Appendix D

Hydrostratigraphy of Area 3
San Gabriel Valley Area 3
Superfund Site

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Contents

Section **Page**

Acronyms and Abbreviations ..... **v**

Glossary ..... **vii**

D. Hydrostratigraphy of Area 3 ..... **D-1**

D.1 Interpretation of the Structural Bedrock Discontinuity D-1

D.1.1 Evaluation of Bedrock Depth D-1

D.1.2 Evaluation of Groundwater Levels Adjacent to Structural Bedrock Discontinuity D-2

D.1.3 Evaluation Groundwater Level Response to Pumping D-2

D.1.4 Fault Evaluations D-3

D.1.5 Bedrock Structural Features D-3

D.2 Hydrostratigraphic Interpretation of the Western Portion of Area 3 ..... D-4

D.2.1 Characterization of Groundwater Zones in the Western Portion of Area 3 ..... D-5

D.2.1.1 Hydrogeologic Cross Sections in the Western Portion of Area 3 ..... D-5

D.2.1.2 Groundwater Level Fluctuations in the Western Portion of Area 3 ..... D-6

D.2.2 Summary of the Aquifer Features in the Western Portion of Area 3 ..... D-6

D.2.2.1 Features of the Western Alluvial Aquifer in the Western Portion of Area 3 ..... D-7

D.2.2.2 Features of the Bedrock Aquifer in the Western Portion of Area 3 ..... D-7

D.3 Interpretation of the Hydrostratigraphy of the Eastern Portion of Area 3 ..... D-8

D.3.1 Characterization of Groundwater Zones in the Eastern Portion of Area 3 ..... D-9

D.3.1.1 Hydrogeologic Cross Sections in the Eastern Portion of Area 3 ..... D-9

D.3.1.2 Vertical Profiles of Groundwater Levels in the Eastern Portion of Area 3 ..... D-10

D.3.1.3 Groundwater Level Fluctuations in the Eastern Portion of Area 3 ..... D-11

D.3.1.4 Groundwater Inorganic General Chemistry in the Eastern Portion of Area 3 ..... D-11

D.3.2 Summary of the Aquifer Features in the Eastern Portion of Area 3 ..... D-12

D.3.2.1 Features of the Shallow Groundwater Zone in the Eastern Portion of Area 3 ..... D-13
D.3.2.2 Features of the Intermediate Groundwater Zone in the Eastern Portion of Area 3 ..... D-13
D.3.2.3 Features of the Deep Groundwater Zone in the Eastern Portion of Area 3 ..... D-14
D.4 References D-15

Exhibits

Exhibit D-1 Summary of Groundwater Types and Total Dissolved Solids Concentrations D-12

Tables

Table D-1 Groundwater Elevation Measurements in the Western Portion of Area 3
Table D-2 Pumping Test Results for the Bedrock Aquifer in San Gabriel Basin
Table D-3 Groundwater Elevation Measurements in the Eastern Portion of Area 3
Table D-4 Summary of Aquifer Test Data
Table D-5 Summary of Results for Inorganic COPCS in Groundwater
Table D-6 Annual Groundwater Production within Area 3

Figures

Figure D-1 Conceptual Hydrogeology of Area 3
Figure D-2 Geologic Map and Base of Alluvial Aquifers
Figure D-3 Groundwater Production, Summer 2003 through Spring 2004
Figure D-4 Groundwater Elevation Contours Intermediate Groundwater Zone – Winter/Spring 2007
Figure D-5 Changes in Groundwater Elevations in Area 3
Figure D-6 San Gabriel Basin Surface Water and Geologic Features
Figure D-7 Locations of Wells and Hydrogeologic Cross Sections
Figure D-8 Conceptual Hydrogeologic Cross Section A-A′
Figure D-9 Hydrographs of Groundwater Elevations – Western Alluvial/ Bedrock Aquifers
Figure D-10 Conceptual Hydrogeologic Cross Section B-B′
Figure D-11 Conceptual Hydrogeologic Cross Section C-C′
Figure D-12 Conceptual Hydrogeologic Cross Section D-D′
Figure D-13 Conceptual Hydrogeologic Cross Section E-E′
Figure D-14 Conceptual Hydrogeologic Cross Section F-F′
Figure D-15 Piezometric Surface Elevation Measurements
Figure D-16 Hydrographs of Groundwater Elevations – Eastern Alluvial/ Bedrock Aquifers
Figure D-17 Precipitation Effect on Groundwater Elevations San Gabriel Basin and Area 3

Figure D-18 Groundwater Geochemistry – Eastern Alluvial Aquifer – Intermediate Zone
Figure D-19 Groundwater Geochemistry – Eastern Alluvial Aquifer – Deep Zone
Figure D-20 Groundwater Geochemistry – Bedrock Aquifer
Figure D-21 Groundwater Geochemistry – Western Alluvial Aquifer
Figure D-22 Groundwater Elevation Contours – Eastern Alluvial Aquifer – Shallow Groundwater Zone Spring 2007
Figure D-23 Groundwater Elevation Contours – Eastern Alluvial Aquifer – Deep Groundwater Zone Spring 2007

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Acronyms and Abbreviations

Area 3	San Gabriel Valley Area 3 Superfund Site
bgs	below ground surface
Ca-HCO_3	calcium bicarbonate
CDWR	California Department of Water Resources
EPA	United States Environmental Protection Agency
meq/L	milliequivalents per liter
mg/L	milligrams per liter
msl	mean sea level
Na-Ca-HCO_3	sodium-calcium bicarbonate
Na-HCO_3	sodium bicarbonate
Na-SO_4	sodium sulfate
NE	northeastern
NW	northwestern
OU	operable unit
RI	remedial investigation
San Gabriel Basin	San Gabriel Valley Groundwater Basin
SE	southeastern
SW	southwestern
TDS	total dissolved solids

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Glossary

alluvial: Relating to alluvium.

alluvium: Sediment deposited by flowing water, as in a riverbed, flood plain, or delta.

anion: A negatively charged particle.

anticline: A convex upward series of folded geologic units that contains older rocks at its core.

aquifer: A saturated geologic unit, often of sand or gravel, which contains and transmits significant quantities of water under normal conditions.

aquitard: A saturated geologic unit that retards, but does not prevent, flow of water to or from adjacent aquifer units.

basin: A large geologic depression in the bedrock that is filled with unconsolidated sediments.

bedrock: The solid rock that underlies loose material, such as soil, sand, clay, or gravel.

cation: A positively charged particle.

conceptual site model: A planning tool that provides the framework from which the study design is structured. It is frequently created as a site map that organizes information that already is known about a site.

conglomerate: A coarse-grained clastic sedimentary rock, composed of rounded to subangular fragments larger than 2 millimeters in diameter.

contaminant: A substance not naturally present in the environment or present in unnatural concentrations that can, in sufficient concentration, adversely alter an environment.

displacement: Distance a fault moved.

drag fold: A minor fold formed in an incompetent bed by movement of a competent bed.

effective porosity: the percent of the total volume of a given mass of soil or rock that consists of the interconnecting voids.

erosional feature: A landform shaped by the wearing away of soil and rock by weathering, mass wasting, or the action of water.

fault: A fracture in the continuity of a rock formation, caused by a shifting or dislodging of the earth's crust, in which adjacent surfaces are displaced relative to one another and parallel to the plane of fracture.

feasibility study: The mechanism for the development, screening, and detailed evaluation of alternative remedial actions.

folds: Bends in a stratum of rock.

geochemistry: The study of the distribution and amounts of the chemical elements in minerals, rocks, soils, water and the atmosphere, and chemical element circulation in nature.

geophysical log: A graphical representation record of properties of subsurface geologic materials; commonly used to determine soil or rock type and the location of the water table.

groundwater: Water occurring underground, in the zone of saturation in an aquifer.

groundwater gradients: The rate at which the groundwater elevation or the potentiometric surface changes with distance. Groundwater gradients can be calculated in both horizontal and vertical directions.

groundwater monitoring well: A type of well specially designed and installed to sample groundwater at specific locations and depths to evaluate groundwater flow and contamination.

groundwater recharge: Infiltration of water from the earth's surface into the groundwater system.

Holocene: In geologic time, a time period referred to as an epoch or series within the Quaternary Period, extending from approximately 8 thousand years ago to the present.

hydraulic conductivity: The ability of soil, sediment, or rock to transmit fluid, dependent on the properties of the soil, sediment, or rock and the fluid.

hydraulic gradient: In an aquifer, the rate of change of total head per unit of distance of flow at a given point and in a given direction.

hydrograph: A graph showing the variation of the elevation of the groundwater table with respect to time.

hydrostratigraphy: The body of soil or rock having considerable lateral extent that also exhibits reasonably distinct groundwater conditions.

inorganic chemistry: The study of all compounds and elements in which carbon is not the principal element.

Jurassic: In geologic time, a time period extending from approximately 190 million years ago through approximately 135 million years ago.

lithologic log: Record of visual observations and manual testing that describe the type of rock and/or soil encountered at depth, as described when drilling a borehole.

marine origin: Deposited in an ocean environment.

Miocene: In geologic time, a time period referred to as an epoch or series within the Tertiary Period, extending from approximately 24 million years ago to approximately 5 million years ago.

multiport monitoring well: A type of monitoring well equipped with a sampling port for monitoring groundwater at multiple depth intervals of an aquifer.

operable unit: A subunit of a Superfund site, defined based on a geographical area or on another parameter, where a number of separate activities are undertaken as part of site cleanup.

Pattern (Stiff) diagram: A display of the major ion composition of water. The shape and size of the polygon represent the relative proportions and concentrations of the different ions in the water.

piezometric surface elevation: An imaginary surface representing the total head of ground water and defined by the level to which water will rise in a well.

Pleistocene: In geologic time, a time period extending from approximately 2 million years ago to approximately 10 thousand years ago.

Pliocene: In geologic time, a time period extending from approximately 5 million years ago to approximately 2 million years ago.

plunging: A term used to describe a folded geologic unit that is not horizontal. A fold will plunge in a particular direction.

porosity: The fraction of the total volume of a porous material (i.e., soil or rock) that is occupied by void space.

potentiometric surface: An imaginary surface representing the level to which water will rise in a well that penetrates a confining unit.

Quaternary: In geologic time, a time period extending from approximately 2 million years ago through the present, and which is subdivided into the Pleistocene and Holocene Epochs or Series.

reactivated fault: A fault with more than one episode of movement.

remedial investigation: Actions undertaken to characterize the full nature and extent of contamination, including characterization of hazardous substances, identification of contaminant sources, and assessment of human health and ecological risk.

sandstone: A sedimentary rock composed of grains of sand set in a matrix of silt or clay, united by a cementing material.

sedimentary: A type of rock consisting of layers resulting from consolidation of sediment; one of three main categories or classes into which all rocks are divided, the others being igneous and metamorphic.

siltstone: A sedimentary rock composed of consolidated silt without fine lamination or layering.

structural bedrock discontinuity: In structural geology, a subsurface bedrock zone or surface separating two unrelated groups of rocks across which an abrupt geologic change occurs, e.g., a fault.

Superfund: The program operated under the legislative authority of CERCLA and SARA that funds and carries out EPA solid waste emergency and long-term response actions, including conducting or supervising cleanup actions.

syncline: A concave upward series of folded geologic units that contains younger rocks at its core.

Tertiary: In geologic time, a time period extending from approximately 63 million years ago through approximately 2 million years ago.

trend: A general term for the direction of a geological feature, such as a fracture or fold.

D. Hydrostratigraphy of Area 3

The following interpretations of the ***hydrostratigraphy*** of Area 3 supplement Section 3 of the ***remedial investigation*** (RI) report.

Each section of this report provides a discussion of the subject, followed by any tables or figures cited in the text. In addition, exhibits and text boxes noted in the margins present key concepts, tables, and figures.

D.1 Interpretation of the Structural Bedrock Discontinuity

The following evaluation presents data to support both the presence and nature of a ***structural bedrock discontinuity*** in the San Gabriel Valley Area 3 ***Superfund*** Site (Area 3). The existence of a structural bedrock discontinuity might explain a significant disparity in ***bedrock*** elevations and ***groundwater*** levels between the western and eastern portions of Area 3. The hydrogeologic ***conceptual site model*** presented in Figure D-1 and the geologic map of Area 3 presented in Figure D-2 support the discussion.

*The glossary explains words presented in **bold, italicized** text.*

Figure D-1 presents the hydrogeologic conceptual model for Area 3.

Figure D-2 presents the geologic map of Area 3.

A review of the evidence listed in the bullets below suggests that the structural bedrock discontinuity might be an unnamed ***fault*** zone that extends across Area 3, from the southern boundary to the northern boundary at the Raymond Fault:

- Bedrock depths
- Groundwater levels
- Response of groundwater levels in the western portion of Area 3 to groundwater pumping in the eastern portion of Area 3
- Fault evaluations
- Bedrock structural features

Additional data are needed to sufficiently define the location, area, and extent of the structural bedrock discontinuity. The data would help to explain whether or not groundwater flows across the structural bedrock continuity and, if so, the directions that the groundwater flows from ***contaminant*** sources in the western portion of Area 3 to production wells in the eastern portion of Area 3. The ***feasibility study*** will consider the data needs identified in the RI as shown in Table 8-1 in Section 8 of the RI report.

Table 8-1 of the RI report presents the assessment of the next steps to be taken in Area 3.

D.1.1 Evaluation of Bedrock Depth

The base of the alluvial ***aquifer*** depicted with bedrock elevation contours in Figure D-2 shows that the bedrock depth in the area of the structural bedrock discontinuity abruptly decreases (elevation increases) moving from east to west. This abrupt decrease of up to approximately 300 feet occurs within a relatively short horizontal distance of approximately 3,000 feet. Although a gradual

Figure D-2 presents the geologic map of Area 3 with bedrock elevation contours.

decrease in the bedrock elevation could be interpreted as an ***erosional feature***, the abrupt elevation change suggests a vertical offset across a fault zone.

D.1.2 Evaluation of Groundwater Levels Adjacent to Structural Bedrock Discontinuity

Figures D-3 and D-4 illustrate the different groundwater elevations between the western and eastern portions of Area 3.

The groundwater elevation contour maps in Figures D-3 and D-4 show that groundwater occurs at elevations approximately 100 feet higher in the ***alluvium*** and bedrock in the western portion of Area 3 than in the alluvium in the eastern portion of Area 3. The closely spaced groundwater contours across the southern and northern segments of the structural bedrock discontinuity indicate a local, relatively steep hydraulic gradient, likely caused by a resistance to groundwater flow from west to east at the structural bedrock discontinuity.

The groundwater elevation contours across the southern segment of the structural bedrock discontinuity provide stronger evidence of the two segments for this resistance to groundwater flow because they are calculated using groundwater level measurements from a greater number of monitoring wells. The elevated groundwater levels in the northern portion of Area 3 occur (approximately 400 feet higher than the groundwater levels observed east of the structural bedrock discontinuity, which provides evidence that the structural bedrock discontinuity might extend to the Raymond Fault.

D.1.3 Evaluation Groundwater Level Response to Pumping

The absence of a response in groundwater levels in the western portion of Area 3 to groundwater pumping in the eastern portion of Area 3 indicates that the structural bedrock discontinuity prevents direct hydraulic communication between the western and eastern portions of Area 3. This lack of hydraulic communication provides further evidence supporting the existence of the structural bedrock discontinuity.

Figure D-5 shows a response to pumping prior to 1940 in the western portion of Area 3.

Figure D-2 shows the locations of the wells in Figure D-5.

As the graph of historical groundwater elevations in Figure D-5 shows, groundwater levels at the former Midwick Country Club Well and the former City of Alhambra Marengo Well, located in the western portion of Area 3 (see Figure D-2), shows similar drawdown in response to pumping at production wells located east of the structural bedrock discontinuity prior to the late 1940s. As water levels declined in the eastern portion of Area 3 to below the elevation of the western bedrock aquifer, the response of groundwater levels to regional pumping lessened at the wells in the western portion of Area 3, as the two areas became hydraulically separated.

The difference in groundwater level responses between the City of Alhambra former Marengo Well and Production Well 01900018 during the periods from about 1930 to 1934 and from 1950 to 1965 provides evidence that a hydraulic separation developed between the wells. The difference also indicates that the structural bedrock discontinuity likely extends northwest to the Raymond Fault.

D.1.4 Fault Evaluations

Surface features and fault evaluations indicate the presence of a fault possibly associated with the Whittier Fault system extending northwest from Whittier Narrows through the western portion of Area 3 in the general vicinity of the structural bedrock discontinuity shown in Figures D-2 and D-6 (Lamar, 1970; Treiman, 1991). The Whittier Fault system appears to continue northwest of the Puente Hills under the alluvium and is expressed in the northwest-trending faults in the Repetto Hills (Lamar, 1970).

Figure D-2 presents the geologic map for Area 3 and shows the location of the structural bedrock discontinuity.

The geologic map in Figure D-2 shows the surface fault traces identified in the southern portion of Area 3 as a linear drainage and a broad gentle linear ridge (Treiman, 1991). The linear ridge observed in the western portion of the inferred fault zone between Alhambra Wash and the structural bedrock discontinuity could indicate that the bedrock might have been uplifted in the western portion of this apparent extension of the Whittier Fault Zone. Uplifted bedrock along a fault correlates with the abrupt decrease in the depth to bedrock moving from east to west indicated by the contours of the base of ***alluvial*** aquifers (top of bedrock) in Figure D-2. The northwestern extent of the surface features has not been mapped.

Figure D-6 shows the faults that occur in the San Gabriel Basin.

The possible northwest extension of the Whittier Fault Zone, identified as the East Montebello Fault, is interpreted as buried (not expressed at the surface) in its northwesternmost segment. Two interpretations exist regarding the extent of the fault. One interpretation shows the East Montebello Fault extending northwest to the Raymond Fault (McCulloh et al., 2001). The second interpretation of the linear drainage and broad gentle linear ridge (surface features) observed by Treiman (1991) includes a possible recently ***reactivated fault*** associated with the East Montebello Fault, within the southwestern portion of Area 3, which extends to just north of the South Pasadena ***anticline*** (Yeats, 2004). The East Montebello Fault is interpreted as the northern end of the Whittier Fault with its ***displacement*** absorbed by the Montebello anticline (south of Area 3) and the Elysian Park anticline (within the southern portion of Area 3). The East Montebello Fault is consistent with the structural bedrock discontinuity shown in Figure D-2.

D.1.5 Bedrock Structural Features

The geologic map in Figure D-2 shows four prominent bedrock structural ***folds*** that ***trend*** and ***plunge*** in the eastern and southeastern directions (California Department of Water Resources [CDWR], 1966; Lamar, 1970; and Dibblee, 1989). The Elysian Park anticline is a major structure that occurred during the deposition of the Pico Formation. The three younger and tighter folds (Hellman Avenue anticline, an unnamed ***syncline***, and South Pasadena anticline) are possibly ***drag folds*** related to the fault movement (Lamar, 1970). The three folds appear to terminate near the structural bedrock discontinuity and do not continue into the eastern portion of Area 3, as shown in Figure D-2. The apparent truncation of these folds along a linear zone provides evidence

suggesting the presence of a structural bedrock discontinuity that is typical of a fault zone.

D.2 Hydrostratigraphic Interpretation of the Western Portion of Area 3

The following analysis interprets the hydrostratigraphy of the alluvial and bedrock aquifers in the western portion of Area 3. The discussion supplements the information presented in Section 3.1.6 of the RI report. The hydrostratigraphy defines the groundwater flow and contaminant transport conditions.

Relatively young floodplain and stream channel deposits compose the alluvium in Area 3 and consist of interbedded layers and lenses of fine-grained and coarse-grained sediments. Floodplain deposits tend to contain more fine-grained sediments, which include clay, silty sands, and sandy clays. Stream channel deposits contain more coarse-grained material that consists mostly of cobbles, gravel, and sand. The interbedded layers of sediments resulted from the erosion and southward transport of coarse-grained sediments from the San Gabriel Mountains, and the erosion of finer-grained sediments from the sedimentary rocks in the adjacent hills.

Alluvium

- Recent alluvium of ***Holocene*** (***Quaternary***) age generally forms alluvial fans along the San Gabriel Mountains and stream deposits that follow the course of the major streams and rivers across the San Gabriel Valley. The deposits mainly consist of boulders, gravel, and sand, with silt and clay in smaller amounts. Recent alluvial deposits range in thickness from a few inches to approximately 100 feet and generally are unsaturated. The recent alluvium overlies older alluvium along stream channels and the San Gabriel Mountain front in the central part of the ***basin***.
- Older alluvium of Upper ***Pleistocene*** (Quaternary) age composes the majority of the basin-fill sediments and outcrops along the margins of the San Gabriel Valley Groundwater Basin (San Gabriel Basin) as dissected alluvial fans and terrace deposits. The older alluvium ranges in thickness from 40 to 4,100 feet and consists of unsorted deposits of boulders, sand, silt, and clay (CDWR, 1966). The older alluvium, generally coarser-grained closer to the San Gabriel Mountains, becomes finer-grained farther from the mountains, such as just north of Whittier Narrows (United States Environmental Protection Agency [EPA], 1998a).

  The presence of ***aquitards*** is documented within the older alluvium in Area 3 and in other San Gabriel Valley ***operable units*** (OUs), including Whittier Narrows (EPA, 1998b), South El Monte (South El Monte Participants, 1998), and El Monte (Northwest El Monte Community Task Force, 1998).

Sedimentary Bedrock

- The San Jose, Puente, Montebello, and Repetto Hills expose the ***sedimentary*** bedrock of Lower Pleistocene (Quaternary) to ***Miocene*** (***Tertiary***) age that occurs in the subsurface in most of the San Gabriel Basin. The sedimentary bedrock consists of interbedded ***sandstone, conglomerate***, and ***siltstone*** (CDWR, 1966).

Underlying the alluvium in Area 3, the bedrock sequence with increasing depth consists of the Pico, Puente, and Topanga Formations of ***marine origin***, and the Santa Monica Slate basement complex (CDWR, 1966; Dibblee, 1989; and Lamar, 1970). The following bullets summarize the lithologic characteristics of the bedrock formations in Area 3:

- Pico Formation. The ***Pliocene*** (Tertiary) Pico Formation consists of weakly cemented sandy siltstone, with interbedded sandy conglomerate to silty coarse sandstone, ranging from 10 feet to more than 100 feet in thickness. Fractures observed in the siltstone beds occur where the formation outcrops at the surface (EPA, 1990).
- Puente Formation. The Upper Miocene (Tertiary) Puente Formation consists of siltstone, shale, and conglomerate, with interbedded sandstone and mudstone. The upper 80 to 100 feet of this formation are highly weathered where the formation underlies alluvium (Ray, 1986).
- Topanga Formation. The Middle Miocene (Tertiary) Topanga Formation consists of well-cemented interbedded siltstone, sandstone, and shale. The sandstone varies from fine to coarse grained (Lamar, 1970).
- Santa Monica Slate Basement Complex. The ***Jurassic***-aged Santa Monica Slate occurs at depths exceeding 5,000 feet below ground surface (bgs) in the western portion of Area 3 (Lamar, 1970). Because this formation might influence groundwater flow only at extreme depths, EPA eliminated the Santa Monica Slate from further consideration in evaluating site geology and hydrostratigraphy.

D.2.1 Characterization of Groundwater Zones in the Western Portion of Area 3

The following discussion presents an interpretation of individual groundwater zones representative of the variations in hydrostratigraphy with depth in Area 3 based on the interpretation of the following components.

- Hydrogeologic cross sections
- Groundwater level fluctuations

D.2.1.1 Hydrogeologic Cross Sections in the Western Portion of Area 3

The map in Figure D-7 shows the locations of the hydrogeologic cross sections in plan view. The hydrogeologic cross section, presented in Figure D-8, helps to evaluate the hydrostratigraphy of the western portion of Area 3. The cross sections correlate the coarse-grained and fine-grained sediments identified on

Figure D-7 shows the location of the cross sections in plan view.

Figure D-8 presents Cross Section A-A′.

lithologic logs and ***geophysical logs***. The correlation helps to delineate groundwater zones.

D.2.1.2 Groundwater Level Fluctuations in the Western Portion of Area 3

Table D-1 presents the groundwater elevation data measured in the western portion of Area 3.

Table D-1 presents data for groundwater levels measured in the western portion of Area 3. Groundwater elevations range from approximately 550 feet above mean sea level (msl) (Monitoring Well W12EXMW01) and 470 feet above msl (Monitoring Well W1276W10) near where the sedimentary bedrock outcrops to approximately 278 feet msl (Monitoring Well EPAMW11) near the structural bedrock discontinuity.

Groundwater levels measured in the western portion of Area 3 currently show elevations approximately 100 feet higher than groundwater levels measured in the eastern portion of Area 3. As discussed in Section D.1.2, a significant hydraulic gradient occurs at the structural bedrock discontinuity, which suggests a resistance to groundwater flow from west to east.

Figure D-9 illustrates hydrographs of water levels measured in the western portion of Area 3.

