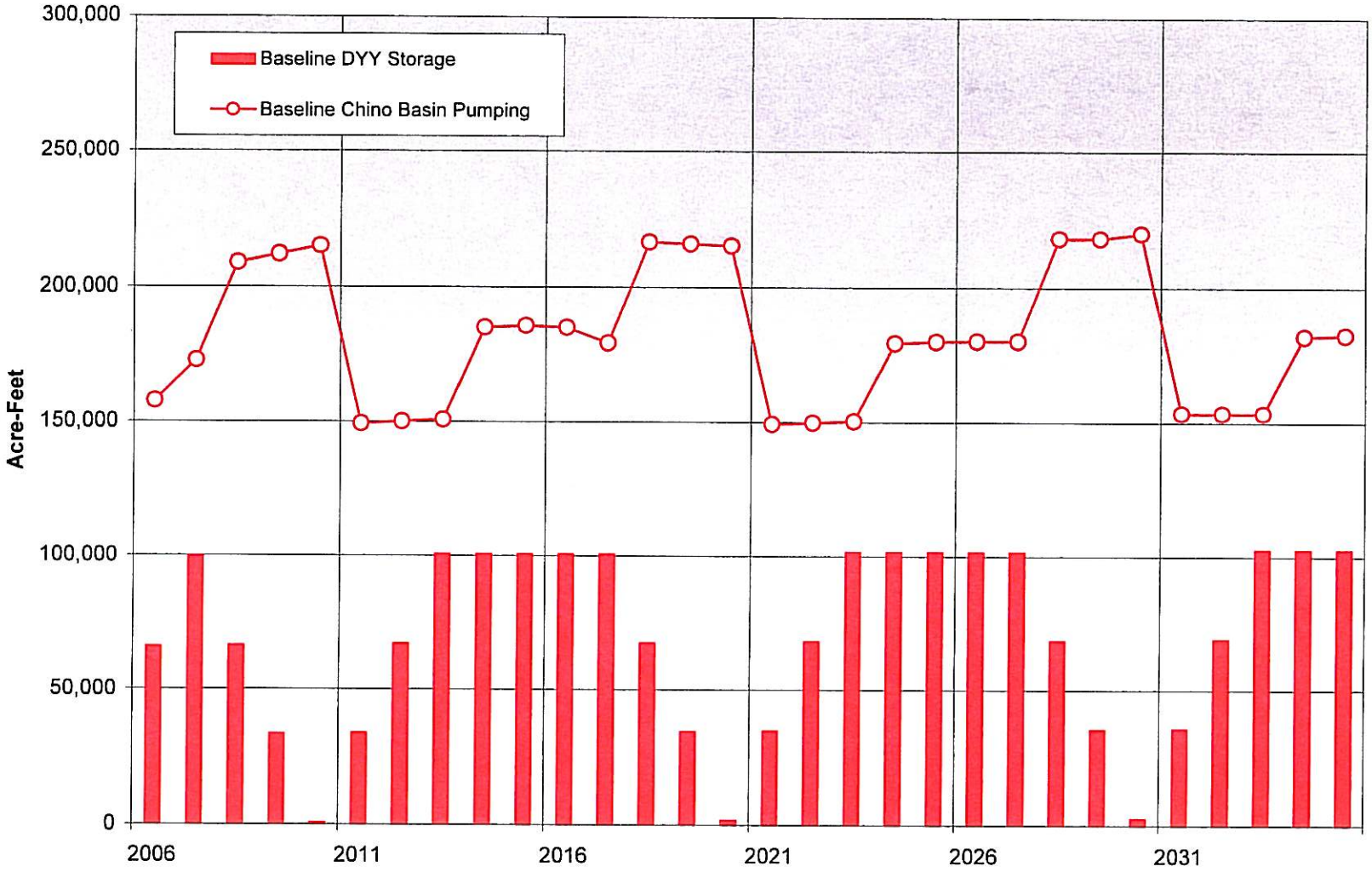

Figure 3a to 3d.xls

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Figure 3b
Alternative 1 - 10 Typical Operation, Pumping and Storage Over Time

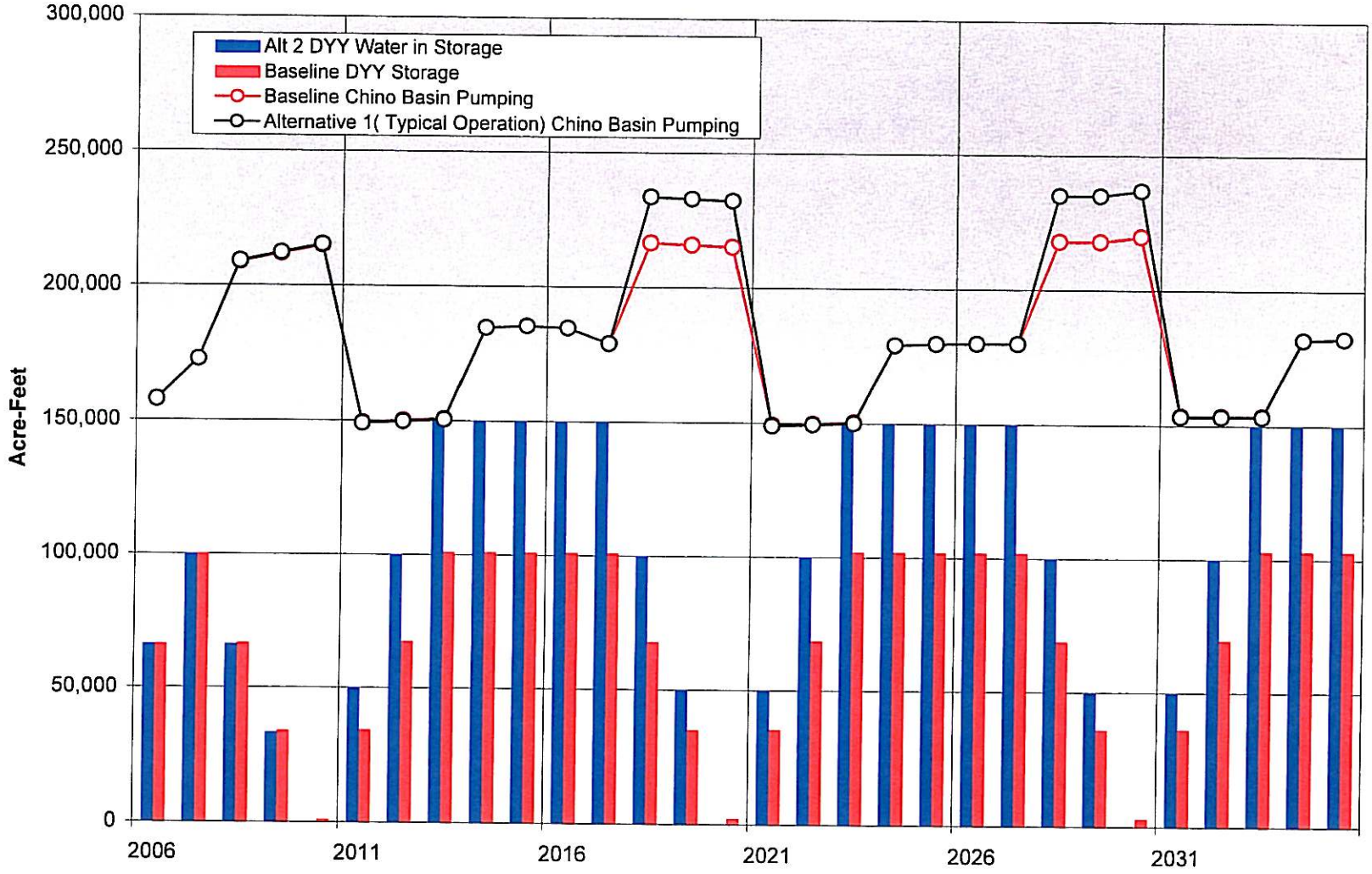

Figure 3a to 3d.xls

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Figure 3c
Alternative 2 - Negative Storage, Pumping and Storage Over Time

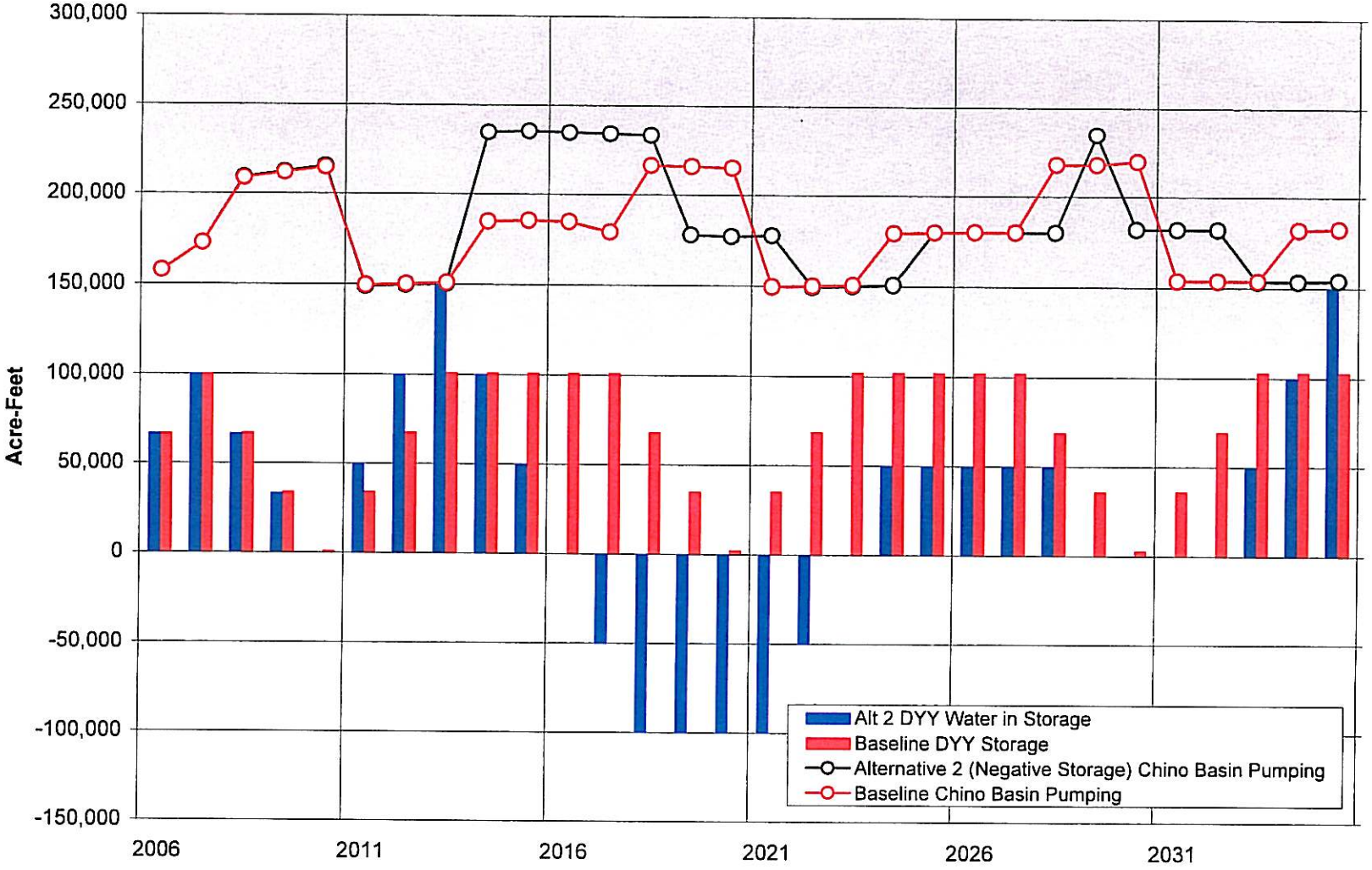

Figure 3a to 3d.xls

WILDERMUTH ENVIRONMENTAL INC

Figure 3d
Alternative 3 - Maximum Storage, Pumping and Storage Over Time

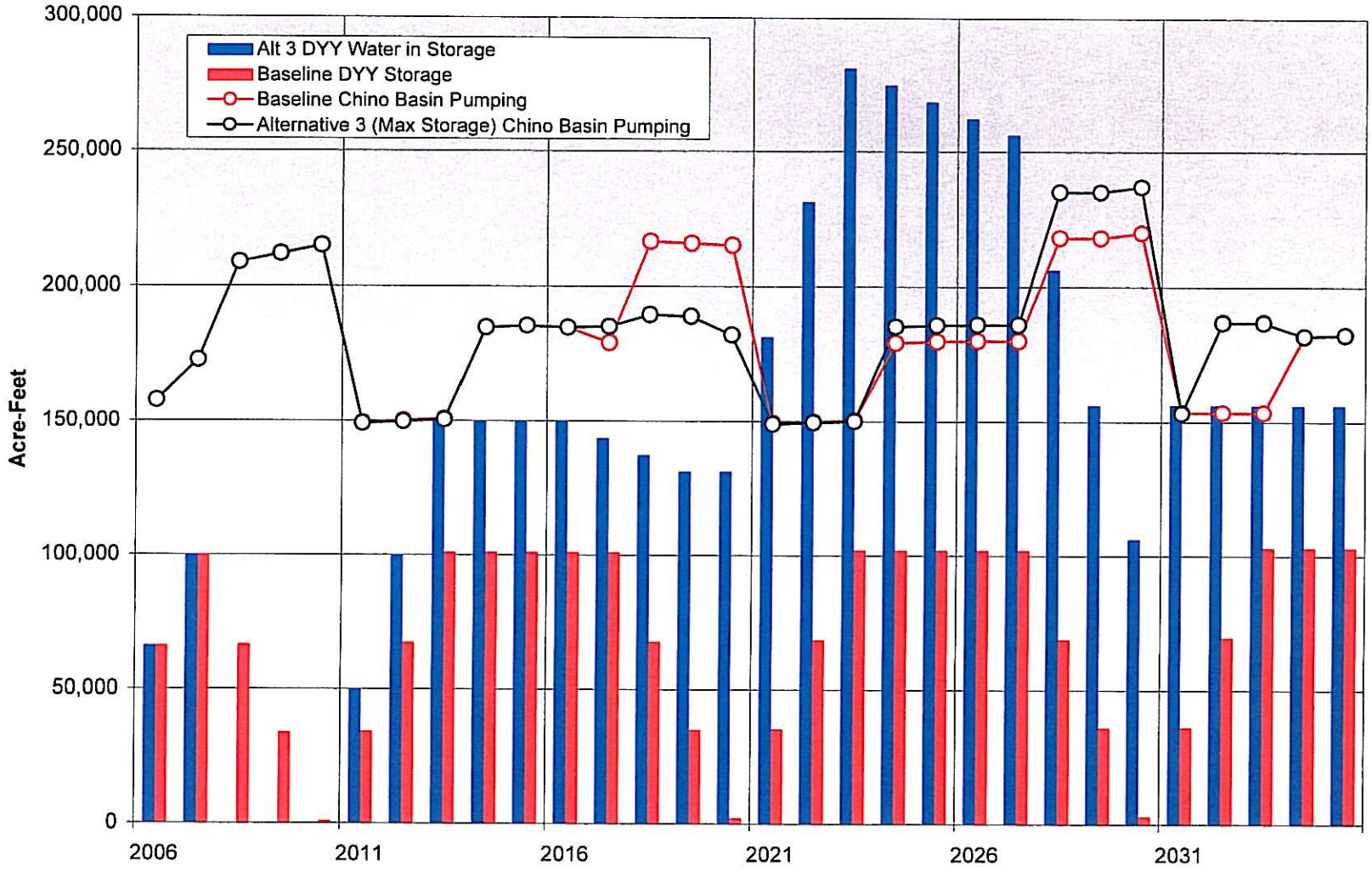

Figure 3a to 3d.xls

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Figure 4a
Comparison of Projected Annual Time Histories of Santa Ana River Recharge the the Chino Basin for the Dry-Year Yield Expansion Program Alternatives Relative to the Baseline Alternative

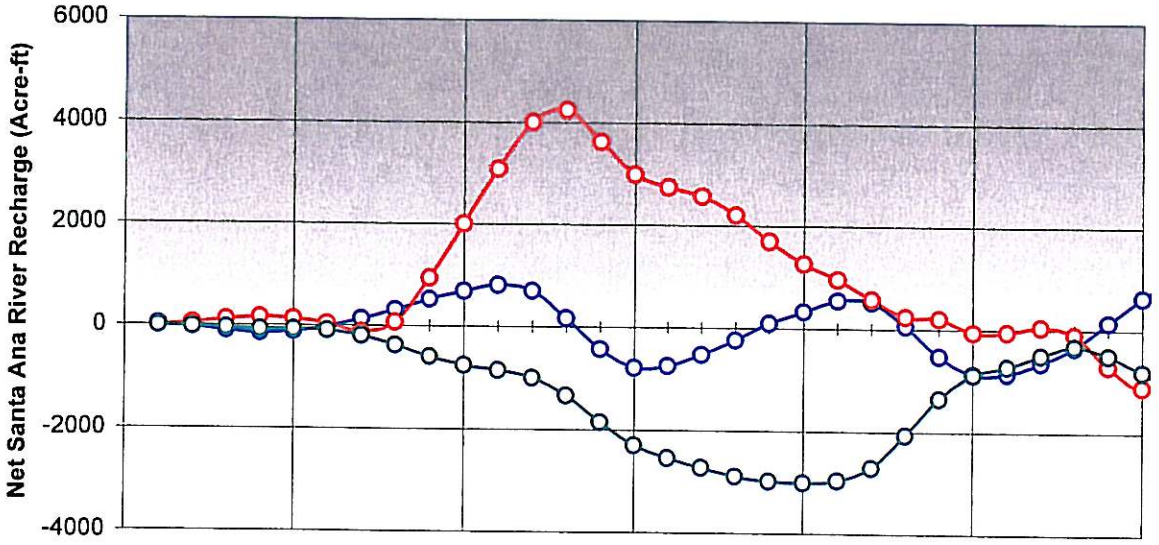
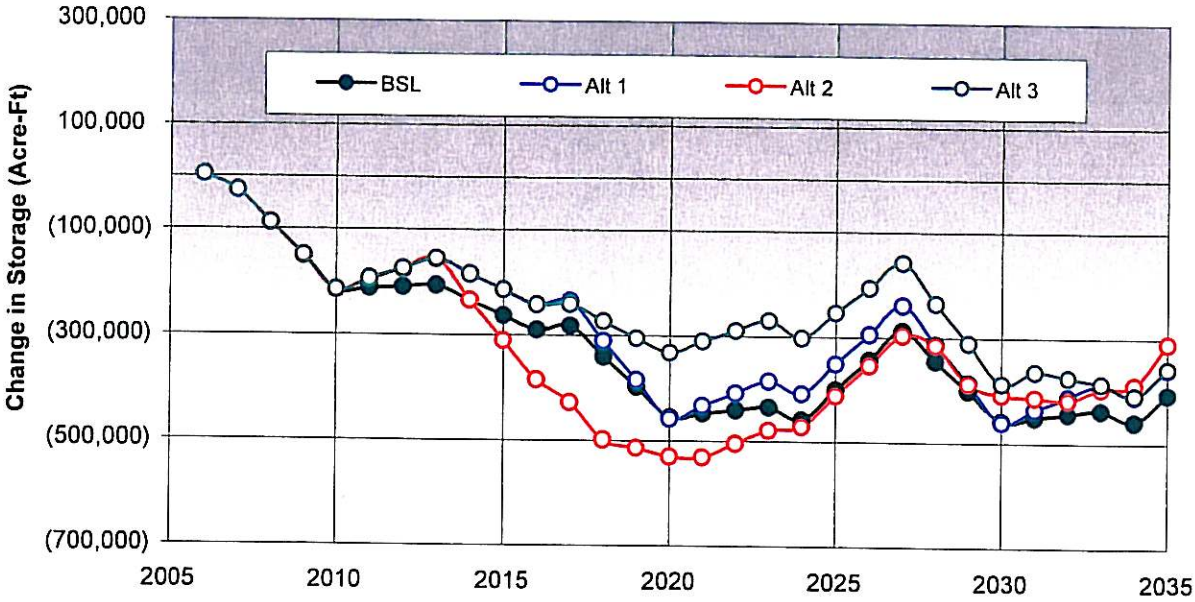
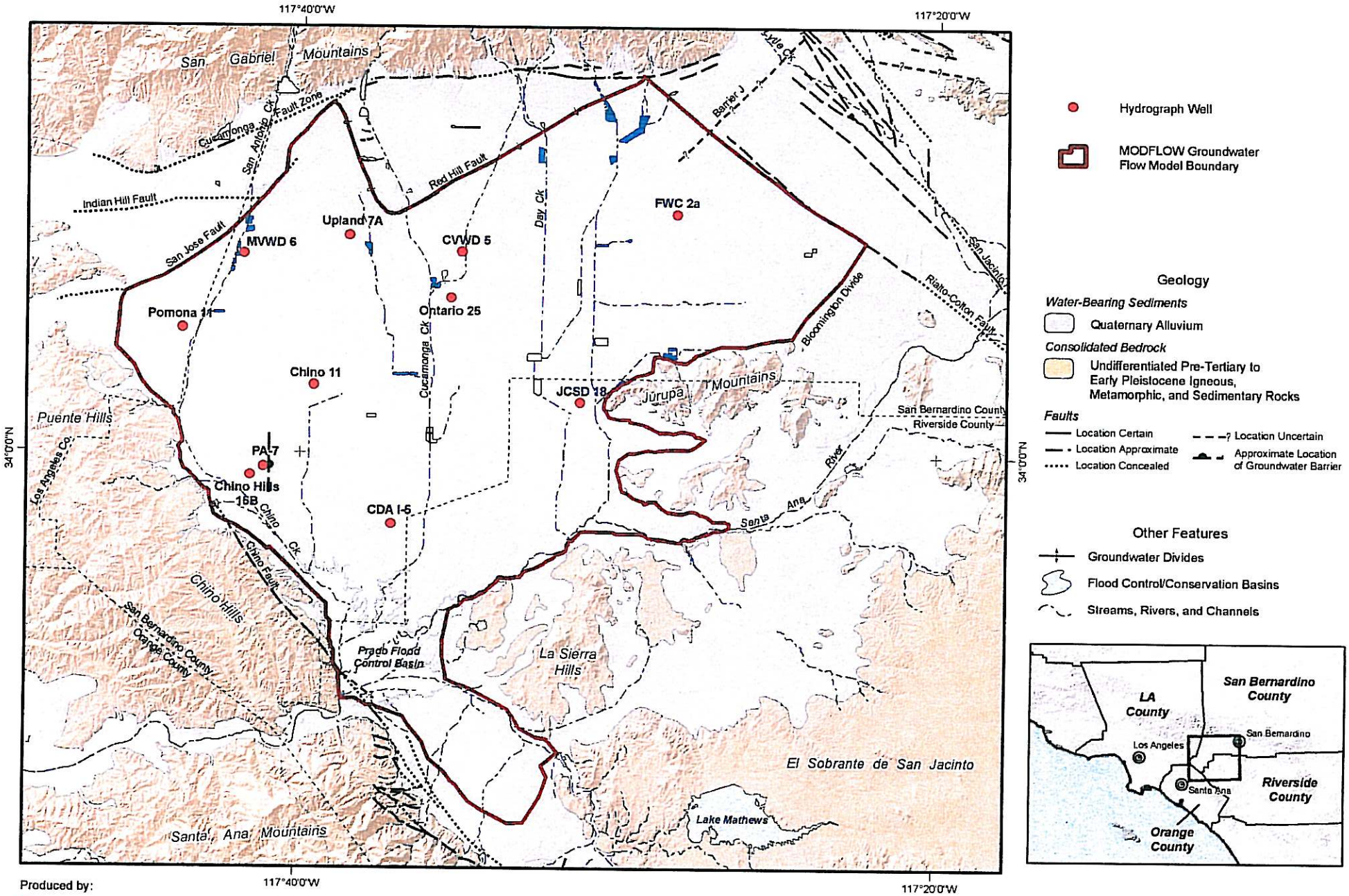


Figure 4b
Cumulative Change in Chino Basin Groundwater Strorage For Each Alternative





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Chino Basin Watermaster

Chino Basin Dry-Year Yield Program Expansion Impact Analysis

Planning Alternative Hydrograph Well Location Map

Figure 5

Figure 6a
Simulated Groundwater Water Levels in Well 7A, City of Upland

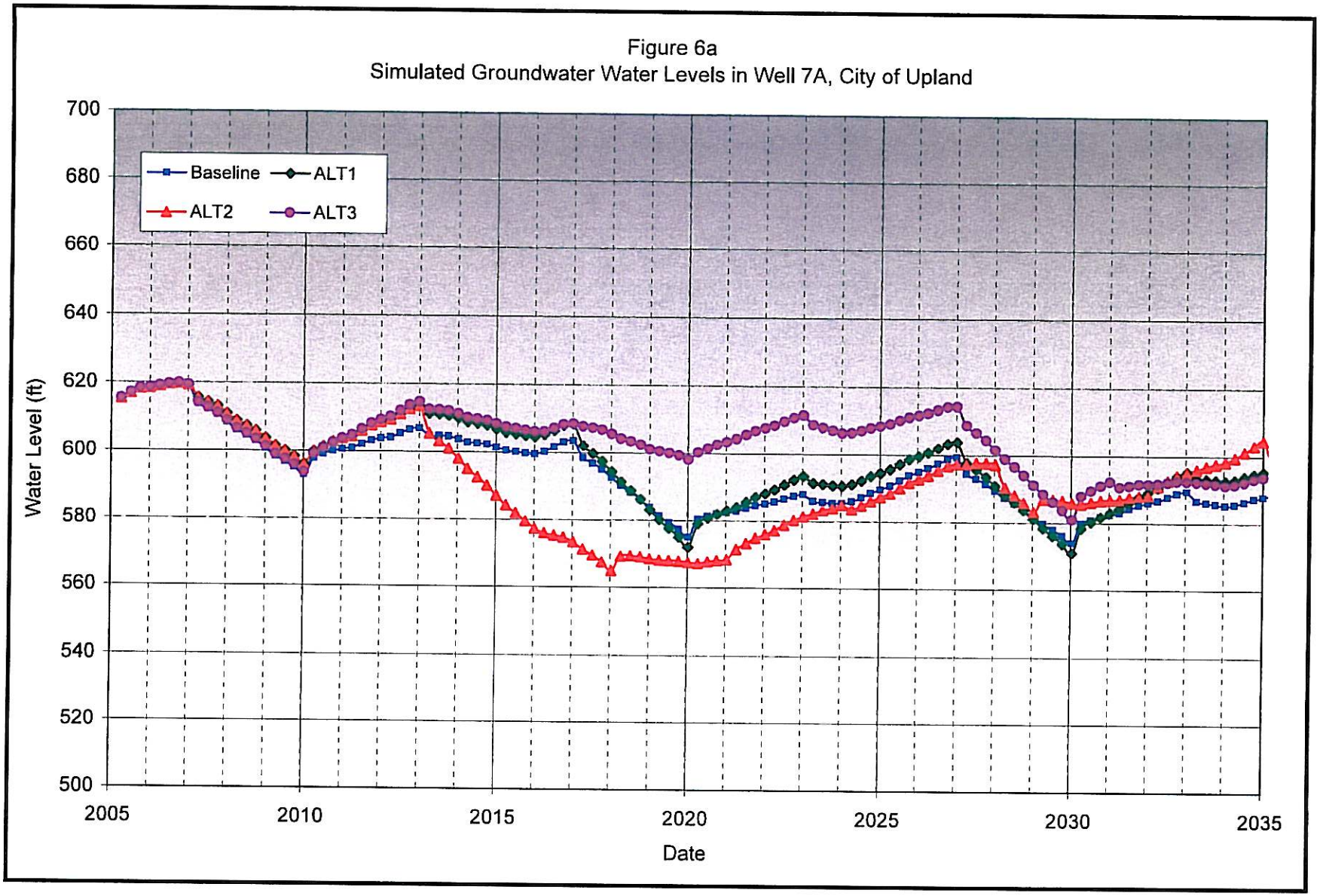

Figure 6 and Figure 14.xls

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Figure 6b
Simulated Groundwater Water Levels in Well 11, City of Chino

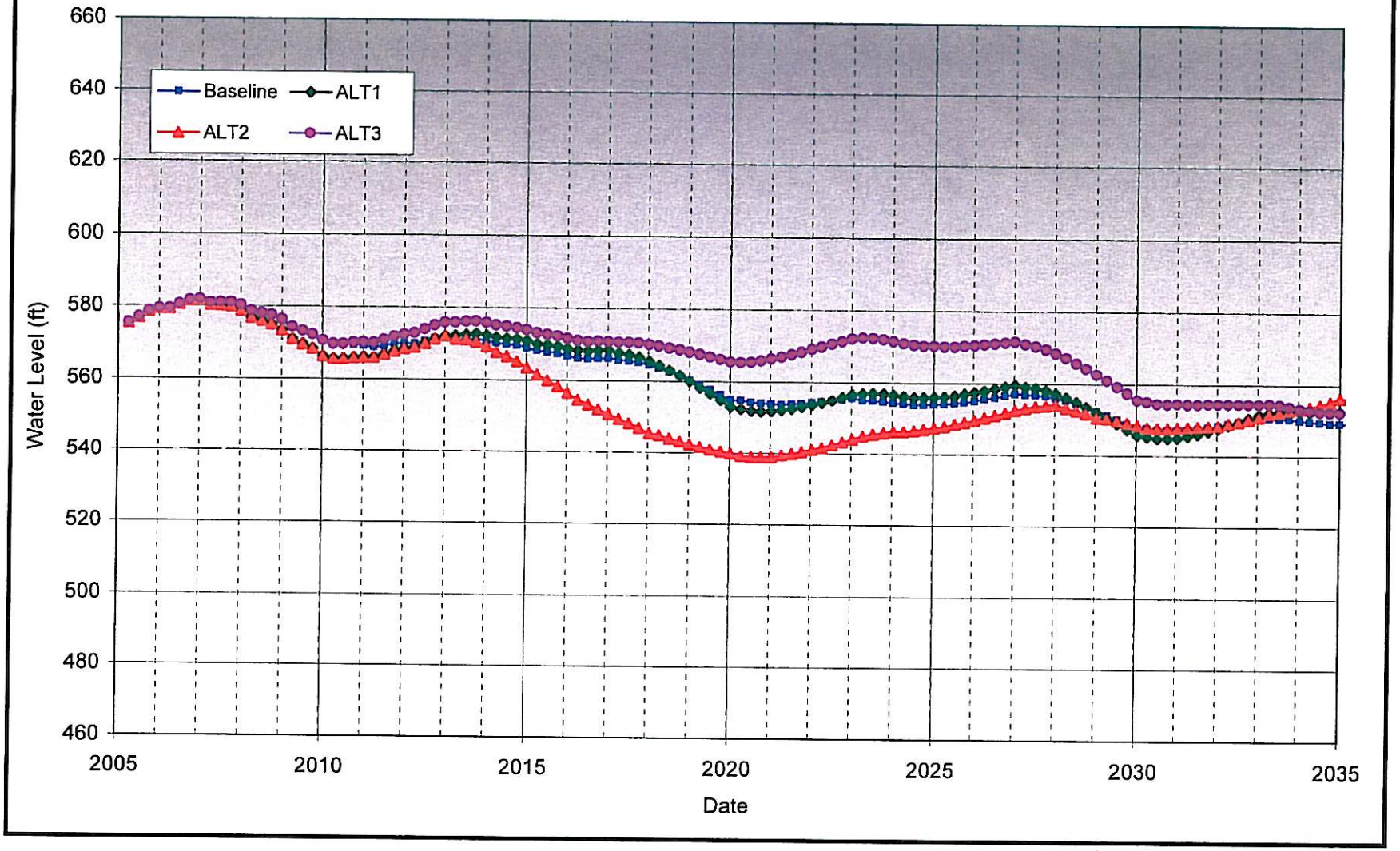

Figure 6 and Figure 14.xls

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Figure 6c
Simulated Groundwater Water Levels in Well18, Jurupa Community Services District

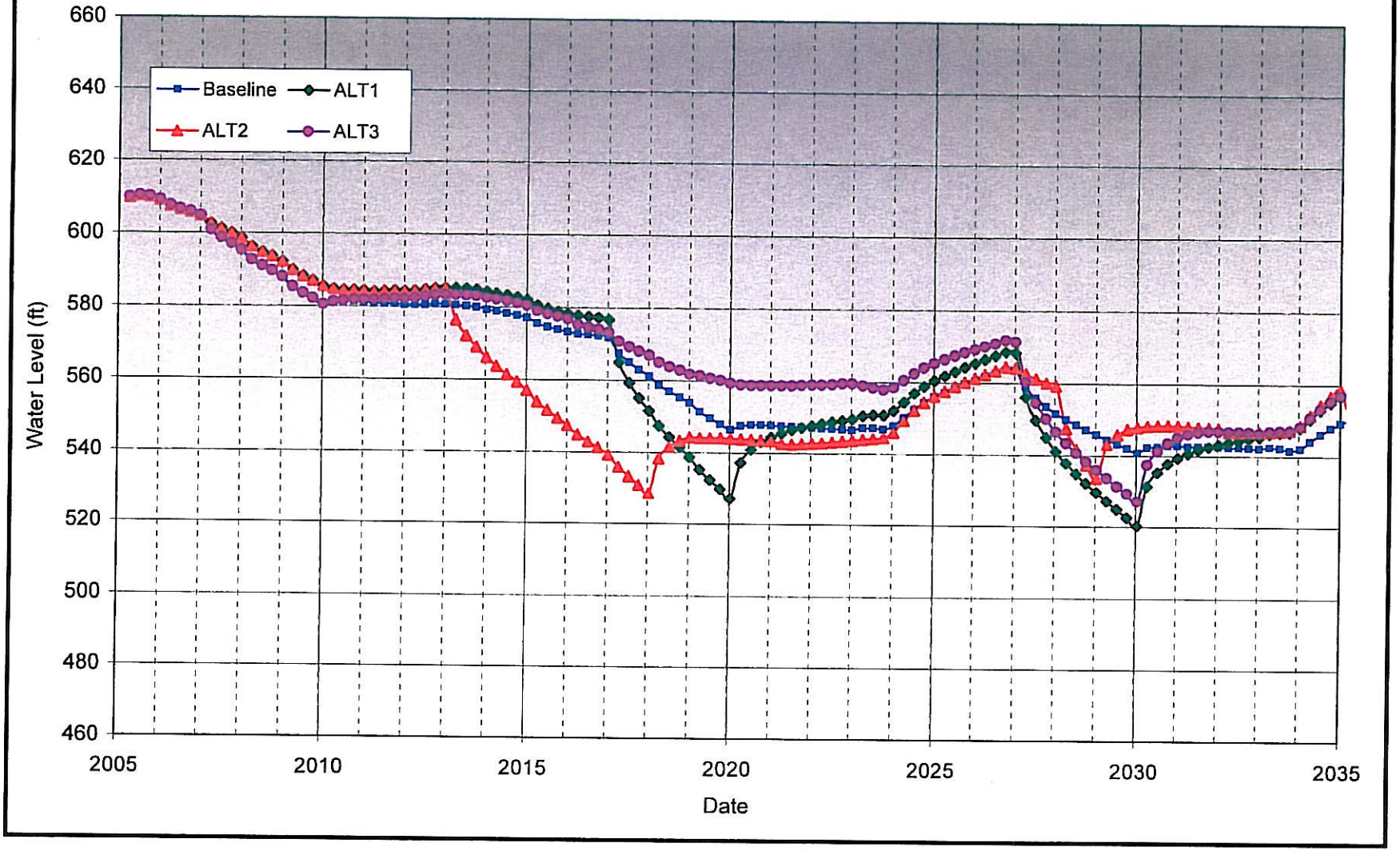

Figure 6 and Figure 14.xls

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Figure 6d
Simulated Groundwater Water Levels in Well P-11, City of Pomona

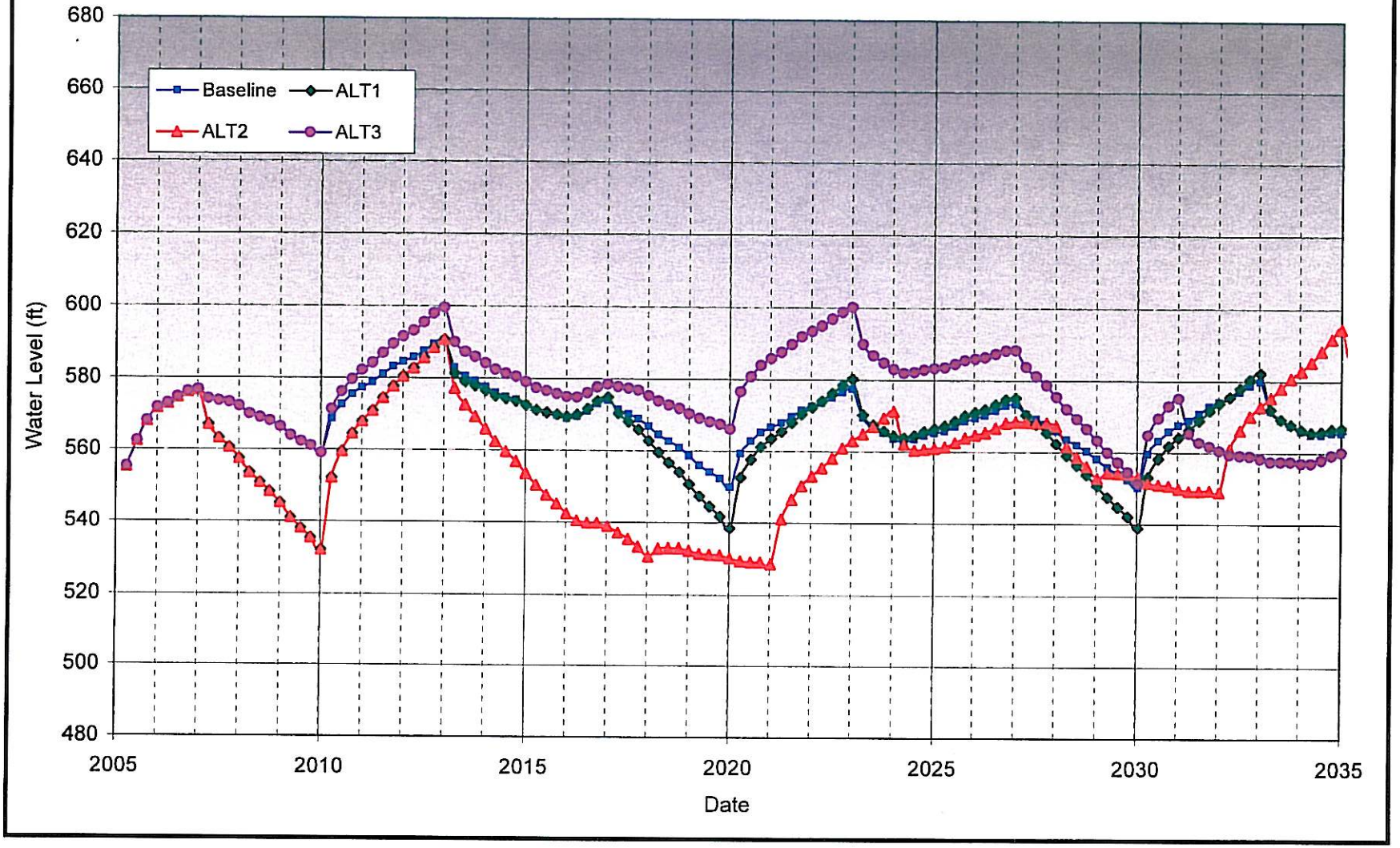

Figure 6 and Figure 14.xls

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Figure 6e
Simulated Groundwater Water Levels in Well 6, Monte Vista Water District

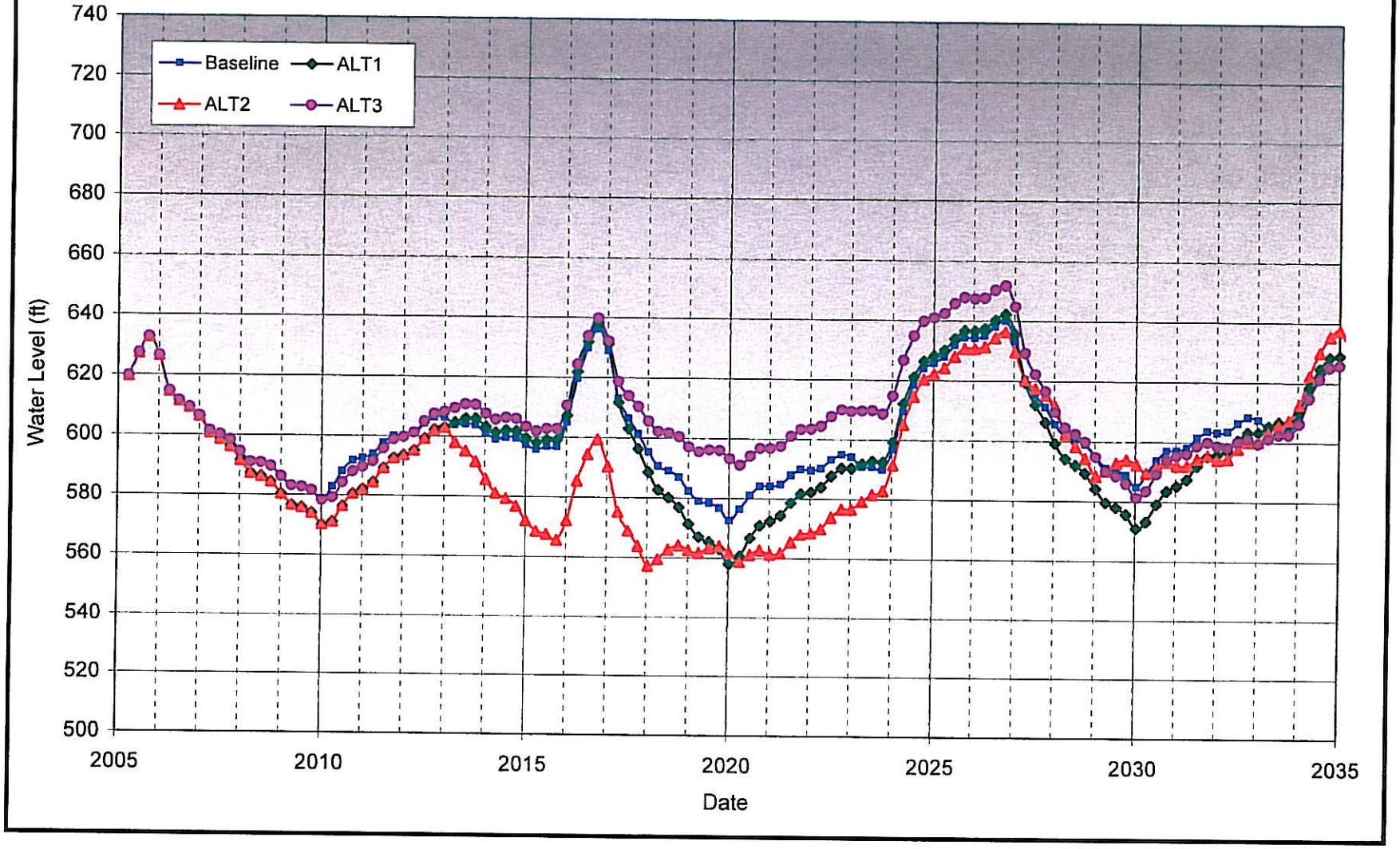

Figure 6 and Figure 14.xls

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Figure 6f
Simulated Groundwater Water Levels in Well 25, City of Ontario

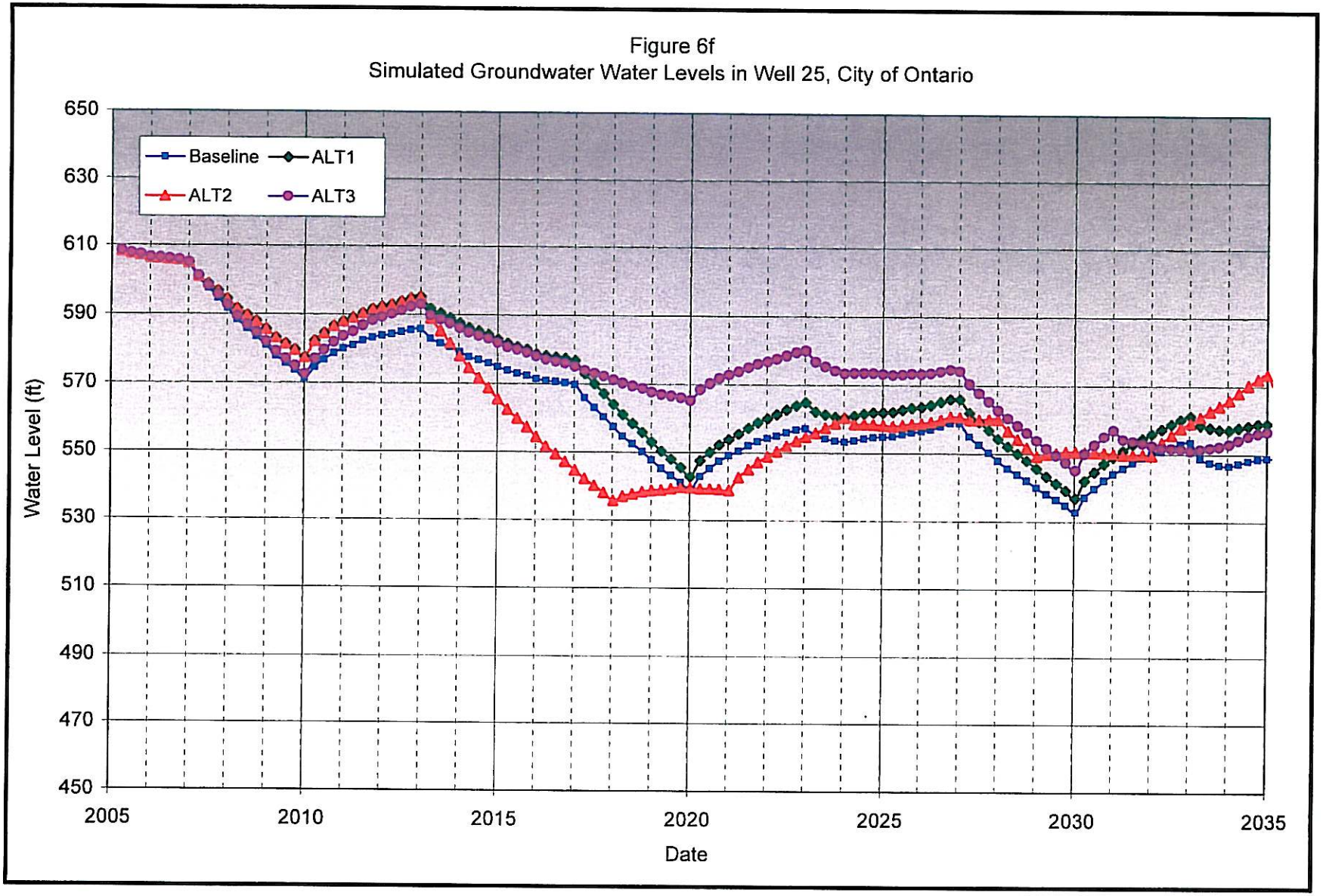

Figure 6 and Figure 14.xls

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Figure 6g
Simulated Groundwater Water Levels in Well CB-5, Cucamonga Valley Water District

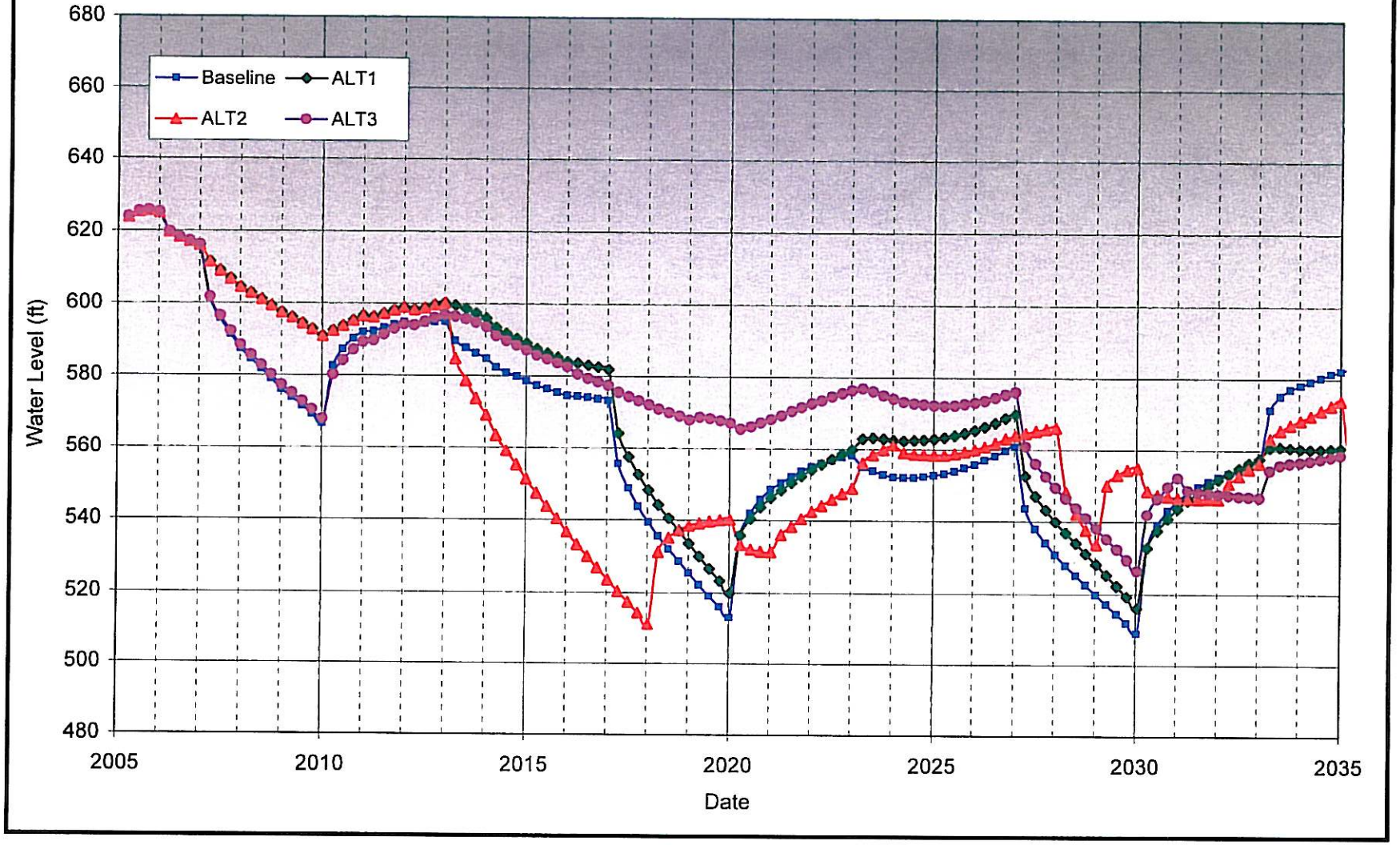

Figure 6 and Figure 14.xls

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Figure 6h
Simulated Groundwater Water Levels in Well 1, Chino Desalter Authority