Figure D-9 illustrates ***hydrographs*** for water levels measured between 2003 and 2007 in the western portion of Area 3. Groundwater levels in the western alluvial aquifer and bedrock aquifer remain relatively static and unresponsive to groundwater pumping east of the bedrock discontinuity. ***Groundwater recharge*** in the western alluvial aquifer primarily occurs from the infiltration of precipitation, runoff, and landscape irrigation. The hydrographs generally show a response with precipitation events, such as the increase in groundwater elevation after significant precipitation in 2005.

D.2.2 Summary of the Aquifer Features in the Western Portion of Area 3

This report identifies two generalized aquifers in the western portion of Area 3.

- Western Alluvial Aquifer. Includes the relatively fine-grained to coarse-grained alluvium in the western portion of Area 3. Structural features of the bedrock control the saturated thickness of the western alluvial aquifer. The alluvium in the unnamed syncline area can reach a thickness of up to approximately 90 feet. In areas where the bedrock elevation is higher or outcrops (anticline area), the western alluvial aquifer is thin or absent. The western alluvial aquifer acts as an unconfined aquifer.

- Bedrock Aquifer. Includes the portion of the sedimentary bedrock capable of transmitting significant amounts of water, generally composed of the Pico Formation and Puente Formation. Where the bedrock aquifer is the first encountered groundwater, the aquifer acts as an unconfined aquifer and has a similar hydraulic response as the western alluvial aquifer. The bedrock aquifer has not been characterized with depth below the alluvial aquifer.

A conspicuous absence of groundwater production wells exists in the western portion of Area 3. This absence likely indicates the limited ability of the aquifers in the western portion of Area 3 to yield groundwater relative to the aquifer present in the eastern portion of Area 3.

D.2.2.1 Features of the Western Alluvial Aquifer in the Western Portion of Area 3

Distinct differences appear to exist between the properties of the water-bearing units on either side of the structural bedrock discontinuity. The alluvium in the western portion of Area 3 primarily consists of relatively fine-grained sediments with less prevalent layers of coarse-grained sediments, compared to layers in the eastern portion of Area 3. The alluvium measures up to approximately 300 feet in thickness but is absent in areas where sedimentary bedrock outcrops extend above the ground surface. The elevation contours of the base of the alluvial aquifers on the geologic map in Figure D-2 show that the base of the alluvium/bedrock surface generally slopes to the east.

Figure D-2 presents the geologic map of Area 3 with bedrock elevation contours.

The greatest saturated thickness of the alluvium occurs primarily in the areas where the bedrock is encountered deeper, such as in the area of the unnamed syncline shown on the geologic map in Figure D-2. In locations where the bedrock is shallow or outcrops, the alluvium is thin and unsaturated. Figure D-7 shows the locations of the cross sections, and Figure D-8 shows the synclines and anticlines in hydrogeologic Cross Section A-A′, as described in Section D.1.5. Based on limited data, groundwater appears to occur in the bedrock below the alluvium. The alluvium and bedrock exhibit different hydrogeologic properties because the bedrock is generally more consolidated and finer-grained than the alluvium.

Figure D-7 shows the location of the cross sections in plan view.

Figure D-8 presents Cross Section A-A′.

This report estimates the average ***hydraulic conductivity*** of the western alluvial aquifer as 20 feet per day based on literature values. The western alluvial aquifer primarily consists of silty sand to coarse-grained sand. Hydraulic conductivity values for silty sand range from 0.03 to 3 feet per day, and for a coarse-grained sand from 3 to 280 feet per day (Freeze and Cherry, 1979).

This appendix estimates the velocity of groundwater flow using the following equation (Domenico and Schwartz, 1990).

$$v_w = Ki/n_e$$

where:

	v_w	=	average groundwater flow velocity
	K	=	hydraulic conductivity
	i	=	***hydraulic gradient***
	n_e	=	***effective porosity***

The effective porosity of the alluvial aquifers in the San Gabriel Basin is estimated at 20 percent or 0.20 (EPA, 2002). The RI report estimates the average horizontal groundwater velocity of the western alluvial aquifer in the area of the unnamed syncline at 1 foot per day, assuming an average hydraulic gradient of 0.01 foot per foot and a hydraulic conductivity of 20 feet per day.

D.2.2.2 Features of the Bedrock Aquifer in the Western Portion of Area 3

This report infers the properties of the western bedrock aquifer based on measured values from the same sedimentary bedrock formations in other parts of the San Gabriel Basin as shown in Figure D-6. The properties of the bedrock aquifer measured at two landfills indicate the following conditions.

Figure D-6 shows the San Gabriel Basin and the locations of the two landfills where bedrock aquifer properties were measured.

- Pico Formation. The hydraulic conductivity ranges from 0.1 to 240 feet per day at the OII Landfill, located in the Montebello Hills south of Area 3. The lower hydraulic conductivity values generally represent the siltstone units of the Pico Formation, and the higher hydraulic conductivity values generally represent the sandstone units (EPA, 1990).
- Puente Formation. The hydraulic conductivity at the BKK Landfill, located in the San Jose Hills to the southeast of the San Gabriel Basin varies from 0.03 to 440 feet per day (BKK Corporation, 1986). Higher hydraulic conductivity values generally correlate to wells in fractured, jointed, and weathered bedrock.

Because the bedrock aquifer in the area of anticline in Area 3 appears to be primarily siltstone, this report estimates the hydraulic conductivity at 1 foot per day, based on hydraulic conductivity values measured in the Pico Formation siltstone at the OII Landfill (shown in Table D-2).

Table D-2 presents the pumping test results for the bedrock aquifer in the San Gabriel Basin.

The effective porosity of a siltstone representative of the bedrock aquifer in the area of the anticline ranges from 21 to 41 percent or 0.21 to 0.41 (Freeze and Cherry, 1979). This report estimates the effective porosity of the bedrock aquifer at 21 percent (0.21) because the siltstone appears to restrict groundwater flow to the adjacent alluvium in the unnamed syncline. The report estimates the linear horizontal groundwater velocity for the bedrock aquifer in the area of the anticline at 0.5 foot per day, assuming an average hydraulic gradient of approximately 0.1 foot per foot, and hydraulic conductivity of 1 foot per day.

D.3 Interpretation of the Hydrostratigraphy of the Eastern Portion of Area 3

The following discussion supplements the information presented in Section 3.1.6 of the RI report. The hydrostratigraphy defines the groundwater flow and contaminant transport conditions.

Figure D-2 presents the geologic map of Area 3 with bedrock elevation contours.

As shown in Figure D-2, the base of the alluvium/bedrock surface in the eastern portion of Area 3 slopes from northwest to southeast and ranges from approximately 200 feet above msl to 1,600 feet below msl. The upper portion of the bedrock encountered near the bedrock discontinuity consists of siltstone with some sandstone lenses or layers associated with the Puente Formation.

A thick sequence of coarse-grained to fine-grained sediments underlies the eastern portion of Area 3 and forms a heterogeneous alluvial aquifer. In general, this alluvium is coarser-grained than the alluvium that occurs west of the bedrock discontinuity. Relatively coarse-grained alluvium derived from the San Gabriel Mountains characterizes the eastern portion of Area 3 and roughly corresponds to the area drained by the Rubio and Eaton Washes (EPA, 2001).

Lithologic logs indicate the prominence of sand and gravel deposits in the central and eastern portions of Area 3 and an abundance of thick, fine-grained lenses of sand and gravel deposits to the west of and along the Alhambra Wash. In

general, lenses of finer-grained sediments appear to form disconnected layers with slopes similar to the topography.

Three distinct groundwater zones occur in the eastern alluvial aquifer in Area 3, designated in this report as the shallow, intermediate, and deep groundwater zones. Each groundwater zone generally dips to the southeast, similar to the dip of the fine-grained sediments and slope of the surface topography. The shallow groundwater zone occurs as the first encountered groundwater in the easternmost extent of Area 3. In all other portions of eastern Area 3, the intermediate groundwater zone is the first encountered groundwater. The deep groundwater zone occurs beneath the intermediate groundwater zone.

Figure D-1 presents the hydrogeologic conceptual model for Area 3.

Figure D-7 shows the location of the cross sections in plan view.

Figures D-10 through D-14 present the hydrostratigraphy of the eastern portion of Area 3.

- Shallow Groundwater Zone. As shown in Figure D-1, the bottom of the shallow groundwater zone appears to be a continuous fine-grained unit that dips to the southeast. No groundwater production in Area 3 occurs within this zone.
- Intermediate Groundwater Zone. The intermediate groundwater zone is unconfined where it occurs as the first encountered groundwater (majority of Area 3) and increasingly confined where it is encountered below the shallow groundwater zone in the eastern portion of Area 3. Figures D-10 through D-14 show the location of the intermediate groundwater zone. Figure D-7 presents the locations of the cross sections in plan view. Some production wells are either fully or partially completed within the intermediate groundwater zone. This report interprets the base of the intermediate groundwater zone as a fairly continuous fine-grained unit.
- Deep Groundwater Zone. The majority of groundwater production in Area 3 occurs from the confined, deep groundwater zone located beneath the intermediate groundwater zone. Figures D-10 through D-14 show the location of the deep groundwater zone. Figure D-7 presents the locations of the cross sections in plan view. The base of the deep groundwater zone is currently unknown, due to the lack of exploratory drilling at depth.

D.3.1 Characterization of Groundwater Zones in the Eastern Portion of Area 3

The following discussion explains the characterization of groundwater zones based on the interpretation of the components listed below.

- Hydrogeologic cross sections
- Vertical profiles of groundwater levels
- Groundwater level fluctuations
- Groundwater inorganic general chemistry

D.3.1.1 Hydrogeologic Cross Sections in the Eastern Portion of Area 3

The hydrogeologic cross sections presented in Figures D-10 through D-14 depict the hydrostratigraphy of the eastern portion of Area 3. The cross sections correlate the coarse-grained and fine-grained sediments identified on lithologic

Figure D-7 shows the location of the cross sections in plan view.

logs and geophysical logs. The map in Figure D-7 shows the locations of the hydrogeologic cross sections in plan view.

D.3.1.2 Vertical Profiles of Groundwater Levels in the Eastern Portion of Area 3

Table D-3 presents groundwater elevation data measured in the eastern portion of Area 3.

Table D-3 summarizes data for groundwater levels measured east of the bedrock discontinuity. In 2007, groundwater elevations for the three groundwater zones in the eastern portion of Area 3 ranged as follows.

- Shallow Groundwater Zone – approximately 215 to 213 feet msl
- Intermediate Groundwater Zone – approximately 196 to 87 feet msl
- Deep Groundwater Zone – approximately 154 to 87 feet msl

Figure D-15 presents the vertical profiles of groundwater measured in multiport monitoring wells.

The graphs in Figure D-15 present vertical profiles of the ***piezometric surface elevations*** (groundwater levels) measured at ***multiport monitoring wells***. The hydraulic discontinuities in water levels support the delineation of groundwater zones.

The differences in groundwater levels generally show discontinuities in the vertical ***groundwater gradients*** between the shallow, intermediate, and deep groundwater zones. The ***potentiometric surface*** elevations of groundwater in the eastern alluvial aquifer decrease with increasing depth below ground surface, as indicated in Figure D-15.

The vertical gradient measured in 2007 between the intermediate and deep groundwater zones ranges from 0.05 to 0.13 foot per foot. The lower portion of the deep groundwater zone has an upward, vertical gradient of 0.08 foot per foot (as observed at Monitoring Well EPAMW15 and occasionally at EPAMW13). A single exception occurs in the deepest groundwater monitoring zone at one well (EPAMW15), discussed below. The downward vertical gradient between the shallow and intermediate groundwater zones is approximately 0.32 foot per foot (as measured at Monitoring Wells W11TCSW2 and W11TCSW12).

Table D-4 summarizes the aquifer test data for the eastern alluvial aquifer.

This report estimates properties of the eastern alluvial aquifer using data from aquifer testing performed at production wells, as shown in Table D-4. The estimates generally represent composite hydraulic conductivity values because the data are derived from production wells screened across multiple groundwater zones. Aquifer properties for each individual groundwater zone have not been calculated. Observed composite hydraulic conductivity values range from 44 to 380 feet per day, and correlate with published values for sands (Domenico and Schwartz, 1990).

Based on the ranges of the hydraulic gradient (0.005 to 0.03 foot per foot), the hydraulic conductivity (44 to 380 feet per day), and an effective porosity of 20 percent, the average velocity of groundwater flow in the composite eastern alluvial aquifer ranges from 1 to 57 feet per day. Aquifer properties for each specific groundwater zone are unavailable. Additional hydrogeologic data will assist with further characterizing each groundwater zone.

D.3.1.3 Groundwater Level Fluctuations in the Eastern Portion of Area 3

Groundwater level fluctuations in the eastern portion of Area 3 correspond to seasonal variations in groundwater production. Figure D-16 shows ***hydrographs*** for groundwater level measurements between 2003 and 2007 collected in the eastern portion of Area 3, which illustrates that the groundwater levels in the different groundwater zones respond differently to pumping. Figure D-17 compares rainfall data with groundwater levels measured in the central portion of the San Gabriel Basin and Area 3 and shows that precipitation in Area 3 has minimal impact on groundwater levels. The responses of groundwater levels to precipitation and pumping over time correlate with coarse-grained and fine-grained units in the hydrogeologic cross sections.

Figure D-16 presents the hydrographs for groundwater level measurements collected in the eastern portion of Area 3.

Figure D-17 compares rainfall data with groundwater levels measured in Area 3 and San Gabriel Basin.

D.3.1.4 Groundwater Inorganic General Chemistry in the Eastern Portion of Area 3

As groundwater flows through an aquifer, interaction with the soil matrix affects the chemical composition or the ***geochemistry*** of the water. The dissolved solids in groundwater generally include the sodium, calcium, potassium, and magnesium major ***cations*** and the sulfate, chloride, bicarbonate, and carbonate major ***anions***. Calcium-bicarbonate-type groundwater predominates in the alluvium in the San Gabriel Basin.

Analysis of groundwater inorganic general chemistry data helps to evaluate differences in chemistry associated with different groundwater zones and aquifers in Area 3. Figures D-18 through D-21 present ***Pattern (Stiff) diagrams*** that represent the ***inorganic chemistry*** of groundwater in the eastern alluvial aquifer (both intermediate and deep groundwater zones), western alluvial aquifer, and western bedrock aquifer, respectively.

Figures D-18 through D-21 present Pattern (Stiff) diagrams that represent the inorganic chemistry of the aquifers underlying Area 3.

The polygons in the Stiff diagrams illustrate similarities or differences in the major ion chemistry of groundwater from different locations, groundwater zones, and aquifers using plots of the concentrations of the major anions and cations (expressed in milliequivalents per liter [meq/L]). Groundwater from different locations within a single aquifer or within groundwater zones often shows similar inorganic ion chemistry, referred to as the groundwater type. Differences in inorganic ion chemistry can also identify different groundwater zones or aquifers.

The groundwater type is identified on a Stiff diagram by the cation(s) with the most negative concentration(s) and the anion(s) with the most positive concentration(s). Comparison of the Stiff diagrams in the intermediate and deep groundwater zones of the eastern alluvial aquifer indicates no significant difference in groundwater chemistry between these zones, and thus was not useful in characterizing the groundwater zones.

The Stiff diagrams indicate the differences in groundwater chemistry between the western bedrock, western alluvial, and eastern alluvial aquifers. Exhibit D-1 provides the major groundwater types in the western bedrock, western alluvial, and eastern alluvial aquifers based on inorganic ion chemistry.

Exhibit D-1 summarizes the groundwater types in the aquifers underlying Area 3.

EXHIBIT D-1
Summary of Groundwater Types and Total Dissolved Solids Concentrations

Aquifer	Groundwater Type	TDS Concentration Range (mg/L)	Mean TDS Concentration (mg/L)
Western Area 3 Bedrock	Na-HCO_3 with one occurrence of Na-Ca-HCO_3	429 to 723	615 (of 3 sample points)
Western Area 3 Alluvium	Ca-HCO_3	725	725 (of 1 sample point)
Eastern Area 3 Alluvium	Ca-HCO_3 to Na-HCO_3 with some occurrences of Na-SO_4	155 to 548 with most values in the 200 to 300 range,	298 (of 22 sample points)

Notes:

Ca-HCO_3 = calcium bicarbonate
mg/L = milligrams per liter
Na-HCO_3 = sodium bicarbonate
Na-Ca-HCO_3 = sodium-calcium bicarbonate
Na-SO_4 = sodium sulfate
TDS = total dissolved solids

The higher total dissolved solids (TDS) concentrations in the western alluvial and bedrock aquifers shown in Exhibit D-1 are consistent with the elevated salt content expected for groundwater occurring in marine sedimentary bedrock and associated alluvial sediments in the western portion of Area 3.

Table D-5 summarizes the groundwater geochemistry data for the aquifers underlying Area 3.

Table D-5 summarizes general groundwater geochemistry data for the aquifers underlying Area 3. The two general conditions discussed below explain slight differences between the groundwater geochemistry in the western and the eastern alluvial aquifers.

- Recharge Source of Groundwater. Because the western alluvial aquifer is hydraulically disconnected from the eastern alluvial aquifer, the sources of groundwater recharge vary somewhat. The primary source of groundwater in the western portion of Area 3 includes recharge from rainfall, local runoff, and landscape irrigation. Groundwater recharge in the eastern portion of Area 3 includes rainfall, runoff, landscape irrigation, imported surface water at the Eaton Spreading Basin, and groundwater inflow from the San Gabriel Basin and the Raymond Basin.
- Nature of Aquifer. The western alluvial aquifer generally consists of relatively fine-grained alluvium and fine-grained bedrock of marine origin compared to the relatively coarse-grained alluvium in the eastern alluvial aquifer. Groundwater flows more slowly through finer-grained materials, which allows more time for the groundwater to interact with the minerals of the aquifer materials. The higher TDS concentration of groundwater in the western portion of Area 3 is unsurprising.

Figure D-7 shows the location of the cross sections in plan view.

Figures D-10 through D-14 present the hydrostratigraphy of the eastern portion of Area 3.

D.3.2 Summary of the Aquifer Features in the Eastern Portion of Area 3

The cross sections in Figures D-10 through D-14 illustrate three hydrostratigraphic sequences designated as the shallow, intermediate, and deep groundwater zones that comprise the eastern alluvial aquifer in Area 3. Figure D-7 shows the location of the cross sections in plan view.

Figures D-4, D-22, and D-23 present the groundwater elevation contour maps for the groundwater zones in the eastern alluvial aquifer. The upper and lower boundaries of the groundwater zones might be continuous fine-grained sediment units that dip to the southeast; however, the groundwater zones could merge in some locations, with discontinuous fine-grained sediment units. The intermediate and deep groundwater zones are absent in the western portion of Area 3.

Figures D-4, D-22, and D-23 present the groundwater elevation contour maps for the groundwater zones in the eastern alluvial aquifer.

D.3.2.1 Features of the Shallow Groundwater Zone in the Eastern Portion of Area 3

The shallow groundwater zone, an unconfined aquifer, exists only in the extreme eastern portion of Area 3, as shown in the hydrogeologic cross section in Figure D-13 and the groundwater elevation contour map in Figure D-22. The bottom of the zone appears to be a continuous fine-grained sediment unit that dips to the southeast, as shown in Figure D-1. As shown in Figure D-13 (hydrogeologic Cross Section E-E′), the western boundary of the shallow groundwater zone occurs between Monitoring Wells W11TCSW3/W11TCSW12 and EPAMW16, as illustrated by the difference in groundwater elevations of approximately 40 feet or more lower at Monitoring Wells EPAMW16_07 and W12NVJW2.

Figure D-13 presents Cross Section E-E, which shows the groundwater zones in the eastern alluvial aquifer.

Figure D-22 presents the groundwater elevation contour map for the shallow groundwater zone in the eastern alluvial aquifer.

Figure D-1 presents the hydrogeologic conceptual model for Area 3.

As shown in Figure D-13 (hydrogeologic Cross Section E-E′), west of Monitoring Wells W11TCSW1 through W11TCSW11, the fine-grained unit that defines the base of the shallow groundwater zone occurs above the water table in the uppermost monitoring point of EPAMW16_07. Monitoring Well W11TCW12 is screened at a depth interval lower than the fine-grained unit, and the groundwater level is approximately 17 feet lower than the water levels in Monitoring Wells W11TCSW1 through W11TCSW11 screened above the fine-grained unit. The approximate 17-foot difference between water levels in monitoring wells screened above and below the fine-grained unit suggests that the fine-grained unit limits vertical downward groundwater flow.

D.3.2.2 Features of the Intermediate Groundwater Zone in the Eastern Portion of Area 3

The first encountered groundwater in most of Area 3 occurs in the intermediate zone. This portion of the intermediate groundwater zone is unconfined. The intermediate groundwater zone also occurs below the shallow groundwater zone as an increasingly confined aquifer.

Figure D-13 (hydrogeologic Cross Section E-E′) shows that a continuous fine-grained unit at the base of the intermediate groundwater zone can be correlated based on the lithology observed at Monitoring Wells EPAMW13, EPAMW14, and EPAMW15. The limited data set precludes fully defining the bottom of the intermediate groundwater zone.

Figure D-16 presents the hydrographs for groundwater level measurements collected in the eastern portion of Area 3.

The hydrographs in Figure D-16 show that pumping influences indicated by groundwater level fluctuations in the intermediate groundwater zone are smaller than the greater pumping influence indicated by the larger groundwater level fluctuations in the underlying deep groundwater zone. A similar groundwater

Figure D-4 illustrates the groundwater elevation contour map for the intermediate zone in the eastern alluvial aquifer.

Table D-6 summarizes annual groundwater production within Area 3 from 1974 through 2007.

Figures D-3 and D-4 show the location of the Alhambra Pumping Hole.

Figure D-15 presents the vertical profiles of groundwater measured in multiport monitoring wells.

Figure D-16 presents the hydrographs for groundwater level measurements collected in the eastern portion of Area 3.

Figure D-23 presents the groundwater elevation contour map for the deep groundwater zone in the eastern alluvial aquifer.

level response occurs in the intermediate groundwater zone at Monitoring Wells EPAMW13, EPAMW14, EPAMW15, and EPAMW16.

Figure D-4 shows a groundwater response to pumping at ***groundwater monitoring wells*** located closer to active production wells. The total groundwater production within Area 3 has been relatively consistent since 2003, as shown in Table D-6.

The groundwater in the intermediate zone generally flows to pumping centers, including the Alhambra Pumping Hole between Central and southeastern (SE) Area 3 and to Production Well 01903059 located in northeastern (NE) Area 3, as shown in Figure D-3. Figure D-4 shows the Alhambra Pumping Hole centered on Production Well 01900014.

D.3.2.3 Features of the Deep Groundwater Zone in the Eastern Portion of Area 3

The deep groundwater zone, which is encountered below the intermediate groundwater zone, acts as a confined aquifer. The lower portion of the deep groundwater zone at Monitoring Well EPAMW15 generally has a higher piezometric surface elevation resulting in an upward vertical gradient, as indicated by the deflection in the vertical groundwater elevation profile in Figure D-15. However, characterizing the upper and lower boundaries of the deep groundwater zone is infeasible.

The hydrographs in Figure D-16 illustrate that the water level trends in the deep groundwater zone and the intermediate groundwater zone differ. Groundwater levels in the deep groundwater zone generally show seasonal fluctuations (up to 15 feet at EPAMW15) and influences from pumping. The lowest groundwater levels occur during the summer when groundwater pumping is highest. The general trend shows a slight increase in groundwater levels since early 2005.

The relatively large groundwater level fluctuations, shown in Figure D-16, for the deep groundwater zone indicate the strong influence of pumping of production wells. Similar fluctuations occur in the deep groundwater zone.

The groundwater response in the deep groundwater zone is generally similar to the response in the intermediate groundwater zone at this well, unlike the distinctly different responses observed at the other multiport monitoring wells. The fine-grained unit at the base of the intermediate groundwater zone in the vicinity of EPAMW16 might be discontinuous, and the boundary between the intermediate and deep groundwater zones difficult to define, as shown in Figure D-16.

Groundwater flow in the deep groundwater zone is similar to groundwater flow in the intermediate groundwater zone. Groundwater flows towards the active production wells as shown in Figure D-23.

D.4 References

BKK Corporation. 1986. *BKK Landfill Site Assessment and Mitigation Work Plan: Book 1 Subsurface Site Characterization.* Prepared by Environmental Solutions, Inc. August.

California Department of Water Resources (CDWR). 1966. *Bulletin No. 104-2, Planned Utilization of Ground Water Basins; San Gabriel Valley, Appendix A: Geohydrology.* March.

Dibblee. 1989. *Geologic Map of the Los Angeles Quadrangle. Los Angeles County California 7.5 Minute Series.*

Domenico, Patrick A., and Franklin W. Schwartz. 1990. *Physical and Chemical Hydrogeology.* John Wiley & Sons: New York.

Freeze, Alan R., and John A. Cherry. 1979. *Groundwater.* Prentice Hall.

Lamar, Donald L., Consulting Geologist, Lamar-Merifield. 1970. *Geology of the Elysian Park-Repetto Hills Area, Los Angeles County, California.* Prepared for Division of Mines and Geology Special Report 101.