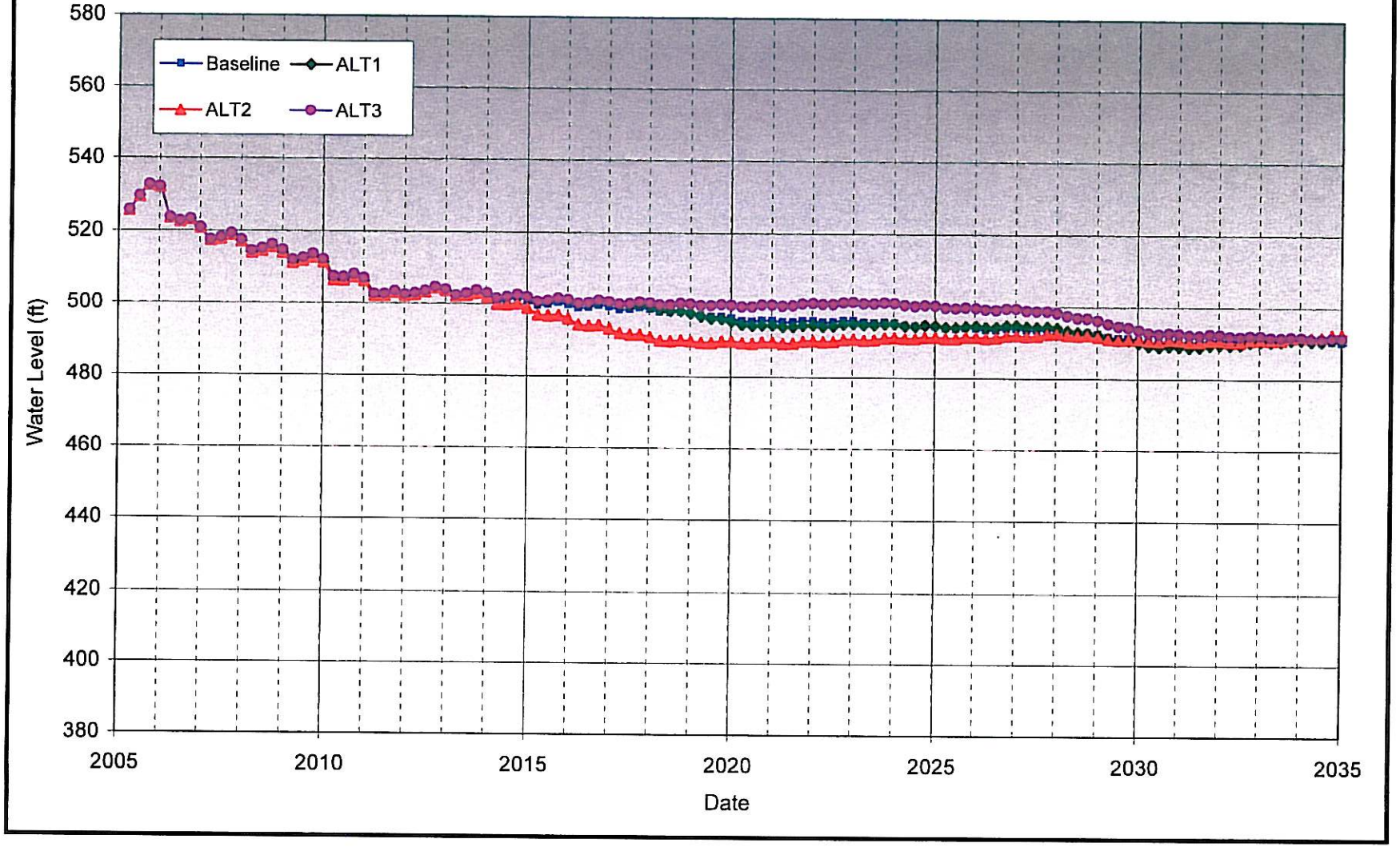

Figure 6 and Figure 14.xls

Figure 6i
Simulated Groundwater Water Levels in Well 15B, City Of Chino Hills

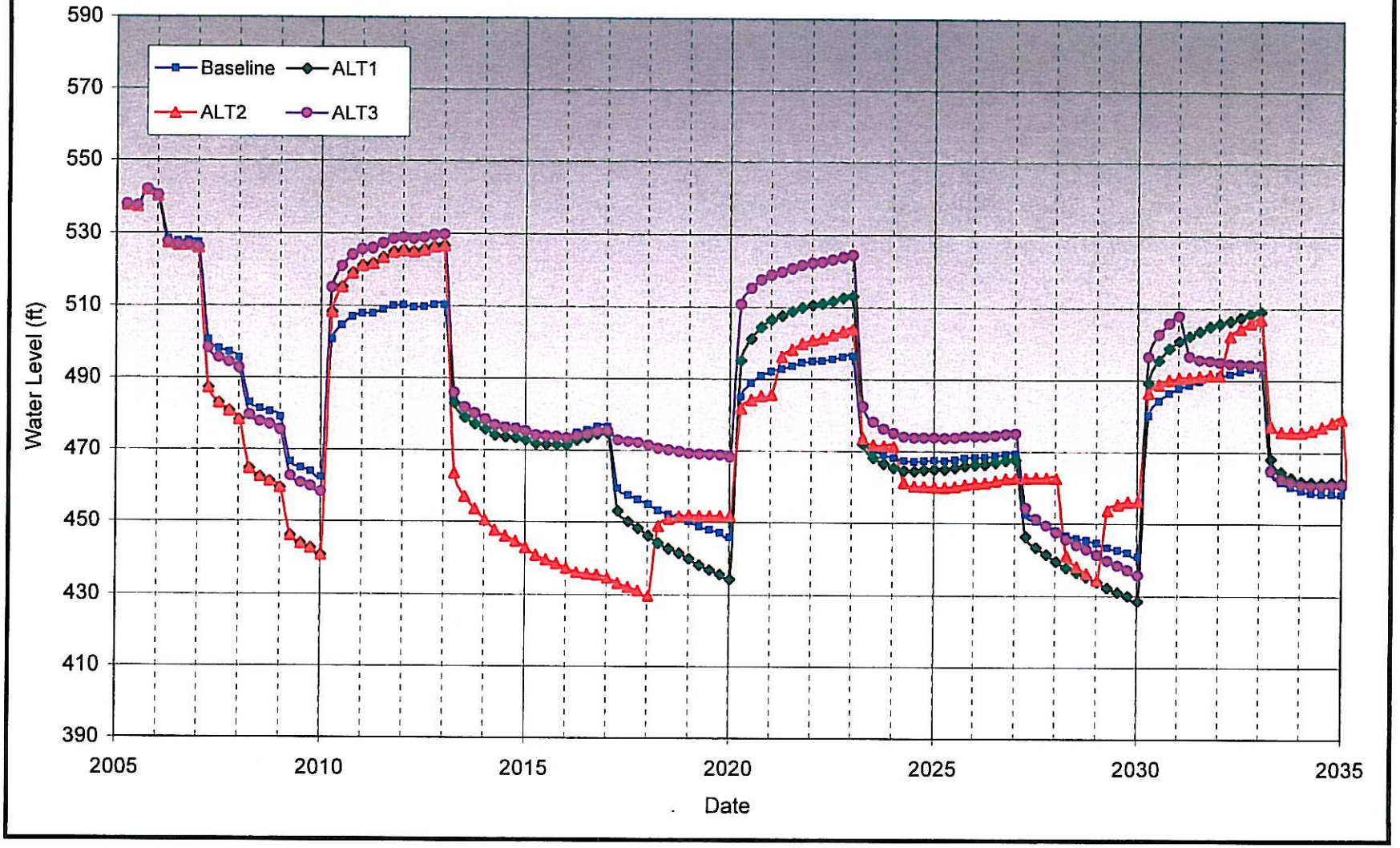

Figure 6 and Figure 14.xls

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Figure 6j
Simulated Groundwater Water Levels in Well F2A, Fontana Water Company

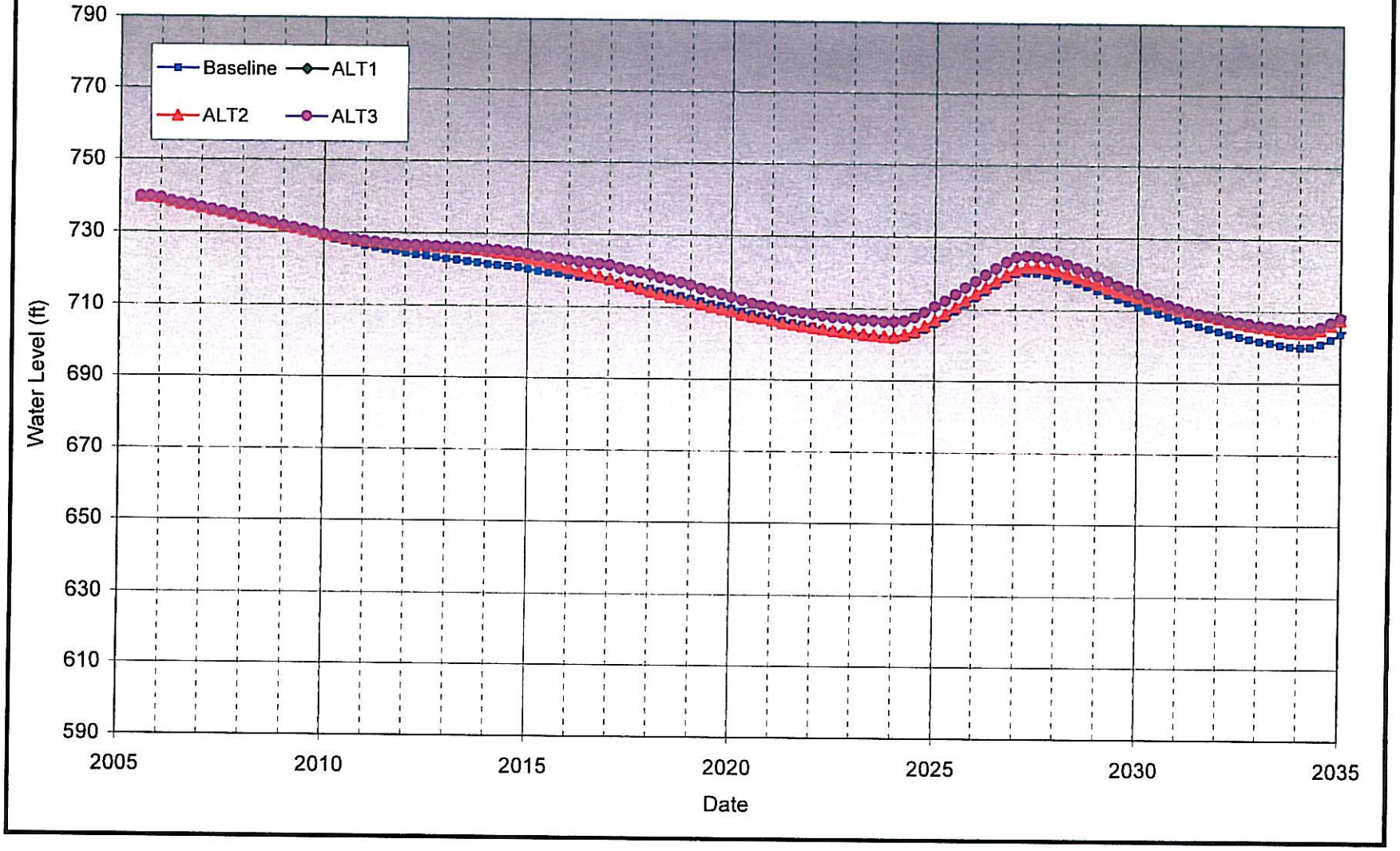

Figure 6 and Figure 14.xls

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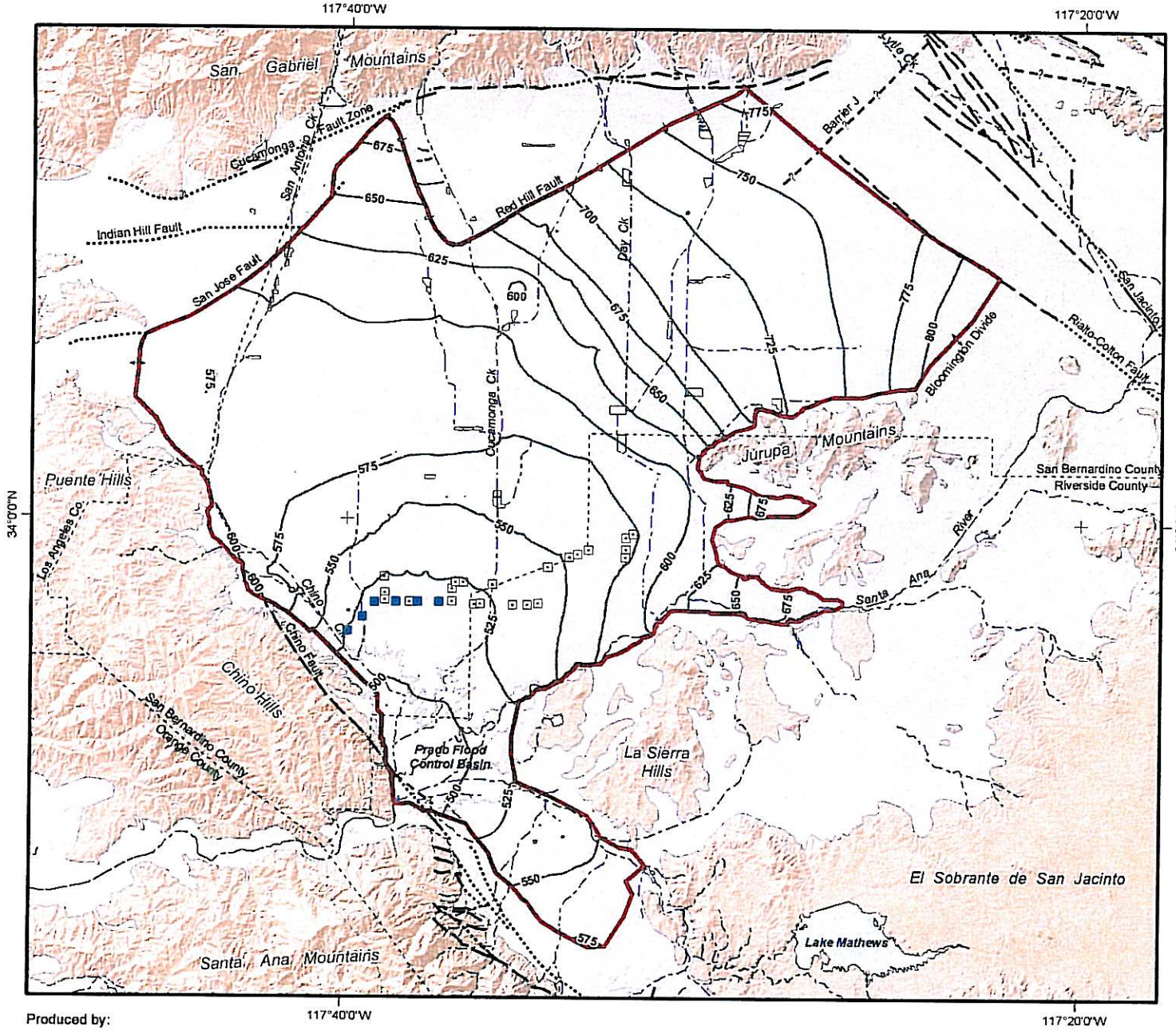

Groundwater Elevation Contours *(feet above mean sea-level)*

Existing Chino Desalter Well

Proposed Chino Desalter Well

MODFLOW Groundwater Flow Model Boundary

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks

Faults

Location Certain — — —? Location Uncertain

Location Approximate ----- Location Concealed

Other Features

Groundwater Divides

Flood Control/Conservation Basins

Streams, Rivers, and Channels

Assumed Groundwater Elevations for Layer 1

Start of the Baseline Period in 2008

Figure 7a

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0 1 2 3 4 Miles
0 2 4 6 KM

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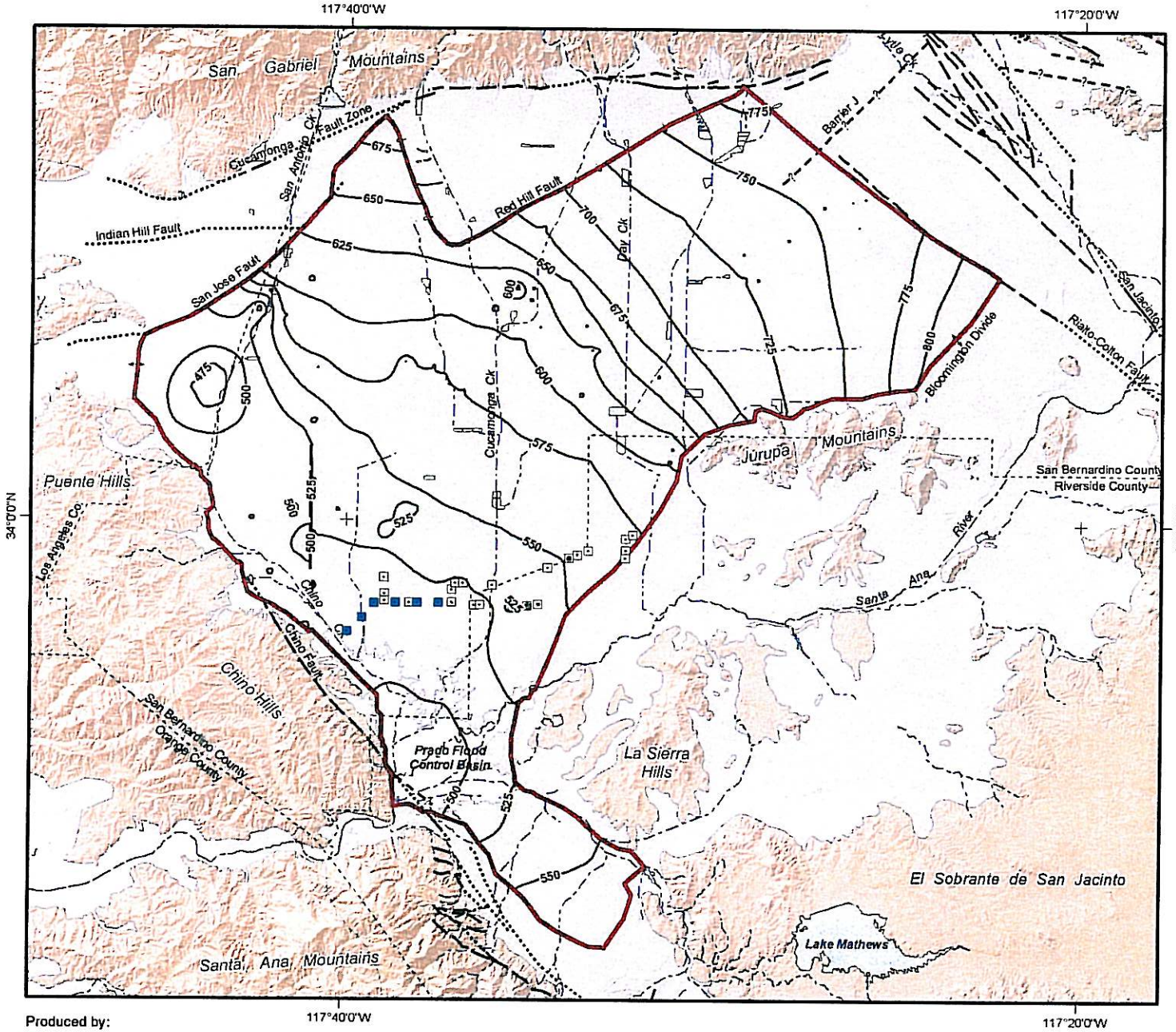
Inland Empire Utilities Agency

Western Municipal Water District

Three Valleys Municipal Water District

Chino Basin Watermaster

Chino Basin Dry-Year Yield Program Expansion Impact Analysis



~800~ Groundwater Elevation Contours *(feet above mean sea-level)*

Existing Chino Desalter Well

Proposed Chino Desalter Well

MODFLOW Groundwater Flow Model Boundary

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks

Faults

Location Certain
Location Approximate
Location Concealed
Location Uncertain
Approximate Location of Groundwater Barrier

Other Features

Groundwater Divides
Flood Control/Conservation Basins
Streams, Rivers, and Channels

Assumed Groundwater Elevations for Layer 2

Start of the Baseline Period in 2008

Figure 7b

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0 1 2 3 4 Miles
0 2 4 6 KM

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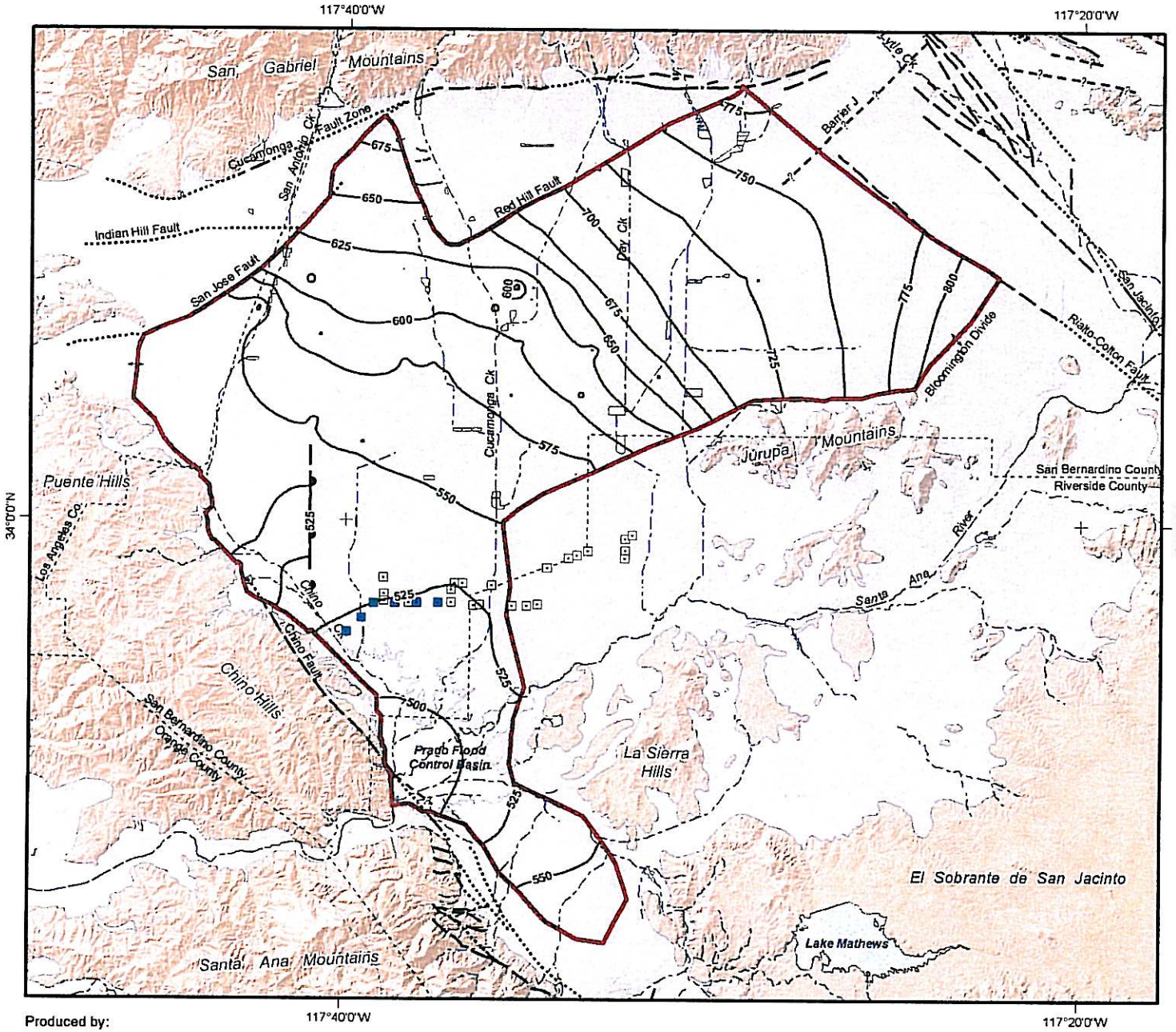
Three Valleys Municipal Water District
Chino Basin Watermaster

Chino Basin Dry-Year Yield Program Expansion Impact Analysis



-800- Groundwater Elevation Contours *(feet above mean sea-level)*

Existing Chino Desalter Well

Proposed Chino Desalter Well

MODFLOW Groundwater Flow Model Boundary

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks

Faults

Location Certain

Location Approximate

Location Concealed

Location Uncertain

Approximate Location of Groundwater Barrier

Other Features

Groundwater Divides

Flood Control/Conservation Basins

Streams, Rivers, and Channels

Assumed Groundwater Elevations for Layer 3

Start of the Baseline Period in 2008

Figure 7c

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0 1 2 3 4 Miles

0 2 4 6 KM

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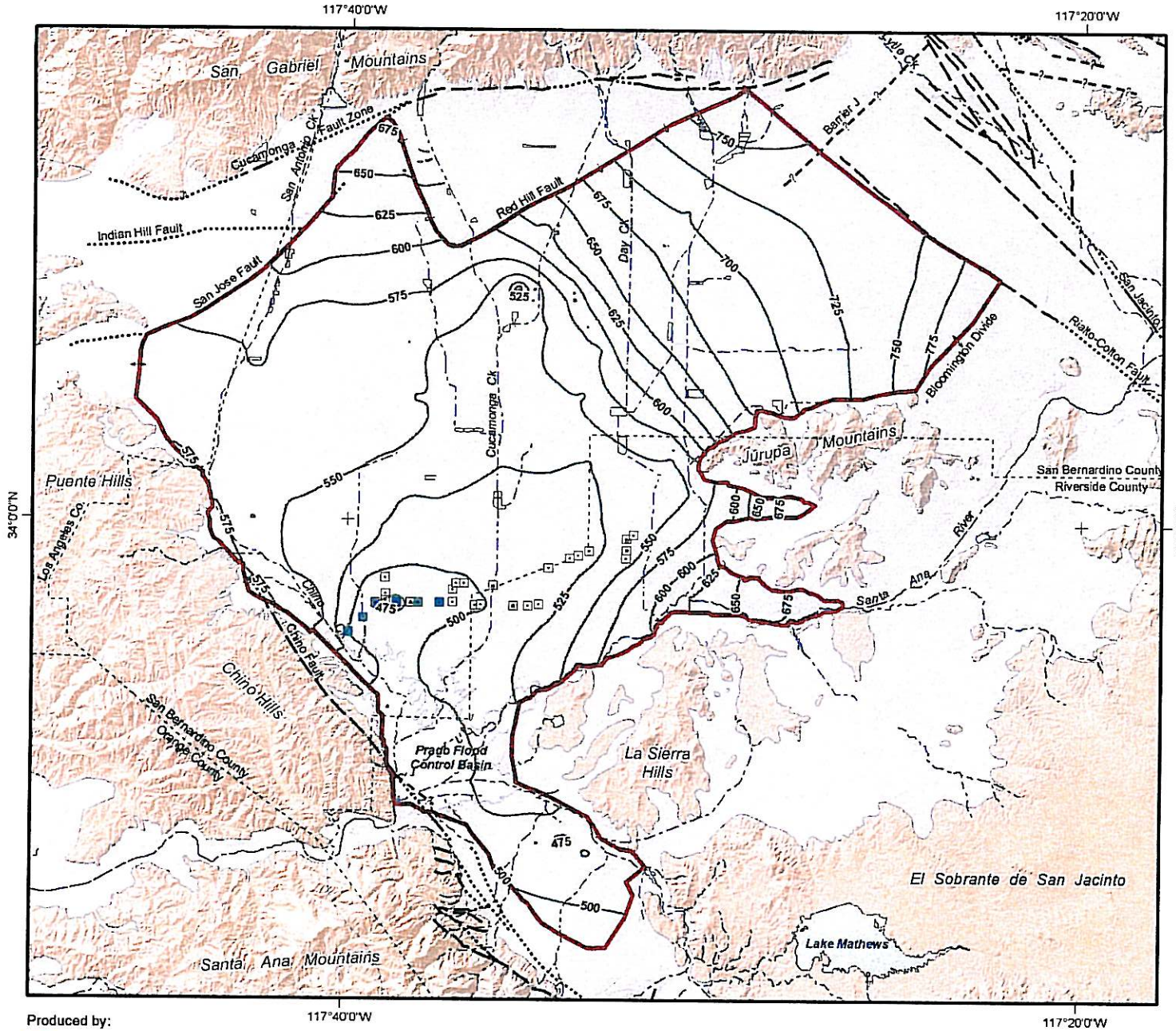
Western Municipal Water District

Three Valleys Municipal Water District

Chino Basin Dry-Year Yield Program Expansion Impact Analysis



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0 1 2 3 4 Miles
0 2 4 6 KM

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Inland Empire Utilities Agency
Western Municipal Water District
Three Valleys Municipal Water District

Chino Basin Dry-Year Yield Program Expansion
Impact Analysis

Groundwater Elevation Contours
(feet above mean sea-level)

Existing Chino Desalter Well

Proposed Chino Desalter Well

MODFLOW Groundwater Flow Model Boundary

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks

Faults

Location Certain
Location Approximate
? Location Uncertain
Location Concealed

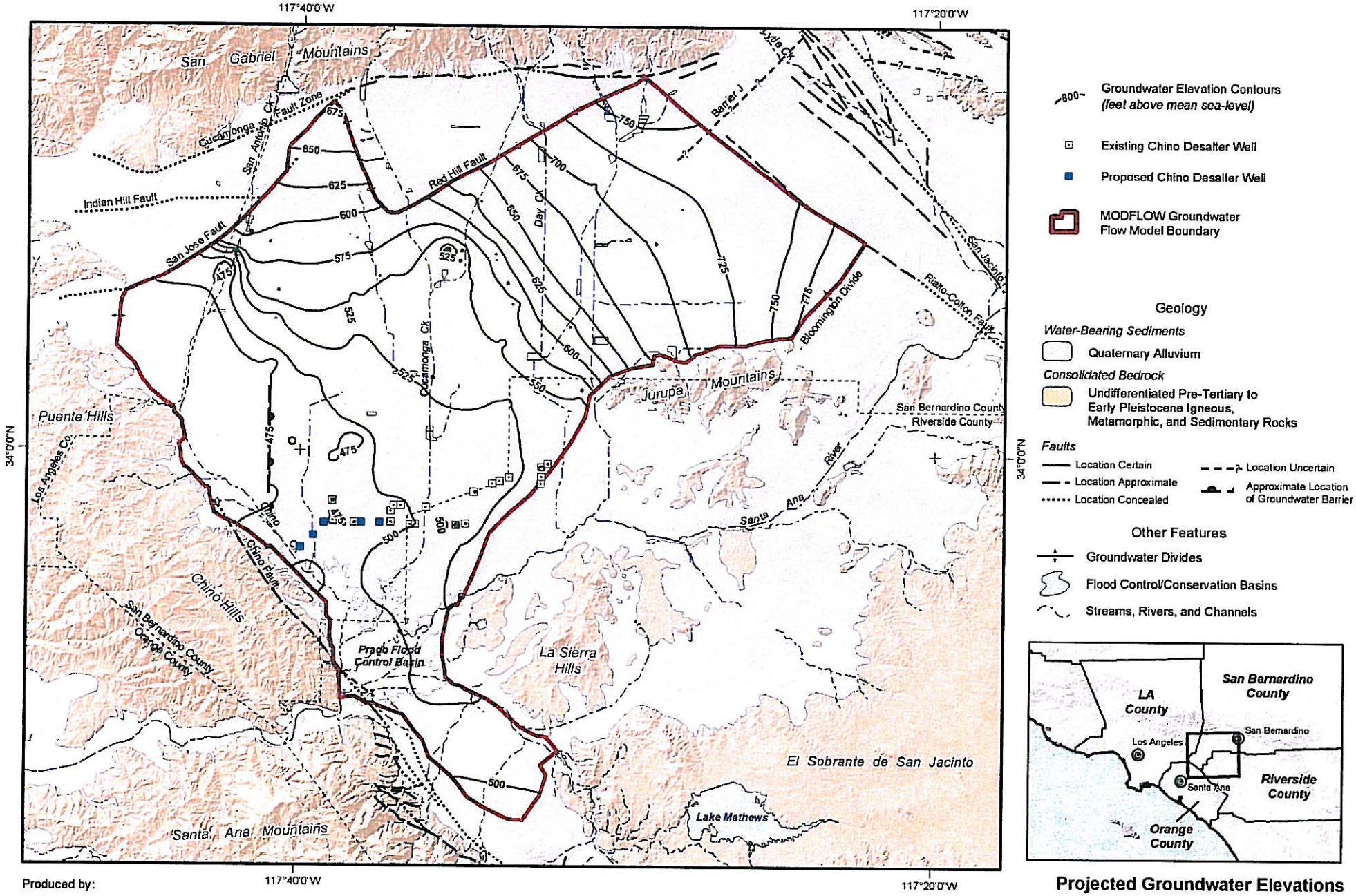
Other Features

Groundwater Divides
Flood Control/Conservation Basins
Streams, Rivers, and Channels

Projected Groundwater Elevations for Layer 1

Baseline Alternative in 2035

Figure 8a



Projected Groundwater Elevations for Layer 2

Baseline Alternative in 2035

Figure 8b

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0 1 2 3 4 Miles
0 2 4 6 KM

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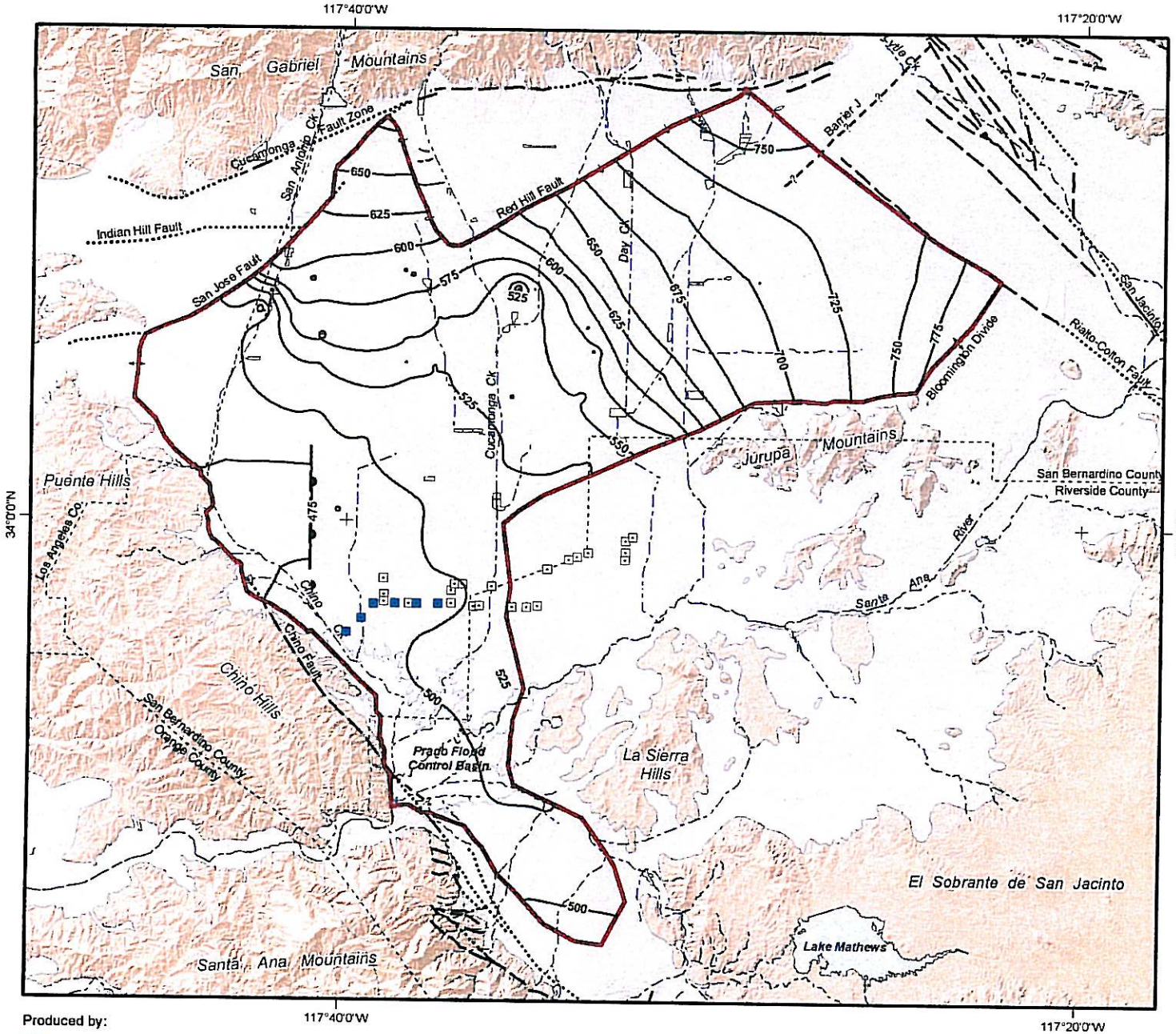
Inland Empire

Chino Basin Dry-Year Yield Program Expansion
Impact Analysis



Groundwater Elevation Contours *(feet above mean sea-level)*

Existing Chino Desalter Well

Proposed Chino Desalter Well

MODFLOW Groundwater Flow Model Boundary

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks

Faults

Location Certain

Location Approximate

Location Concealed

Location Uncertain

Approximate Location of Groundwater Barrier

Other Features

Groundwater Divides

Flood Control/Conservation Basins

Streams, Rivers, and Channels

Projected Groundwater Elevations for Layer 3

Baseline Alternative in 2035

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0 1 2 3 4 Miles

0 2 4 6 KM

BLACK & VEATCH Corporation

Inland Empire Utilities Agency

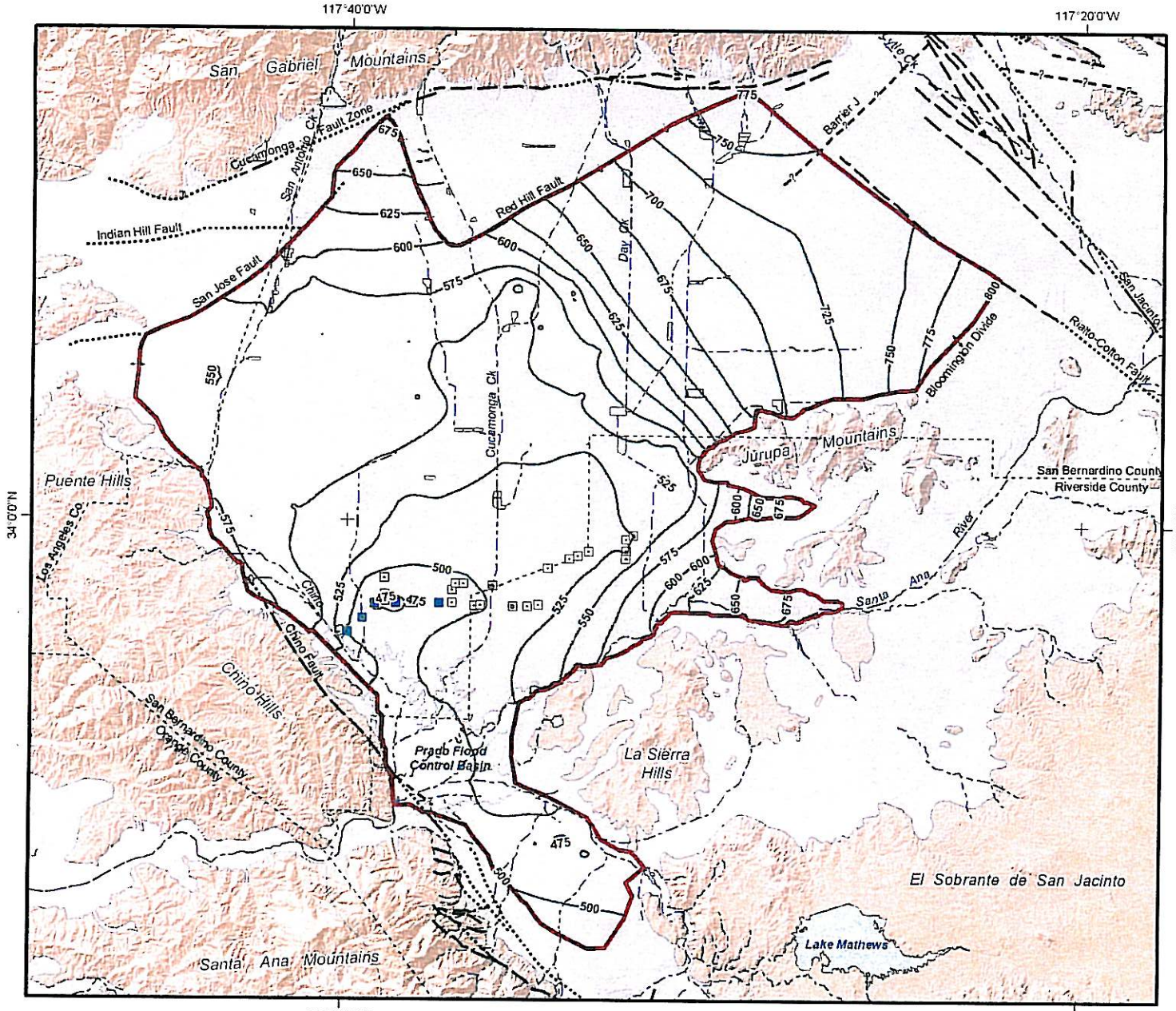
Western Municipal Water District

Three Valleys Municipal Water District

Chino Basin Watermaster

Chino Basin Dry-Year Yield Program Expansion Impact Analysis

Figure 8c



Groundwater Elevation Contours *(feet above mean sea-level)*

Existing Chino Desalter Well

Proposed Chino Desalter Well

MODFLOW Groundwater Flow Model Boundary

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks

Faults

Location Certain — — —? Location Uncertain

Location Approximate ····· Location Concealed

Other Features

Groundwater Divides

Flood Control/Conservation Basins

Streams, Rivers, and Channels

Projected Groundwater Elevations for Layer 1

Alternative 1 in 2030

Figure 9a

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0 1 2 3 4 Miles
0 2 4 6 KM

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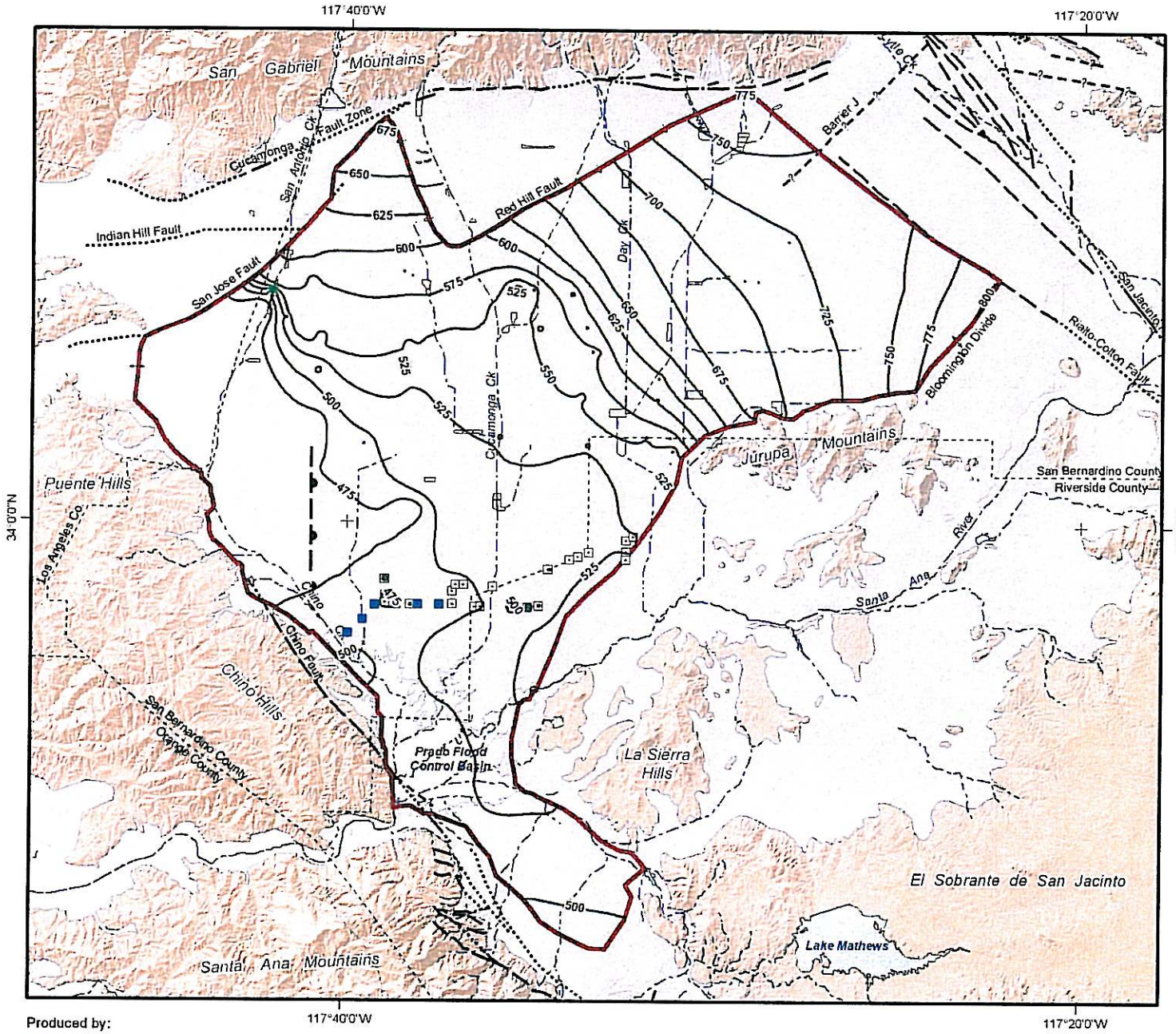
Inland Empire
THREE VALLEYS
CHINO BASIN

Chino Basin Dry-Year Yield Program Expansion Impact Analysis



Groundwater Elevation Contours
(feet above mean sea-level)

Existing Chino Desalter Well

Proposed Chino Desalter Well

MODFLOW Groundwater Flow Model Boundary

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks

Faults

- Location Certain
- Location Approximate
- Location Concealed
- Location Uncertain
- Approximate Location of Groundwater Barrier

Other Features

- Groundwater Divides
- Flood Control/Conservation Basins
- Streams, Rivers, and Channels

Projected Groundwater Elevations for Layer 2

Alternative 1 in 2030

Figure 9b

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0 1 2 3 4 Miles
0 2 4 6 KM

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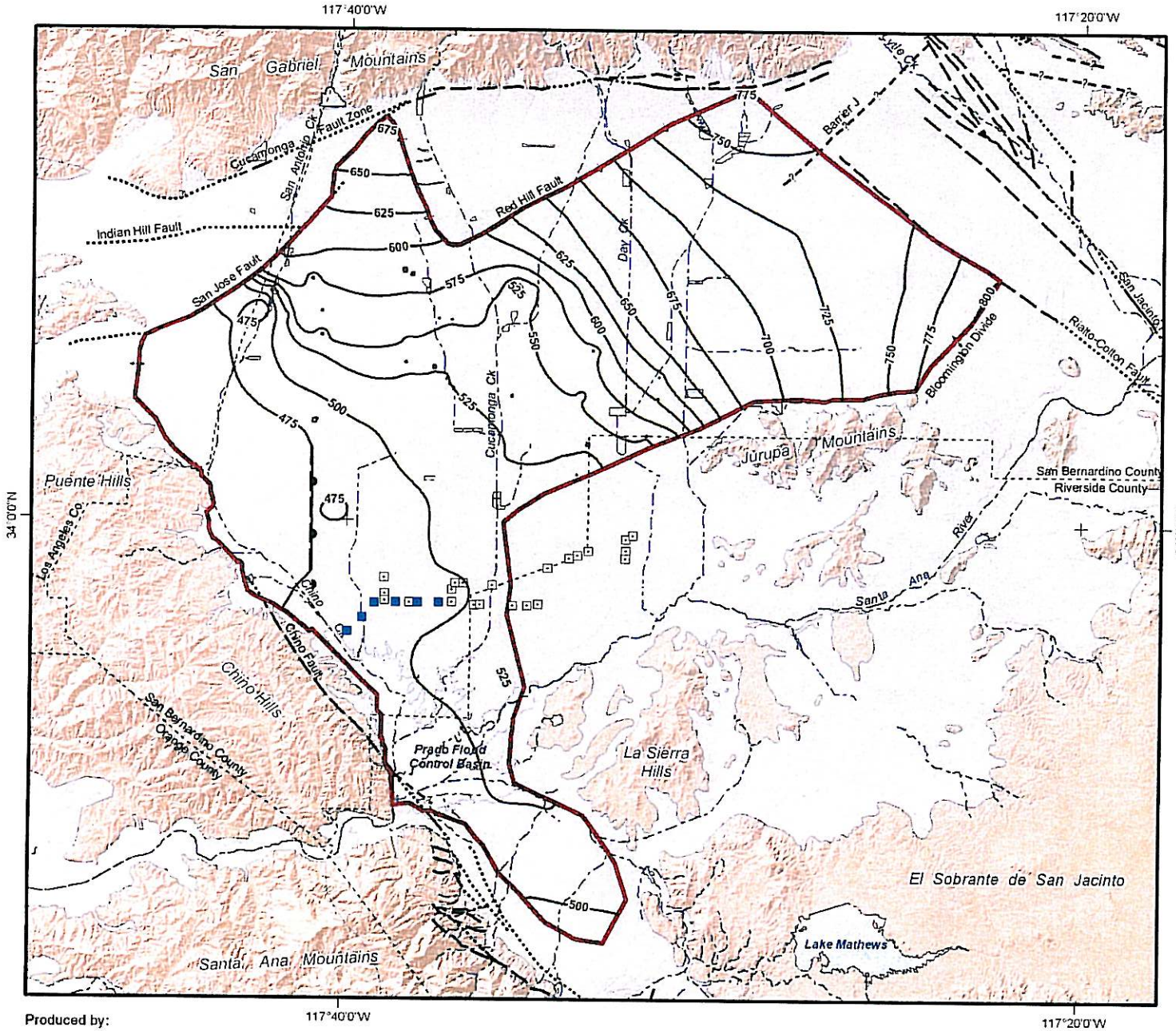
Inland Empire

THREE VALLEYS MUNICIPAL WATER DISTRICT

Chino Basin Dry-Year Yield Program Expansion Impact Analysis



Groundwater Elevation Contours
(feet above mean sea-level)

Existing Chino Desalter Well

Proposed Chino Desalter Well

MODFLOW Groundwater Flow Model Boundary

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks

Faults

- Location Certain
- Location Approximate
- Location Concealed
- Location Uncertain
- Approximate Location of Groundwater Barrier

Other Features

- Groundwater Divides
- Flood Control/Conservation Basins
- Streams, Rivers, and Channels

Projected Groundwater Elevations for Layer 3

Alternative 1 in 2030

Figure 9c

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File: Figure_9c.mxd

0 1 2 3 4 Miles
0 2 4 6 KM

BLACK & VEATCH Corporation

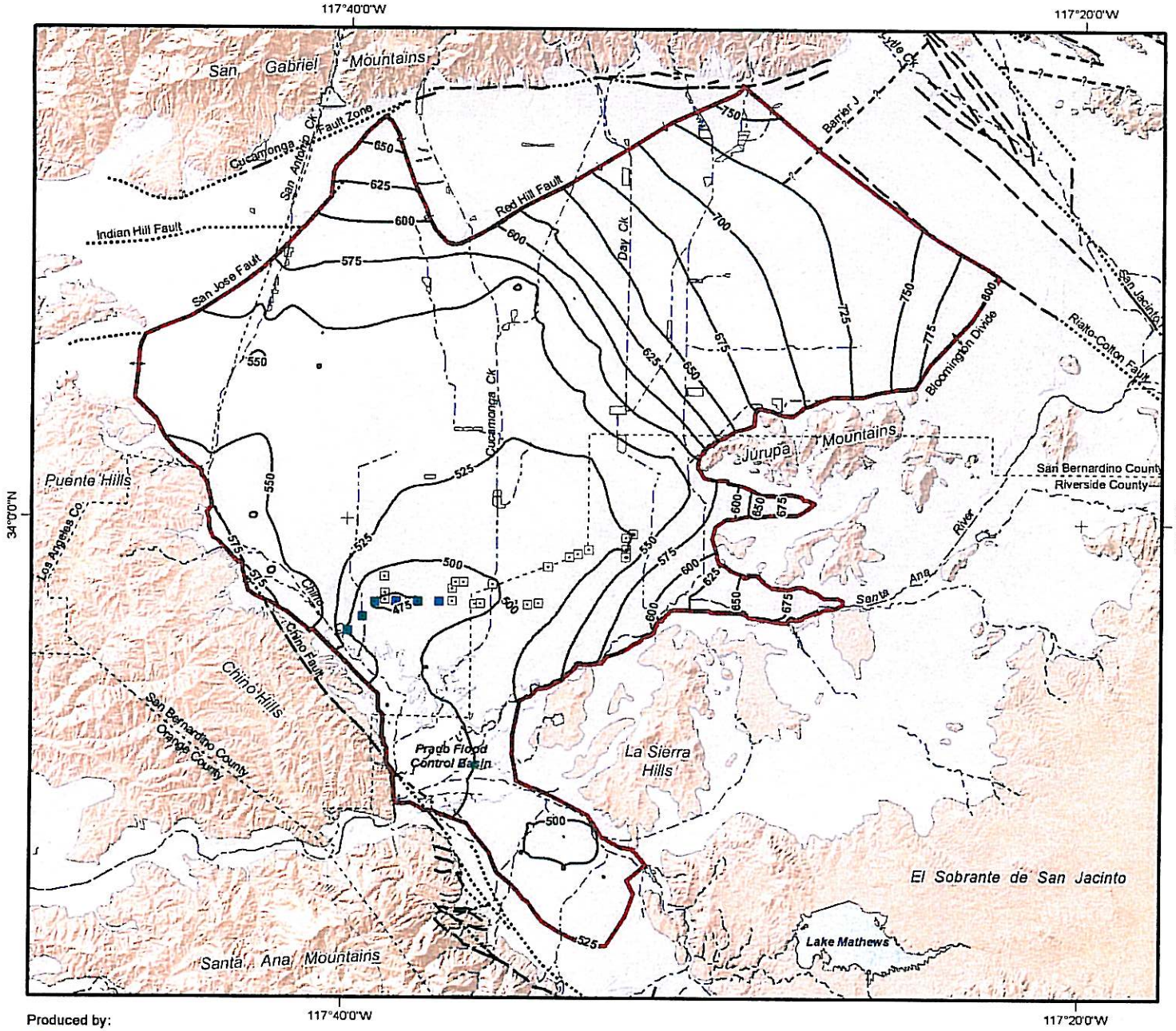
Inland Empire Utilities Agency

Western Municipal Water District

Three Valleys Municipal Water District

Chino Basin Watermaster

Chino Basin Dry-Year Yield Program Expansion Impact Analysis



Groundwater Elevation Contours (feet above mean sea-level)

Existing Chino Desalter Well

Proposed Chino Desalter Well

MODFLOW Groundwater Flow Model Boundary

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks

Faults

Location Certain — — —? Location Uncertain

— · — Location Approximate ····· Location Concealed

Other Features

Groundwater Divides

Flood Control/Conservation Basins

Streams, Rivers, and Channels

Projected Groundwater Elevations for Layer 1

Alternative 2 in 2021

Figure 10a

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0 1 2 3 4 Miles

0 2 4 6 KM

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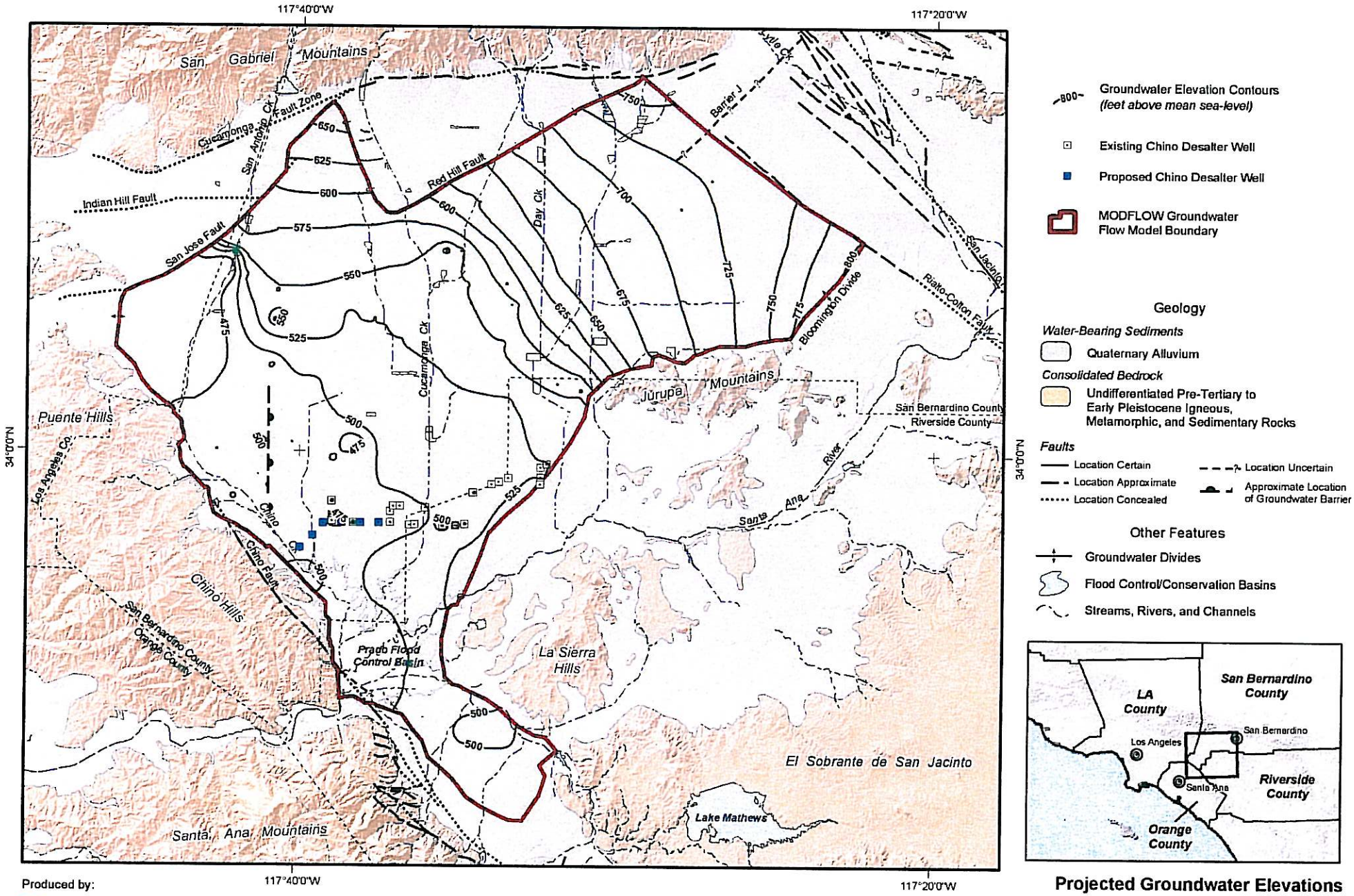
Inland Empire