McCulloh, Thane H., Larry A. Beyer, and Ronald W. Morin. 2001. *Mountain Meadows Dacite: Oligocene Intrusive Complex that Welds Together the Los Angeles Basin, Northwestern Peninsular Ranges, and Central Transverse Ranges, California.* U.S. Geological Survey Professional Paper 1649. 34p.

Northwest El Monte Community Task Force. 1998. *El Monte Operable Unit Interim Remedial Investigation/Feasibility Study: Final Feasibility Study Report.* Prepared by Camp Dresser & McKee Inc., July 31.

Ray, Monte E. 1986. *BKK Landfill Hydrogeological Investigation. Volume and Guidebook: Hydrogeology of Southern California.* Prepared for the 82nd Annual Meeting of the Cordilleran Section of the Geological Society of America. California State University, Los Angeles. March 25-28.

South El Monte Operable Unit Participants. 1998. *Remedial Investigation Report: Interim Remedial Investigation/Feasibility Study.* Prepared by Geosystem Consultants, Inc., August 26.

Treiman, J.A. 1991. *Whittier Fault Zone, Los Angeles and Orange Counties California.* California Division of Mines and Geology. Fault Evaluation Report FER-222, 17p.

United States Environmental Protection Agency (EPA), Region 9. 2002. *Technical Memorandum Conversion and Update of the San Gabriel Basin Groundwater Flow Model.* Prepared by CH2M HILL. December.

United States Environmental Protection Agency (EPA), Region 9. 1990. *Phase I Hydrogeology Investigation Final Report: Volume I.* Prepared by CH2M HILL. September 28.

United States Environmental Protection Agency (EPA), Region 9. 2001. *Alhambra Operable Unit Draft Data Evaluation Report.* Prepared by CH2M HILL. January.

United States Environmental Protection Agency (EPA), Region 9. 1998a. *Site Characterization Report Whittier Narrows Operable Unit.* Prepared by CH2M HILL, January.

United States Environmental Protection Agency (EPA), Region 9. 1998b. *Whittier Narrows Operable Unit Feasibility Study Addendum, San Gabriel Basin, Los Angeles County, California*. Prepared by CH2M HILL. October.

Yeats, R.S. 2004. *Tectonics of the San Gabriel Basin and Surroundings, Southern California*. GSA Bulletin, Volume 116 No. 9/10. September/October.

Tables

TABLE D-1
Groundwater Elevation Measurements in the Western Portion of Area 3
Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

Well/ Station ID	Geographic Area	Aquifer	Reference Point Elevation (ft msl)	Well Depth (ft bgs)	Screened Interval(s) (ft bgs)	Date Sampled	Depth to Water (ft bgs)	Piezometric Surface/ Water Table Elevation (ft msl)
EPAMW11[1]	SW	Western Alluvial	462.08	282	252-272	3/5/2003	185.43	276.65
						7/18/2003	185.72	276.36
						11/4/2003	186.10	275.98
						2/3/2004	186.22	275.86
						5/21/2004	186.75	275.33
						8/3/2004	186.77	275.31
						11/9/2004	187.39	274.69
						5/25/2005	187.64	274.44
						8/22/2005	187.15	274.93
						12/2/2005	186.69	275.39
						5/22/2006	185.09	276.99
						8/24/2006	184.17	277.91
						11/13/2006	183.74	278.34
						2/8/2007	183.45	278.63
						3/26/2007	182.97	279.11
						5/11/2007	182.51	279.57
						6/18/2007	183.32	278.76
EPAMW18[1]	SW	Bedrock	479.01	236	196-226	5/25/2005	180.91	298.10
						9/9/2005	179.46	299.55
						11/28/2005	184.53	294.48
						5/24/2006	179.57	299.44
						8/24/2006	179.24	299.77
						11/14/2006	179.30	299.71
						2/7/2007	179.23	299.78
						3/26/2007	179.04	299.97
						5/11/2007	178.69	300.32
						6/20/2007	178.89	300.12
W12VCGM1[1,2]	SW	Western Alluvial	442[3]	180	75-180	11/3/2006	108.91	333.09
						4/24/2007	108.05	333.95
						6/20/2007	108.13	333.87
W12CW202[1,2]	SW	Western Alluvial	480.86	200	180-200	9/27/2006	184.02	296.84
						4/2/2007	183.71	297.15
						6/20/2007	183.78	297.08
						9/11/2007	183.83	297.03
W12USMW1[1,2]	SW	Western Alluvial	467.32	195	165-195	11/7/2006	169.23	298.09
						12/21/2006	165.92	301.40
						4/2/2007	161.78	305.54
						6/20/2007	161.33	305.99
						12/13/2007	161.47	305.85
W12IWMW1[1,2]	SW	Western Alluvial	471.55	-	160-190	9/24/2004	183.11	288.44
						6/16/2005	183.21	288.34
						9/27/2005	181.89	289.66
						12/15/2005	177.52	294.03
						9/5/2006	166.07	305.48
						4/2/2007	164.80	306.75
						6/20/2007	164.51	307.04
W12PMMW1[1,2]	SW	Bedrock	489.83	200	10-200	1/22/2004	192.00	297.83
						5/12/2004	186.94	302.89
						6/15/2004	186.34	303.49
						6/28/2004	196.97	292.86
						8/5/2004	195.46	294.37
						6/14/2005	186.26	303.57
						9/27/2005	192.82	297.01
						12/15/2005	195.36	294.47
						3/22/2006	193.94	295.89
						9/5/2006	190.74	299.09
						4/2/2007	187.26	302.57
						6/21/2007	187.40	302.43
						10/12/2007	184.85	304.98

Notes:
ft bgs = feet below ground surface
ft msl = feet (relative to) mean sea level
- = not measured
SW = southwestern
[1]Measurement represents the groundwater table elevation.
[2]Groundwater elevation measurements obtained from LARWQCB.
[3]Value estimated based on ground surface elevation from USGS topographic map.

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W12RDFW1[1,2]	SW	Western Alluvial/Bedrock	496.1	100	60-100	8/20/2003	68.35	427.75
						1/22/2004	68.42	427.68
						6/14/2004	65.70	430.40
						6/28/2004	68.72	427.38
						10/29/2004	68.88	427.22
						2/25/2005	68.07	428.03
						6/14/2005	65.70	430.40
						4/3/2007	67.26	428.84
						6/22/2007	67.49	428.61
W12CVMW3[1,2]	SW	Western Alluvial	468.12	168	156-166	6/30/2003	160.51	307.61
						12/10/2003	160.95	307.17
						1/22/2004	160.92	307.20
						6/2/2004	161.22	306.90
						12/29/2004	161.51	306.61
						3/16/2005	161.48	306.64
						5/31/2005	161.16	306.96
						9/2/2005	160.39	307.73
						12/14/2005	159.54	308.58
						2/28/2006	158.95	309.17
						5/31/2006	158.48	309.64
						8/4/2006	158.12	310.00
						4/2/2007	157.43	310.69
						6/20/2007	157.57	310.55
						9/12/2007	157.80	310.32
W12CVMW4[1,2]	SW	Western Alluvial	465.93	180	152-167	6/30/2003	156.78	309.15
						12/10/2003	157.29	308.64
						1/22/2004	157.21	308.72
						6/2/2004	157.57	308.36
						12/29/2004	157.92	308.01
						3/16/2005	157.90	308.03
						5/31/2005	157.27	308.66
						9/2/2005	156.31	309.62
						12/14/2005	155.38	310.55
						2/28/2006	154.76	311.17
						5/31/2006	154.12	311.81
						8/4/2006	153.29	312.64
						4/2/2007	153.30	312.63
						6/20/2007	153.5	312.43
						8/12/2007	153.71	312.22
W12CVMW5[1,2]	SW	Western Alluvial/Bedrock	466.27	163.4	153-163	6/30/2003	156.90	309.37
						12/10/2003	157.27	309.00
						1/22/2004	157.23	309.04
						6/2/2004	157.55	308.72
						12/29/2004	157.79	308.48
						3/16/2005	157.66	308.61
						5/31/2005	157.05	309.22
						9/2/2005	156.15	310.12
						12/14/2005	155.35	310.92
						2/28/2006	154.85	311.42
						5/31/2006	154.39	311.88
						8/4/2006	154.10	312.17
						4/2/2007	153.73	312.54
						9/12/2007	154.15	312.12
						6/20/2007	153.92	312.35

Notes:
ft bgs = feet below ground surface
ft msl = feet (relative to) mean sea level
- = not measured
SW = southwestern
[1]Measurement represents the groundwater table elevation.
[2]Groundwater elevation measurements obtained from LARWQCB.
[3]Value estimated based on ground surface elevation from USGS topographic map.

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San Gabriel Valley Area 3 Superfund Site

Well/ Station ID	Geographic Area	Aquifer	Reference Point Elevation (ft msl)	Well Depth (ft bgs)	Screened Interval(s) (ft bgs)	Date Sampled	Depth to Water (ft bgs)	Piezometric Surface/ Water Table Elevation (ft msl)
W12CPMW1[1,2]	SW	Western Alluvial	466.27	192.5	160-190	2/4/2005	177.66	288.61
						1/31/2005	178.25	288.02
						4/27/2005	178.26	288.01
						7/28/2005	177.37	288.90
						10/26/2005	176.01	290.26
						1/26/2006	174.47	291.80
						4/2/2007	166.14	300.13
						6/20/2007	165.97	300.30
						12/19/2007	166.2	300.07
W12ASMW1[1,2]	SW	Western Alluvial/Bedrock	471.45	350	170-200	8/4/2005	185.00	286.45
						8/29/2005	186.99	284.46
						11/30/2006	182.80	288.65
						4/3/2007	181.72	289.73
						6/21/2007	181.55	289.90
						12/12/2007	181.53	289.92
W12ASMW2[1,2]	SW	Western Alluvial	473.67		165-185	11/30/2006	173.91	299.76
						4/3/2007	173.34	300.33
						6/21/2007	173.32	300.35
						8/18/2007	174.04	299.63
						12/12/2007	173.65	300.02
W12ASMW3[1,2]	SW	Western Alluvial	468.58		179-194	11/30/2006	178.14	290.44
						4/3/2007	177.11	291.47
						6/21/2007	177.11	291.47
						9/18/2007	177.55	293.90
						12/12/2007	177.24	294.21
W12ARMW1[1,2]	SW	Western Alluvial	448.82	99.5	70-96	9/9/2005	71.51	377.31
						4/6/2007	71.38	377.44
						6/20/2007	71.85	376.97
W12ARMW2[1,2]	SW	Western Alluvial	447.46	99.5	70-96	9/9/2005	70.46	377.00
						4/6/2007	70.32	377.14
						6/20/2007	70.8	376.66
W12ARMW3[1,2]	SW	Western Alluvial	442.29	97	70-95	9/9/2005	66.82	375.47
						4/6/2007	66.78	375.51
						6/20/2007	67.21	375.08
W12ARMW4[1,2]	SW	Western Alluvial	448.04	98.5	65-95	12/5/2005	69.81	378.23
						4/6/2007	70.05	377.99
						6/20/2007	70.52	377.52

Notes:
ft bgs = feet below ground surface
ft msl = feet (relative to) mean sea level
- = not measured
SW = southwestern
[1]Measurement represents the groundwater table elevation.
[2]Groundwater elevation measurements obtained from LARWQCB.
[3]Value estimated based on ground surface elevation from USGS topographic map.

TABLE D-2
Pumping Test Results for the Bedrock Aquifer in San Gabriel Basin
Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

Formation	Sedimentary Rock Material	Landfill	Hydraulic Conductivity (ft/day)[1]	Specific Yield/ Storativity Range[1] (dimensionless)	Number of Wells Tested	Comments	Source
Pico Formation	siltstone	OII	0.1	NM	1		EPA, 1990b
Pico Formation	sandstone and conglomerate	OII	0.1 to 240[2]	NM	17		EPA, 1990b
Puente Formation	siltstone/shale	BKK	0.032 to 440[2]	0.0003 to 0.04	13	Higher transmissivity values obtained in fractured, jointed, and/or weathered bedrock.	BKK Corporation, 1986

Notes:
ft/day = feet per day
NM = not measured
[1]Based on aquifer pumping test results per the analysis in report referenced.
[2]Higher end of hydraulic conductivity is indicative of fractured bedrock.
OII = Operating Industries, Inc. Landfill
EPA = United States Environmental Protection Agency
BKK = BKK Landfill

TABLE D-3
Groundwater Elevation Measurements in the Eastern Portion of Area 3
Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

Well/ Station ID	Geographic Area	Aquifer	Reference Point Elevation (ft msl)	Well Depth (ft bgs)	Screened Interval(s) (ft bgs)	Screen Depth (ft bgs)	Date Sampled	Depth to Water (ft bgs)	Piezometric Surface/ Water Table Elevation (ft msl)	Vertical Gradient[1]
EPAMW12A	Central	Bedrock	482.30	399	384-394	389	3/6/2003	323.70	158.60	--
							7/17/2003	326.04	156.26	--
							11/5/2003	330.00	152.30	--
							2/3/2004	329.80	152.50	--
							5/24/2004	330.59	151.71	--
							8/4/2004	332.43	149.87	--
							11/11/2004	333.74	148.56	--
							5/25/2005	331.15	151.15	--
							8/5/2005	332.50	149.80	--
							12/2/2005	332.67	149.63	--
							2/27/2006	330.60	151.70	--
							5/22/2006	327.83	154.47	--
							8/24/2006	328.81	153.49	--
							11/15/2006	328.56	153.74	--
							2/8/2007	327.92	154.38	--
							3/26/2007	325.33	156.97	--
							5/11/2007	325.27	157.03	--
							6/18/2007	325.97	156.33	--

Notes:
ft bgs - feet below ground surface
ft msl - feet (relative to) mean sea level
NE - northeastern
-- not measured
[1]Vertical gradient indicated is between identified and next lowest screened interval. Negative value indicates a downward vertical gradient. Screen midpoint elevations used to calculate vertical gradients.
[2]Measurement represents the groundwater table elevation.
[3]Groundwater elevation measurements obtained from LARWQCB.

TABLE D-3
Groundwater Elevation Measurements in the Eastern Portion of Area 3
Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

Well/ Station ID	Geographic Area	Aquifer	Reference Point Elevation (ft msl)	Well Depth (ft bgs)	Screened Interval(s) (ft bgs)	Screen Depth (ft bgs)	Date Sampled	Depth to Water (ft bgs)	Piezometric Surface/ Water Table Elevation (ft msl)	Vertical Gradient[1]
EPAMW13_05	Central	Eastern Alluvial Intermediate Zone	457.53	800	350-360	355	3/6/2003	310.83	146.70	-0.030
							7/15/2003	312.89	144.64	-0.082
							11/7/2003	315.79	141.74	-0.065
							2/3/2004	316.44	141.09	-0.044
							5/24/2004	316.67	140.86	-0.059
							8/3/2004	318.24	139.29	-0.079
							11/11/2004	318.86	138.67	-0.049
							2/16/2005	319.16	138.37	-0.016
							5/18/2005	316.92	140.61	-0.022
							8/30/2005	317.36	140.17	-0.050
							11/22/2005	316.95	140.58	-0.042
							5/25/2006	312.54	144.99	-0.013
							8/22/2006	313.19	144.34	-0.046
							11/16/2006	311.89	145.64	-0.046
							2/6/2007	310.81	146.72	-0.031
							3/28/2007	310.03	147.50	-0.025
							5/10/2007	309.91	147.62	-0.043
							6/20/2007	310.69	146.84	-0.062
							11/14/2007	311.8	145.73	-0.045

Notes:
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[2]Measurement represents the groundwater table elevation.
[3]Groundwater elevation measurements obtained from LARWQCB.

TABLE D-3
Groundwater Elevation Measurements in the Eastern Portion of Area 3
Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

Well/ Station ID	Geographic Area	Aquifer	Reference Point Elevation (ft msl)	Well Depth (ft bgs)	Screened Interval(s) (ft bgs)	Screen Depth (ft bgs)	Date Sampled	Depth to Water (ft bgs)	Piezometric Surface/ Water Table Elevation (ft msl)	Vertical Gradient[1]
EPAMW13_04	Central	Eastern Alluvial Deep Zone			480-490	485	3/6/2003	314.67	142.86	-0.011
							7/15/2003	323.51	134.02	-0.019
							11/6/2003	324.22	133.31	-0.012
							2/3/2004	322.12	135.41	-0.011
							5/24/2004	324.36	133.17	-0.014
							8/3/2004	328.47	129.06	-0.017
							11/11/2004	325.17	132.36	-0.011
							2/16/2005	321.25	136.28	-0.003
							5/18/2005	319.73	137.80	-0.004
							8/30/2005	323.85	133.68	-0.006
							11/22/2005	322.45	135.08	-0.002
							5/25/2006	314.26	143.27	-0.003
							8/22/2006	319.22	138.31	-0.006
							11/16/2006	317.88	139.65	-0.004
							2/6/2007	314.86	142.67	-0.002
							3/28/2007	313.31	144.22	-0.004
							5/10/2007	315.48	142.05	-0.006
							6/20/2007	318.71	138.82	-0.011
							11/14/2007	317.67	139.86	-0.009

Notes:
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[1]Vertical gradient indicated is between identified and next lowest screened interval. Negative value indicates a downward vertical gradient. Screen midpoint elevations used to calculate vertical gradients.
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[3]Groundwater elevation measurements obtained from LARWQCB.

TABLE D-3
Groundwater Elevation Measurements in the Eastern Portion of Area 3
Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

Well/ Station ID	Geographic Area	Aquifer	Reference Point Elevation (ft msl)	Well Depth (ft bgs)	Screened Interval(s) (ft bgs)	Screen Depth (ft bgs)	Date Sampled	Depth to Water (ft bgs)	Piezometric Surface/ Water Table Elevation (ft msl)	Vertical Gradient[1]
EPAMW13_03	Central	Eastern Alluvial Deep Zone			580-590	585	3/6/2003	315.73	141.80	-0.020
							7/15/2003	325.42	132.11	-0.042
							11/6/2003	325.45	132.08	-0.025
							2/3/2004	323.23	134.30	-0.022
							5/24/2004	325.75	131.78	-0.034
							8/3/2004	330.13	127.40	-0.036
							11/11/2004	326.32	131.21	-0.024
							2/16/2005	321.59	135.94	-0.006
							5/18/2005	320.16	137.37	0.001
							8/30/2005	324.48	133.05	-0.016
							11/21/2005	322.63	134.90	-0.002
							2/27/2006	318.87	138.66	--
							5/25/2006	314.54	142.99	0.014
							8/22/2006	319.84	137.69	-0.003
							11/16/2006	318.32	139.21	-0.002
							2/6/2007	315.09	142.44	0.005
							3/28/2007	313.70	143.83	0.003
							5/10/2007	316.08	141.45	-0.004
							6/20/2007	319.79	137.74	-0.015
							11/14/2007	318.57	138.96	-0.019

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[2]Measurement represents the groundwater table elevation.
[3]Groundwater elevation measurements obtained from LARWQCB.

TABLE D-3
Groundwater Elevation Measurements in the Eastern Portion of Area 3
Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

Well/ Station ID	Geographic Area	Aquifer	Reference Point Elevation (ft msl)	Well Depth (ft bgs)	Screened Interval(s) (ft bgs)	Screen Depth (ft bgs)	Date Sampled	Depth to Water (ft bgs)	Piezometric Surface/ Water Table Elevation (ft msl)	Vertical Gradient[1]
EPAMW13_02	Central	Eastern Alluvial Deep Zone			660-670	665	3/6/2003	317.37	140.16	-0.008
							7/15/2003	328.75	128.78	-0.023
							11/6/2003	327.45	130.08	-0.018
							2/3/2004	325.03	132.50	-0.007
							5/24/2004	328.45	129.08	-0.015
							8/3/2004	332.97	124.56	-0.013
							11/11/2004	328.26	129.27	-0.010
							2/16/2005	322.10	135.43	0.004
							5/18/2005	320.07	137.46	0.015
							8/30/2005	325.72	131.81	0.004
							11/21/2005	322.75	134.78	0.030
							5/25/2006	313.38	144.15	0.027
							8/22/2006	320.09	137.44	0.014
							11/16/2006	318.46	139.07	0.021
							2/6/2007	314.72	142.81	0.020
							3/28/2007	313.47	144.06	0.012
							5/10/2007	316.36	141.17	0.007
							6/20/2007	320.97	136.56	0.003
							11/14/2007	320.09	137.44	-0.008

Notes:
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TABLE D-3
Groundwater Elevation Measurements in the Eastern Portion of Area 3
Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

Well/ Station ID	Geographic Area	Aquifer	Reference Point Elevation (ft msl)	Well Depth (ft bgs)	Screened Interval(s) (ft bgs)	Screen Depth (ft bgs)	Date Sampled	Depth to Water (ft bgs)	Piezometric Surface/ Water Table Elevation (ft msl)	Vertical Gradient[1]
EPAMW13_01	Central	Eastern Alluvial Deep Zone			770-780	775	3/6/2003	318.21	139.32	--
							7/15/2003	331.32	126.21	--
							11/5/2003	329.43	128.10	--
							2/3/2004	325.85	131.68	--
							5/24/2004	330.07	127.46	--
							8/3/2004	334.36	123.17	--
							11/11/2004	329.36	128.17	--
							2/16/2005	321.70	135.83	--
							5/18/2005	318.40	139.13	--
							8/30/2005	325.30	132.23	--
							11/18/2005	319.44	138.09	--
							5/25/2006	310.46	147.07	--
							8/22/2006	318.51	139.02	--
							11/16/2006	316.14	141.39	--
							2/6/2007	312.56	144.97	--
							3/28/2007	312.10	145.43	--
							5/10/2007	315.63	141.90	--
							6/20/2007	320.66	136.87	--
							11/14/2007	320.98	136.55	--

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Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

Well/ Station ID	Geographic Area	Aquifer	Reference Point Elevation (ft msl)	Well Depth (ft bgs)	Screened Interval(s) (ft bgs)	Screen Depth (ft bgs)	Date Sampled	Depth to Water (ft bgs)	Piezometric Surface/ Water Table Elevation (ft msl)	Vertical Gradient[1]
EPAMW14_04	Central	Eastern Alluvial Intermediate Zone	505.83	635	380-390	385	7/16/2003	356.35	149.48	-0.029
							11/10/2003	355.11	150.72	-0.075
							2/6/2004	359.37	146.46	-0.007
							5/21/2004	360.27	145.56	-0.016
							8/5/2004	362.49	143.34	-0.035
							11/9/2004	363.02	142.81	-0.018
							2/16/2005	362.95	142.88	0.010
							5/17/2005	360.76	145.07	0.002
							8/24/2005	362.33	143.50	-0.013
							11/17/2005	362.44	143.39	-0.002
							5/25/2006	357.74	148.09	0.016
							8/28/2006	358.96	146.87	-0.011
							11/15/2006	357.92	147.91	-0.007
							2/7/2007	356.31	149.52	-0.001
							3/26/2007	355.11	150.72	-0.002
							5/11/2007	355.36	150.47	-0.005
							6/18/2007	356.19	149.64	-0.013
							8/22/2007	356.74	149.09	-0.023
							11/19/2007	355.71	150.12	-0.003

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TABLE D-3
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Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

Well/ Station ID	Geographic Area	Aquifer	Reference Point Elevation (ft msl)	Well Depth (ft bgs)	Screened Interval(s) (ft bgs)	Screen Depth (ft bgs)	Date Sampled	Depth to Water (ft bgs)	Piezometric Surface/ Water Table Elevation (ft msl)	Vertical Gradient[1]
EPAMW14_03	Central	Eastern Alluvial Intermediate Zone			460-470	465	7/16/2003	358.64	147.19	-0.160
							11/10/2003	361.10	144.73	-0.114
							2/6/2004	359.95	145.88	-0.093
							5/21/2004	361.57	144.26	-0.128
							8/5/2004	365.28	140.55	-0.147
							11/9/2004	364.47	141.36	-0.106
							2/16/2005	362.17	143.66	-0.067
							5/17/2005	360.64	145.19	-0.067
							8/24/2005	363.34	142.49	-0.091
							11/16/2005	362.63	143.20	-0.061
							2/27/2006	360.48	145.35	-0.046
							5/25/2006	356.49	149.34	-0.036
							8/28/2006	359.84	145.99	-0.085
							11/15/2006	358.45	147.38	-0.068
							2/7/2007	356.42	149.41	-0.061
							3/26/2007	355.29	150.54	-0.067
							5/11/2007	355.78	150.05	-0.091
							6/18/2007	357.23	148.60	-0.108
							8/22/2007	358.59	147.24	-0.123
							11/19/2007	355.98	149.85	-0.115

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[1]Vertical gradient indicated is between identified and next lowest screened interval. Negative value indicates a downward vertical gradient. Screen midpoint elevations used to calculate vertical gradients.
[2]Measurement represents the groundwater table elevation.
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TABLE D-3
Groundwater Elevation Measurements in the Eastern Portion of Area 3
Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

Well/ Station ID	Geographic Area	Aquifer	Reference Point Elevation (ft msl)	Well Depth (ft bgs)	Screened Interval(s) (ft bgs)	Screen Depth (ft bgs)	Date Sampled	Depth to Water (ft bgs)	Piezometric Surface/ Water Table Elevation (ft msl)	Vertical Gradient[1]
EPAMW14_02	Central	Eastern Alluvial Deep Zone			545-555	550	7/16/2003	372.24	133.59	-0.015
							11/10/2003	370.79	135.04	-0.002
							2/6/2004	367.83	138.00	-0.013
							5/21/2004	372.47	133.36	-0.013
							8/5/2004	377.75	128.08	-0.009
							11/9/2004	373.44	132.39	-0.008
							2/16/2005	367.86	137.97	-0.003
							5/17/2005	366.36	139.47	-0.003
							8/24/2005	371.09	134.74	-0.012
							11/15/2005	367.79	138.04	-0.008
							2/27/2006	364.37	141.46	0.000
							5/25/2006	359.53	146.30	0.002
							8/28/2006	367.03	138.80	-0.003
							11/15/2006	364.24	141.59	0.003
							2/7/2007	361.61	144.22	0.002
							3/26/2007	360.98	144.85	-0.002
							5/11/2007	363.52	142.31	-0.005
							6/18/2007	366.45	139.38	-0.006
							8/22/2007	369.01	136.82	-0.008
							11/19/2007	365.76	140.07	-0.007

Notes:
ft bgs - feet below ground surface
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NE - northeastern
-- not measured
[1]Vertical gradient indicated is between identified and next lowest screened interval. Negative value indicates a downward vertical gradient. Screen midpoint elevations used to calculate vertical gradients.
[2]Measurement represents the groundwater table elevation.
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TABLE D-3
Groundwater Elevation Measurements in the Eastern Portion of Area 3
Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

Well/ Station ID	Geographic Area	Aquifer	Reference Point Elevation (ft msl)	Well Depth (ft bgs)	Screened Interval(s) (ft bgs)	Screen Depth (ft bgs)	Date Sampled	Depth to Water (ft bgs)	Piezometric Surface/ Water Table Elevation (ft msl)	Vertical Gradient[1]
EPAMW14_01	Central	Eastern Alluvial Deep Zone			605-615	610	7/16/2003	373.12	132.71	--
							11/10/2003	370.93	134.90	--
							2/6/2004	368.60	137.23	--
							5/21/2004	373.28	132.55	--
							8/5/2004	378.31	127.52	--
							11/9/2004	373.92	131.91	--
							2/16/2005	368.04	137.79	--
							5/17/2005	366.52	139.31	--
							8/24/2005	371.78	134.05	--
							11/14/2005	368.25	137.58	--
							2/27/2006	364.35	141.48	--
							5/25/2006	359.44	146.39	--
							8/28/2006	367.21	138.62	--
							11/15/2006	364.07	141.76	--
							2/7/2007	361.49	144.34	--
							3/26/2007	361.12	144.71	--
							5/11/2007	363.80	142.03	--
							6/18/2007	366.84	138.99	--
							8/22/2007	369.5	136.33	--
							11/19/2007	366.2	139.63	--

Notes:
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[2]Measurement represents the groundwater table elevation.
[3]Groundwater elevation measurements obtained from LARWQCB.

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Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

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EPAMW15_06	Central	Eastern Alluvial Intermediate Zone	438.16	800	325-335	330	7/17/2003	293.31	144.85	-0.029
							11/7/2003	295.98	142.18	-0.017
							2/4/2004	293.61	144.55	-0.011
							5/20/2004	293.79	144.37	-0.024
							8/4/2004	297.25	140.91	-0.024
							11/10/2004	297.85	140.31	-0.017
							2/17/2005	296.26	141.90	-0.002
							5/19/2005	291.81	146.35	-0.018
							9/7/2005	293.93	144.23	-0.019
							11/29/2005	291.69	146.47	-0.018
							2/24/2006	288.30	149.86	--
							5/23/2006	284.68	153.48	-0.013
							8/23/2006	287.86	150.30	-0.017
							11/20/2006	286.78	151.38	-0.005
							2/7/2007	284.66	153.50	-0.016
							3/27/2007	284.29	153.87	-0.018
							5/9/2007	284.40	153.76	-0.023
							6/20/2007	286.39	151.77	-0.023
							11/15/2007	288.99	149.17	-0.015

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TABLE D-3
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Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

Well/ Station ID	Geographic Area	Aquifer	Reference Point Elevation (ft msl)	Well Depth (ft bgs)	Screened Interval(s) (ft bgs)	Screen Depth (ft bgs)	Date Sampled	Depth to Water (ft bgs)	Piezometric Surface/ Water Table Elevation (ft msl)	Vertical Gradient[1]
EPAMW15_05	Central	Eastern Alluvial Intermediate Zone			400-410	405	7/17/2003	295.48	142.68	-0.072
							11/7/2003	297.28	140.88	-0.051
							2/4/2004	294.42	143.74	-0.050
							5/20/2004	295.60	142.56	-0.063
							8/4/2004	299.08	139.08	-0.065
							11/10/2004	299.15	139.01	-0.049
							2/17/2005	296.43	141.73	-0.031
							5/19/2005	293.13	145.03	-0.049
							9/7/2005	295.37	142.79	-0.054
							12/1/2005	293.06	145.10	-0.047
							5/23/2006	285.68	152.48	-0.039
							8/23/2006	289.11	149.05	-0.058
							11/14/2006	287.15	151.01	-0.065
							2/7/2007	285.84	152.32	-0.046
							3/27/2007	285.65	152.51	-0.047
							5/9/2007	286.14	152.02	-0.049
							6/20/2007	288.08	150.08	-0.057
							11/15/2007	290.08	148.08	-0.047

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Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

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EPAMW15_04	Central	Eastern Alluvial Intermediate Zone			480-490	485	7/17/2003	301.23	136.93	-0.197
							11/7/2003	301.34	136.82	-0.121
							2/4/2004	298.46	139.70	-0.109
							5/20/2004	300.65	137.51	-0.165
							8/4/2004	304.25	133.91	-0.168
							11/10/2004	303.05	135.11	-0.117
							2/17/2005	298.90	139.26	-0.063
							5/19/2005	297.03	141.13	-0.109
							9/6/2005	299.68	138.48	-0.124
							11/30/2005	296.80	141.36	-0.089
							2/24/2006	292.37	145.79	--
							5/23/2006	288.81	149.35	-0.075
							8/23/2006	293.73	144.43	-0.132
							11/14/2006	292.32	145.84	-0.106
							2/7/2007	289.53	148.63	-0.095
							3/27/2007	289.37	148.79	-0.096
							5/9/2007	290.06	148.10	-0.092
							6/20/2007	292.62	145.54	-0.133
							11/15/2007	293.8	144.36	-0.117

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TABLE D-3
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Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

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EPAMW15_03	Central	Eastern Alluvial Deep Zone			590-600	595	7/17/2003	322.94	115.22	-0.003
							11/7/2003	314.64	123.52	-0.021
							2/4/2004	310.42	127.74	0.008
							5/20/2004	318.81	119.35	-0.004
							8/4/2004	322.69	115.47	-0.005
							11/10/2004	315.88	122.28	-0.005
							2/17/2005	305.83	132.33	0.000
							5/19/2005	309.01	129.15	0.004
							9/2/2005	313.28	124.88	-0.003
							11/29/2005	306.57	131.59	0.015
							5/23/2006	297.06	141.10	-0.003
							8/23/2006	308.25	129.91	0.001
							11/14/2006	303.98	134.18	-0.006
							2/7/2007	299.97	138.19	0.001
							3/27/2007	299.90	138.26	0.001
							5/9/2007	300.18	137.98	-0.011
							6/20/2007	307.23	130.93	0.001
							11/15/2007	306.66	131.50	0.001

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TABLE D-3
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Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

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EPAMW15_02	Central	Eastern Alluvial Deep Zone			670-680	675	7/17/2003	323.15	115.01	0.057
							11/7/2003	316.35	121.81	0.076
							2/4/2004	309.82	128.34	0.068
							5/20/2004	319.11	119.05	0.052
							8/4/2004	323.08	115.08	0.051
							11/10/2004	316.28	121.88	0.054
							2/17/2005	305.85	132.31	0.071
							5/18/2005	308.71	129.45	0.140
							9/2/2005	313.51	124.65	0.094
							11/28/2005	305.37	132.79	0.133
							5/23/2006	297.27	140.89	0.132
							8/23/2006	308.20	129.96	0.126
							11/20/2006	304.49	133.67	0.124
							2/7/2007	299.92	138.24	0.115
							3/27/2007	299.85	138.31	0.112
							5/9/2007	301.08	137.08	0.086
							6/20/2007	307.19	130.97	0.078
							11/15/2007	306.57	131.59	0.048

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Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

Well/ Station ID	Geographic Area	Aquifer	Reference Point Elevation (ft msl)	Well Depth (ft bgs)	Screened Interval(s) (ft bgs)	Screen Depth (ft bgs)	Date Sampled	Depth to Water (ft bgs)	Piezometric Surface/ Water Table Elevation (ft msl)	Vertical Gradient[1]
EPAMW15_01	Central	Eastern Alluvial Deep Zone			770-780	775	7/16/2003	317.47	120.69	--
							11/7/2003	308.80	129.36	--
							2/4/2004	303.03	135.13	--
							5/20/2004	313.87	124.29	--
							8/4/2004	318.00	120.16	--
							11/10/2004	310.87	127.29	--
							2/17/2005	298.79	139.37	--
							5/18/2005	294.75	143.41	--
							9/2/2005	304.09	134.07	--
							11/28/2005	292.05	146.11	--
							5/23/2006	284.11	154.05	--
							8/23/2006	295.56	142.60	--
							11/14/2006	292.14	146.02	--
							2/7/2007	288.43	149.73	--
							3/27/2007	288.61	149.55	--
							5/9/2007	292.51	145.65	--
							6/20/2007	299.39	138.77	--
							11/15/2007	301.72	136.44	--

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Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

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EPAMW17[2]	Central	Bedrock	504.32	330	270-320	295	2/15/2005	306.65	197.67	--
							5/26/2005	311.31	193.01	--
							8/22/2005	312.66	191.66	--
							11/18/2005	314.82	189.50	--
							2/21/2006	313.24	191.08	--
							5/22/2006	313.07	191.25	--
							8/24/2006	315.17	189.15	--
							11/20/2006	315.02	189.30	--
							2/8/2007	313.04	191.28	--
							3/28/2007	312.58	191.74	--
							5/11/2007	312.30	192.02	--
							6/20/2007	312.13	192.19	--
EPAMW16_07	NE	--	415.39	820	265-275	270	2/21/2005	242.60	172.79	-0.198
							5/20/2005	241.86	173.53	-0.204
							12/6/2005	240.70	174.69	-0.202
							3/1/2006	238.83	176.56	-0.182
							6/6/2006	236.57	178.82	-0.162
							8/25/2006	238.69	176.70	-0.188
							11/17/2006	237.58	177.81	-0.180
							2/6/2007	236.73	178.66	-0.173
							3/27/2007	235.34	180.05	-0.190
							5/10/2007	237.79	177.60	-0.201
							6/20/2007	239.13	176.26	-0.182
							8/21/2007	240.72	174.67	-0.191

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Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

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EPAMW16_06	NE	--			335-345	340	2/21/2005	256.48	158.91	-0.053
							5/20/2005	256.15	159.24	-0.052
							12/6/2005	254.85	160.54	-0.049
							3/1/2006	251.57	163.82	-0.042
							6/6/2006	247.91	167.48	-0.049
							8/25/2006	251.87	163.52	-0.058
							11/17/2006	250.21	165.18	-0.059
							2/6/2007	248.87	166.52	-0.057
							3/27/2007	248.64	166.75	-0.062
							6/20/2007	251.85	163.54	-0.036
							8/21/2007	254.32	161.07	-0.075
							11/16/2007	254.06	161.33	-0.062
EPAMW16_05	NE	--			405-415	410	2/21/2005	260.20	155.19	-0.009
							5/20/2005	259.79	155.60	0.002
							12/6/2005	258.25	157.14	-0.009
							2/24/2006	254.49	160.90	-0.006
							6/5/2006	251.31	164.08	-0.007
							8/25/2006	255.92	159.47	-0.012
							11/17/2006	254.35	161.04	-0.010
							2/6/2007	252.83	162.56	-0.011
							3/27/2007	252.99	162.40	-0.014
							5/10/2007	254.38	161.01	-0.009
							6/20/2007	256.27	159.12	-0.012
							8/21/2007	259.54	155.85	-0.011
							11/16/2007	258.37	157.02	-0.011

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Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

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EPAMW16_04	NE	--			505-515	510	2/21/2005	261.06	154.33	-0.054
							5/20/2005	259.63	155.76	-0.059
							12/6/2005	259.13	156.26	-0.049
							2/23/2006	255.14	160.25	-0.042
							6/5/2006	251.98	163.41	-0.035
							8/25/2006	257.10	158.29	-0.048
							11/17/2006	255.37	160.02	-0.051
							2/6/2007	253.94	161.45	-0.051
							3/27/2007	254.40	160.99	-0.060
							5/10/2007	255.30	160.09	-0.052
							6/20/2007	257.51	157.88	-0.054
							8/20/2007	260.6	154.79	-0.067
							11/16/2007	259.43	155.96	-0.052
EPAMW16_03	NE	--			585-595	590	2/21/2005	265.35	150.04	-0.021
							5/20/2005	264.33	151.06	-0.028
							12/6/2005	263.07	152.32	-0.022
							2/23/2006	258.53	156.86	-0.017
							6/2/2006	254.77	160.62	-0.025
							8/25/2006	260.93	154.46	-0.024
							11/17/2006	259.47	155.92	-0.026
							2/6/2007	258.04	157.35	-0.020
							3/27/2007	259.20	156.19	-0.021
							5/10/2007	259.47	155.92	-0.023
							6/20/2007	261.83	153.56	-0.022
							8/20/2007	265.98	149.41	-0.013
							11/16/2007	263.56	151.83	-0.019

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EPAMW16_02	NE	--			650-660	655	2/21/2005	266.70	148.69	-0.061
							5/19/2005	266.15	149.24	-0.088
							12/6/2005	264.50	150.89	-0.083
							2/22/2006	259.65	155.74	-0.063
							6/2/2006	256.40	158.99	-0.077
							8/25/2006	262.47	152.92	-0.097
							11/17/2006	261.15	154.24	-0.091
							2/6/2007	259.31	156.08	-0.091
							3/27/2007	260.58	154.81	-0.090
							5/10/2007	260.97	154.42	-0.075
							6/20/2007	263.25	152.14	-0.086
							8/20/2007	266.85	148.54	-0.094
							11/16/2007	264.8	150.59	-0.080
EPAMW16_01	NE	--			790-800	795	2/21/2005	275.21	140.18	--
							5/19/2005	278.44	136.95	--
							12/6/2005	276.08	139.31	--
							2/22/2006	268.42	146.97	--
							6/2/2006	267.20	148.19	--
							8/25/2006	276.10	139.29	--
							11/17/2006	273.91	141.48	--
							2/6/2007	271.99	143.40	--
							3/27/2007	273.19	142.20	--
							5/10/2007	271.51	143.88	--
							6/20/2007	275.34	140.05	--
							8/20/2007	280.02	135.37	--
							11/16/2007	275.96	139.43	--

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Remedial Investigation
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W11TCSW1[2,3]	NE	Eastern Alluvial Shallow Zone	413.10	220	190-220		2/24/1993	204.91	208.19	--
							6/23/1993	204.14	208.96	--
							10/12/1993	203.92	209.18	--
							1/31/1994	202.71	210.39	--
							4/14/1994	203.55	209.55	--
							2/5/2004	200.26	212.84	--
							1/18/2007	200.00	213.10	--
							4/24/2007	199.22	213.88	--
							6/21/2007	199.06	214.04	--
W11TCSW2[2,3]	NE	Eastern Alluvial Shallow Zone	410.67	221.5	185-215		2/24/1993	202.90	207.77	--
							6/23/1993	202.22	208.45	--
							10/12/1993	201.64	209.03	--
							1/31/1994	200.77	209.90	--
							4/14/1994	200.96	209.71	--
							1/18/2007	198.05	212.62	--
							4/24/2007	197.30	213.37	--
							6/22/2007	196.97	213.70	--
W11TCSW3[2,3]	NE	Eastern Alluvial Shallow Zone	410.46	220	185-215		2/24/1993	203.15	207.31	--
							6/23/1993	202.43	208.03	--
							10/12/1993	201.92	208.54	--
							1/31/1994	201.02	209.44	--
							4/14/1994	201.40	209.06	--
							1/18/2007	198.15	212.31	--
							4/24/2007	197.39	213.07	--
							6/22/2007	197.03	213.43	--

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Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

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W11TCSW4[2,3]	NE	Eastern Alluvial Shallow Zone	415.01	215	95-215		1/18/2007	202.17	212.84	--
							4/24/2007	201.37	213.64	--
							6/21/2007	201.14	213.87	--
W11TCSW5[2,3]	NE	Eastern Alluvial Shallow Zone	413.13	220	200-220		4/24/2007	198.59	214.54	--
							6/22/2007	198.16	214.97	--
W11TCSW6[2,3]	NE	Eastern Alluvial Shallow Zone	416.84	220	200-220		1/18/2007	203.56	213.28	--
							4/24/2007	202.84	214.00	--
							6/22/2007	202.84	214.00	--
W11TCSW7[2,3]	NE	Eastern Alluvial Shallow Zone	413.94	220	200-220		4/24/2007	199.35	214.59	--
							6/22/2007	198.93	215.01	--
W11TCSW9[2,3]	NE	Eastern Alluvial Shallow Zone	411.25	217	197-217		1/18/2007	198.73	212.52	--
							4/24/2007	197.91	213.34	--
							6/21/2007	197.74	213.51	--
W11TCW10[2,3]	NE	Eastern Alluvial Shallow Zone	410.65	215	195-215		1/18/2007	198.25	212.40	--
							4/24/2007	197.49	213.16	--
							6/21/2007	197.30	213.35	--
W11TCW11[2,3]	NE	Eastern Alluvial Shallow Zone	407.25	215	95-215		1/18/2007	195.09	212.16	--
							4/24/2007	194.25	213.00	--
							6/21/2007	194.14	213.11	--

Notes:
ft bgs - feet below ground surface
ft msl - feet (relative to) mean sea level
NE - northeastern
-- not measured
[1]Vertical gradient indicated is between identified and next lowest screened interval. Negative value indicates a downward vertical gradient. Screen midpoint elevations used to calculate vertical gradients.
[2]Measurement represents the groundwater table elevation.
[3]Groundwater elevation measurements obtained from LARWQCB.

TABLE D-3
Groundwater Elevation Measurements in the Eastern Portion of Area 3
Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

Well/ Station ID	Geographic Area	Aquifer	Reference Point Elevation (ft msl)	Well Depth (ft bgs)	Screened Interval(s) (ft bgs)	Screen Depth (ft bgs)	Date Sampled	Depth to Water (ft bgs)	Piezometric Surface/ Water Table Elevation (ft msl)	Vertical Gradient[1]
W11TCW12[3]	NE	Eastern Alluvial Intermediate Zone	410.44	278	268-278		1/29/2007	212.94	197.50	--
							4/24/2007	211.90	198.54	--
							6/21/2007	214.02	196.42	--
W12NVJW2[2,3]	NE	Eastern Alluvial Intermediate Zone	420.57	-	249-279		8/12/2004	269.06	151.51	--
							8/19/2004	269.30	151.27	--
							9/21/2006	257.30	163.27	--
							12/18/2006	257.30	163.27	--
							3/12/2007	254.67	165.90	--
							4/2/2007	253.87	166.70	--
							6/13/2007	255.89	164.68	--
							6/20/2007	256.62	163.95	--
W12NVJW3[2,3]	NE	Eastern Alluvial Intermediate Zone	420.04	-	259-289		8/12/2004	268.58	151.46	--
							8/19/2004	269.06	150.98	--
							9/21/2006	257.20	162.84	--
							12/18/2006	257.20	162.84	--
							3/12/2007	254.83	165.21	--
							4/2/2007	254.98	165.06	--
							6/13/2007	255.97	164.07	--
							6/20/2007	256.67	163.37	--
W12NVW1R[2,3]	NE	Eastern Alluvial Intermediate Zone	418.57	-	260-290		8/21/2006	255.99	162.58	--
							12/18/2006	255.99	162.58	--
							3/12/2007	253.54	165.03	--
							4/2/2007	253.87	164.70	--
							6/13/2007	255.00	163.57	--
							6/20/2007	255.71	162.86	--

Notes:
ft bgs - feet below ground surface
ft msl - feet (relative to) mean sea level
NE - northeastern
-- not measured
[1]Vertical gradient indicated is between identified and next lowest screened interval. Negative value indicates a downward vertical gradient. Screen midpoint elevations used to calculate vertical gradients.
[2]Measurement represents the groundwater table elevation.
[3]Groundwater elevation measurements obtained from LARWQCB.

TABLE D-4
Summary of Aquifer Test Data
Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

Recordation Number	Geographic Area	Eastern Aquifer Zone(s) Screened	Test Type	Analysis Method	Pumping Rate [Q] (gpm)	Saturated Thickness [b] (ft)	Well Diameter (inches)	Test Duration (hours)	Transmissivity [T] (ft^2/day)	Hydraulic Conductivity [K] (ft/day)	Storativity [S] (dimensionless)	Reference
01903097	Central	Intermediate, Deep	Pumping	Cooper-Jacob	1,733	376[1]	10	5	42,297[1]	112[1]	NA	Stetson, 1993
01900010	Central	Intermediate, Deep	-	-	-	-	-	-	-	348	0.0025	-
01900026	NE	Intermediate, Deep	-	-	-	-	-	-	-	90	0.00087	-
01900927	SE	Intermediate	-	-	-	-	-	-	-	380	0.0013	-
01901672	Central	Intermediate, Deep	Recovery	-	-	-	-	-	17,956[2]	-	-	CDWR, 1966
01902786	NE	Intermediate, Deep	Pumping	Cooper-Jacob	1,901	584[1]	10	5	47,465[1]	81[1]	NA	Stetson, 1993
01901669	SE	Intermediate	Pumping	-	-	-	-	-	4,422[2]	-	-	CDWR, 1966
01900515	SE	Intermediate, Deep	-	-	-	360	-	-	15,909	44		-

Notes:
CDWR = California Department of Water Resources
ft = feet
ft/day = feet per day
ft^2/day = square feet per day
gpm = gallons per minute
NA = not applicable
NE = northeastern
SE = southeastern
- = not available
[1]Calculated based on aquifer pumping test data.
[2]Calculated based on specific capacity test data for a well.