Three Valleys Municipal Water District

Chino Basin Dry-Year Yield Program Expansion Impact Analysis



~800~ Groundwater Elevation Contours *(feet above mean sea-level)*

Existing Chino Desalter Well

Proposed Chino Desalter Well

MODFLOW Groundwater Flow Model Boundary

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks

Faults

Location Certain

Location Approximate

Location Concealed

Location Uncertain

Approximate Location of Groundwater Barrier

Other Features

Groundwater Divides

Flood Control/Conservation Basins

Streams, Rivers, and Channels

Projected Groundwater Elevations for Layer 2

Alternative 2 in 2021

Figure 10b

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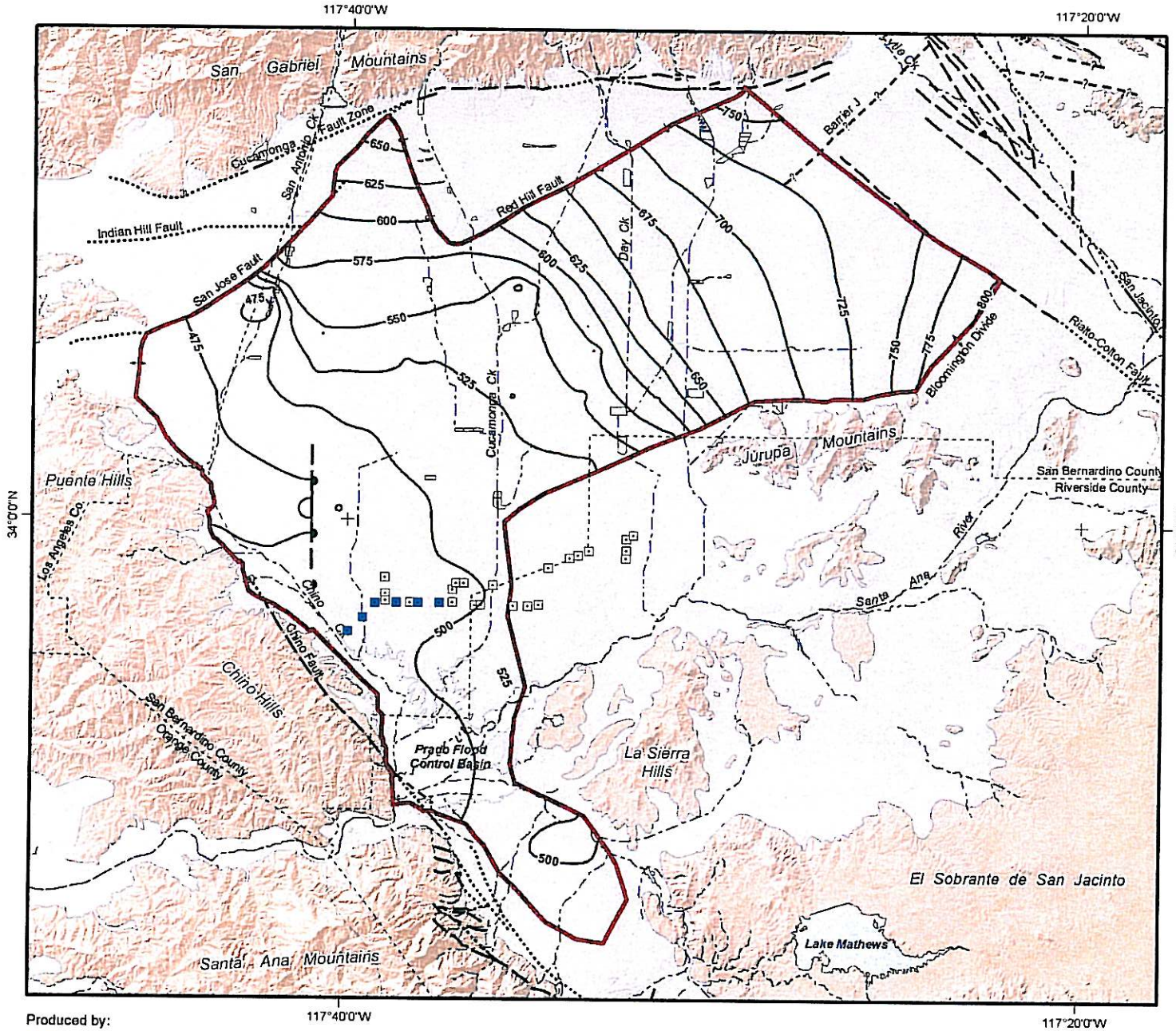
0 1 2 3 4 Miles

0 2 4 6 KM

Chino Basin Dry-Year Yield Program Expansion Impact Analysis



Groundwater Elevation Contours *(feet above mean sea-level)*

Existing Chino Desalter Well

Proposed Chino Desalter Well

MODFLOW Groundwater Flow Model Boundary

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks

Faults

Location Certain

Location Approximate

Location Concealed

Location Uncertain

Approximate Location of Groundwater Barrier

Other Features

Groundwater Divides

Flood Control/Conservation Basins

Streams, Rivers, and Channels

Projected Groundwater Elevations for Layer 3

Alternative 2 in 2035

Figure 10c

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0 1 2 3 4 Miles

0 2 4 6 KM

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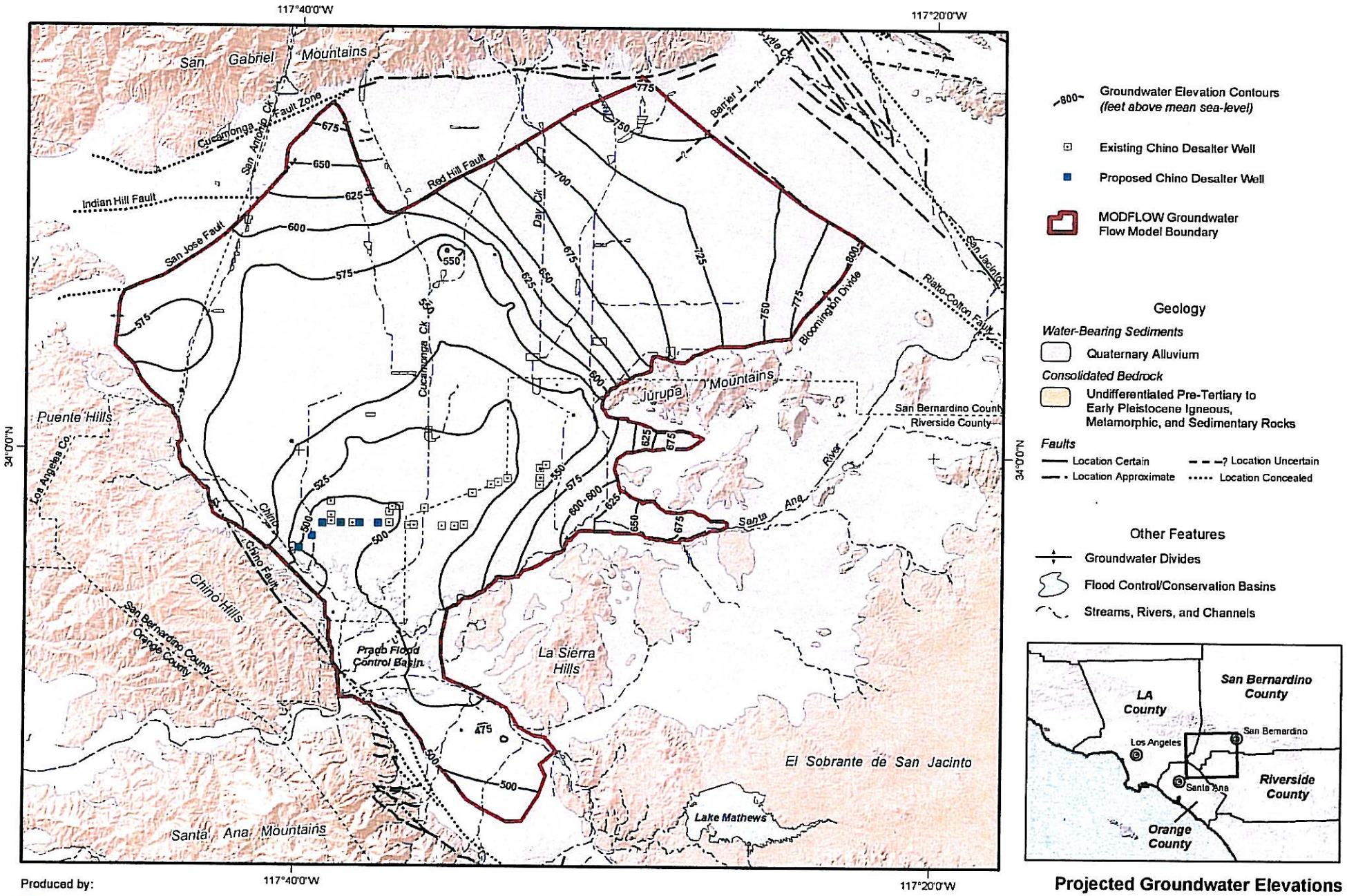
Inland Empire Utilities Agency

Western Municipal Water District

Three Valleys Municipal Water District

Chino Basin Watermaster

Chino Basin Dry-Year Yield Program Expansion Impact Analysis



Groundwater Elevation Contours
(feet above mean sea-level)

Existing Chino Desalter Well

Proposed Chino Desalter Well

MODFLOW Groundwater Flow Model Boundary

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks

Faults

Location Certain — — —? Location Uncertain

Location Approximate ····· Location Concealed

Other Features

Groundwater Divides

Flood Control/Conservation Basins

Streams, Rivers, and Channels

Projected Groundwater Elevations for Layer 1

Alternative 3 in 2030

Figure 11a

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Author: MJC
Date: 20081024
File: Figure_11a.mxd

0 1 2 3 4 Miles
0 2 4 6 KM

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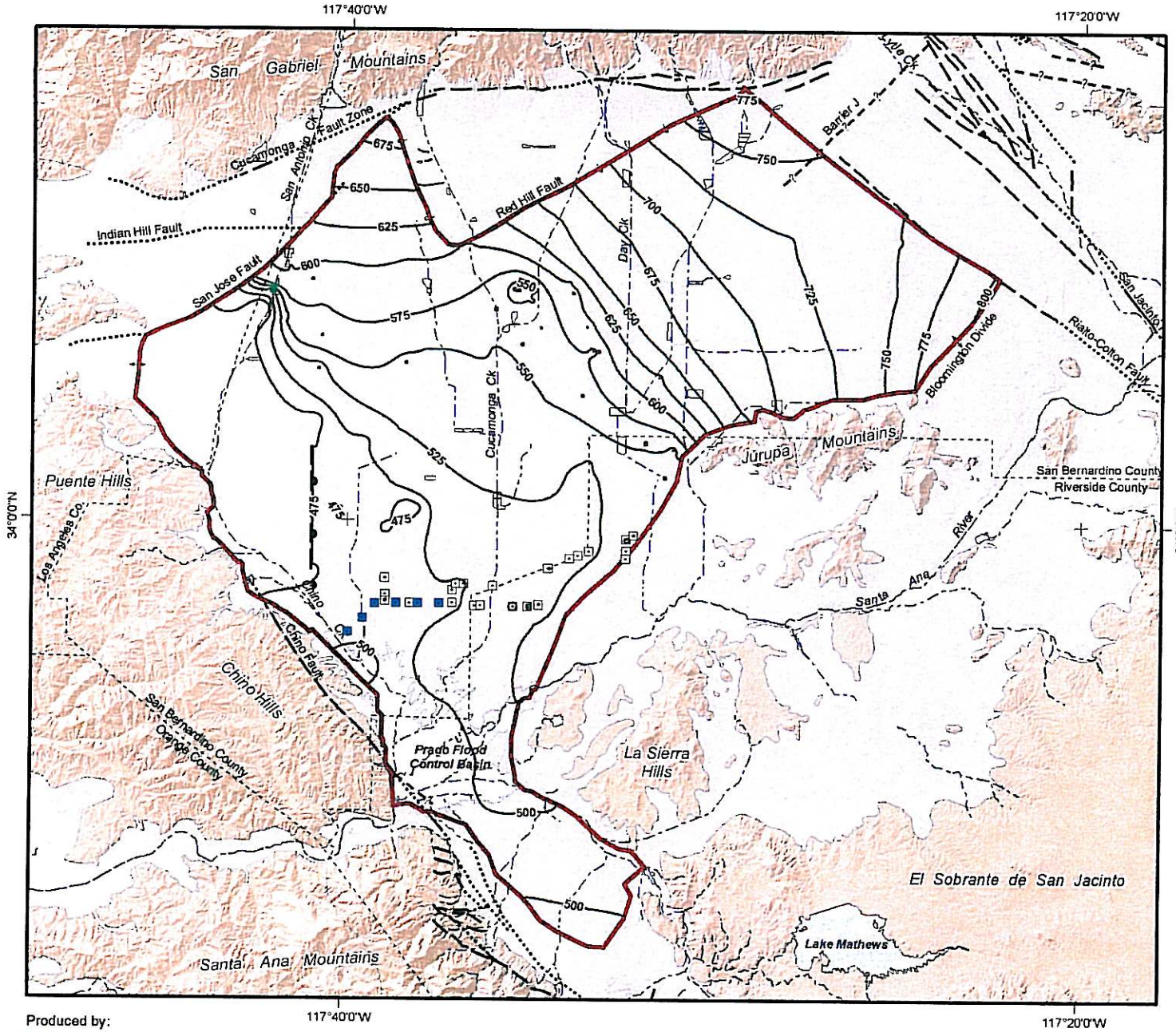
Western Municipal Water District

Three Valleys Municipal Water District

Chino Basin Watermaster

Chino Basin Dry-Year Yield Program Expansion Impact Analysis



Groundwater Elevation Contours (feet above mean sea-level)

Existing Chino Desalter Well

Proposed Chino Desalter Well

MODFLOW Groundwater Flow Model Boundary

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks

Faults

Location Certain

Location Approximate

Location Concealed

Location Uncertain

Approximate Location of Groundwater Barrier

Other Features

Groundwater Divides

Flood Control/Conservation Basins

Streams, Rivers, and Channels

Projected Groundwater Elevations for Layer 2

Alternative 3 in 2030

Figure 11b

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File: Figure_11b.mxd

0 1 2 3 4 Miles

0 2 4 6 KM

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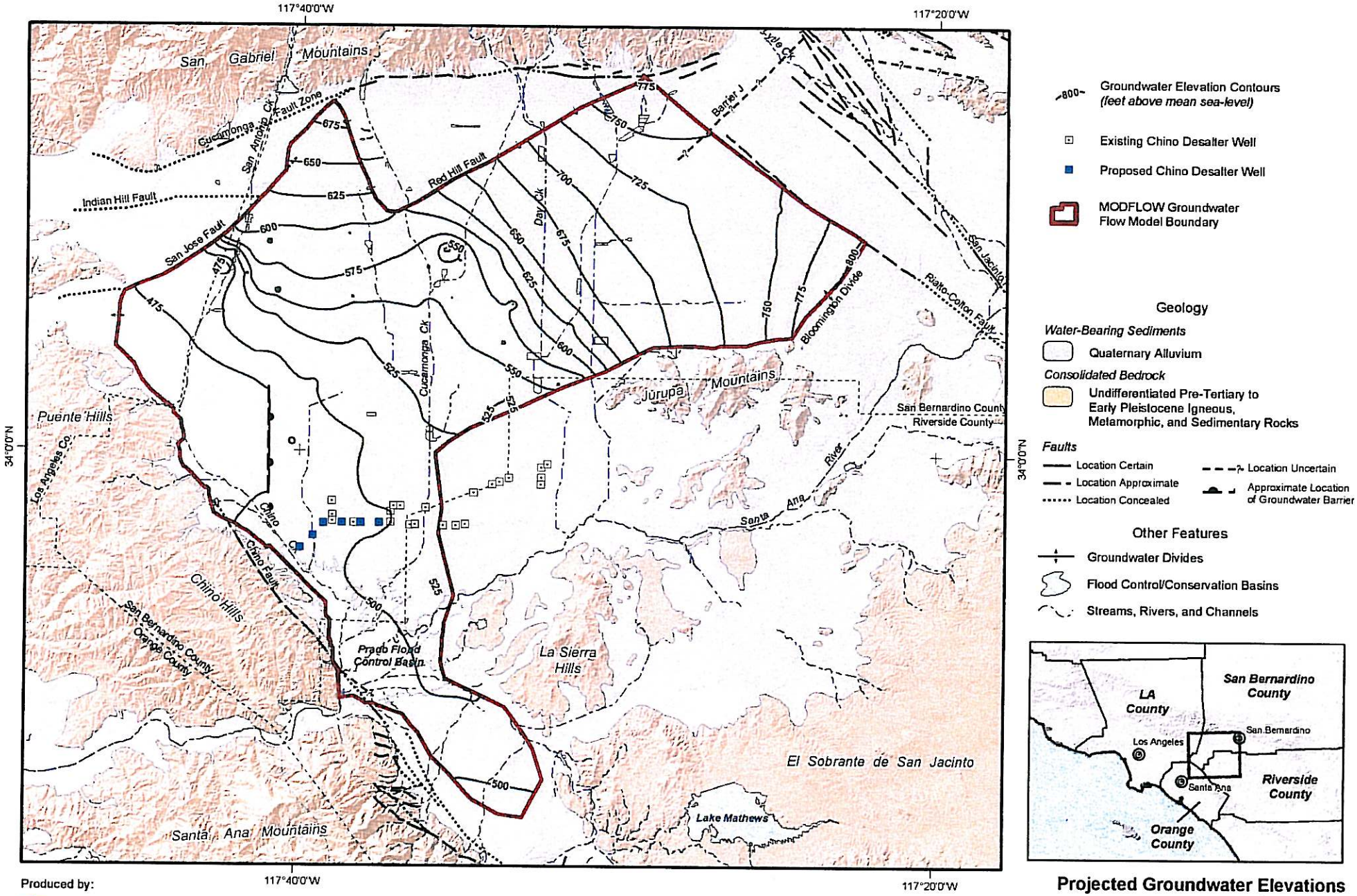
Inland Empire

Chino Basin Dry-Year Yield Program Expansion Impact Analysis



~800~ Groundwater Elevation Contours *(feet above mean sea-level)*

Existing Chino Desalter Well

Proposed Chino Desalter Well

MODFLOW Groundwater Flow Model Boundary

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks

Faults

Location Certain

Location Approximate

Location Concealed

Location Uncertain

Approximate Location of Groundwater Barrier

Other Features

Groundwater Divides

Flood Control/Conservation Basins

Streams, Rivers, and Channels

Projected Groundwater Elevations for Layer 3

Alternative 3 in 2030

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Date: 20081024
File: Figure_11c.mxd

0 1 2 3 4 Miles

0 2 4 6 KM

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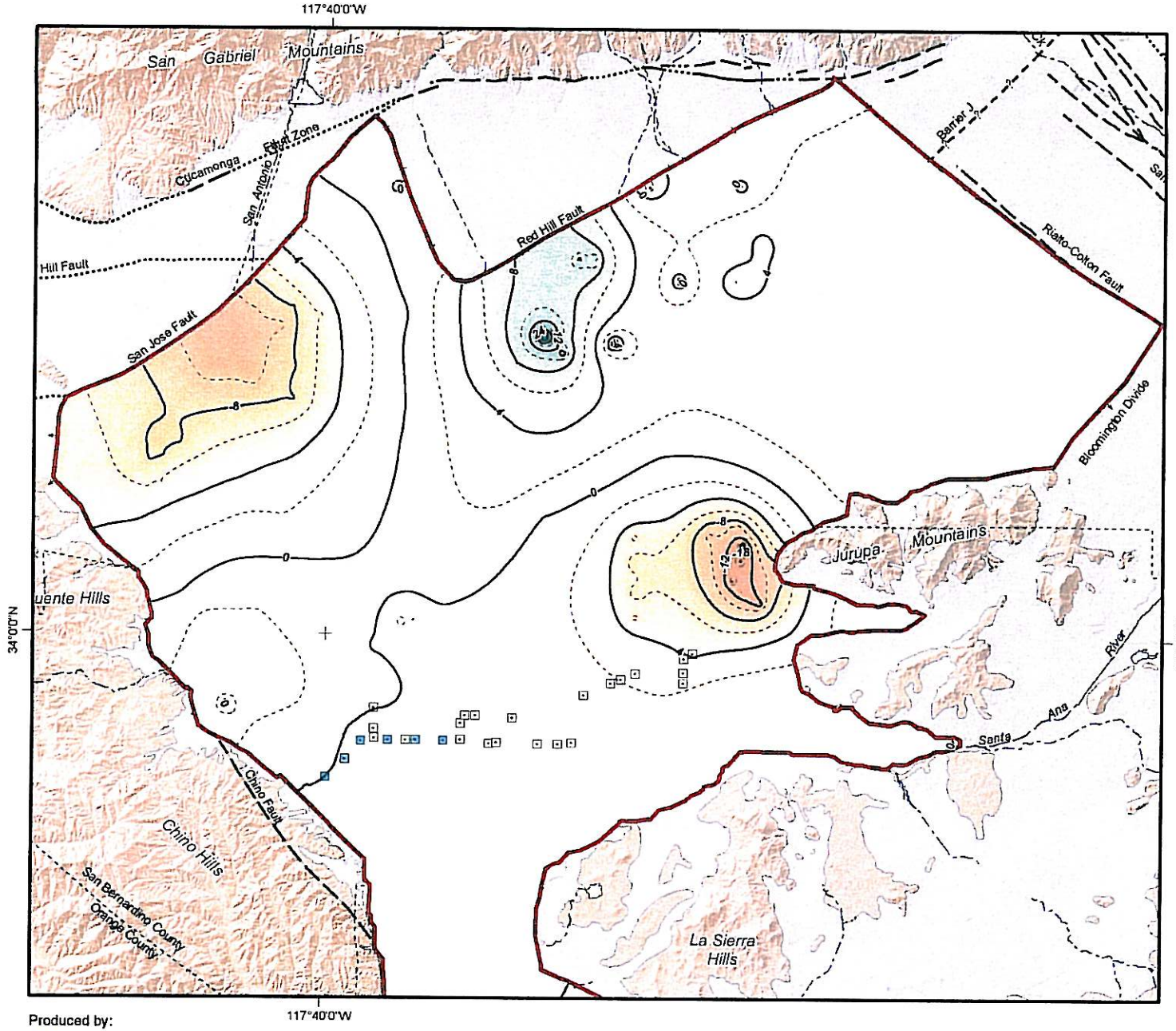
Chino Basin Dry-Year Yield Program Expansion Impact Analysis



25

-25

Grid of Difference in Groundwater-Level *(ft-msl)*

Negative number indicates Alternative 1 has a lower water level than the Baseline Alternative.

Contours of Equal Difference in Groundwater Level *(ft-msl)*

Existing Chino Desalter Well

Proposed Chino Desalter Well

MODFLOW Groundwater Flow Model Boundary

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks

Faults

Location Certain — — —? Location Uncertain

Location Approximate ····· Location Concealed

Other Features

Groundwater Divides

Streams, Rivers, and Channels

Difference in Groundwater Elevations for Layer 1

Baseline - Alternative 1 -- 2030

Figure 12a

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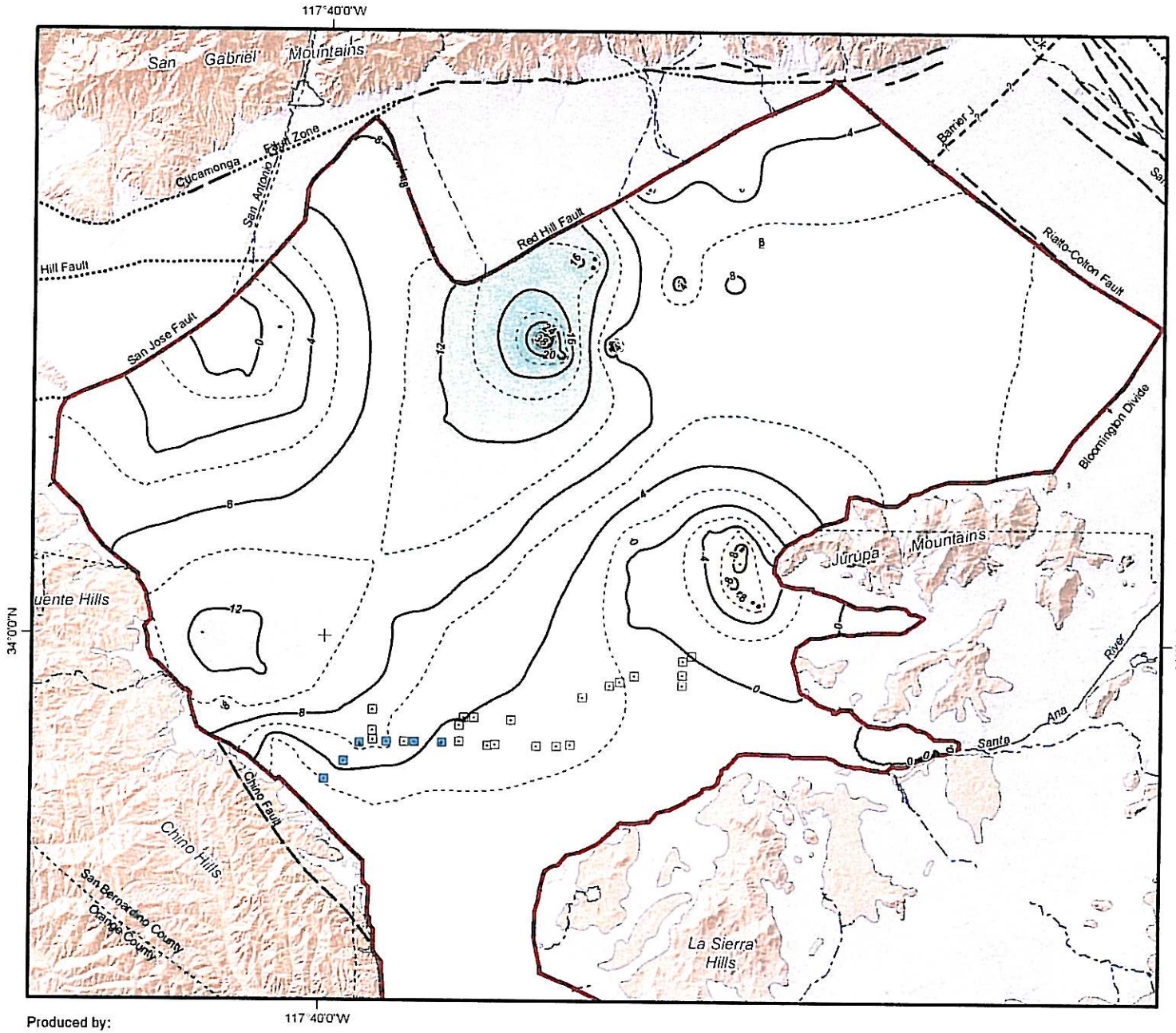
File: Figure_12a.mxd

0 1 2 3 4 Miles

0 2 4 6 KM

BLACK & VEATCH Corporation · Inland Empire · Western Municipal Water District · Three Valleys Municipal Water District

Chino Basin Dry-Year Yield Program Expansion Impact Analysis



40

Grid of Difference in Groundwater-Level *(ft-msl)*

-40

Negative number indicates Alternative 2 has a lower water level than the Baseline Alternative.