TABLE D-5
Summary of Results for Inorganic COPCS in Groundwater
Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

COPC				Concentration of Dissolved Metals (mg/L)				Concentrations of Anions and General Parameters (mg/L)				
				Calcium	Magnesium	Potassium	Sodium	Bicarbonate Alkalinity	Carbonate Alkalinity	Chloride	Sulfate	TDS
Well Station ID	Geographic Area	Aquifer	Sample Date									
EPAMW11	SW	Western Alluvial	3/5/2003	90	32	5	71	--	--	--	--	--
			3/5/2003 (FD)	92	33	3	73	--	--	--	--	--
			11/4/2003	98	36	<5	75	--	--	--	--	--
			11/4/2003 (FD)	<96	36	2.9 J	76	--	--	--	--	--
			12/2/2005	98	36	2.45 J	70.6	--	--	--	--	--
			8/23/2005	98.3	36.5	2.48 J	70.2	--	--	--	--	--
			8/23/2005 (FD)	97.5	36.2	2.48 J	69.7	--	--	--	--	--
			5/22/2006	104	38	2.83 J	72.6	300	<10	72	130	--
			8/24/2006	100	38.6	2.24 J	76.6	300	<10	73	130	--
EPAMW18	SW	Bedrock	9/9/2005	19.4	11.5	3.1 J	82.2	--	--	--	--	--
			5/24/2006	--	--	--	--	180	<10	40	67	--
			5/24/2006 (FD)	--	--	--	--	180	<10	40	67	--
			8/24/2006	40.1	11	2.19 J	78.2	190	<10	39	64	--
			8/24/2006 (FD)	--	--	--	--	--	--	39	65	--
01900934	NW	Eastern Alluvial--Intermediate Zone	12/10/1984	43	14	--	27	--	--	31	126	--
			12/21/1987	44	4.9	--	30	--	--	30	57	272
			5/15/1989	--	--	--	--	--	--	33	--	--
			5/15/1989	48	40	--	22	--	--	33	44	348
			8/7/1990	58.02	16.08	2.01	28.15	--	--	31.9	54.7	344
			10/9/1990	57.63	15.74	1.97	29.69	--	--	32.7	54.8	412
			12/13/1993	--	--	--	--	--	--	30.8	55	320
01901679	NW	Eastern Alluvial--Intermediate and Deep Zones	12/11/1984	69.6	20.3	2.4	33.9	--	--	48	50	338
			4/19/1988	65.5	20.3	2.4	33.5	--	--	47	48	410
			5/2/1989	70.3	20.2	2.3	34.6	--	--	46	48	390
			4/25/1995	--	--	--	--	--	--	46	60	370
01900010	Central	Eastern Alluvial--Intermediate and Deep Zones	5/21/1985	40	12.9	1.8	33	--	--	20	28	275
			5/24/1988	52.5	5.6	2.2	31.3	--	--	18.8	24.9	266
			6/4/1991	--	--	--	--	--	--	24.1	26.1	236
			6/7/1994	--	--	--	--	--	--	25.3	27.8	269
01900011	Central	Eastern Alluvial--Intermediate and Deep Zones	4/15/1986	48.9	14.1	1.9	23.5	--	--	35.1	34.7	327
			4/25/1989	52.7	13.2	1	31	--	--	29.1	50.4	296
			4/3/1990	45	17.1	1.8	24.5	--	--	26.1	32.6	289
			6/26/1990	51.3	14.3	2	26.1	--	--	28.2	34.9	283
			6/22/1993	--	--	--	--	--	--	41.3	46.5	353

Notes:
FD = field duplicate
J = concentration is estimated
mg/L = milligrams per liter
-- = not measured
TDS = total dissolved solids

TABLE D-5
Summary of Results for Inorganic COPCS in Groundwater
Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

COPC				Concentration of Dissolved Metals (mg/L)				Concentrations of Anions and General Parameters (mg/L)				
				Calcium	Magnesium	Potassium	Sodium	Bicarbonate Alkalinity	Carbonate Alkalinity	Chloride	Sulfate	TDS
Well Station ID	Geographic Area	Aquifer	Sample Date									
01900012	Central	Eastern Alluvial--Intermediate and Deep Zones	7/19/1988	58.1	11.9	2.2	54	--	--	44.7	47.4	347
			9/18/2003	--	--	--	--	--	--	--	--	460
			7/19/1988	58.1	11.9	2.2	54	--	--	44.7	47.4	347
			11/17/2005	78.8	23.2	2.69 J	57.6	--	--	--	--	--
			8/23/2005	65.3	20.1	2.42 J	50.4	--	--	--	--	--
			8/23/2005 (FD)	65.2	20	2.41 J	50.1	--	--	--	--	--
01900013	Central	Eastern Alluvial--Intermediate and Deep Zones	4/10/1984	54.4	10.6	2	35.4	--	--	38	40	271
			4/3/1990	61	13.2	2.1	29.7	--	--	34.2	34.8	319
			4/13/1993	--	--	--	--	--	--	39.2	36.5	306
01900014	Central	Eastern Alluvial--Intermediate and Deep Zones	4/15/1986	46.9	18.4	2	34.1	--	--	42.1	22.5	304
			4/25/1989	58.6	8.4	2.8	44.2	--	--	37.3	48.4	354
			5/4/1995	--	--	--	--	--	--	40.3	22.8	287
01900015	Central	Eastern Alluvial--Intermediate and Deep Zones	4/11/1989	49.2	10.4	1.9	30.1	--	--	32.1	20.3	293
			4/8/1986	39.6	10.1	1.7	27.4	--	--	21.2	19.5	284
			5/5/1995	--	--	--	--	--	--	19.1	20	226
01900018	Central	Eastern Alluvial--Intermediate Zone	8/22/1984	71	22	2.5	42	--	--	48	51	461
			8/22/1985	76	22	2.7	42	--	--	48	53	447
			5/21/1985	70	22.7	2.1	46	--	--	47	51	468
			8/16/1988	79.5	19.9	3	48	--	--	48.2	64.9	436
			8/22/1989	86.2	23.2	1.6	39.5	--	--	49.4	62.7	466
			8/28/1990	--	--	--	--	--	--	47.4	51.8	460
			6/4/1991	--	--	--	--	--	--	48.7	56	390
01901672	Central	Eastern Alluvial--Intermediate and Deep Zones	6/13/1978	0.7	1.3	--	24	--	--	12	65	236
			1/22/1990	--	--	--	--	--	--	95	333	--
			11/21/1990	74	7.2	5.8	170	--	--	100	340	700
			8/24/1993	--	--	--	--	--	--	109.2	303	671
01901681	Central	Eastern Alluvial--Intermediate and Deep Zones	12/11/1984	52.7	15.6	1.8	31.6	--	--	25	41	262
			4/9/1986	66.6	19.4	2.3	33.3	--	--	45	46	400
			4/30/1986	53.8	16.9	1.7	30.3	--	--	26	41	340
			4/19/1988	54.5	17.3	1.5	31.2	--	--	28	44	350
			5/2/1989	57.1	17.5	1.7	32.2	--	--	27	43	350
			4/6/1993	--	--	--	--	--	--	30	44	360
			4/20/1994	--	--	--	--	--	--	28	40	360
01901682	Central	Eastern Alluvial--Intermediate and Deep Zones	1/23/1984	22	5.3	1.7	48	--	--	16	51	198
			4/24/1990	26.6	7.3	1.6	38.2	--	--	15	38	230
			4/6/1993	--	--	--	--	--	--	18	47	250

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TABLE D-5
Summary of Results for Inorganic COPCS in Groundwater
Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

COPC				Concentration of Dissolved Metals (mg/L)				Concentrations of Anions and General Parameters (mg/L)				
				Calcium	Magnesium	Potassium	Sodium	Bicarbonate Alkalinity	Carbonate Alkalinity	Chloride	Sulfate	TDS
Well Station ID	**Geographic Area**	**Aquifer**	**Sample Date**									
01903014	Central	Eastern Alluvial--Intermediate and	4/3/1990	42.6	9.7	1.6	24.6	--	--	15.5	15.6	248
			8/10/1993	--	--	--	--	--	--	15.9	18.8	241
01903059	Central	Eastern Alluvial--Intermediate and Deep Zones	8/27/1984	20	6	--	50	--	--	16	19	--
			5/26/1987	20	2	1	49	--	--	22	21	160
			5/15/1989	--	--	--	--	--	--	19	--	--
			5/15/1989	20	2	--	39	--	--	19	17	212
			8/7/1990	20.74	1.47	0.82	47.56	--	--	10.3	27.7	184
			10/9/1990	20.79	1.58	0.69	49.91	--	--	10.3	27	228
			11/7/1994	--	--	--	--	--	--	9.4	29	220
01903086	Central	Eastern Alluvial--Intermediate and Deep Zones	4/18/1984	21	6.1	1.5	34	--	--	14	29	168
			4/24/1990	25	7.3	1.7	31.3	--	--	15	29	200
			4/6/1993	--	--	--	--	--	--	13	26	170
01903097	Central	Eastern Alluvial--Intermediate and Deep Zones	4/15/1986	45.1	18.8	2	29.8	--	--	28.7	24.9	298
			4/11/1989	63.8	10.1	2.1	44.6	--	--	41.8	44.4	366
			4/13/1993	--	--	--	--	--	--	40.1	28.5	325
			7/13/1993	--	--	--	--	--	--	--	--	346
EPAMW12A	Central	Bedrock	3/6/2003	60	30	4	90	--	--	--	--	--
			11/5/2003	65	32	3.5 J	85	--	--	--	--	--
			12/2/2005	73	33.4	3.12 J	82	--	--	--	--	--
			12/2/2005 (FD)	71.3	32.6	3.09 J	80.5	--	--	--	--	--
			8/22/2005	76.5	33.3	3.14 J	81.1	--	--	--	--	--
			5/22/2006	74.3	33.6	3.42 J	81.6	280	<10	75	120	--
			8/24/2006	75.6	34.1	2.79 J	86.2	280	<10	78	130	--
EPAMW13_01	Central	Eastern Alluvial--Deep Zone	7/15/2003	32	11	4 J	120	--	--	--	--	--
			11/5/2003	45	14	3.9 J	130	--	--	--	--	--
			8/30/2005	36.4	15.4	4.28 J	90.6	--	--	--	--	--
			11/18/2005	38.5	18.6	4.49 J	84.5	--	--	--	--	--
			5/25/2006	40.1	19	4.79 J	82.1	<80	<80	59	260	--
			8/22/2006	38.7	17.6	3.44 J	83.5	17	8 J	57	250	--
EPAMW13_02	Central	Eastern Alluvial--Deep Zone	7/15/2003	21	9.7	<5	39	--	--	--	--	--
			11/6/2003	24	9.4	<5	39	--	--	--	--	--
			8/30/2005	6.2	6.17	2.23 J	40.8	--	--	--	--	--
			11/21/2005	12.6	9.18	2.39 J	30.4	--	--	--	--	--
			8/22/2006	11.4	8.84	1.92 J	34	97	16	11	11	--
EPAMW13_03	Central	Eastern Alluvial--Deep Zone	11/6/2003	25	14	2.6 J	39	--	--	--	--	--
			8/30/2005	22.5	15.6	2.65 J	35	--	--	--	--	--
			11/21/2005	20.3	15.7	2.88 J	35.5	--	--	--	--	--
			5/25/2006	13.2	14.9	2.95 J	31.9	110	14	21	20	--
			5/25/2006 (FD)	13.4	15.1	3.04 J	32.6	110	12	22	20	--
			8/22/2006	21.6	18.9	2.62 J	40.4	110	16	37	43	--

Notes:
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-- = not measured
TDS = total dissolved solids

TABLE D-5
Summary of Results for Inorganic COPCS in Groundwater
Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

COPC				Concentration of Dissolved Metals (mg/L)				Concentrations of Anions and General Parameters (mg/L)				
				Calcium	Magnesium	Potassium	Sodium	Bicarbonate Alkalinity	Carbonate Alkalinity	Chloride	Sulfate	TDS
Well Station ID	**Geographic Area**	**Aquifer**	**Sample Date**									
EPAMW13_04	Central	Eastern Alluvial--Deep Zone	7/15/2003	70	22	3.1	29	--	--	--	--	--
			7/15/2003 (FD)	70	22	3.1 J	29	--	--	--	--	--
			11/7/2003	71	22	2.9 J	29	--	--	--	--	--
			8/31/2005	78.4	23.4	2.73 LJ	28.8	--	--	--	--	--
			8/22/2006	76.6	21.9	2.32 J	30.2	210	<10	53	31	--
EPAMW13_05	Central	Eastern Alluvial--Intermediate Zone	7/15/2003	30	16	2.7 J	36	--	--	--	--	--
			11/6/2003	51	17	<5	28	--	--	--	--	--
			8/31/2005	58.4	19.6	2.14 LJ	25.7	--	--	--	--	--
			5/25/2006	56.9	20.1	2.51 J	26.2	170	<10	41	32	--
			8/22/2006	55.8	19.5	2.06 J	27.1	170	<10	39	30	--
			8/22/2006 (FD)	58.4	20.3	2.17 J	28.3	180	<10	39	31	--
EPAMW14_01	Central	Eastern Alluvial--Deep Zone	7/16/2003	3.9	2.1	2.8 J	150	--	--	--	--	--
			2/6/2004	5.6	2.1	2.5 J	110	--	--	--	--	--
			8/24/2005	4.96 J	<1.68 J	1.67 J	83.1	--	--	--	--	--
			11/14/2005	6.54	<2.13 J	1.83 J	80.5	--	--	--	--	--
			5/25/2006	7.31	2.39 J	2.04 J	76.8	160	10	18	13	--
			8/28/2006	8.34	2.79 J	1.71 J	77.5	170	<10	18	12	--
EPAMW14_02	Central	Eastern Alluvial--Deep Zone	7/16/2003	4.6	2.1	<5	230	--	--	--	--	--
			2/6/2004	9.5	2.7	3.2 J	320	--	--	--	--	--
			8/26/2005	10	<3.07 J	3.18 J	241	--	--	--	--	--
			11/15/2005	6.88	<2.18 J	2.65 J	198.999	--	--	--	--	--
			8/28/2006	4.96 J	2.49 J	1.95 J	150	140	68	37	94	--
EPAMW14_03	Central	Eastern Alluvial--Intermediate Zone	7/16/2003	78	23	3.5 J	75	--	--	--	--	--
			7/16/2003 (FD)	77	22	3 J	71	--	--	--	--	--
			2/9/2004	82	23	3 J	64	--	--	--	--	--
			2/9/2004 (FD)	83	23	3.2 J	65	--	--	--	--	--
			8/26/2005	79.4	23.7	3.11 J	61.1	--	--	--	--	--
			11/16/2005	78.6	22.9	3.15 J	61.9	--	--	--	--	--
			11/16/2005 (FD)	81.4	23.7	3.22 J	63.7	--	--	--	--	--
			5/25/2006	76.9	23.6	3.47 J	61.9	250	<10	56	74	--
			8/28/2006	74.3	22.7	2.68 J	64.3	250	<10	57	72	--
EPAMW14_04	Central	Eastern Alluvial--Intermediate Zone	2/9/2004	7.2	2.2	2.9 J	180	--	--	--	--	--
			8/29/2005	3.17 J	1.86 J	2.4 J	114	--	--	--	--	--
			11/17/2005	<3.24 J	<1.92 J	2.57 J	102.999	--	--	--	--	--
			8/28/2006	3.38 J	2.51 J	2.4 J	87.9	33	52	47	53	--
			8/28/2006 (FD)	3.98 J	2.75 J	2.34 J	86.1	36	52	48	52	--

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TABLE D-5
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Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

COPC				Concentration of Dissolved Metals (mg/L)				Concentrations of Anions and General Parameters (mg/L)				
				Calcium	Magnesium	Potassium	Sodium	Bicarbonate Alkalinity	Carbonate Alkalinity	Chloride	Sulfate	TDS
Well Station ID	Geographic Area	Aquifer	Sample Date									
EPAMW15_01	Central	Eastern Alluvial--Deep Zone	7/16/2003	29	13	<5	36	--	--	--	--	--
			2/4/2004	18	5.6	<5	40	--	--	--	--	--
			9/2/2005	19.2	5.32	1.85 LJ	32.3	--	--	--	--	--
			11/28/2005	18.7	4.94 J	1.95 J	35	--	--	--	--	--
			5/23/2006	19.3	4.63 J	2.36 J	35.5	100	24	8.7	11	--
			8/23/2006	6.54	<1.94 J	1.62 J	40.8	61	32	7.8	2.9	--
EPAMW15_02	Central	Eastern Alluvial--Deep Zone	7/17/2003	37	12	<5	34	--	--	--	--	--
			2/4/2004	27	7.8	<5	30	--	--	--	--	--
			9/2/2005	25.9	7.66	1.99 LJ	30.3	--	--	--	--	--
			11/28/2005	26	7.63	2.06 J	30.9	--	--	--	--	--
			8/23/2006	26.3	7.54	1.74 J	31.4	130	<10	9.4	17	--
EPAMW15_03	Central	Eastern Alluvial--Deep Zone	7/17/2003	53	17	<5	37	--	--	--	--	--
			2/4/2004	29	9.2	<5	24	--	--	--	--	--
			9/2/2005	29	9.3	1.66 LJ	23.3	--	--	--	--	--
			11/29/2005	27.3	9.14	1.73 J	23.8	--	--	--	--	--
			5/23/2006	26.6	9.15	2.07 J	24	130	<10	9.2	13	--
			8/23/2006	28.8	8.83	1.43 J	25.6	130	<10	8.5	14	--
EPAMW15_04	Central	Eastern Alluvial--Intermediate Zone	7/17/2003	43	16	2.8 J	55	--	--	--	--	--
			2/4/2004	27	10	<5	30	--	--	--	--	--
			9/6/2005	29.1	10.9	1.81 LJ	26.5	--	--	--	--	--
			11/30/2005	28.3	10.6	1.74 J	26.7	--	--	--	--	--
			8/23/2006	29.6	10.3	1.5 J	28.2	140	<10	10	12	--
EPAMW15_05	Central	Eastern Alluvial--Intermediate Zone	7/17/2003	52	16	<5	34	--	--	--	--	--
			2/5/2004	50	15	<5	31	--	--	--	--	--
			9/6/2005	48.5	14.6	1.81 LJ	30	--	--	--	--	--
			12/1/2005	46.7	13.9	1.79 J	29.7	--	--	--	--	--
			12/1/2005 (FD)	46.6	14.1	1.81 J	29.6	--	--	--	--	--
			5/23/2006	47.9	14.5	2.12 J	29.6	140	<10	20	25	--
			8/23/2006	47.2	13.8	1.57 J	32.5	140	<10	20	24	--
EPAMW15_06	Central	Eastern Alluvial--Intermediate Zone	2/5/2004	50	18	3.9 J	41	--	--	--	--	--
			9/7/2005	45.2	17.1	2.61 LJ	39.6	--	--	--	--	--
			9/7/2005 (FD)	52.1	18.5	2.46 LJ	38.2	--	--	--	--	--
			11/29/2005	43.2	16.8	2.64 J	39.7	--	--	--	--	--
			8/23/2006	19.6	10.2	3.12 J	43.2	63	14	22	26	--
EPAMW17	Central	Bedrock	2/21/2006	62.6	31.3	5.91 J	96.3	--	--	--	--	--
			5/24/2006	--	--	--	--	260	<10	59	180	--
			8/24/2006	69.9	35.4	5.87 J	97.4	270	<10	59	180	--
			8/24/2006 (FD)	66.5	33.5	5.56 J	91.7	270	<10	--	--	--

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TABLE D-5
Summary of Results for Inorganic COPCS in Groundwater
Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

COPC				Concentration of Dissolved Metals (mg/L)				Concentrations of Anions and General Parameters (mg/L)				
				Calcium	Magnesium	Potassium	Sodium	Bicarbonate Alkalinity	Carbonate Alkalinity	Chloride	Sulfate	TDS
Well Station ID	Geographic Area	Aquifer	Sample Date									
01900017	NE	Eastern Alluvial--Intermediate and Deep Zones	4/13/1988	48.2	10.1	1.1	24.5	--	--	13.5	33.8	248
			4/15/1986	54.2	16.6	1.3	28.9	--	--	25	64	291
			4/23/1991	--	--	--	--	--	--	13.6	28.4	238
			5/4/1994	--	--	--	--	--	--	15.2	32.8	249
01900026	NE	Eastern Alluvial--Intermediate and Deep Zones	5/6/1985	56	11	2.2	25	--	--	13	41	260
			5/16/1988	46	11	0.91	22	--	--	16	48	270
			6/8/1989	43	11	1.2	21	--	--	11	33	270
			3/27/1995	--	--	--	--	--	--	8.4	20	176
01900547	NE	Eastern Alluvial--Intermediate Zone	8/24/2005	71.9	24.1	1.33 J	31.8	--	--	--	--	--
01900935	NE	Eastern Alluvial--Intermediate and Deep Zones	12/23/1985	38	12	--	31	--	--	21	59	352
			11/29/1989	--	--	--	--	--	--	29	--	--
			11/29/1989	43	19	--	29	--	--	29	87	394
			11/7/1994	--	--	--	--	--	--	27.1	65.5	416
01901671	NE	Eastern Alluvial--Intermediate and Deep Zones	6/25/1979	28	8	1.2	45	--	--	18	26	--
			6/5/1985	41	10	2.2	30	--	--	15	15	260
			6/1/1988	33	9.3	1.1	33	--	--	15	37	240
			6/26/1991	36	8.6	1.3	40	--	--	17	39	260
			6/23/1994	--	--	--	--	--	--	15.4	31.8	245
01902785	NE	Eastern Alluvial--Intermediate and Deep Zones	10/29/1968	35	14	--	22	--	--	12	23	--
			10/27/1970	35	12	--	29	--	--	13	26	--
			12/29/1983	39	12	1.3	27	--	--	14	28	240
			11/6/1985	59	15	1.2	26	--	--	29	28	240
			11/2/1988	48	13	1.1	25	--	--	17	34	280
			4/5/1989	30	7.9	0.8	29	--	--	11	22	220
			11/17/1994	--	--	--	--	--	--	10.8	19.4	198
01902786	NE	Eastern Alluvial--Intermediate and Deep Zones	6/13/1978	0.6	1.1	--	29	--	--	6	17	192
			6/6/1984	37	11	2.6	21	--	--	12	22	260
			8/13/1993	--	--	--	--	--	--	13.5	21.7	237
			8/13/1993	--	--	--	--	--	--	--	--	252
01902789	NE	Eastern Alluvial--Intermediate and Deep Zones	7/7/1987	36	5.3	0.9	27	--	--	8.1	20.3	221
			7/24/1990	--	--	--	--	--	--	9.1	20.2	215
			8/10/1993	--	--	--	--	--	--	10.1	22.3	199

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TABLE D-5
Summary of Results for Inorganic COPCS in Groundwater
Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

COPC				Concentration of Dissolved Metals (mg/L)				Concentrations of Anions and General Parameters (mg/L)				
				Calcium	Magnesium	Potassium	Sodium	Bicarbonate Alkalinity	Carbonate Alkalinity	Chloride	Sulfate	TDS
Well Station ID	**Geographic Area**	**Aquifer**	**Sample Date**									
01902792	NE	Eastern Alluvial--Intermediate and Deep Zones	8/8/1983	31	7	1.4	33	--	--	6	27	200
			9/17/1984	35	9	1.1	29	--	--	15	32	234
			8/29/1985	27	6.3	1	40	--	--	13	41	250
			8/19/1987	25.4	6	1	37.5	--	--	13	37	220
			9/7/1988	40.8	8.7	2.1	31	--	--	14	38.1	249
			8/16/1990	--	--	--	--	--	--	10.9	32.6	275
			8/20/1990	33	8.6	1.1	26	--	--	10	31	220
			9/26/1994	--	--	--	--	--	--	10.9	26.2	204
01902979	NE	Eastern Alluvial--Deep Zone	8/24/2005	41	9.92	1.2 J	27.5	--	--	--	--	--
EPAMW16_01	NE	Eastern Alluvial	2/22/2006	14.5	<3.43 J	1.12 J	44.7	--	--	--	--	--
			6/2/2006	--	--	--	--	130 J	12 J	6.1 J	11 J	--
			8/25/2006	14.9	3.5 J	1.17 J	46.9	130	6 J	6.2	11	--
EPAMW16_02	NE	Eastern Alluvial	2/22/2006	21.7	9.07	1.27 J	29.7	--	--	--	--	--
			6/2/2006	--	--	--	--	--	--	6.4 J	14 J	--
			8/25/2006	21.6	9.28	<1.38 J	32.1	140	<10	6.5	14	--
EPAMW16_03	NE	Eastern Alluvial	2/23/2006	14.2	9.5	1.5 J	36.9	--	--	--	--	--
			6/2/2006	--	--	--	--	100 J	24 J	8.5 J	20 J	--
			8/25/2006	12.7	10.1	<1.66 J	37.3	100	20	8.7	20	--
EPAMW16_04	NE	Eastern Alluvial	2/23/2006	37.2	14.3	1.31 J	17.4	--	--	--	--	--
			6/5/2006	--	--	--	--	--	--	13	23	--
			8/25/2006	34.2	13.5	<1.29 J	17.3	130	<10	12	21	--
EPAMW16_05	NE	Eastern Alluvial	2/24/2006	49.2	20.5	1.36 J	21.2	--	--	--	--	--
			6/5/2006	--	--	--	--	120	<10	28	63	--
			8/25/2006	40.7	20.9	<1.53 J	23.7	110	<10	28	61	--
EPAMW16_06	NE	Eastern Alluvial	3/1/2006	68.5	21.4	1.39 J	23.2	--	--	--	--	--
			6/6/2006	--	--	--	--	--	--	26	52	--
			8/25/2006	58.8	19.5	<1.17 J	22	150	<10	24	46	--
EPAMW16_07	NE	Eastern Alluvial	3/1/2006	76.2	24	1.51 J	24.8	--	--	--	--	--
			3/1/2006 (FD)	77.4	24.3	<1.54 J	25.2	--	--	--	--	--
			6/6/2006	--	--	--	--	130	<10	31	71	--
			8/25/2006	72.6	24.2	<1.35 J	25.5	130	<10	32	70	--
W11TCSW1	NE	Eastern Alluvial--Shallow Zone	1/26/2007	--	--	--	--	184	--	24.3	76.5	--
W11TCSW2	NE	Eastern Alluvial--Shallow Zone	1/26/2007	--	--	--	--	162	--	22.1	75.8	--
W11TCSW3	NE	Eastern Alluvial--Shallow Zone	1/26/2007	--	--	--	--	288	--	13.7	51.9	--

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COPC				Concentration of Dissolved Metals (mg/L)				Concentrations of Anions and General Parameters (mg/L)				
				Calcium	Magnesium	Potassium	Sodium	Bicarbonate Alkalinity	Carbonate Alkalinity	Chloride	Sulfate	TDS
Well Station ID	**Geographic Area**	**Aquifer**	**Sample Date**									
W11TCSW4	NE	Eastern Alluvial--Shallow Zone										
			1/25/2007	--	--	--	--	182	--	29.7	86.8	--
W11TCSW6	NE	Eastern Alluvial--Shallow Zone	1/29/2007	--	--	--	--	252	--	205.1	56	--
			1/29/2007 (FD)	--	--	--	--	230	--	196	60.8	--
W11TCSW9	NE	Eastern Alluvial--Shallow Zone										
			1/26/2007	--	--	--	--	172	--	20.5	73	--
W11TCW10	NE	Eastern Alluvial--Shallow Zone										
			1/25/2007	--	--	--	--	340	--	30.5	70.2	--
W11TCW11	NE	Eastern Alluvial--Shallow Zone										
			1/22/2007	--	--	--	--	322	--	21.8	71.2	--
W11TCW12	NE	Eastern Alluvial--Shallow Zone										
			1/29/2007	--	--	--	--	132	--	21.2	73.8	--
01900921	SE	Eastern Alluvial--Intermediate Zone	1/20/1983	44	13	1	21	--	--	14	11	256
			1/28/1986	38	11	--	17	--	--	19	13	228
			5/26/1987	39	13	1	25	--	--	18	4	192
			5/15/1989	--	--	--	--	--	--	19	--	--
			5/15/1989	38	12	--	17	--	--	19	2.1	240
			8/7/1990	41.95	13.13	1.01	21.9	--	--	10.4	12.6	260
			10/9/1990	42.13	13.15	0.96	23.96	--	--	10.1	8.9	272
01900926	SE	Eastern Alluvial--Intermediate and Deep Zones	5/26/1987	38	12	1	17	--	--	17	2	172
			5/15/1989	--	--	--	--	--	--	17	--	--
			5/15/1989	37	11	--	16	--	--	17	4.5	224
			8/7/1990	40.13	11.02	1.24	19.21	--	--	7.5	14.6	192
			10/9/1990	40.24	11.11	1.18	21.24	--	--	7.6	13.2	244
			11/7/1994	--	--	--	--	--	--	6.25	14	232
01900927	SE	Eastern Alluvial--Intermediate Zone	10/15/1984	37	14	--	17	--	--	17	7.4	--
			5/26/1987	37	11	2	18	--	--	15	7	172
			5/15/1989	--	--	--	--	--	--	22	--	--
			5/15/1989	36	14	--	17	--	--	22	1	236
			8/7/1990	41.64	12.64	1.19	18.69	--	--	9.1	12	204
			10/9/1990	42.72	13.02	1.11	21.14	--	--	9.2	10.1	248
			11/7/1994	--	--	--	--	--	--	9.4	16.5	256
01901669	SE	Eastern Alluvial--Intermediate Zone	10/3/1967	39	14	--	27	--	--	16	17	--
			10/27/1970	38	12	--	26	--	--	12	17	--
			5/30/1978	0.8	1.6	--	25	--	--	18	35	240
			12/29/1983	46	14	1.4	22	--	--	15	22	250
			7/30/1985	50	17	1.2	24	--	--	19	25	310
			11/6/1985	32	20	1.2	23	--	--	44	20	220
			11/4/1986	47	15	1	23	--	--	19	23	--
			9/29/1987	47.7	17.2	1.1	26.4	--	--	18	25	310
			10/5/1988	52.9	15.8	1.9	23.1	--	--	16.8	24.2	326
			11/2/1988	53	14	0.8	21	--	--	19	27	310
			8/23/1989	53.1	18	1.3	23.9	--	--	19.4	28.9	301
			11/22/1989	61	18	0.88	24	--	--	23	36	330
			6/28/1990	56	17	1.4	28	--	--	22	31	310
			8/20/1990	--	--	--	--	--	--	21.6	30.7	369
			6/29/1993	--	--	--	--	--	--	20.2	31.4	336

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Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

COPC				Concentration of Dissolved Metals (mg/L)				Concentrations of Anions and General Parameters (mg/L)				
				Calcium	Magnesium	Potassium	Sodium	Bicarbonate Alkalinity	Carbonate Alkalinity	Chloride	Sulfate	TDS
Well Station ID	**Geographic Area**	**Aquifer**	**Sample Date**									
01900016	SE	Eastern Alluvial--Intermediate and Deep Zones	4/11/1989	33	6.8	1.4	33.4	--	--	24.2	16.5	224
			4/8/1986	28.1	4.6	1.6	80.1	--	--	12.1	15.6	168
			5/4/1995	--	--	--	--	--	--	16.2	20.4	197
01900514	SE	Eastern Alluvial--Intermediate and Deep Zones	8/10/1983	33	9	1.8	29	--	--	11	12	190
			8/28/1984	35	6.7	1.1	29.2	--	--	14	9	196
			8/15/1985	32	9.5	1.8	27	--	--	12	16	200
			9/29/1987	29.2	8.8	1.7	30.4	--	--	10	13	200
			9/19/1989	33.5	15.9	1.9	14.2	--	--	8	13	207
			8/15/1994	--	--	--	--	--	--	13.3	22.2	204
01900515	SE	Eastern Alluvial--Intermediate and Deep Zones	1/12/1984	33.6	10.2	1.6	27.9	--	--	26	15	237
			1/9/1990	44.5	13	1.5	25.1	--	--	18	15.4	249
			1/27/1993	--	--	--	--	--	--	15.1	19.9	205
			8/15/1994	--	--	--	--	--	--	20.6	28.7	228
08000067	SE	Eastern Alluvial--Intermediate and Deep Zones	6/6/1984	28	6.5	2.8	28	--	--	7.7	13	200
			6/3/1987	31	11	1.3	28	--	--	10	16	210
			6/28/1990	31	8.5	1.2	34	--	--	10	16	200
			6/29/1993	--	--	--	--	--	--	11.6	20.2	218
08000123	SE	Eastern Alluvial--Intermediate and	12/17/1990	8.5	1.5	0.9	50	--	--	9	12	180
			12/15/1993	--	--	--	--	--	--	4.6	16.3	147
08000133	SE	Eastern Alluvial--Deep Zone	6/23/1994	--	--	--	--	--	--	13.4	26.3	169
8000146	SE	Eastern Alluvial--Intermediate and	3/4/1992	--	--	--	--	--	--	11.2	19	166
			8/15/1994	--	--	--	--	--	--	14	25.2	194

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TABLE D-6
Annual Groundwater Production within Area 3
Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

Recordation Number	Geographic Area	Annual Production (acre-ft/pumping year)[1]																			
		1974-1975	1975-1976	1976-1977	1977-1978	1978-1979	1979-1980	1980-1981	1981-1982	1982-1983	1983-1984	1984-1985	1985-1986	1986-1987	1987-1988	1988-1989	1989-1990	1990-1991	1991-1992	1992-1993	1993-1994
01903097	Central	1,767	2,239	1,422	553	895	1,022	773	957	597	878	831	661	846	1,017	175	11	12	7	1	0
01900011	Central	555	493	294	570	481	739	227	451	494	568	583	621	331	323	620	588	252	8	5	40
01900012	Central	148	33	29	4	44	123	36	228	229	270	294	289	318	312	304	300	310	276	258	259
01903014	Central	304	219	111	272	252	192	113	97	175	164	220	134	347	281	1,299	1,232	1,321	1,232	1,231	1,057
01900013	Central	148	40	43	127	238	110	39	276	202	22	28	31	18	15	10	4	5	3	0	20
01900014	Central	1,518	1,674	1,483	955	718	894	606	310	1,093	1,715	1,697	1,814	1,687	1,337	1,357	1,474	848	1,177	1,067	606
01900015	Central	683	1,057	419	570	349	390	333	190	411	580	424	407	384	460	311	751	348	253	408	372
01900010	Central	3,095	3,195	1,536	1,374	892	2,381	3,368	3,346	2,825	3,289	3,283	3,014	3,260	3,368	2,694	3,320	3,013	2,333	1,620	3,651
01900018	Central	600	421	0	0	725	548	704	771	594	18	25	24	22	13	5	4	3	3	0	3
01901672	Central	756	581	488	754	416	0	0	0	0	0	0	0	0	0	51	141	431	0	0	0
01901681	Central	1,089	1,173	716	1,301	839	1,187	1,026	678	792	345	534	385	385	284	344	208	309	84	211	185
01901682	Central	1,749	2,833	2,464	1,053	2,261	2,547	2,694	2,602	2,753	2,788	2,927	2,930	2,626	2,540	2,537	2,519	2,367	2,449	2,460	2,524
01903086	Central	396	168	700	1,110	828	367	405	473	590	1,129	805	764	1,052	933	1,118	1,131	1,124	933	1,061	991
01900017	NE	188	634	582	351	569	449	351	260	470	692	769	783	783	452	674	1,124	500	502	832	240
01902789	NE	246	651	431	595	376	273	106	137	247	380	411	435	447	402	707	1,446	1,364	1,537	1,729	1,560
01900935	NE	1,931	2,154	1,011	422	1,604	1,985	1,567	515	1,973	2,397	3,033	2,809	1,533	2,433	404	144	7	4	6	150
01903059	NE	1,068	631	1,103	993	1,676	1,052	1,484	1,465	767	1,175	1,458	1,493	1,356	692	1,411	1,438	1,408	1,345	1,381	1,447
01900547	NE	1	1	3	6	0	15	1	0	0	0	0	0	0	2	7	0	0	0	0	0
01902979	NE	215	181	146	142	156	155	171	155	139	185	168	173	164	172	183	191	199	182	188	206
01901671	NE	2,507	2,555	2,335	1,078	1,093	974	1,981	676	2,204	880	1,040	256	1,019	625	1,374	1,120	1,226	1,703	2,023	2,674
01902785	NE	215	54	22	98	239	579	473	913	261	374	21	3	609	1,077	1,061	1,771	1,753	1,775	1,615	2,020
01902786	NE	887	1,711	1,404	1,118	1,193	1,385	1,520	721	0	125	71	46	26	0	0	0	0	0	0	0
08000157	NE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01900026	NE	1,719	441	281	98	13	0	14	40	14	6	192	1,439	339	38	35	155	19	9	15	433
01902792	NE	534	0	604	230	58	174	1,556	2,094	1,254	1,273	1,139	129	308	809	629	1,025	1,222	1,208	1,365	1,217
01900934	NW	1,620	1,795	1,757	1,310	1,456	1,450	2,236	2,235	1,185	1,172	502	782	911	1,023	1,882	1,923	1,640	1,520	1,367	1,479
01901679	NW	320	486	258	246	182	234	483	205	193	566	597	908	982	1,166	964	958	731	786	708	945
01900016	SE	754	311	533	511	483	578	1,137	776	1,050	1,324	1,472	1,538	1,967	1,514	1,745	2,019	1,398	1,576	1,347	1,125
01900926	SE	782	458	148	79	135	334	417	412	156	123	763	1,589	1,107	1,043	913	863	927	832	820	676
01900927	SE	247	799	825	689	764	499	746	817	857	861	696	296	330	91	281	153	116	14	78	88
01900921	SE	26	118	133	109	117	119	73	212	522	655	217	28	7	37	7	0	0	0	0	0
08000067	SE	591	465	401	402	648	2,464	1,243	2,779	1,684	2,711	2,841	2,632	2,035	2,813	1,591	2,399	2,113	35	824	348
08000123	SE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	395	1,626	643	937
08000133	SE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	523	888	14
01901669	SE	612	920	435	1,273	1,591	1	0	367	635	1,958	1,025	2,834	1,806	1,420	1,092	407	264	7	38	213
01901670	SE	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01900515	SE	468	531	548	431	370	476	429	661	637	604	578	402	685	647	660	676	692	654	635	615
01900514	SE	596	586	543	580	443	693	690	578	536	687	645	667	536	575	570	492	418	405	513	574
08000146	SE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	43
Total		**28,336**	**29,607**	**23,204**	**19,404**	**22,103**	**24,388**	**26,999**	**26,395**	**25,539**	**29,912**	**29,290**	**30,317**	**28,226**	**27,915**	**27,018**	**29,988**	**26,734**	**25,002**	**25,337**	**26,711**
Total Groundwater Production in the San Gabriel Basin[1]		**207,904**	**226,016**	**198,689**	**184,780**	**203,162**	**211,442**	**218,051**	**208,077**	**195,788**	**221,130**	**228,102**	**231,678**	**237,855**	**236,916**	**236,976**	**240,612**	**224,004**	**203,964**	**217,718**	**227,527**

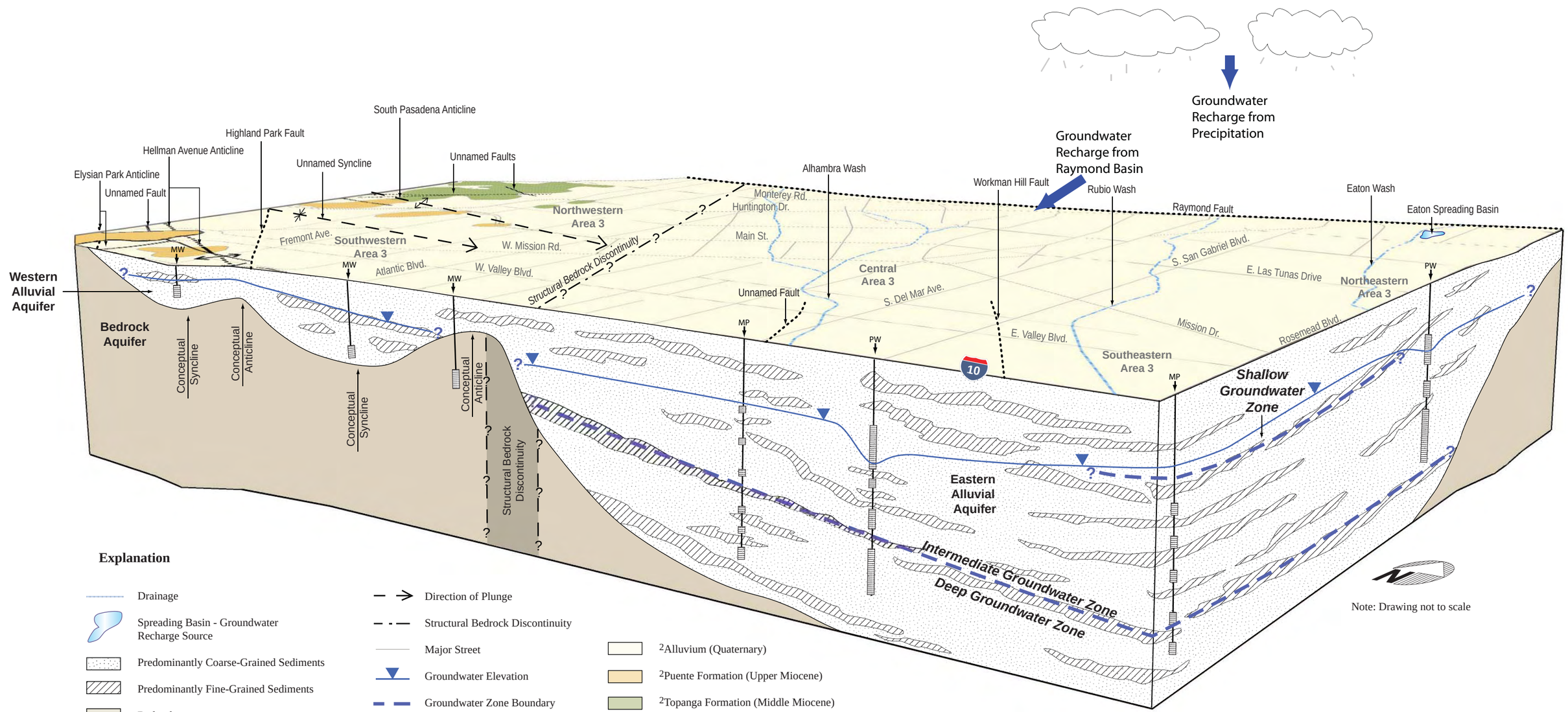
Notes:
[1]Source: Main San Gabriel Basin Watermaster Reports
NE = northeastern
NW = northwestern
SE =southeastern

TABLE D-6
Annual Groundwater Production within Area 3
Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

Recordation Number	Annual Production (acre-ft/year)[2]												
	1994-1995	1995-1996	1996-1997	1997-1998	1998-1999	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007
01903097	11	0	0	0	0	0	0	211	216	1,234	1,373	1,245	1,030
01900011	323	392	776	624	537	647	48	0	0	3	18	432	675
01900012	255	265	276	206	234	232	275	241	226	130	0	167	205
01903014	1,044	642	775	938	886	155	1,063	575	884	800	792	836	835
01900013	2	1	0	0	0	0	0	0	0	0	0	0	0
01900014	1,783	1,121	1,238	820	227	0	8	1,549	1,139	2,208	2,043	2,059	1,204
01900015	433	550	1,025	1,056	1,374	1,642	1,670	1,866	1,791	1,542	890	1,495	1,560
01900010	2,431	3,582	3,408	2,725	3,381	3,427	3,306	2,862	216	1,569	0	0	0
01900018	0	0	0	0	0	0	0	0	0	0	0	0	0
01901672	0	0	0	0	0	0	0	0	0	0	0	0	0
01901681	308	139	174	164	178	104	46	0	0	0	0	0	0
01901682	2,294	2,548	2,478	2,465	2,639	2,469	2,526	940	2,700	3,166	2,747	3,181	3,092
01903086	995	1,139	1,451	1,116	913	59	998	648	928	1,221	968	927	1,319
01900017	452	305	345	850	1,196	2,328	2,086	2,020	1,543	1,184	2,126	1,913	1,935
01902789	1,434	1,395	834	909	782	966	1,316	1,079	1,421	693	1,115	1,032	1,394
01900935	2	1	0	0	0	0	336	376	338	220	327	401	812
01903059	1,437	1,299	1,367	1,040	1,323	1,258	1,259	1,119	1,217	1,221	1,171	1,071	603
01900547	9	9	6	0	0	0	0	0	7	66	7	8	17
01902979	218	261	282	223	258	320	253	284	249	222	235	259	286
01901671	823	2,206	3,090	3,192	3,043	2,786	2,369	1,586	634	1,457	745	1,393	1,143
01902785	1,930	1,400	1,094	2,184	2,229	2,166	1,263	479	1,369	2,569	2,570	2,551	1,864
01902786	0	0	0	0	0	0	0	0	0	0	0	0	0
08000157	0	0	765	1,907	1,991	1,299	1,865	2,733	2,722	2,872	1,987	359	702
01900026	23	304	467	161	1,054	892	401	524	850	565	954	1,259	1,678
01902792	1,158	2,446	1,818	681	352	680	657	275	353	651	696	1,338	1,237
01900934	934	1,884	1,804	1,598	1,772	1,244	1,160	0	0	0	0	0	0
01901679	1,020	919	981	643	944	504	1,002	549	765	566	483	701	855
01900016	1,096	1,317	1,366	935	1,422	1,463	1,098	590	872	1,582	1,352	956	1,748
01900926	786	663	933	896	707	845	931	905	896	608	600	1,192	1,073
01900927	112	45	108	119	47	109	188	288	250	103	745	935	1,061
01900921	0	0	0	0	0	0	0	0	0	0	0	0	0
08000067	1,084	1,523	1,883	630	1,115	1,332	1,089	2,156	1,531	1,124	904	9	979
08000123	2,863	1,708	1,112	1,057	946	890	2,318	2,354	2,529	2,156	2,325	2,033	2,164
08000133	279	146	178	88	46	307	1,030	904	1,513	1,089	1,254	1,289	1,516
01901669	9	8	8	6	4	4	13	0	0	0	0	0	0
01901670	0	0	0	0	0	0	0	0	0	0	0	0	0
01900515	199	119	101	4	0	0	0	0	0	0	0	0	0
01900514	208	138	243	608	573	484	490	438	453	454	443	477	402
08000146	1,097	1,300	1,381	635	875	847	905	726	1,222	1,324	1,212	618	1,188
Total	**27,053**	**29,775**	**31,767**	**28,479**	**31,049**	**29,457**	**31,970**	**28,279**	**28,834**	**32,598**	**30,083**	**30,139**	**32,577**
Total Groundwat the San Ga	**229,429**	**253,161**	**260,426**	**239,718**	**246,291**	**265,184**	**254,174**	**249,930**	**235,809**	**248,571**	**237,335**	**249,289**	**287,294**

Notes:
[1]Source: Main Sar
NE = northeastern
NW = northwestern
SE =southeastern

Figures



Source:

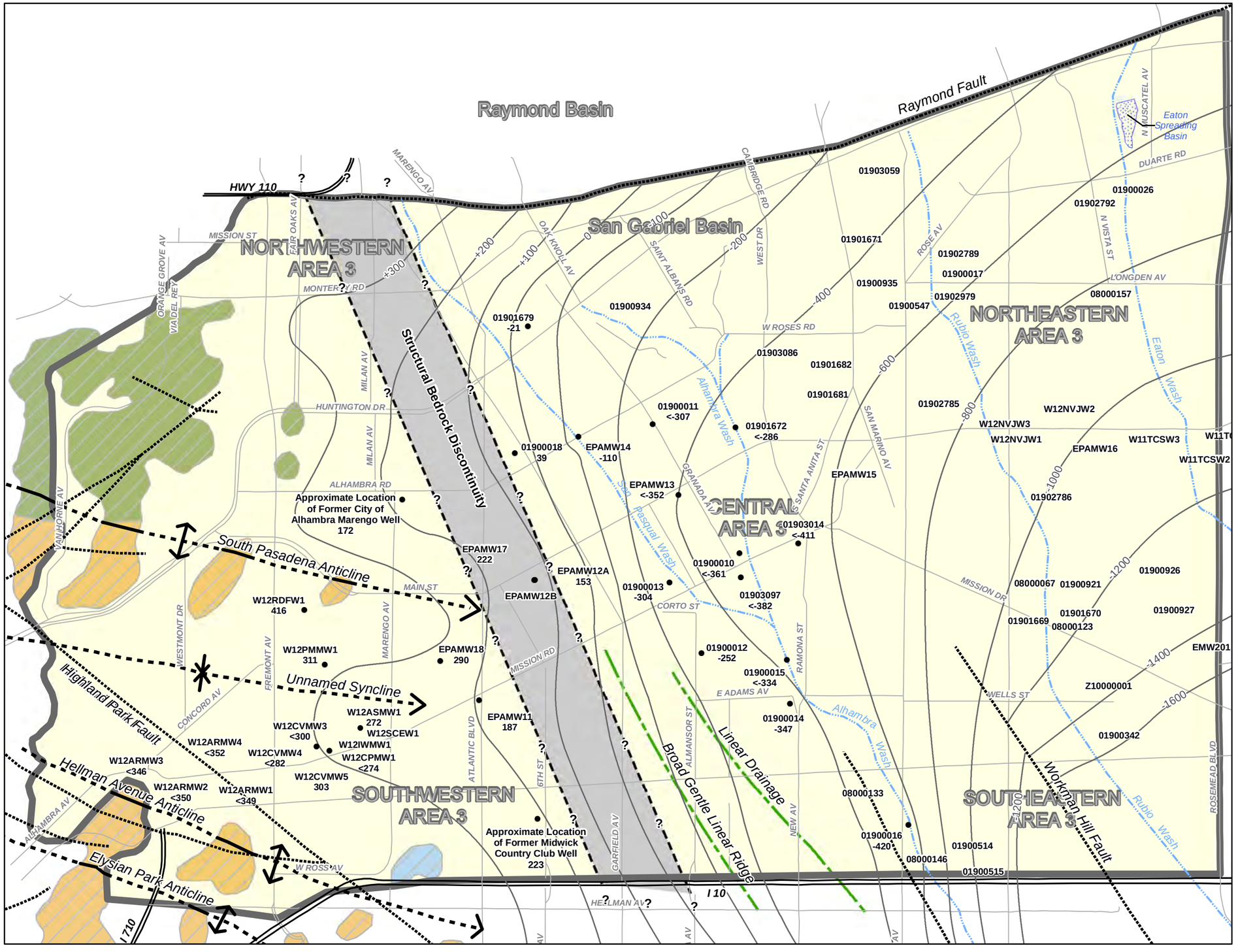
1. Treiman J.A., 1991, Whittier Fault Zone, Los Angeles and Orange Counties, California: California Division of Mines and Geology Fault Evaluation Report FER-222.

2. California Division of Mines and Geology, Geologic Map of the Elysian Park - Repetto Hills Area, Los Angeles County, California. Mapped 1958-1960. Revised and Extended 1961-1965.

NOTE: This Figure (D-1) is the same as Figures ES-2, 3-9, and 8-1.

FIGURE D-1
Conceptual Hydrogeology of Area 3
Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

CH2MHILL



Legend

- Well Locations (Elevation in feet relative to mean sea level of the bedrock surface) (153)
- Syncline (dotted where concealed by surficial sediments)
- Anticline (dotted where concealed by surficial sediments)
- Direction of Plunge
- [1]Lines of equal elevation of the base of the alluvial aquifers (feet relative to mean sea level)
- Highway
- Major Street
- Streams
- Fault
- [2]Fault Surface Features
- Structural Bedrock Discontinuity
- [3]Alluvium (Quaternary)
- [3]Pico Formation (Pliocene)
- [3]Puente Formation (Upper Miocene)
- [3]Topanga Formation (Middle Miocene)
- Area 3 Site
- Spreading Ground

SOURCE:

1. CDWR-1966
   BULLETIN NO. 104-2, PLANNED UTILIZATION OF GROUNDWATER BASINS, SAN GABRIEL VALLEY, APPENDIX A. GEOHYDROLOGY. MARCH 1966 MODIFIED USING AREA 3 SITE DATA WHERE APPROPRIATE.
2. TREIMAN J. A., 1991, WHITTIER FAULT ZONE, LOS ANGELES AND ORANGE COUNTIES, CALIFORNIA: CALIFORNIA DIVISON OF MINES AND GEOLOGY FAULT EVALUATION REPORT FER-222.
3. CALIFORNIA DIVISION OF MINES AND GEOLOGY, GEOLOGIC MAP OF THE ELYSIAN PARK-REPETTO HILLS AREA, LOS ANGELES COUNTY, CALIFORNIA. MAPPED 1958-1960, REVISED AND EXTENDED 1961-1965.