Contours of Equal Difference in Groundwater Level *(ft-msl)*

Existing Chino Desalter Well

Proposed Chino Desalter Well

MODFLOW Groundwater Flow Model Boundary

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks

Faults

Location Certain — — —? Location Uncertain

— • Location Approximate ····· Location Concealed

Other Features

Groundwater Divides

Streams, Rivers, and Channels

Difference in Groundwater Elevations for Layer 1

Baseline - Alternative 3 -- 2030

Figure 12b

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File: Figure_12b.mxd

0 1 2 3 4 Miles

0 2 4 6 KM

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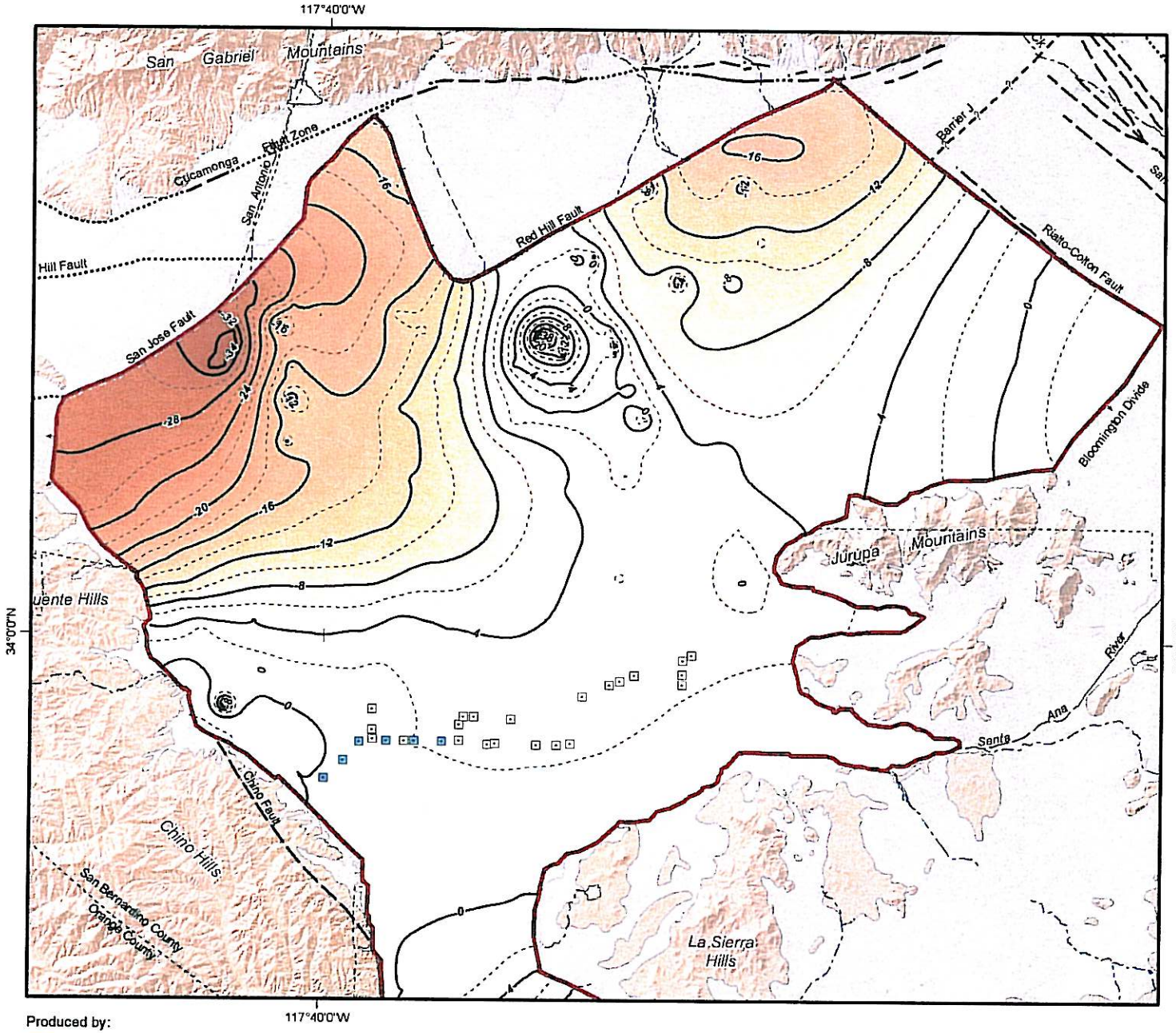
Western Municipal Water District

Three Valleys Municipal Water District

Chino Basin Watermaster

Chino Basin Dry-Year Yield Program Expansion Impact Analysis



40

Grid of Difference in Groundwater-Level *(ft-msl)*

-40

Negative number indicates Alternative 2 in 2021 has a lower water level than the Baseline Alternative in 2030.

Contours of Equal Difference in Groundwater Level *(ft-msl)*

Existing Chino Desalter Well

Proposed Chino Desalter Well

MODFLOW Groundwater Flow Model Boundary

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks

Faults

Location Certain — — — ? Location Uncertain

— · — Location Approximate ····· Location Concealed

Other Features

Groundwater Divides

Streams, Rivers, and Channels

Difference in Groundwater Elevations for Layer 1

Baseline 2030 - Alternative 2 2021

Figure 12c

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File: Figure_12c.mxd

0 1 2 3 4 *Miles*

0 2 4 6 *KM*

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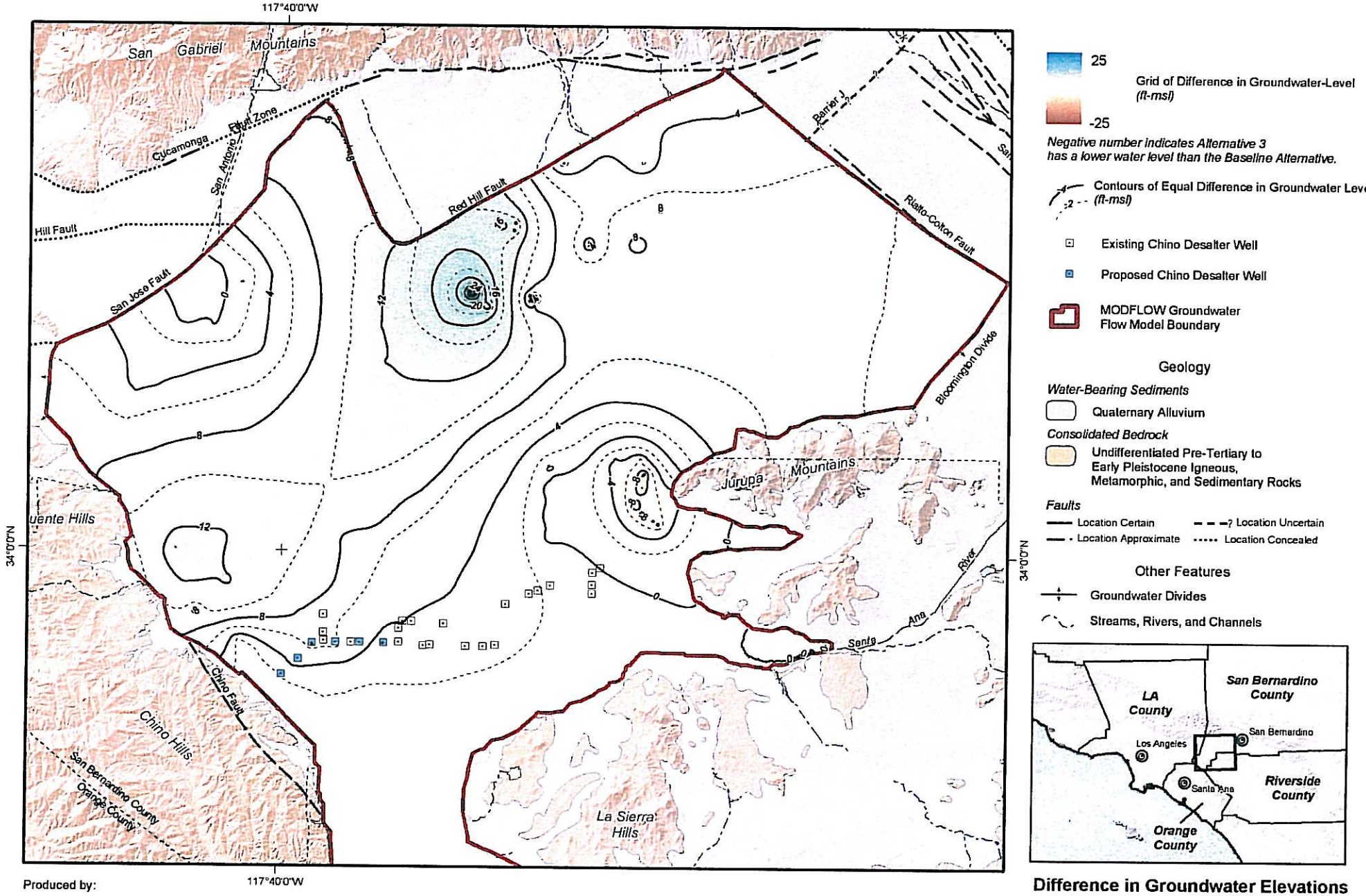
Inland Empire

Western Municipal Water District

Three Valleys Municipal Water District

Chino Basin Watermaster

Chino Basin Dry-Year Yield Program Expansion Impact Analysis



Difference in Groundwater Elevations for Layer 1

Baseline - Alternative 2 -- 2030

Figure 12d

Chino Basin Dry-Year Yield Program Expansion Impact Analysis

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Date: 20081024
File: Figure_12d.mxd

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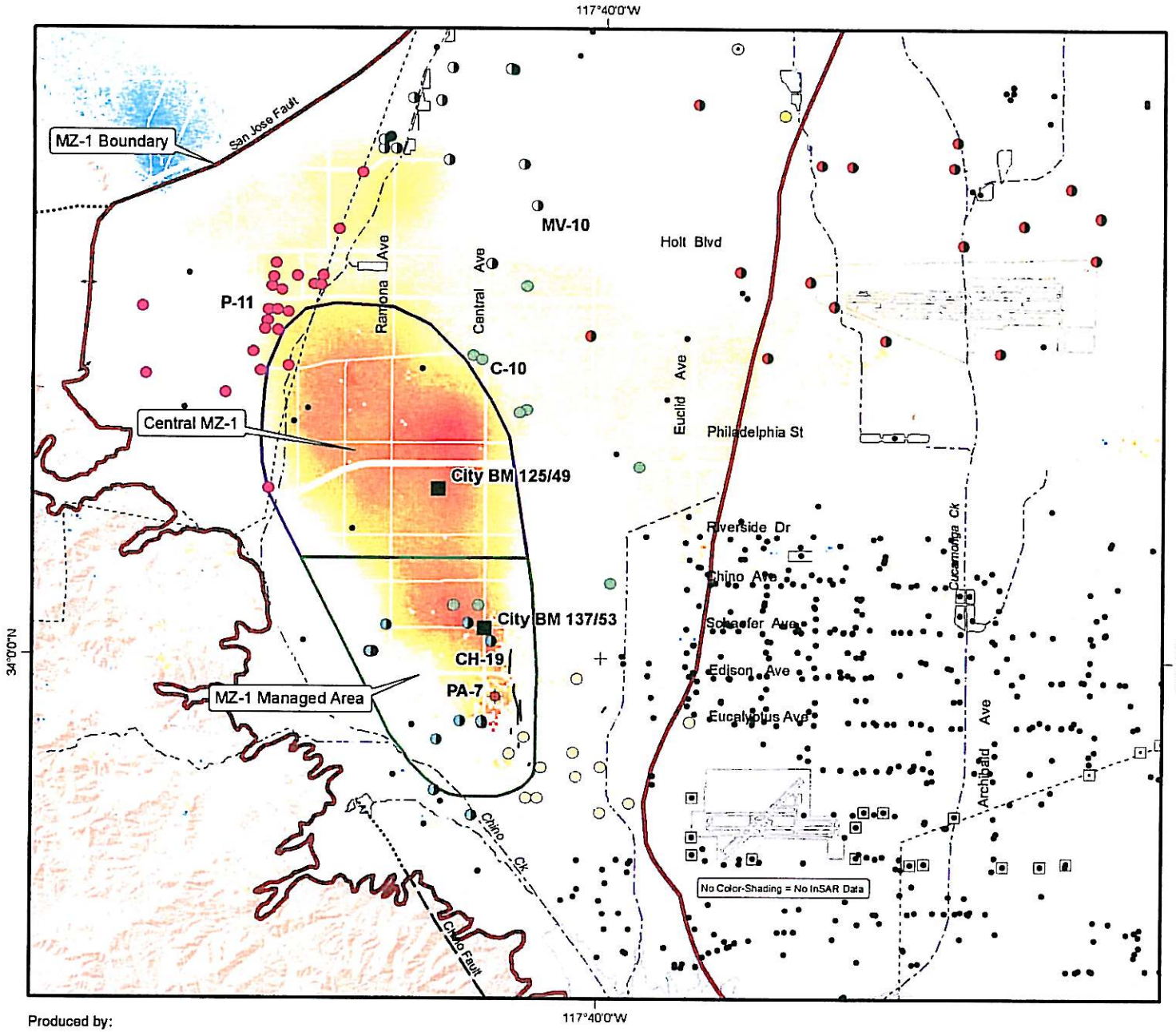
Inland Empire Utilities Agency

Western Municipal Water District

Three Valleys Municipal Water District



Area of Subsidence Management

Areas of Subsidence Concern

Benchmark Monument for Subsidence Monitoring

Active Wells in MZ1 by Owner

- Ontario
- Pomona
- SAWC
- Upland
- SCWC
- CIM
- Chino Hills
- Chino
- MVWD
- Other Owner

Results of InSAR Analysis

+15
-15
Relative Change in Land Surface Altitude Jan 1996 - Apr 2000 (centimeters)

Other Features

- Chino-I Desalter Well
- Ground Fissure (early 1990s)

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

- Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks

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File: Figure_13.mxd

0 1 Miles
0 2 KM

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Three Valleys

Chino Basin Dry-Year Yield Program Expansion Impact Analysis

Subsidence Area in MZ1

Figure 13

Figure 14
Simulated Groundwater Water Levels in Well PA-7 for Each Alternative

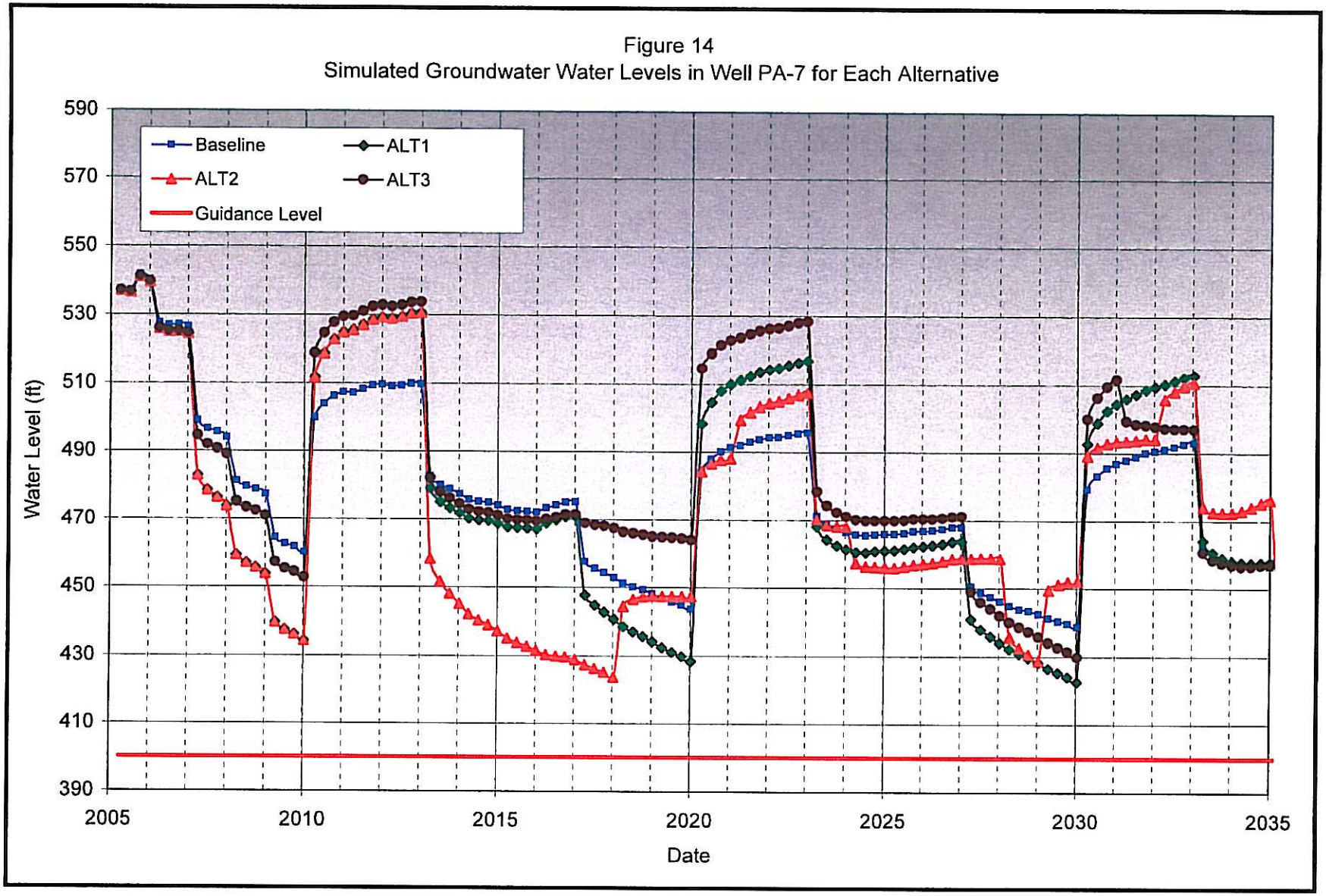

Figure 6 and Figure 14.xls

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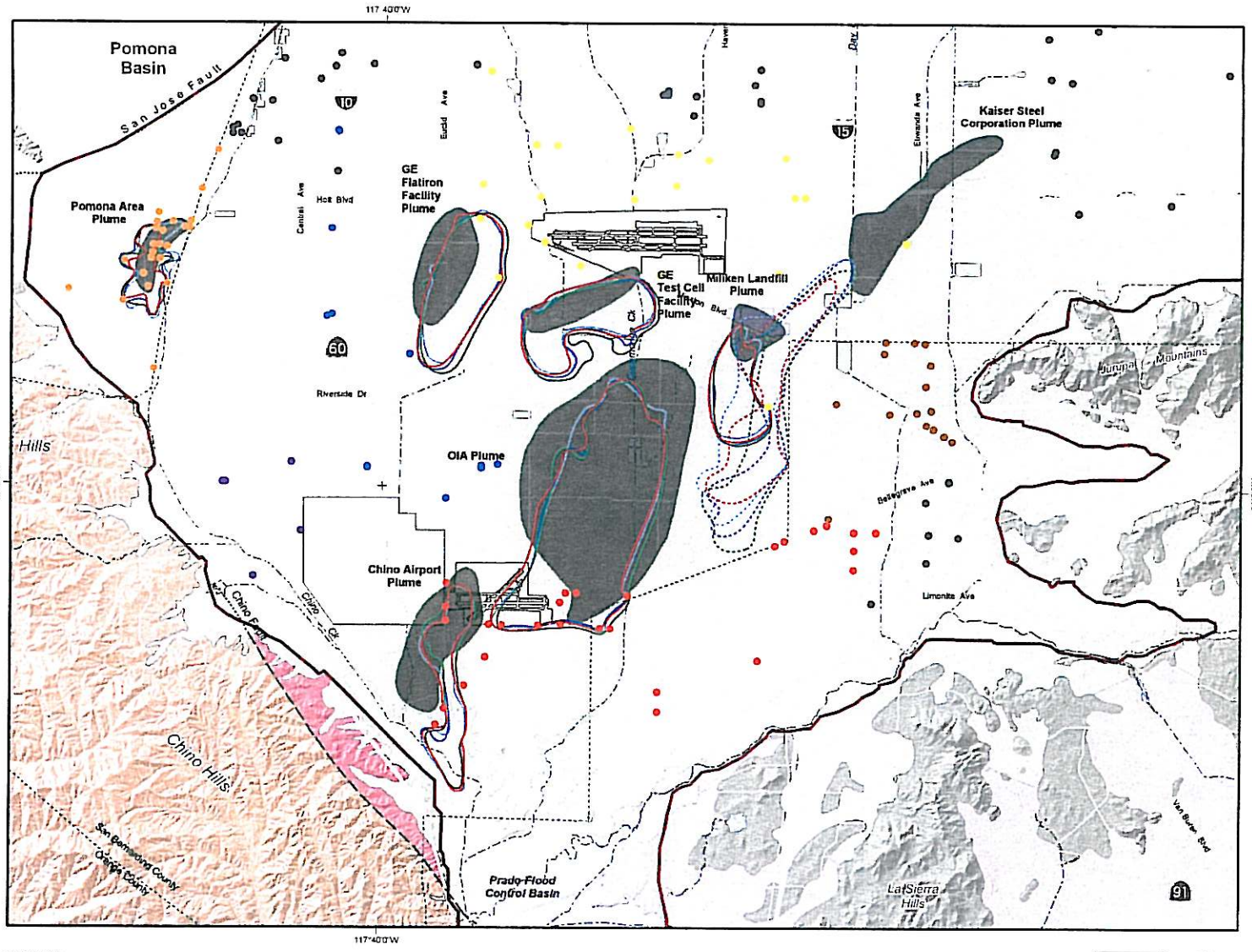


Location of Groundwater Contaminant Plumes (2006)

Water Quality Anomaly

Baseline Alternative
Location of Groundwater Contaminant Plumes (2035)

Water Quality Anomaly[1]

Alternative 1
Location of Groundwater Contaminant Plumes (2035)

Water Quality Anomaly[1]

Alternative 2
Location of Groundwater Contaminant Plumes (2035)

Water Quality Anomaly[1]

Alternative 3
Location of Groundwater Contaminant Plumes (2035)

Water Quality Anomaly[1]

[1] For clarity, the Kaiser Plume is designated with a dashed outline

Appropriator Wells

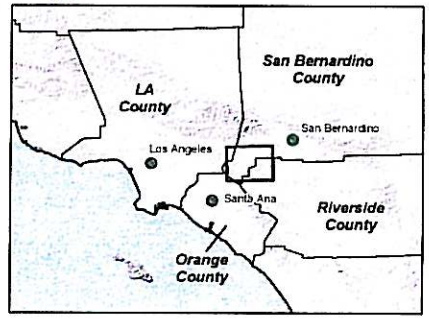
- Jurupa Community Services District
- City of Pomona
- City of Ontario
- Chino Desalter Authori
- City of Chino Hills
- Other Appropriators
- City of Chino

Other Features

MODFLOW Groundwater Flow Model Boundary

Chino Basin Hydrologic Boundary

Flood Control and Conservation Basins



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File: Figure_15

0 1 2 3 Miles
0 2 4 KM

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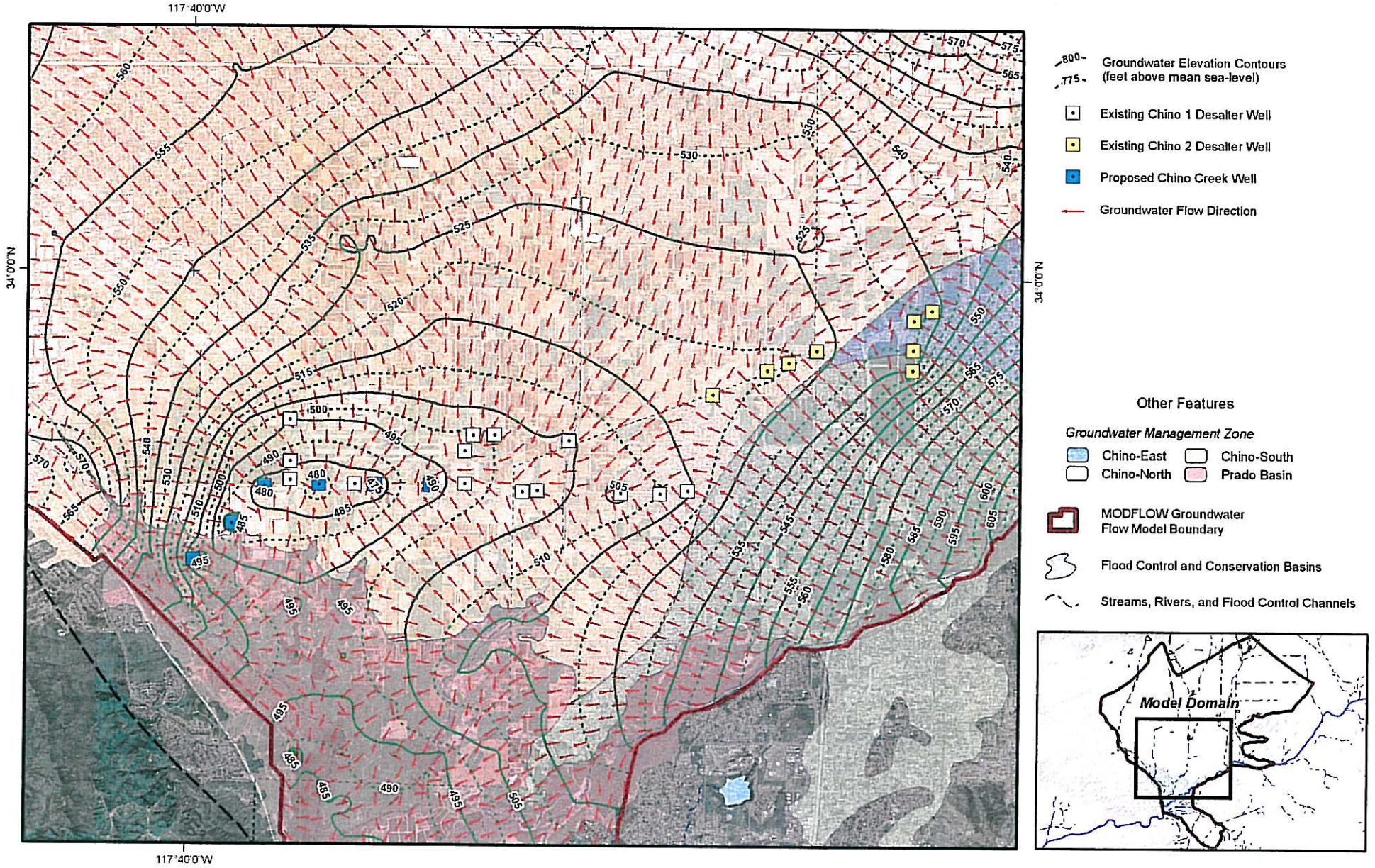
Western Municipal Water District
Three Valleys Municipal Water District
Chino Basin Watermaster

Chino Basin Dry-Year Yield Program Expansion Impact Analysis

Estimated Location of Water Quality Anomalies in 2006 and their Projected Locations in 2035

Figure 15



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File: Figure_16a.mxd

0 1 2 Miles
0 1 2 3 KM

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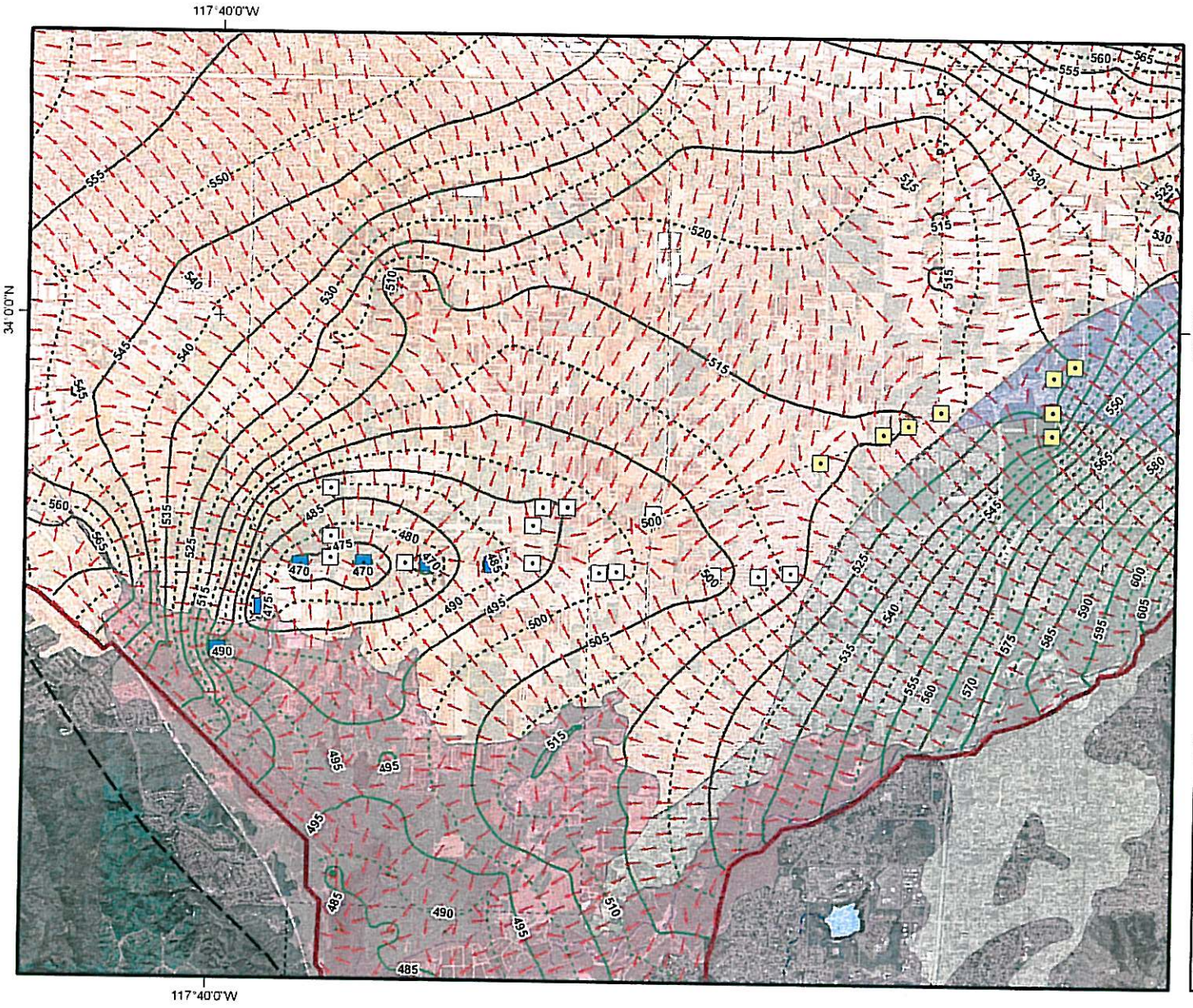
Western Municipal Water District
Three Valleys Municipal Water District

Chino Basin Dry-Year Yield Program Expansion Impact Analysis

Groundwater Elevation Contours and Flow Direction in the Vicinity of the Desalters

Baseline Alternative in Layer 1 -- 2023

Figure 16a



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Date: 20081024
File: Figure_16b.mxd

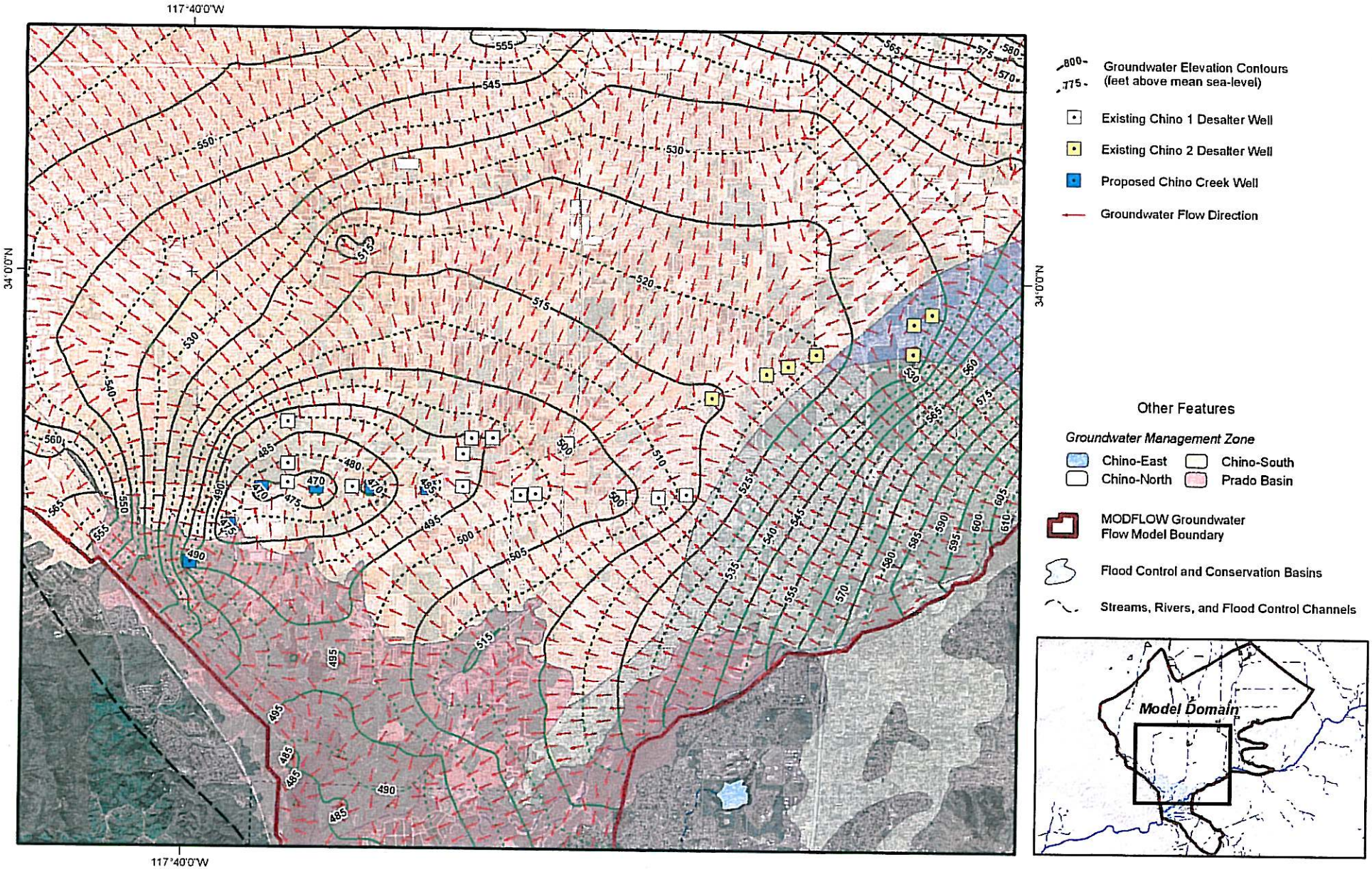
0 1 2 Miles
0 1 2 3 KM

Chino Basin Dry-Year Yield Program Expansion Impact Analysis

Groundwater Elevation Contours and Flow Direction in the Vicinity of the Desalters

Alternative 1 in Layer 1 -- 2030

Figure 16b



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Date: 20081024
File: Figure_16c.mxd

0 1 2 Miles
0 1 2 3 KM

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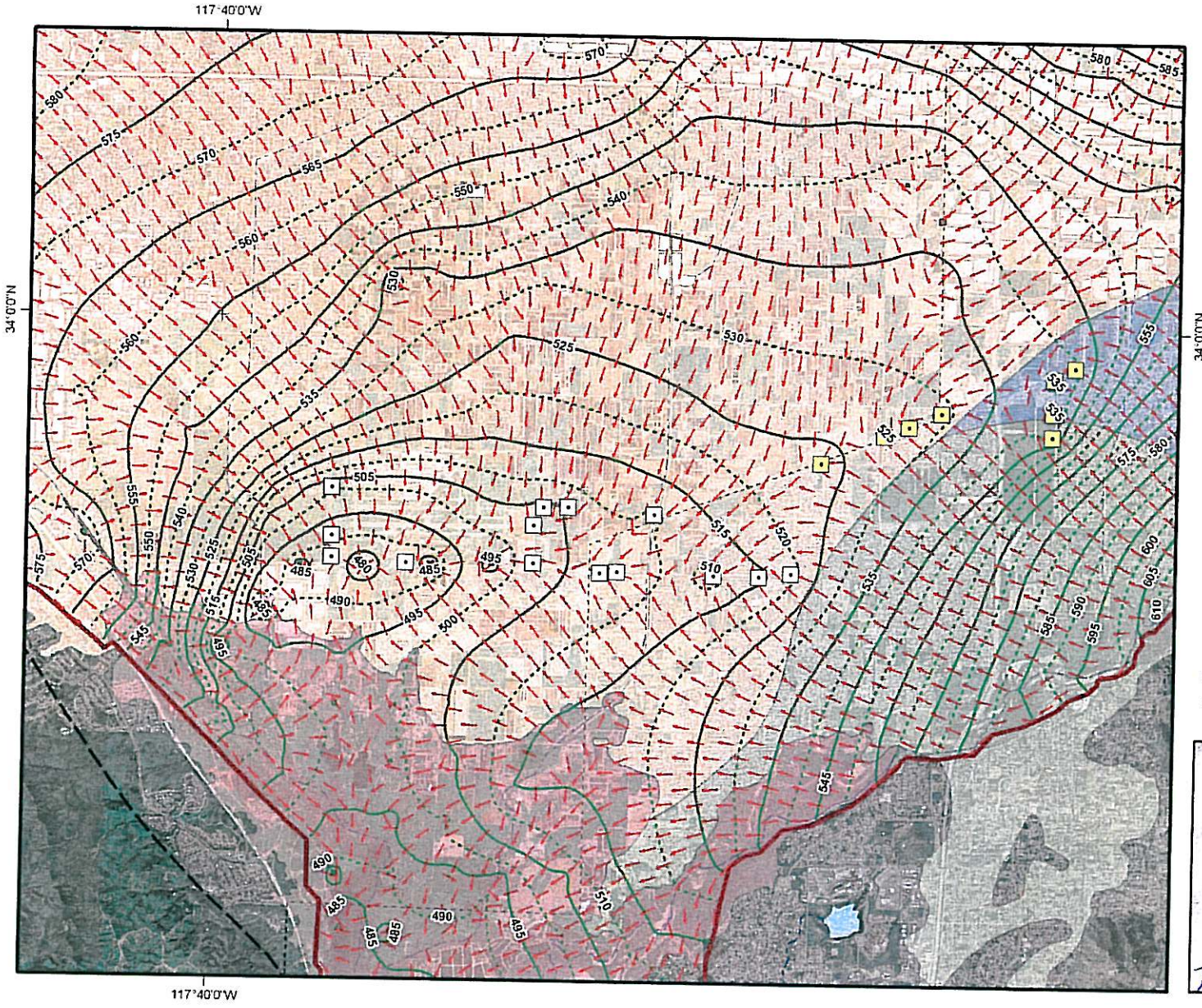
Inland Empire
THREE VALLEYS

Chino Basin Dry-Year Yield Program Expansion
Impact Analysis

Groundwater Elevation Contours and Flow Direction in the Vicinity of the Desalters

Alternative 2 in Layer 1 -- 2035

Figure 16c



800 775 Groundwater Elevation Contours (feet above mean sea-level)

Existing Chino 1 Desalter Well

Existing Chino 2 Desalter Well

Proposed Chino Creek Well

Groundwater Flow Direction

Other Features

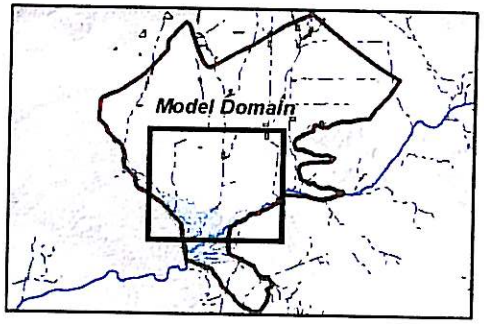
Groundwater Management Zone

Chino-East
Chino-South
Chino-North
Prado Basin

MODFLOW Groundwater Flow Model Boundary

Flood Control and Conservation Basins

Streams, Rivers, and Flood Control Channels



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Author: MJC
Date: 20081024
File: Figure_16d.mxd

0 1 2 Miles
0 1 2 3 KM

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Inland Empire Utilities Agency
Western Municipal Water District
Three Valleys Municipal Water District
Chino Basin Watermaster

Chino Basin Dry-Year Yield Program Expansion Impact Analysis

Groundwater Elevation Contours and Flow Direction in the Vicinity of the Desalters

Alternative 3 in Layer 1 -- 2025

Figure 16d

CHINO BASIN WATERMASTER

IV. INFORMATION

1. Newspaper Articles

http://www.latimes.com/news/local/la-me-la-water-stimulus30-2009apr30,0,2788263.story
From the Los Angeles Times

Los Angeles water projects to get stimulus boost

The Army Corps of Engineers plans to use federal stimulus funds to help complete a raft of projects, including work on the county river system and dredging of Upper Newport Bay.
By Alexandra Zavis

April 30, 2009

The Los Angeles district of the Army Corps of Engineers plans to use its share of federal stimulus dollars to help complete a backlog of projects aimed at improving the local water supply, officials said Wednesday.

The new funding includes $6.5 million for delayed repairs and improvements to the Los Angeles County river system, $5.1 million for water recycling and $17.4 million to finish a dredging project to prevent mud-choked Upper Newport Bay from becoming a meadow.

Nearly $184 million in all has been allocated to the district, which covers 226,000 square miles in Southern California, Arizona, southern Nevada and a small part of Utah. The funding is part of $4.6 billion in allocations to the corps under the American Recovery and Reinvestment Act, which President Obama signed into law in February.

"In many cases the projects that we have on this list are projects that have kind of hung out there for a while without the necessary funds to complete them," said Col. Thomas Magness, who commands the corps' L.A. district. "We finally have a chance to complete the projects, put them in the portfolio as 100% and turn over the project."

District officers estimate that the funding will create or save about 1,472 jobs directly related to the work and 2,558 positions in supporting fields, including companies that provide materials and services to the contractors.

"We are very excited," said Dave Kiff, assistant city manager for Newport Beach.

Mud flats, fed by sediment that washes into Upper Newport Bay via the San Diego Creek, have been building up in the ecologically important estuary for years, greatly reducing the water level. Eventually, the reserve became so choked with sediment and growth that coyotes and other predators could walk across to what had been small islands, disturbing nests and eating eggs, including those of the endangered least tern. Tons of silt were also spilling over from the upper bay into the lower bay, grounding vessels in the Newport Beach marina.

In October 2005, dredging crews began removing 2.3 million cubic yards of accumulated muck, but funding started running out about halfway into the project, Kiff said.

The corps, the lead agency on the project, was supposed to cover 65% of the estimated $38.5 million cost, with state and local agencies providing the rest. Local authorities funded their $13.5-million share with money raised for coastal protection under Proposition 12 of 2000. Until now, however, Congress had only appropriated $17.5 million of the roughly $25-million federal share.

In the meantime, the corps estimates that the project's tab has ballooned to more than $50 million, driven in part by rising fuel costs.

Together with some additional local funding, Kiff said, the new federal money should be sufficient to finish dredging by the summer of 2010.

"It's a little ironic that it took a recession and stimulus package for the government to complete its share," Kiff said.

The additional $6.5 million for the L.A. County drainage system will allow the corps to perform delayed maintenance and repairs to the channels and dams, clear out vegetation and debris that is inhibiting water flow, remove graffiti and update recreation plans for the area, corps officials said.

"That work is never complete," Magness said.

The $5.1 million for water recycling will help the West Basin Municipal Water District reduce the region's dependence on imported water from Northern California and Colorado, said General Manager Richard Nagel. West Basin already delivers 35 million gallons of recycled water from the El Segundo wastewater treatment plant -- water that would otherwise be dumped into the ocean. The extra funding will be used to build new pipelines and a pump station in another step toward doubling capacity by 2020, Nagel said.

Also on the corps' list are:

* $27.5 million for flood control along the Santa Ana River, part of a $2-billion project that corps officials say is about 90% complete.

* $2.5 million to finish deepening the turning basin at the Port of Long Beach.

* $1.98 million to assess the condition of the San Pedro breakwater and dredge the L.A. River estuary.

* $500,000 for a survey of the Dana Point Harbor breakwater, where officials want to check recent storm damage repairs.

alexandra.zavis@latimes.com

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Official: Water recycling critical

DROUGHT: Inland agency executive testifies before lawmakers about where to channel stimulus funds.

10:00 PM PDT on Tuesday, April 28, 2009

By BEN GOAD
Washington Bureau

WASHINGTON - With California facing a third consecutive year of drought, federal economic recovery dollars should go to water recycling programs that will both create jobs and stretch the state's ever-dwindling supply, a top Inland water official told lawmakers Tuesday.

Federal officials recently announced that roughly $135 million from President Barack Obama's $787 billion stimulus legislation would go toward the construction of water recycling projects across the country.

"This decision means that drought-starved communities and regions where the recession has been particularly devastating to local economies are now in a position to address two problems at once," Inland Empire Utilities Agency chief executive Richard Atwater said in prepared testimony submitted to the House Natural Resources' subcommittee on Water and Power.

Atwater said the Chino-based agency has decreased its reliance on potable water by 20 percent in the last five years through water recycling and desalting programs.

Gov. Arnold Schwarzenegger on Feb. 27 declared a statewide emergency due to drought and raised the prospect of water rationing.

"If oil becomes too expensive, we can shift our energy demands to other sources," Atwater said. "But if reliable water supplies dry up, our industries, ranging from agriculture to manufacturing to retail, cannot sustain their business operations."

Local officials have requested $14 million of the funds for the Inland Empire Regional Recycled Water Program, with the work focused in three areas: Fontana/Upland, Rancho Cucamonga and Montclair, said Martha Davis, the agency's executive manager of policy development.

Beyond water recycling projects, water officials and lawmakers should be exploring ways to increase the region's water supply, said Inland Rep. Joe Baca, a member of the panel.

Baca suggested the possibility of importing water from other states, including South Dakota.

"They've got plenty of water," said Baca, D-Rialto. "This way, we would not always be competing with Northern California."

Reach Ben Goad at 202-661-8422 or bgoad @PE.com

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Sometimes history fails to get it right

Joe Blackstock, Staff Writer

Created: 04/06/2009 10:28:36 PM PDT

Is there any more lasting honor given to a man or woman than to have his or her name attached to some permanent building or location?

The names of Chaffey College, Howard Cattle Elementary School, Henry J. Kaiser High School and the community of Guasti remember some of the former leaders of the Inland Valley, preserving at least a little of their legacy.

Sometimes, though, history's memory is just a bit faulty.

Consider the Sainsevain brothers - Pierre and Jean Louis - who were among the first winemakers in this area.

A camping area in the San Gabriel Mountains, streets in Rancho Cucamonga, Mira Loma and Fontana, a flood control channel and spreading grounds, and even a San Bernardino County redevelopment area just east of the 15 Freeway all are named for those brothers - and every one of them is misspelled.

The name "San Sevaine" was attached, albeit spelled wrong, to all those locations in memory of the French-born brothers who came to California while it was still part of Mexico.

They were instrumental in Southern California winemaking well before the arrival of Secondo

dailybulletin.com

Guasti and other Italian and French vintners who developed the Inland Valley wine industry at the start of the 20th century.

Pierre Sainsevain arrived in Santa Barbara by ship in 1839, encouraged to come here by his uncle Jean Louis Vignes, who had a vineyard in the vicinity of today's Union Station in downtown Los Angeles. Pierre later spent time in Santa Cruz and San Jose and even took off for the Sierra Nevada chasing the lure of gold in 1848.

Pierre and his older brother bought their uncle's vineyard in 1855 for $42,000. A carpenter by trade in his native Bordeaux, Pierre returned to France to study winemaking and brought his knowledge back to expand his vineyard in Los Angeles.

Brother Jean Louis had his own chance to make his name in Los Angeles trying to deliver something that is still more valuable here than gold: water.

In 1865, he was awarded the contract to lay water pipes through the streets of downtown L.A. and build a reservoir, putting him in the position of being a power broker.

However, he washed out of the water business. The material he chose for water pipes - wood - proved far better at aging wine than it was at carrying water. He had to quickly replace his leaking piping system with iron pipes. Then a storm destroyed the reservoir, releasing all the water stored there, and briefly leaving Los Angeles with neither a working water system nor any water to deliver.

It was then Jean Louis decided to go back to the wine business and moved with his brother to the Inland Valley.

Jean Louis became winery superintendent on the holdings of the original Rancho Cucamonga, whose grapes were planted in 1839 near today's Foothill Boulevard and Vineyard Avenue. Pierre imported grape cuttings from France and planted a number of new varieties.

"A very superior article of wine grown in San Bernardino County is now on the market and is attracting considerable attention . .. from consumers of the juices of the grape," praised the San Francisco Times in 1869 about the brothers' wines.

"It is known as Cocomun- go, or California Madeira wine, and is pronounced by competent judges to be as fine an article as manufactured in the world."

The brothers had sales offices in Los Angeles and San Francisco and seemed to be doing well until they decided to sell off their interests and left the area.

On Feb. 24, 1873, Pierre sold 850 acres of Etiwanda to a partner in the Cucamonga winery, Capt. Joseph Garcia. Garcia, a former ship captain from Portugal, built a ranch home and then in 1881 sold his ranch to two brothers from Canada - the Chaffey brothers - who were the developers of today's Ontario, Upland and Rancho Cucamonga.

Now, more than a century later, little sign of the vineyards of the Sainsevain brothers remains in

dailybulletin.com

the Inland Valley.

But their name, with its rather creative spelling, lives on.

dailybulletin.com

Chino proposes utility-tax hike

Public hearing set for June 2

Neil Nisperos, Staff Writer

Posted: 04/08/2009 10:29:21 PM PDT

CHINO - Residents might have to deal with utility rate increases but not before they have their say on the proposed charges.

If the increase is approved by the City Council, its impact on the average Chino home will be an increase of $4.38 per month during the first year and $5.18 more per month in the second year, according to a city report by David Cain, the city's director of finance.

Among the proposed rate increases for this year is $1.08 for every 748 gallons of water and $1.17 the next year. The current rate is $0.9863 for every 748 gallons.

A public hearing has been scheduled by the council for June 2 to discuss proposed rate increases for water, sewer and trash collection.

The hearing is required under Proposition 218, which was passed in 1996 and requires local governments to notify residents of proposed new or increased rates.

The council on Tuesday also approved $14,000 for the printing and mailing of notices to residents informing them of the hearing.

During the hearing, council will consider the public protests and objections.

"The rates being proposed ... are largely the result of increases from our third-party suppliers being passed through to Chino residents," said Rob Burns, deputy director of finance.

"These third parties include Metropolitan Water District, a major supplier of water for Chino; Inland Empire Utilities Agency, which provides wastewater treatment; and Waste Management, which provides refuse and recycling services."

The proposed rate increase comes as the continuing statewide drought has led to higher imported-water costs from agencies including the MWD.

According to the city report, officials are

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anticipating more rate increases from water suppliers in the near future.

The Inland Empire Utilities Agency sewage treatment service is at $9.62 for a single-family household and $6.73 for a multifamily household.

The proposed rates for single-family units are $10.75 for 2009 and $11.29 for the next year.

The multifamily charges per household are proposed at $7.52 and $7.90.

Waste Management does not plan to increase household trash-collection fees. Services are expected to remain at $22.12 this year, although an increased charge is proposed in July 2010.

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Reclaiming flood basin

Rancho sizes up developers for 1,200 acres of open land

Wendy Leung, Staff Writer

Created: 04/11/2009 07:01:24 AM PDT

RANCHO CUCAMONGA - The 1,200 acres of untouched land north of Los Osos High School have sat idle while residential development sprouted on all sides. But the time has come for development to come knocking.

County and city officials are in the preliminary stages of selecting a developer to build on the rocky terrain that once served as flood control land. The City Council is considering the five developer teams that responded to the request for qualification and will forward its top two picks to San Bernardino County. The county could make a selection by June.

Located north of Banyan Street between Milliken Avenue and the Day Creek Channel, the land is partly within city limits but mostly is unincorporated land within the city's sphere of influence. Eventually, the city will annex the property.

"It's the last big piece of developable land left," said Mayor Don Kurth. "Hopefully it'll be a community within a community that's a real gem."

Council members are sifting through proposals from five developers - Rancho Alliance Investors, Foremost Communities, K&K Development Inc., Richland Communities/Toll Brothers and Brookfield Homes.

"I'm interested in the stability of the organization, in where they had done other projects and their relationship with the city," said Councilman Sam Spagnolo.

"In the past, developers would come in and they would build and be gone and leave us with a multitude of problems. That's one of my concerns."

Of the 1,200 acres, 815 acres will be developed and 385 acres will be set aside for open space.

One of the potential developers, Rancho Alliance, is a consortium that includes Diversified Pacific, a Rancho Cucamonga-based company co-founded and managed by Jeff Burum.

Burum was a partner in Colonies project, which received a $102 million settlement after suing the county over flood control easements at the Upland development. During the settlement talks, all or portions of the 1,200 acres, were used by the county as a bargaining chip at various points of the negotiations. Ultimately, the land was not part of the settlement.

At a meeting in March, each developer gave a 30-minute presentation on its qualifications, financial capabilities and visions for the project.

Sustainability, diversity of housing choices and a

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commercial component serving as a village center were the common thread in the presentations. All the developers had proposals for a golf course and a 25-acre park - features that were sought by the city and county in the request for qualifications process.

But it's too early to determine whether those features will make it through the final design phase.

"I think our job is to look at who's the most financially qualified," Kurth said. "It's not about who does the prettiest design."

Spagnolo pointed out that the preliminary designs of Victoria Gardens included meandering streets and lakes.

"If you look at Victoria Gardens, it looks nowhere like what it was supposed to," Spagnolo said.

But that didn't stop the developers from getting painstakingly detailed in their proposals.

Rancho Alliance - an amalgam of Lewis Homes, Shea Homes and other companies - wants to create a lake park in what is currently a rock quarry. Richland/Toll Brothers wants to plant more than 400 acres of grapevines to tie the project to local history. K&K Developers proposed a 200-room hotel and recharge stations for electric cars and golf carts.

Spagnolo said building a hotel to accommodate a golf course isn't a far-fetched plan.

"If you talked about hotels in the city of Rancho Cucamonga 30 years ago, people would have said, `No way,'" Spagnolo said. "Now we've got Fourth Street, and a high-end hotel coming on Haven and on Foothill. Thinking out of the box is not a bad idea."

Councilman Rex Gutierrez, not quite keen on another golf course in the city, has hopes for an athletic complex.