This Figure (D-2) is the same as Figure 3-16 in Section 3.

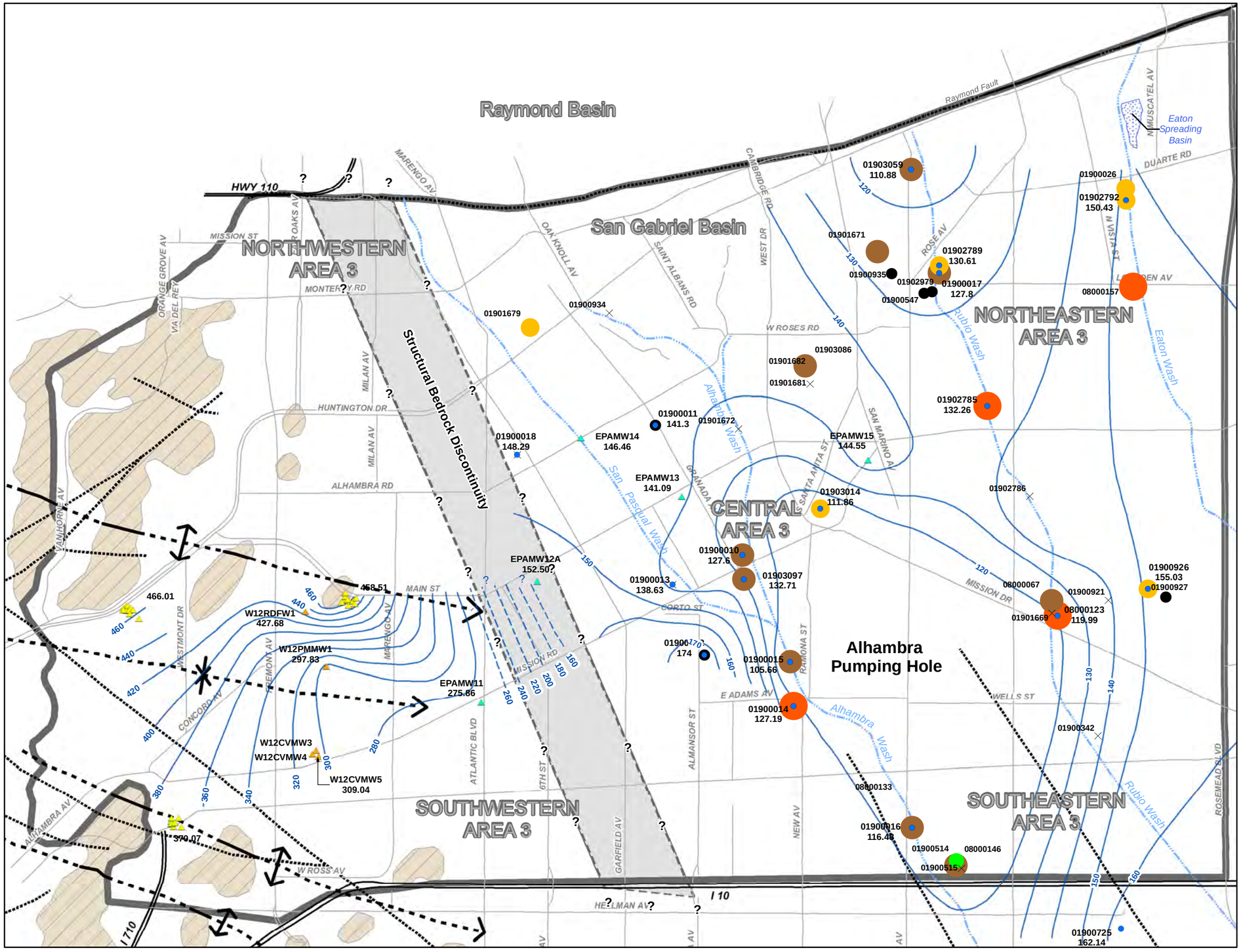
N

0 1,250 2,500 5,000

Feet

Figure D-2
Geologic Map and
Base of the Alluvial Aquifers
Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

\\galt\proj\EPAF\ALOU\2007\MapFiles\ALOU_Geologic_gndwtr.mxd



Legend

- Production Well
- EPA Monitoring Well
- Facility Monitoring Well
- UST Monitoring Well
- No Production
- 1 - 250 AF/YR
- 250 - 500 AF/YR
- 500 - 1000 AF/YR
- 1000 - 2000 AF/YR
- 2000 - 3000 AF/YR
- Syncline (dotted where concealed by surficial sediments)
- Anticline (dotted where concealed by surficial sediments)
- Direction of Plunge
- Groundwater Elevation Contour
- Inferred Groundwater Elevation Contour
- Highway
- Major Street
- Streams
- Fault
- Structural Bedrock Discontinuity
- Area 3 Site
- Spreading Ground
- Bedrock

Notes:
- Groundwater elevations (measured Winter 2006) represent the shallowest water level at monitoring and production wells, which are screened in the imtermediate and deep zones.
- AF/YR = Acre Feet Per Year

This figure (D-3) is the same as Figure 3-7 in Section 3.

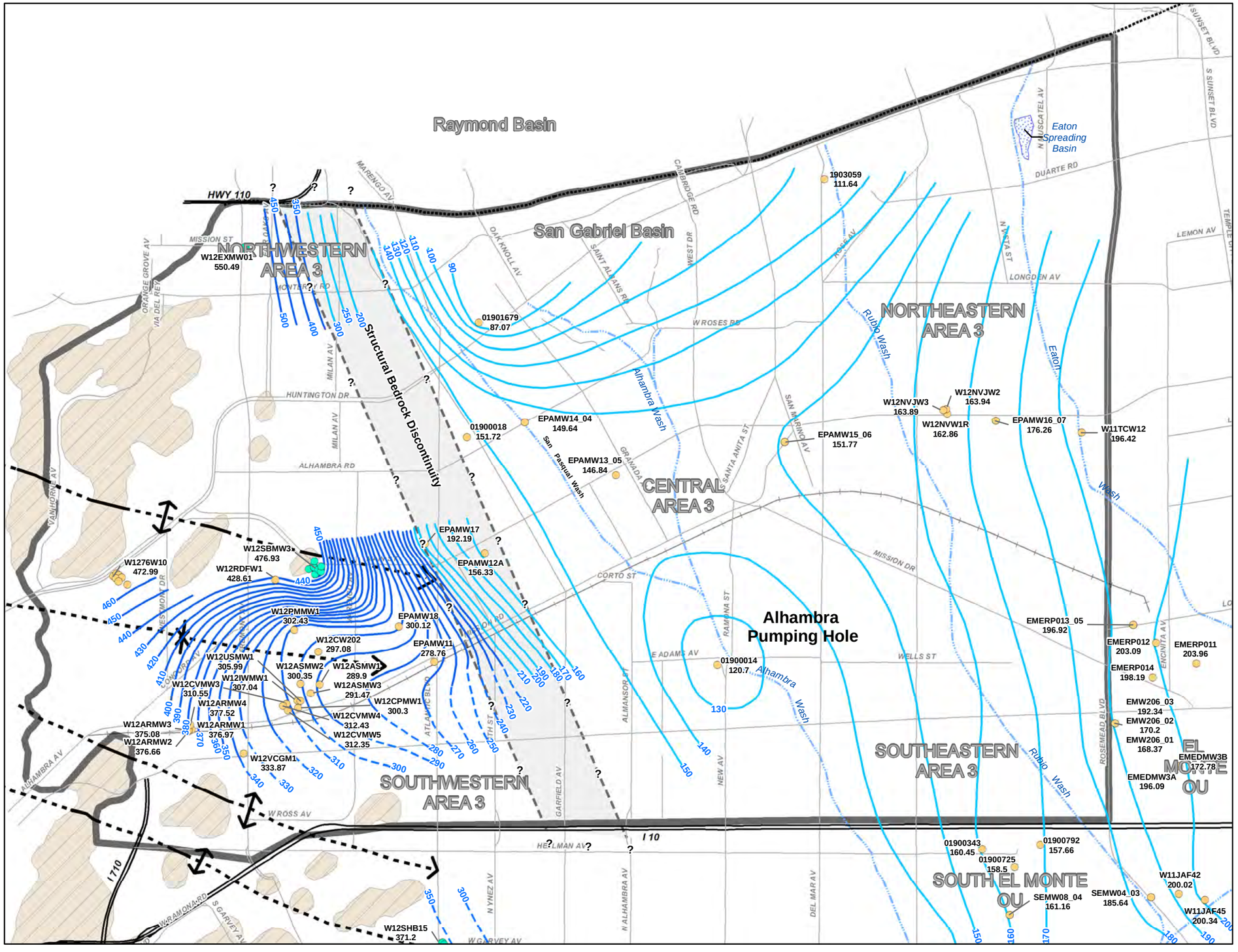
N

0 1,250 2,500 5,000

Feet

Figure D-3
Groundwater Production, Summer 2003 through Spring 2004
Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

\\galt\proj\EPAF\ALOU\MapFiles\ALOU_GrndwtrElevCntrsWinter04_v2.mxd



Legend

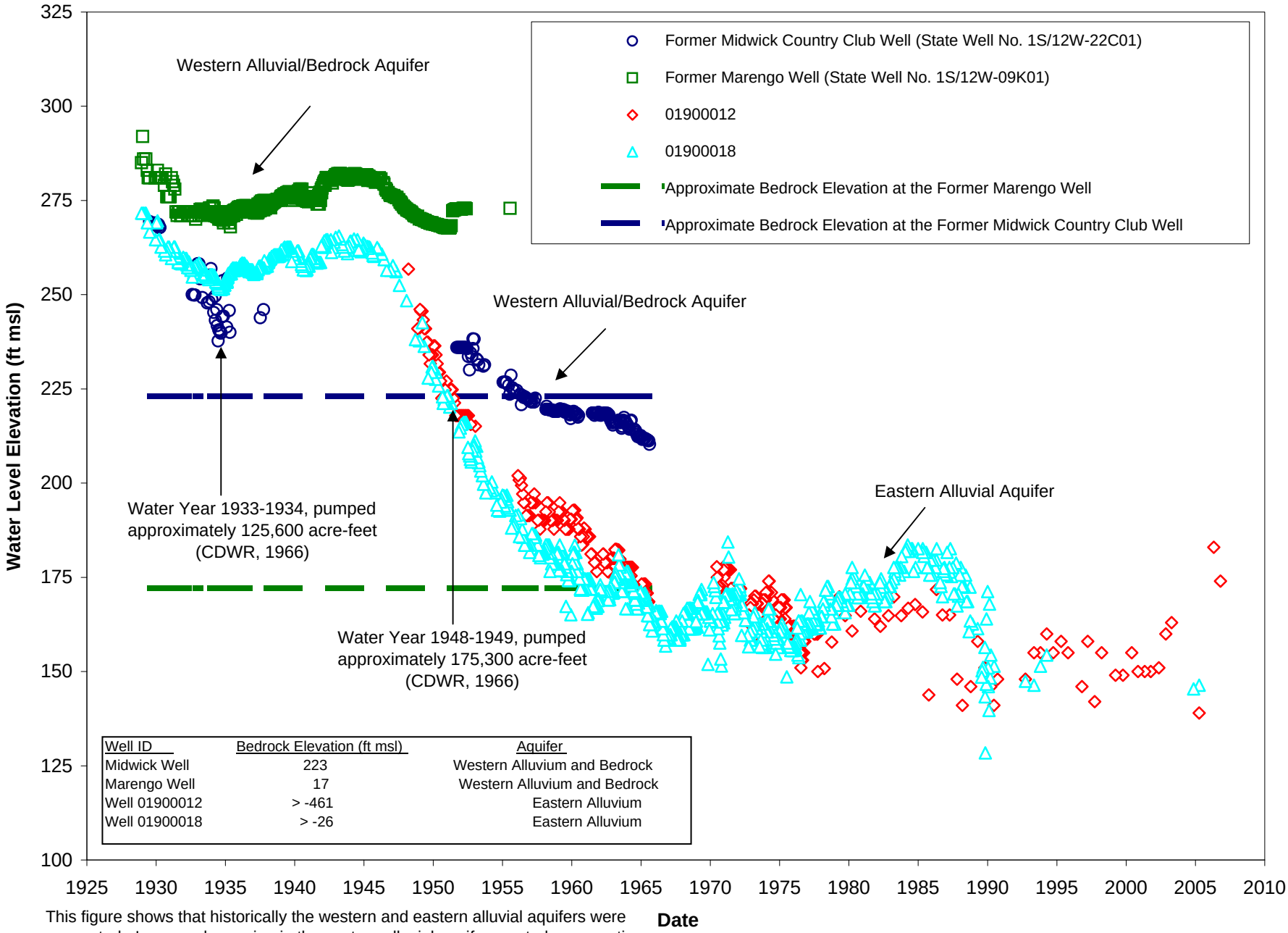
- Well Location (Spring 2007 Groundwater Elevation)
- Well Location[1] (Winter 2007 Groundwater Elevation)
- Syncline (dotted where concealed by surficial sediments)
- Anticline (dotted where concealed by surficial sediments)
- Direction of Plunge
- Intermediate Groundwater Zone Elevation Contour (ft msl)
- Western Alluvial Aquifer Groundwater Elevation Contour (ft msl)
- Western Alluvial Aquifer Inferred Groundwater Elevation Contour (ft msl)
- Fault (short dash indicates that fault impedes groundwater flow)
- Highway
- Major Street
- Railway
- Streams
- Structural Bedrock Discontinuity
- Area 3 Site
- Spreading Ground
- Bedrock

Notes:
ft msl - feet above mean sea level.
1. UST well locations. Groundwater elevation data obtained from LARWQCB Geotracker database.

This Figure (D-4) is the same as Figure 3-18 in Section 3.

Figure D-4
Groundwater Elevation Contours Intermediate Groundwater Zone - Winter/Spring 2007
Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

\\galt\proj\EPAF\ALOU\MapFiles\ALOU_GeologicWesternContour.mxd

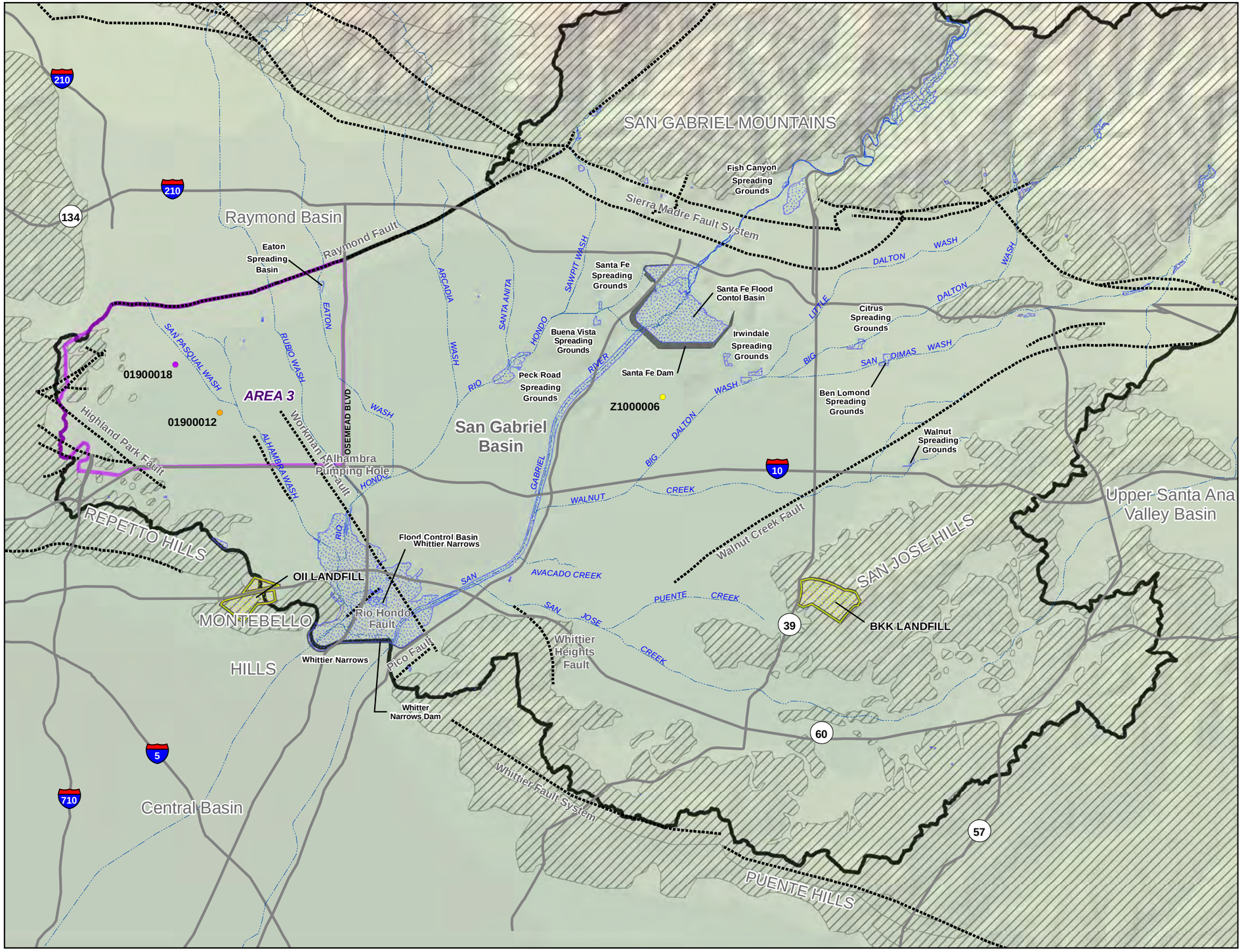


Well ID	Bedrock Elevation (ft msl)	Aquifer
Midwick Well	223	Western Alluvium and Bedrock
Marengo Well	17	Western Alluvium and Bedrock
Well 01900012	> -461	Eastern Alluvium
Well 01900018	> -26	Eastern Alluvium

This figure shows that historically the western and eastern alluvial aquifers were connected. Increased pumping in the eastern alluvial aquifer created a separation of the two aqufers. This figure (D-5) is the same as Figure 3-17 in Section 3.

ft msl - feet (relative to) mean sea level

Figure D-5
Changes in Groundwater Elevation in Area 3
Remedial Investigation
San Gabriel Valley Area 3 Superfund Site



Legend

- 01900012
- 01900018
- Z1000006
- Major Street
- Stream
- Fault
- Dam
- Landfill Sites
- San Gabriel Basin Boundary
- Area 3 Site
- Spreading Ground
- Bedrock

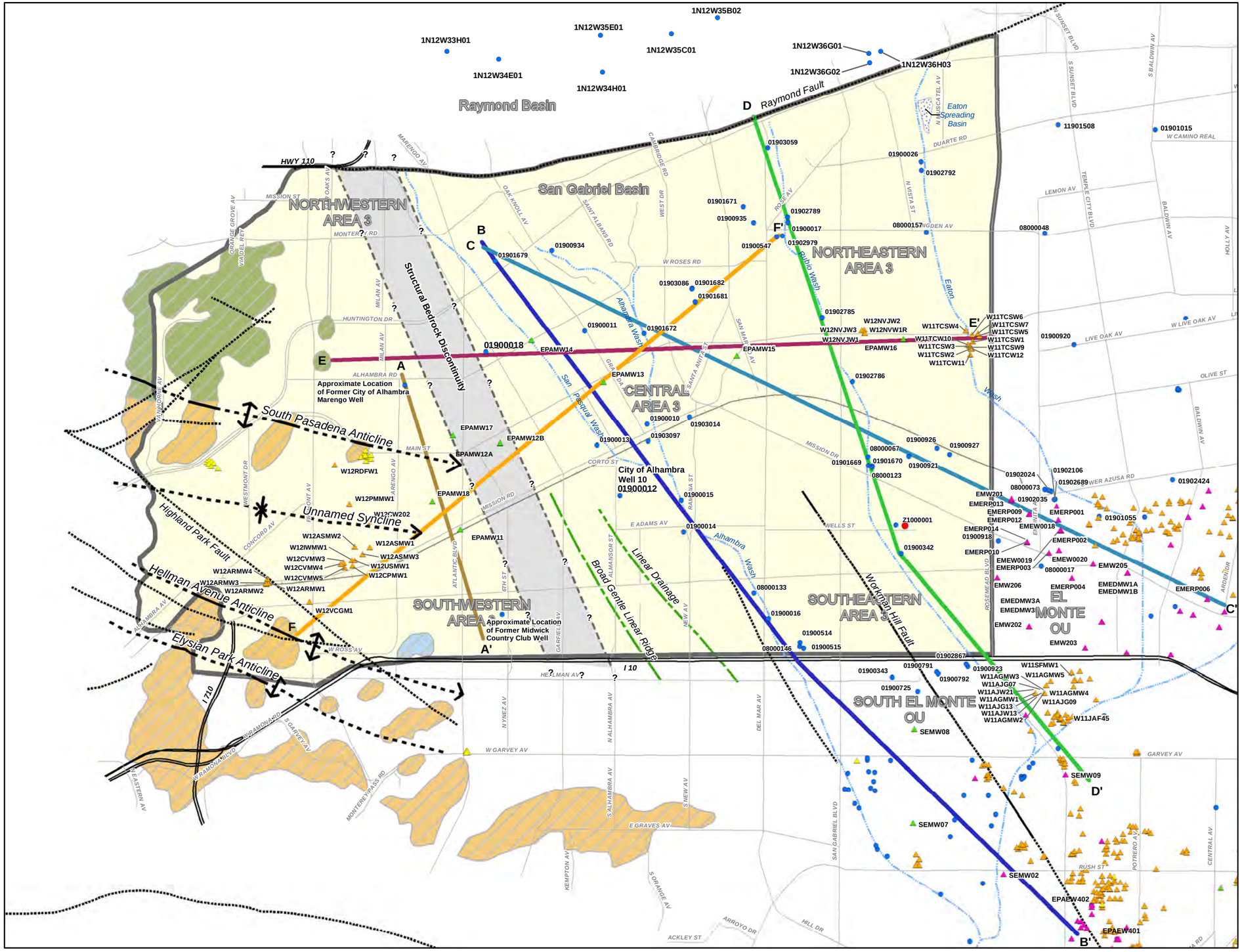
Note:
This Figure (D-6) is the same as Figure 3-1 in Section 3.

N

0 1 2 4
Miles

Figure D-6
San Gabriel Basin Surface Water and Geologic Features
Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

\\galt\proj\EPAF\ALOU\MapFiles\ALOU_GeologicFeat.mxd



Legend

- Los Angeles City Flood Control District Monitoring Well
- EPA Monitoring Well
- Facility Monitoring Well
- Production Well
- PRP Monitoring Well
- UST Monitoring Well
- Syncline
- Anticline
- Direction of Plunge

Cross Section Locations

- A — A'
- B — B'
- C — C'
- D — D'
- E — E'
- F — F'
- Faults (short dash indicates that fault impedes groundwater flow)
- [2]Fault Surface Features
- Highway
- Major Street
- Railway
- Streams
- Structural Bedrock Discontinuity
- Area 3 Site
- Spreading Ground
- [3]Alluvium (Quaternary)
- [3]Pico Formation (Pliocene)
- [3]Puente Formation (Upper Miocene)
- [3]Topanga Formation (Middle Miocene)

Notes:

1. Treiman, J.A., 1991. Whittier Fault Zone, Los Angeles and Orange Counties, California: California Division of Mines and Geology Fault Evaluation Report FER-222.
2. California Division of Mines and Geology Geologic Map of Elysian Park – Repetto Hills Area, Los Angeles Counties California. Mapped 1958-1960. Revised and Extended 1961-1965.