"We have plenty of access to golf courses," Gutierrez said. "We desperately need sports space. So far, we have more demand than supply."

Last week, the City Council and county representatives took a tour of the site. It is not known when the council will make its picks.

The project is likely to face opposition from residents who want to preserve open space and nearby neighbors who assumed the land would be left alone, especially since it has remained unchanged despite the population boom.

The majority of the property lies on a flood plain that wasn't deemed developable until the nearby Day Creek and Deer Creek debris basins were built. The land is now considered surplus flood control property but the fire-prone hillside terrain will be a challenge for developers.

In May the county will have the land appraised. County Supervisor Paul Biane estimated the value at $25 million to $50 million.

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A rock quarry operated by Hanson Aggregates is in the center of the property. The company has an agreement with the county to cease operation in 2013, said Biane.

Developing the 815 acres will be a long-term project with a land entitlement agreement process that could take five years. The city, after it picks the top two candidates, will continue to play a role in the project by sending two members to serve on a design review committee.

"It isn't often that somebody who owns the land asks their neighbor to help develop it," Spagnolo said.

Biane, a former Rancho Cucamonga councilman, said one of the reasons he ran for the Board of Supervisors was because he felt cities weren't given a voice in development and planning issues.

"I have a long history and consistent record in involving cities in every decision I make and understanding the impacts that the board makes on cities," Biane said.

There are limitations however. As the county tries to maximize its flood control assets, it retains the right to veto the city's selections with a unanimous vote by the supervisors.

"It's the county's project, it's the county's land and the county gets the money for it," Kurth said. "We expect that we will annex it and we want to have some input. Having a little seat at the table is better than not having a seat at the table at all."

Expectations are high for the city's last grand project. The design details are far from being finalized but they are slowly being etched in the minds of local leaders. Park space is a must. Green concepts are a given. Some are even talking of an amphitheater.

"When you're driving down the freeway and you come up to Victoria Gardens, it's so distinct," Spagnolo said. "I want people to be driving up with the same feeling on this project. I don't want to be looking at a bunch of rooftops." Five developers are vying for the chance to develop 1,200 acres of untouched land in the northern part of the city. They are:

Brookfield Homes

* Based in Del Mar and is responsible for Edenglen in Ontario's New Model Colony and Mulberry at The Preserve in Chino.

* Proposes a main street with restaurants, retail and small grocery store in addition to a park with equestrian trails.

Foremost Communities

* Based in Irvine and is responsible for Sycamore Creek in south Corona and Talega in San Clemente.

* Partnering with Starwood Capital Group for the project.

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* Proposes a village center near Los Osos High School that would include commercial and medical facilities as well as a farmer's market.

K&K Development Inc.

* Based in Beverly Hills and built Eagle Valley project in Corona.

* Proposes a 200-room hotel, amphitheater and botanic gardens.

* Envisions homes with solar panels and recharge stations for electric vehicles.

Rancho Alliance Investors

* A consortium of developers including Lewis Homes, Diversified Pacific, Shea Homes and Pitassi Architects.

* Calls the project "Rancho Bella" and proposes an oasis lake park for the quarry site.

* Vows to initiate a community input process with workshops on project details.

Richland Communities/Toll Brothers

* The Stockton-based Richland and Pennsylvania-based Toll Brothers merged for this request for qualification.

* Calls project "Cuverra," a mixture of the words cuvee and terra. Cuvee is a wine term that refers to the best product from a grape pressing.

* Toll Brothers has sold more than 140 homes in the city including The Heights at Haven View and The Estates.

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MDW poised to tighten water conservation measures

Mediha Fejzagic DiMartino, Staff Writer

Created: 04/13/2009 04:46:24 PM PDT

The Metropolitan Water District's Board of Directors is expected to vote today to implement a Water Supply Allocation Plan that will reduce water supplies to its member agencies by 10 percent.

The water supply reduction will affect local agencies differently, based on their water usage levels as well as dependency on imported water.

The Metropolitan Water District of Southern California is a consortium of 26 cities and water agencies serving 19 million people in six counties. Locally, MWD provides water to Inland Empire Utilities Agency, which serves Fontana and the Cucamonga Valley Water District.

San Bernardino Valley Municipal Water District imports only 10 percent of its water supplies and does not buy water from MWD. Still, it is subject to the same supply problems. The district serves the cities of San Bernardino, Colton, Loma Linda, Redlands, Rialto, Bloomington, Highland, East Highland, Mentone, Grand Terrace and Yucaipa.

California is in a third consecutive year of drought. Rainfall levels statewide for the 2008-2009 water year are 24 percent below average.

Statewide snowpack water content is at 19 percent below normal. In addition, the water stored in the state's reservoir system is extremely low, prompting Gov. Arnold Schwarzenegger to declare a water supply emergency in February.

Over the past two years, MWD has depleted half of its water reserves to deal with the drought and with a court-ordered 30 percent restriction on water deliveries from the State Water Project and the Central Valley Project to protect the Delta smelt.

The MWD board is expected to vote to declare a change of Metropolitan's Water Supply Condition from "Condition 2 - Water Supply Alert" to "Condition 3 - Implement Water Supply Allocation," effective July 1.

Not implementing the Water Supply Allocation Plan at the recommended level would result in an over-withdrawal from MWD's storage resources and increase the risk of even lower supply allocations and more severe shortage impacts in the future, the board's voting packet stated.

Water levels in ground basins in the San Bernardino area are as low as they have been since the 1960s, said Randy Van Gelder, general manager of the San Bernardino Valley Municipal Water District.

To conserve water, Van Gelder's team is installing weather-based irrigation controllers in public parks and school districts' fields.

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"They use weather information and calculate how much water the turf needs every day," Van Gelder said. "We think that there is a lot of water that can be saved and used more efficiently."

The recession is hurting everyone, but it is working in favor of preserving the water supplies.

"The water demands are not increasing as they would have," Van Gelder said. "When a house goes into foreclosure, the bank will turn off the utilities including water."

In response to the governor's emergency declaration, the Inland Empire Utilities Agency called for all households and businesses to step up their water conservation efforts.

"We need residents and business owners to recognize the severity of the drought that is affecting us," stated IEUA Board President Terry Catlin. "It's time to take shorter showers, fix your leaky faucets, and turn off your sprinklers when it is raining outside."

IEUA imports 25 percent of its total supply from MWD. Groundwater represents 60 percent of its supply, recycled water is contributes 10 percent, while mountain runoff adds another 5 percent.

Currently, local rainfall is about 80 percent of average, said Richard Atwater, general manager of the IEUA. The groundwater supplies are fine but IEUA is using its "storage reserves."

"If MWD curtails their imported supplies by 10 percent it will reduce supplies within IEUA service by about 3 percent," Atwater said. "We are asking all customers to conserve 10 percent to keep our local supplies in storage in case the the drought continues next year."

U.S. Rep. Grace F. Napolitano, D-Santa Fe Springs, was recently reappointed chair of the House Water and Power Subcommittee.

"There is no simple solution to California's water problems. Everyone is going to have to give because of the decreased water supplies," Napolitano said last month at a congressional briefing. "To meet this challenge, we all need to take proactive steps to increase local supplies and lessen our dependence on imported water through conservation and water recycling."

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Less water for more money

Rebecca Kimitch, Staff Writer

Created: 04/12/2009 05:26:24 PM PDT

It appears likely that water imported to the Southland is about to get more expensive and less available.

The cumulative effects of the state's third year of drought and a judge's effort to avoid ecological collapse in northern rivers are finally taking their toll in a very real way.

The Metropolitan Water District, the agency that distributes imported water throughout Southern California, is expected to approve Tuesday two separate plans that would increase the cost of imported water by 40 percent and cut availability to water agencies by 10 percent to 15 percent.

Because many water providers throughout the San Gabriel Valley and other areas rely on local groundwater supplies as well as imported water, the end effect on consumers may not be as severe here. However, on average, water consumers in Southern California can expect to be asked to use 10 percent less water, according to MWD general manager Jeffrey Kightlinger.

They also can expect their monthly water bills to rise $15 on average over the next three years, or about $180 annually, he said.

"Yes, it's a double whammy," said Shan Kwan, assistant general manager for Pasadena Water and Power. "That's the nature of the business - you make money by selling more water, but when there is a need to conserve, you get less revenue, but you still have fixed costs we have to pay for. And somehow you have to recover the lost revenue."

Though the massive aquifers spreading across the Valley could protect consumers in this region, local supplies are also low. And many cities and water utilities are implementing tiered pricing structures under which water becomes increasingly expensive.

Under the MWD's plan, member agencies would receive 10 percent to 15 percent less imported water than normal based on a complicated formula that takes into consideration local supplies, cost impacts and conservation efforts.

If agencies go above the amount they are allocated under the plan, they could pay about three to five times higher than the normal price for an acre-foot of water, currently $579.

Whether water agencies are able to avoid these hefty prices depends a lot on consumers. So far even the most successful voluntary conservation campaigns have only reduced water consumption by at most 5 percent, officials said.

"It will be difficult to reach those levels - 10 to 15 percent conservation is going to be difficult for any agency in any area," said Kirk Howie, assistant general manager of administration for

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Three Valleys Municipal Water District. "It certainly is doable ... In the long run, we'll have to change our focus and habits, but we'll learn a lot in the next year in this process."

Many cities across the region are adopting water conservation ordinances that permanently prohibit outdoor watering during some hours of the day, require leaks to be fixed, and provide incentives to install low-flow toilets and shower heads.

It has been more than 15 years since MWD has raised rates so dramatically. For the past decade, rates have increased only about 5 percent.

Water remains relatively cheap compared to other utilities. While a single family home may pay $100 or more for electricity, the water bill for a typical family in California is $45 a month.

Even so, water costs look poised to grow.

"The easy sources of conservation have been tapped," said Kightlinger of the MWD.

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County completes project to tame San Sevaine Creek

Wendy Leung, Staff Writer

Created: 04/09/2009 07:35:41 PM PDT

RANCHO CUCAMONGA - The San Sevaine Flood Control project at the Rancho Cucamonga-Fontana border, a $150 million venture aimed to offer protection from 100-year floods, has been completed.

The San Bernardino County project, nearly 25 years in the making, is expected to solve the flood-prone areas of Rancho Cucamonga, Ontario, Fontana and other cities.

County Supervisor Paul Biane and other local dignitaries marked the project's completion at the Etiwanda debris basin Thursday. Biane said the region has been prone to flooding from San Sevaine Creek since the first floods were recorded in the early 1900s.

"With this project, we've tamed the San Sevaine," Biane said.

The project, partly funded by the cities of Rancho Cucamonga, Fontana and Ontario, is expected to benefit about 100,000 residents from the foothills to the Riverside County line and pave the way for future development.

Rancho Cucamonga Mayor Don Kurth said massive infrastructure projects like this one will usher in much needed jobs to the region.

"Now we can have the development we need in this whole eastern side of Rancho Cucamonga so we'll have the industrial and commercial development we need to get people jobs," Kurth said. "Lord knows that's what we need right now. We need to get the economy going again."

The project's completion means an end to the flooding that takes place nearly every year in areas where Fourth Street and the Southern Pacific Railroad tracks cross the channel.

Louis Abi-Younes, Ontario's city engineer, said it also means no more flooding on Ontario Mills Parkway, which was closed for nearly a year due to past storms that brought three feet of mud to the street.

Part of the project also involved the construction of several water basins that will sink about 25,000 acre-feet of storm water runoff every year into the Chino Groundwater Basin.

Ontario Mayor Paul Leon said the completion of the project comes at a time of renewed understanding of water conservation.

"Most of us didn't give much thought to water back then," Leon said. "One of those bottles of water costs $3 at the airport. I know back in the 1960s I wouldn't have paid a nickel for that bottle of water.

"We didn't think in terms of how important water was to retain it and make sure it recharges to

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our water supply."

Construction of the project will also set aside 360 acres near the Etiwanda debris basin as conservation in order to protect plant and wildlife in the area.

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Places saved, water boosted

Our view: New legislation will help produce new sources of fresh water in county and protect more than 700,000 acres of wild lands in California.

Posted: 04/04/2009 06:01:24 PM PDT

We're gratified that Congress passed and President Obama signed the Omnibus Public Land Management Act of 2009, which not only protects wild lands but also promotes important water-supply projects in San Bernardino County.

The new law authorizes $20 million to treat tainted surface water, reclaim and reuse tainted groundwater, and provide brine disposal in the Yucaipa area.

It authorizes $26 million for a desalination project in the Chino dairy area, and $10 million for the construction of "natural" treatment systems and wetlands for water flowing into the Prado Basin.

Another $26 million is authorized for the U.S. Bureau of Reclamation to design, plan and construct a series of grandwater wells, pumps and pipelines in Riverside and San Bernardino counties that will provide new, local water.

In addition, the public land act protects more than 2 million acres of wild places, more than 700,000 of them in California.

Some 190,000 acres are designated as wilderness in neighboring Riverside County alone, including the new Cahuilla Mountain, Beauty Mountain and South Fork San Jacinto wilderness areas.

The act adds acreage to the Joshua Tree, Pinto Mountains, Palen-McCoy, Orocopia Mountains, Chuckwalla Mountains and Agua Tibia wilderness areas; as well as to the Santa Rosa Peak, Southeast Boundary, Tahquitz Peak and Snow Creek monuments.

Wild and scenic river protection goes to Palm Canyon, Bautista, Fuller Mill and North Fork San Jacinto creeks.

In San Bernardino County, the Amargosa River now has wild and scenic river protection. That river lies mostly in Inyo County, but runs through several miles of San Bernardino County south of Tecopa.

The bill creates two new wilderness areas in Los Angeles County as well: Pleasant View Ridge in the San Gabriel Mountains and Magic Mountain near Santa Clarita, both part of Angeles National Forest. Piru Creek gets wild and scenic river protection.

Much of the land with new wilderness area protection in California is in the Eastern Sierra and the White Mountains, just a few hours north of here.

We're pleased that these wild places will be preserved for those who come after us.

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WESTERN MUNICIPAL WATER DISTRICT

News Release

For Release: Immediate

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Western appoints representative to CDA board

RIVERSIDE, CA – April 13, 2009 – Western Board Vice President Charles D. Field has been appointed as District representative to serve on the Chino Basin Desalter Authority (CDA) Board of Directors; John V. Rossi, Western's general manager, has been appointed as the District's alternate representative to the CDA board.

Western membership in the CDA was approved last December. The CDA's goal is to achieve local water sustainability by cleaning up and recharging the local aquifer. Other members include Jurupa Community Services District, the Santa Ana River Water Company, Inland Empire Utilities Agency, and the cities of Chino, Chino Hills, Norco and Ontario. Working cooperatively, these agencies built and operate the Chino Desalter facility that creates clean drinking water by removing salts and nitrates from otherwise non-useable groundwater.

Charles D. Field

"Our region faces many challenges as imported water supplies from the Colorado River and State Water Project are reduced. Now that Western has a seat at the CDA table, we can work more closely with the Authority to expand our local water supply for the region," said Field, who also represents Western on the Chino Basin Watermaster Board.

A current CDA project is the $112 million expansion of the Chino Desalter facilities. In partnership with the city of Ontario and Jurupa Community Services District, the project includes construction of new wells, groundwater treatment and water distribution facilities in the lower Chino Basin. When complete in 2013, the expanded facility will increase drinking water supply from 10 to 20 million gallons per day (MGD) to Western and other CDA members.

"Western's recent membership to the CDA allows the District to continue focusing on securing new water sources as imported supplies diminish," said Rossi. "Director Field brings extensive experience and provides a strong voice for the District on the CDA Board. Additionally, the Chino Desalter expansion project will significantly increase water supply reliability to our customers."

In addition to expanding water supplies, benefits of the Chino Desalter operation include: achieving hydraulic control of the Chino Groundwater Basin outflow to the Santa Ana River; increasing desalter groundwater pumping from the lower Chino Groundwater Basin to 40,000 acre-feet per year; removing salts and other impurities from the groundwater basin; and 10 MGD of additional drinking water to Ontario, Jurupa and Western.

Western Municipal Water District provides water supply, wastewater disposal and water resource management to the public in a safe, reliable, environmentally sensitive and financially responsible manner.

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The Metropolitan Water District of Southern California

NEWS RELEASE

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April 14, 2009

SOUTHLAND CONSUMERS, BUSINESSES FACE
MANDATORY CONSERVATION THIS SUMMER
Delta environmental issues, dwindling reserves, drought combine to force Metropolitan board to begin limiting imported supplies effective July 1

Southland consumers and businesses for the first time in 18 years will face mandatory water conservation restrictions this summer, a reflection of drought, the region's limited water reserves and worsening environmental and regulatory conditions in Northern California's Sacramento-San Joaquin Delta.

The board of directors of the Metropolitan Water District of Southern California today reduced supplies delivered to its member public agencies for the first time since 1991, effective July 1. The financial impacts of higher Delta costs due to supply reductions caused by new regulatory restraints also were primary factors behind a rate increase approved by the Metropolitan board in a separate action. The rate increase will take effect Sept. 1.

"Up to 19 million Southern Californians this summer will feel the impact of a new water reality that has been in the making for years, if not decades," said Metropolitan board Chairman Timothy F. Brick.

Metropolitan General Manager Jeffrey Kightlinger said the tight water supply situation has had a cumulative, region-wide effect.

"When you consider the cuts we had already made to our agricultural customers and to groundwater replenishment deliveries, along with the reductions being asked for from consumers, the total amounts to about a 20 percent reduction in water usage for Southern California," said Kightlinger.

The approved allocation action offers local water providers the flexibility to choose among various conservation strategies, from tiered pricing to limits on outdoor water use, to ensure that demands stay in balance with limited supplies. As the region's wholesale supplier of water imported from Northern California and the Colorado River, Metropolitan provides water to

more . . . . .

its 26 member public agencies and helps supplement local supplies to meet the needs of 19 million Southern Californians in MWD's six-county service area.

"There is no one-size-fits-all conservation solution. All residents of Southern California, however, do rely on the same regional water reserves," Brick said. "If we want to protect the region's water reserves, we will all need to reduce our water use and use it more efficiently.

"Today's action represents the critical need for each of us to modify our water use behavior—to be more efficient on a permanent basis—to reflect our new water reality," he added.

After consecutive critically dry years in the Sierra Nevada, the state Department of Water Resources' most-recent snow survey of the winter season indicates snowpack water content statewide is 81 percent of normal. DWR officials rely on snow water content to determine the availability of supplies to be delivered from Northern California via the State Water Project.

In the face of Delta environmental restrictions, the statewide drought and low reservoir levels, DWR has currently established a 20 percent allocation of State Water Project deliveries to Metropolitan. On the Colorado River, Metropolitan cannot expect additional deliveries as that watershed has yet to recover from eight years of record drought.

Kightlinger said the prospects of replenishing the region's water reserves in the coming years have been reduced by deteriorating environmental conditions in the Delta resulting in a series of court and regulatory actions which will reduce deliveries by as much as 40 percent.

"Since 2006, we have drawn down our reserves that are set aside for dry cycles and emergencies by more than half," Kightlinger said. "We must be very careful on how we manage our remaining supplies.

"The challenge is to achieve a careful balance that maintains supplies critical to our economy and well being and conserve our remaining resources to assure Southern California has water for the coming years," he said.

Metropolitan's allocation plan, first approved by the board in February 2008, will limit supplies and impose penalty rates on member agencies for any water use above the target levels. Funds collected by Metropolitan through penalty rates would help finance conservation programs within the boundaries of that member agency.

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In its rate action, Metropolitan's board approved an 8.8 percent increase in the district's base wholesale water rate plus a $69-per-acre-foot Delta surcharge.

The Delta surcharge reflects Metropolitan's costs in dealing with the loss of State Water Project supplies due to the environmental collapse of the Delta, Kightlinger said.

"The supply losses caused by that collapse have required us to purchase expensive replacement supplies, accelerate funding of alternative water supply programs and finance Delta sustainability projects, including the protection of endangered species," Kightlinger said.

The effect of the rate adjustment and Delta surcharge on Southland consumers will depend on how much of Metropolitan's imported water is purchased by their local water agency to augment supplies, such as groundwater and recycled supplies.

For more information on Metropolitan, visit the district's Web site at www.mwdh2o.com.

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The Metropolitan Water District of Southern California is a cooperative of 26 cities and water agencies serving 19 million people in six counties. The district imports water from the Colorado River and Northern California to supplement local supplies, and helps its members to develop increased water conservation, recycling, storage and other resource-management programs.

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Public asked to conserve water

Mediha Fejzagic DiMartino, Staff Writer

Created: 04/15/2009 06:16:01 PM PDT

CHINO - Richard Atwater is walking the talk. The General manager of Inland Empire Utilities Agency has pulled all the grass from his backyard and replaced it with native California plants.

"I cut my water bill in half and I don't have to mow my lawn every week," he said.

On Thursday, Atwater and his colleagues from IEUA asked members of the public to do their share too, and reduce water consumption by at least 10 percent. The agency's Board of Directors has adopted a drought plan in response to Metropolitan Water District's Tuesday decision Wednesday to cut supply allocations to its member agencies by 10 percent.

No one is being asked to pull out their green turf just yet, but responsible watering could do the trick.

"Sixty five (percent) to 75 percent of water use in a typical home in our area is used for outdoor irrigation," Atwater said.

IEUA's concern for the water supply started a few years ago. Anticipating drought and a reduction in the supply of imported water, the agency beefed up its local resources. The newly adopted drought plan is designed to maximize the development of local water supplies and to increase water efficiency.

"Working together with other agencies, we have been developing a portfolio of local supply," said Martha Davis, IEUA'S executive manager of policy development.

Local supply includes groundwater, surface and recycled water, as well as water reclaimed by Chino desalters. As of July 1, MWD will deliver 10,000 acre-feet less water to IEUA for the upcoming year. The agency's supply of recycled water is at 20,000 acre-feet per year, twice as much as it will lose in imported water.

"We have one of the most aggressive recycled water projects in the state of California," said Angel Santiago, IEUA's vice president. "But I don't want to

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(understate) the severity of the problem. The truth is, we don't know if we are in the third year of a three-year drought or in the third year of a 15-year drought."

The price of imported water from MWD will go up about 20 percent as of Sept. 1.

"We are getting less and paying more," Santiago said.

Some agencies, such as Las Virgenes Municipal Water District in Calabasas, import all of their water supply. IEUA buys 25 percent of its supply from MWD. The 10 percent cut represents about a 3 percent cut in IEUA's overall supply.

"If we control our demand, together with the water supplies we have developed locally, we will have sufficient supply," Davis said.

Controlling the demand can be simple. Watering lawns in the early morning hours saves 25 gallons of water per day. Using a broom instead of a hose to clean driveways saves 150 gallons of water each time. Checking sprinkler systems for leaks or overspray can save 500 gallons of water per month.

"If you are efficient about irrigation, you can save 10 percent of water," Atwater said. "Ten percent is doable by everybody."

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Chino Council okays stronger water use rules

Neil Nisperos, Staff Writer

Created: 04/22/2009 07:26:35 PM PDT

CHINO - The City Council has enacted stronger codes for tighter water usage in light of the governor's call for conservation in a time of drought.

Gov. Arnold Schwarzenegger announced a "State of Emergency" regarding the water situation in February and requested all urban water users increase conservation activities.

In response, the city revised the Municipal Code to make it consistent with conservation measures adopted by local agencies.

Among the newly approved permanent restrictions announced by Public Works Director Jose Alire:

- Allowing irrigation water, under ordinary conditions, to run off into a gutter, ditch, drain, driveway, sidewalk, street or onto pavement or other hard surface is prohibited.

- Outdoor irrigation of landscape for more than 15 minutes of watering per day per station is prohibited. Landscapes that utilize drip irrigation systems are exempt from the restriction.

- Automated irrigation of landscape during the hours of 6 a.m. to 8 p.m. is prohibited. Customers are also encouraged to avoid using sprinklers on windy days. Irrigation by handheld hoses with automatic shutoff nozzles, drip irrigation, or handheld buckets is permitted any time.

- Outdoor irrigation of landscape on a rainy day is prohibited.

- Restaurants serving water to their customers is prohibited unless specifically requested by a patron.

- Washing of vehicles and mobile equipment is prohibited, unless done with a handheld bucket or handheld hose equipped with a positive shut-off nozzle for quick rinses.

Councilwoman Eunice Ulloa, general manager of the Chino Basin Water Conservation District and a member of

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the Southern California Water Committee, has been a vocal advocate for water conservation.

"It's critical that we implement the ordinance and we're hoping that people are aware of how desperate the situation is," Ulloa said. "We all need to do our share of conserving this special resource."

Stronger measures needing council approval would take effect with further reductions in supply, officials said. Among the more drastic measures included with a further reduction of 10 to 20 percent of water supplies are limiting irrigation of lawns to every other day.

The move comes as imported water has become scarce because of low snow levels in the Sierra Nevada and court-ordered water use restrictions to help save an endangered fish in the San Joaquin River delta.

Local agencies have increasingly had to rely on groundwater sources and have proposed water rate increases because of the water shortage.

Last week the Metropolitan Water District announced a 10 percent cutback in imported water deliveries to the region, which goes into effect July 1.

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Water shortage at Stage II

Monte Vista district sets mandatory restrictions

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The Monte Vista Water District is asking residents to conserve even more water than before due to continuing drought conditions and reductions.

The district board of directors last week declared a Stage II water supply shortage condition, which includes mandatory water-use restrictions for customers that focuses on outdoor water use.

"If we're not able to maintain a level of conservation, then we'll have to buy penalty water from the Metropolitan Water District of Southern California," MWVD General Manager Mark Kinsey said.

Since October, Monte Vista - which covers Montclair, Chino Hills and portions of Chino - has been under Stage I conditions, which called for customers to voluntarily reduce water usage.

The district has been communicating with its customers for the past year-and-a-half about the need to efficiently use water, board President Sandra Rose said.

"We have seen a 12 percent reduction in water demand during the past year, and we will need to sustain that reduction and achieve more savings this summer," Rose said.

Imported water from Northern California continues to decrease, because of the recent water allocation plan implemented by MWD, which reduced the water supply to its members by 10percent.

Monte Vista's goal with a Stage II is to maintain a 10 to 15percent reduction in water demand.

Other districts may not have declared a Stage II shortage but, for years, have been advocating water conservations.

The Cucamonga Valley Water District board of directors will consider adopting two ordinances to address local water supply needs.

"Conservation is all about real basic stuff," said Jo Lynne Russo-Pereyra, the district's assistant general manager for external affairs. "Evaluate what you're watering outdoors, because that's the biggest place you'll see conservation."

Three Valleys Municipal Water District for more than three years has urged conservation, board President Bob Kuhn said.

Three Valleys - which encompasses Inland Valley cities including Claremont, La Verne, Pomona, Diamond Bar and San Dimas - has been advising residents to use low-flush toilets and sprinkler boxes as well as not watering on a daily basis and taking shorter showers.

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But the bulk of where customers use water is outdoors, as up to 72 percent of the water usage is for landscaping, Kuhn said.

Residents can conserve by watering their lawns three days a week for six minutes, or seven minutes when it is hot, said Justin Scott-Coe, Monte Vista public affairs specialist.

The best time to water is either between 2 and 5 a.m. or late in the evening.

"You don't want to water during the day because you don't want to lose water from evaporation or wind dispersal," Scott-Coe said.

"When there are high winds, we don't recommend watering at all because the water isn't going to go where its supposed to."

Penalties for violations in Monte Vista's area start off with two written notices. The third violation will result in a $50 fine, a $100 fine for the fourth violation and $150 as well as a flow restrictor for the fifth violation.

"In order to make it mandatory, this is our enforcement tool, but we want to continue to educate and encourage our customers to use water wisely," Kinsey said.