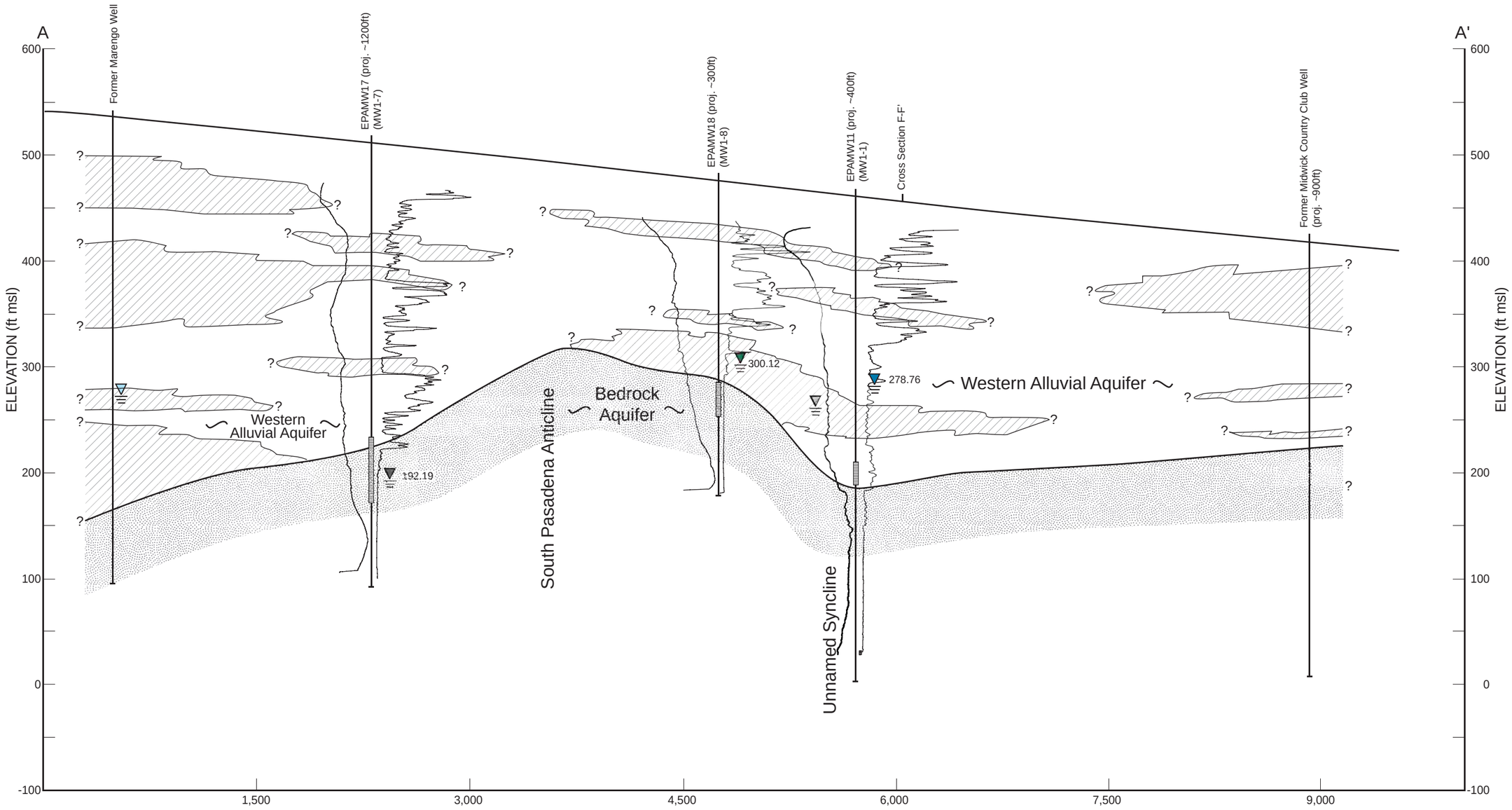
This figure (D-7) is the same as Figure 3-4 in Section 3.

N

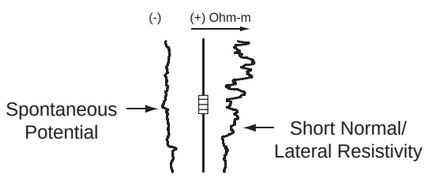
0 1,750 3,500 7,000

Feet

Figure D-7
Locations of Wells and Hydrogeologic Cross Sections
San Gabriel Valley Area 3
Superfund Site Remedial Investigation



Geophysical Logs



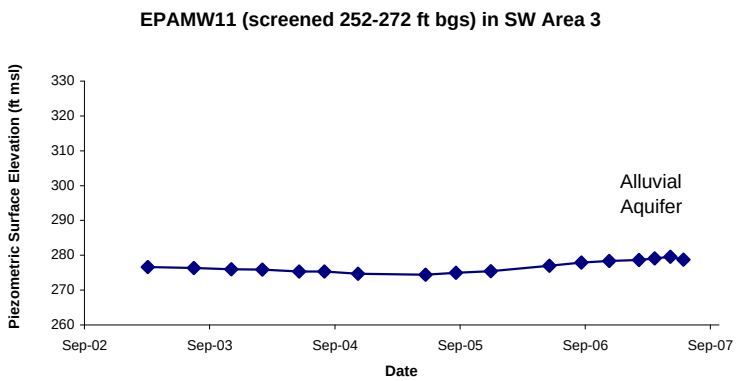
Legend

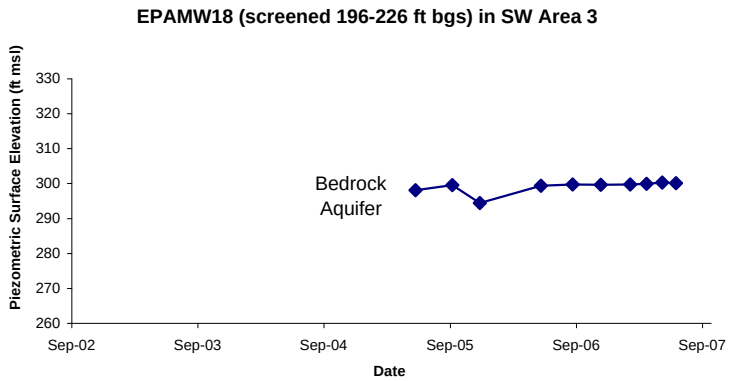
Lithologic Units (contacts and extents queried (?) where interpretation infeasible due to limited dataset)

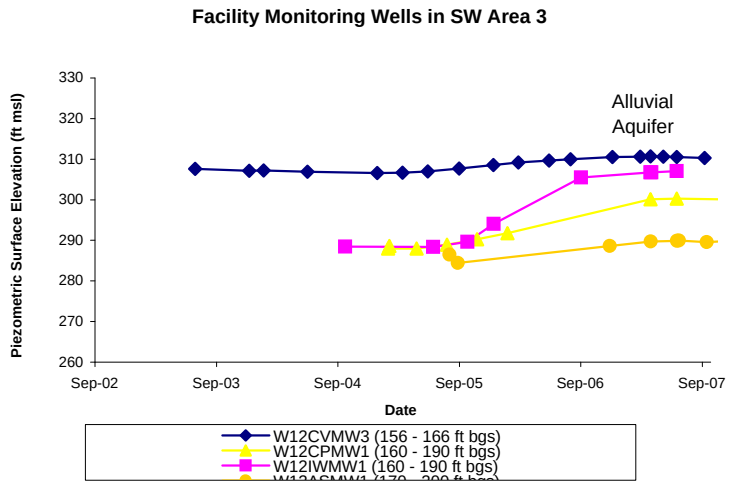
- Predominantly Coarse-grained Material
- Predominantly Fine-grained Material
- Sedimentary Bedrock[1]
- Screened Well Intervals
- Groundwater Elevation: 2007[2]
- Groundwater Elevation: 1933[3]

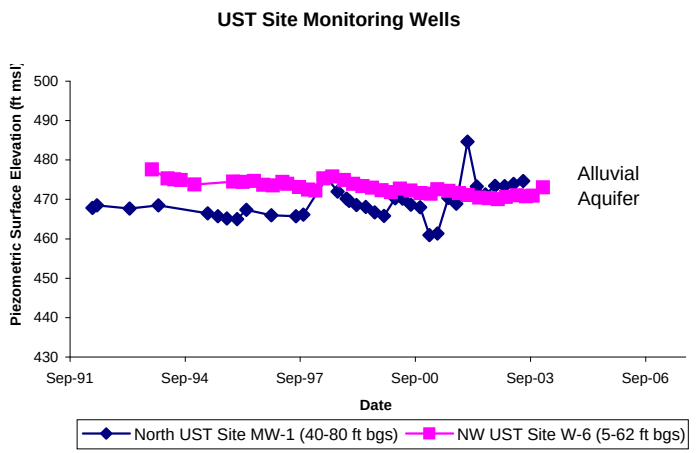
Notes:
- See Figure D-7 for locations of cross-sections in plan view.
- These cross sections show generalized lithologies based on the following categories: predominantly coarse grained material (includes gravel, sand, silty sand, and/or clayey sand) and predominantly fine grained material (includes clay, silt, sandy silt, and/or sandy clay).
- (1) Sedimentary bedrock elevations are shown on Figure D-2.
- (2) 2007 groundwater elevations represent the water table or potentiometric surface as measured in spring 2007, in feet (relative to) mean sea level.
- (3) 1933 groundwater elevations shown on Figure 3-5.
- (4) This Figure (D-8) is the same as Figure 3-10 in Section 3.

Figure D-8
Conceptual Hydrogeologic Cross Section A-A'
Remedial Investigation
San Gabriel Valley Area 3 Superfund Site









Notes:

Hydrographs show relatively static groundwater levels over time.

ft bgs - feet below ground surface
ft msl - feet (relative to) mean sea level

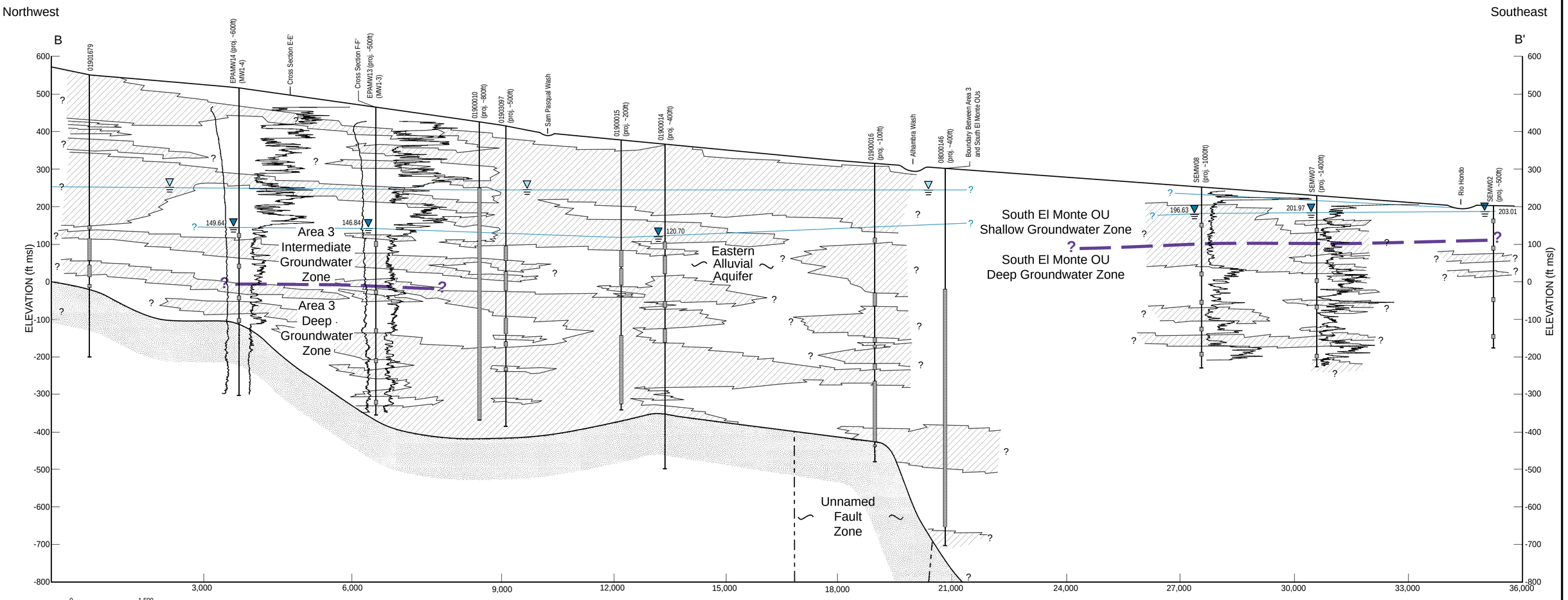
SW - southwestern

Figure D-9

Hydrographs of Groundwater Elevations - Western Alluvial/Bedrock Aquifers

Remedial Investigation

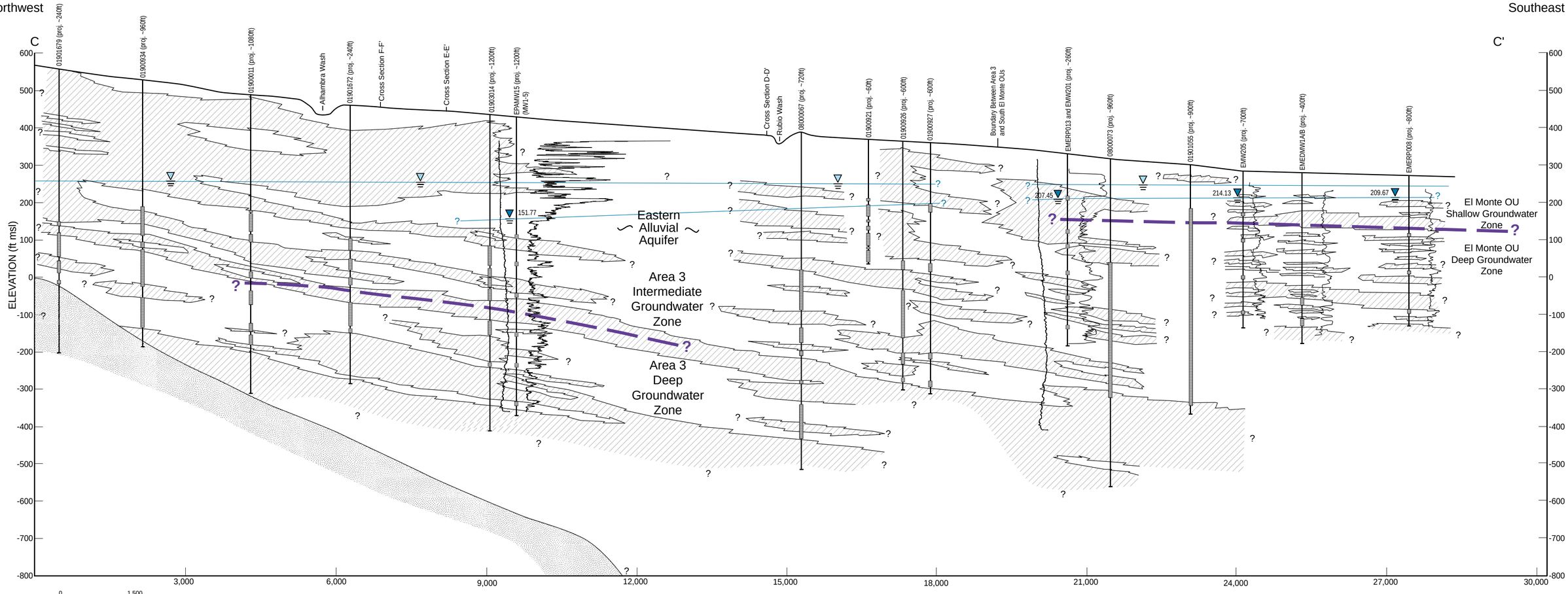
San Gabriel Valley Area 3 Superfund Site



Notes:
- See Figure D-7 for locations of cross-sections in plan view.
- Groundwater zone boundaries shown are conceptual.
- These cross sections show generalized lithologies based on the following categories: predominantly coarse grained material (includes gravel, sand, silty sand, and/or clayey sand) and predominantly fine grained material (includes clay, silt, sandy silt, and/or sandy clay).
- (1) Sedimentary bedrock elevations are shown on Figure D-2.
- (2) 2007 groundwater elevations represent the water table or potentiometric surface as measured in spring 2007, in feet (relative to) mean sea level.
- (3) 1933 groundwater elevations shown on Figure 3-5.
- (4) This Figure (D-10) is the same as Figure 3-11 in Section 3.

Figure D-10
Conceptual Hydrogeologic Cross Section B-B'
Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

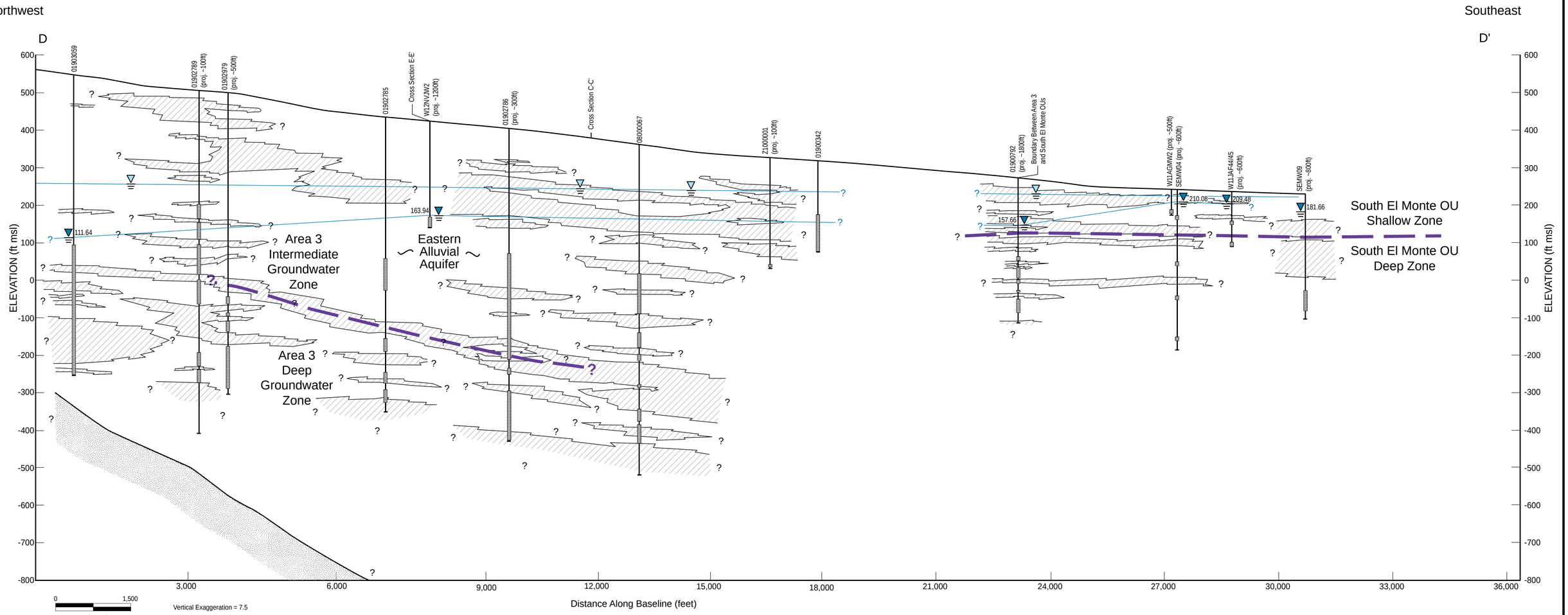
SCO385133.RR.01 SGV_CrossBB' 4.ai 5/09



Notes:
- See Figure D-7 for locations of cross-sections in plan view.
- Groundwater zone boundaries shown are conceptual.
- These cross sections show generalized lithologies based on the following categories: predominantly coarse grained material (includes gravel, sand, silty sand, and/or clayey sand) and predominantly fine grained material (includes clay, silt, sandy silt, and/or sandy clay).
- (1) Sedimentary bedrock elevations are shown on Figure D-2.
- (2) 2007 groundwater elevations represent the water table or potentiometric surface as measured in spring 2007, in feet (relative to) mean sea level.
- (3) 1933 groundwater elevations shown on Figure 3-5.
- (4) This Figure (D-11) is the same as Figure 3-12 in Section 3.

Figure D-11
Conceptual Hydrogeologic Cross Section C-C'
Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

SCO385133.RR.01 SGV_CrossCC 4.ai 5/09



Legend

Lithologic Units (contacts and extents queried (?) where interpretation infeasible due to limited dataset)

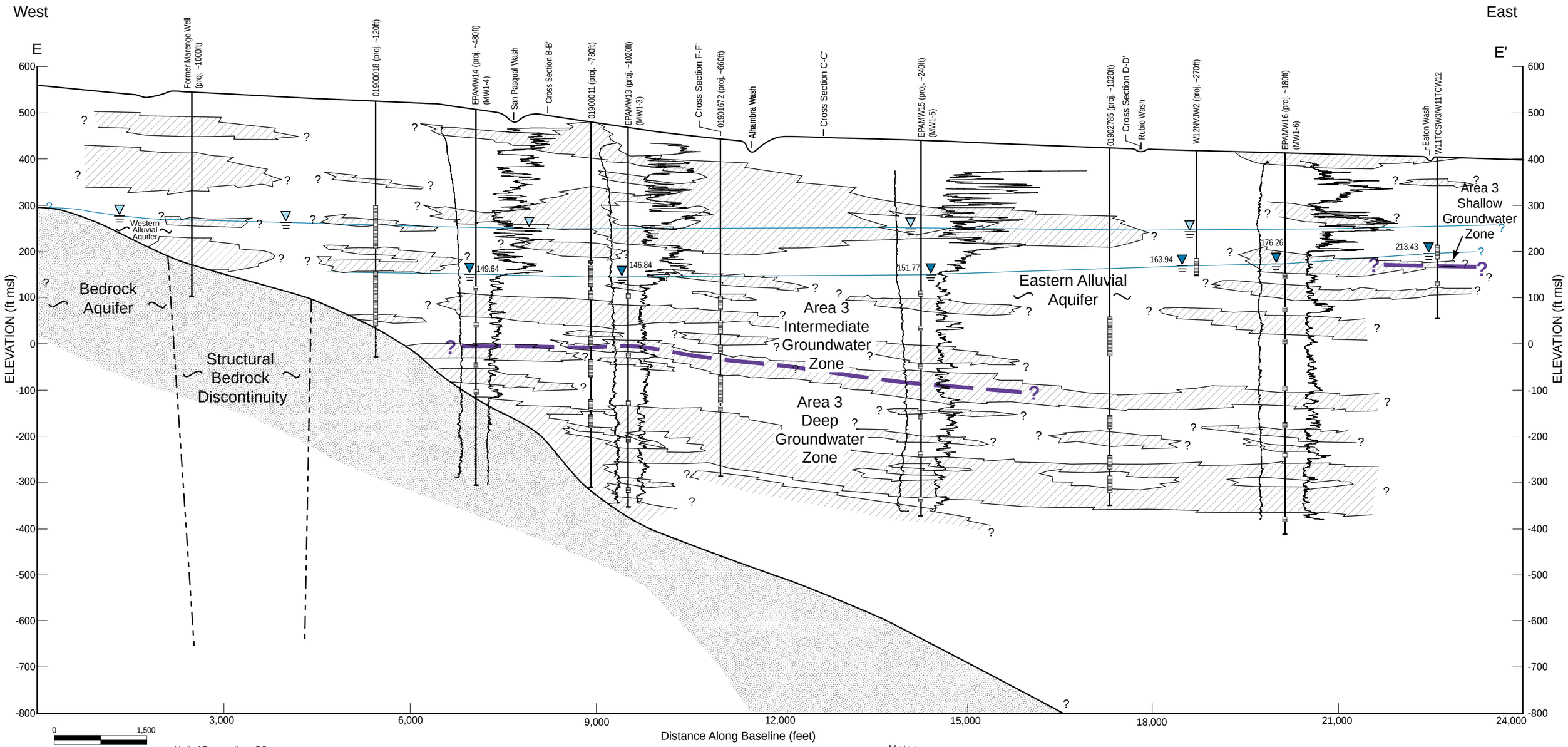
- Predominantly Coarse-grained Material
- Predominantly Fine-grained Material
- Sedimentary Bedrock[1]

- Screened Well Intervals
- Groundwater Elevation: 2007[2], queried (?) where interpretation infeasible due to limited dataset)
- Groundwater Elevation: 1933[3], queried (?) where interpretation infeasible due to limited dataset)
- Approximate location of boundary between groundwater zones, extent queried (?) where interpretation infeasible due to limited dataset)

Notes:
- See Figure D-7 for locations of cross-sections in plan view.
- Groundwater zone boundaries shown are conceptual.
- These cross sections show generalized lithologies based on the following categories: predominantly coarse grained material (includes gravel, sand, silty sand, and/or clayey sand) and predominantly fine grained material (includes clay, silt, sandy silt, and/or sandy clay).
- (1) Sedimentary bedrock elevations are shown on Figure D-2.
- (2) 2007 groundwater elevations represent the water table or potentiometric surface as measured in spring 2007, in feet (relative to) mean sea level.
- (3) 1933 groundwater elevations shown on Figure 3-5.
- (4) This Figure (D-12) is the same as Figure 3-13 in Section 3.

Figure D-12
Conceptual Hydrogeologic Cross Section D-D'
Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

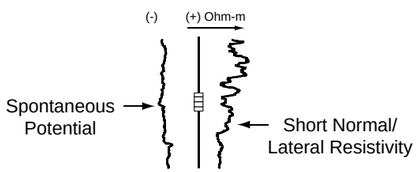
SCO385133.RR.01 SGV_CrossDD 4.ai 5/09



0 1,500
Horizontal Scale in Feet

Vertical Exaggeration = 7.5

Geophysical Logs



Legend

Lithologic Units (contacts and extents queried (?) where interpretation infeasible due to limited dataset)

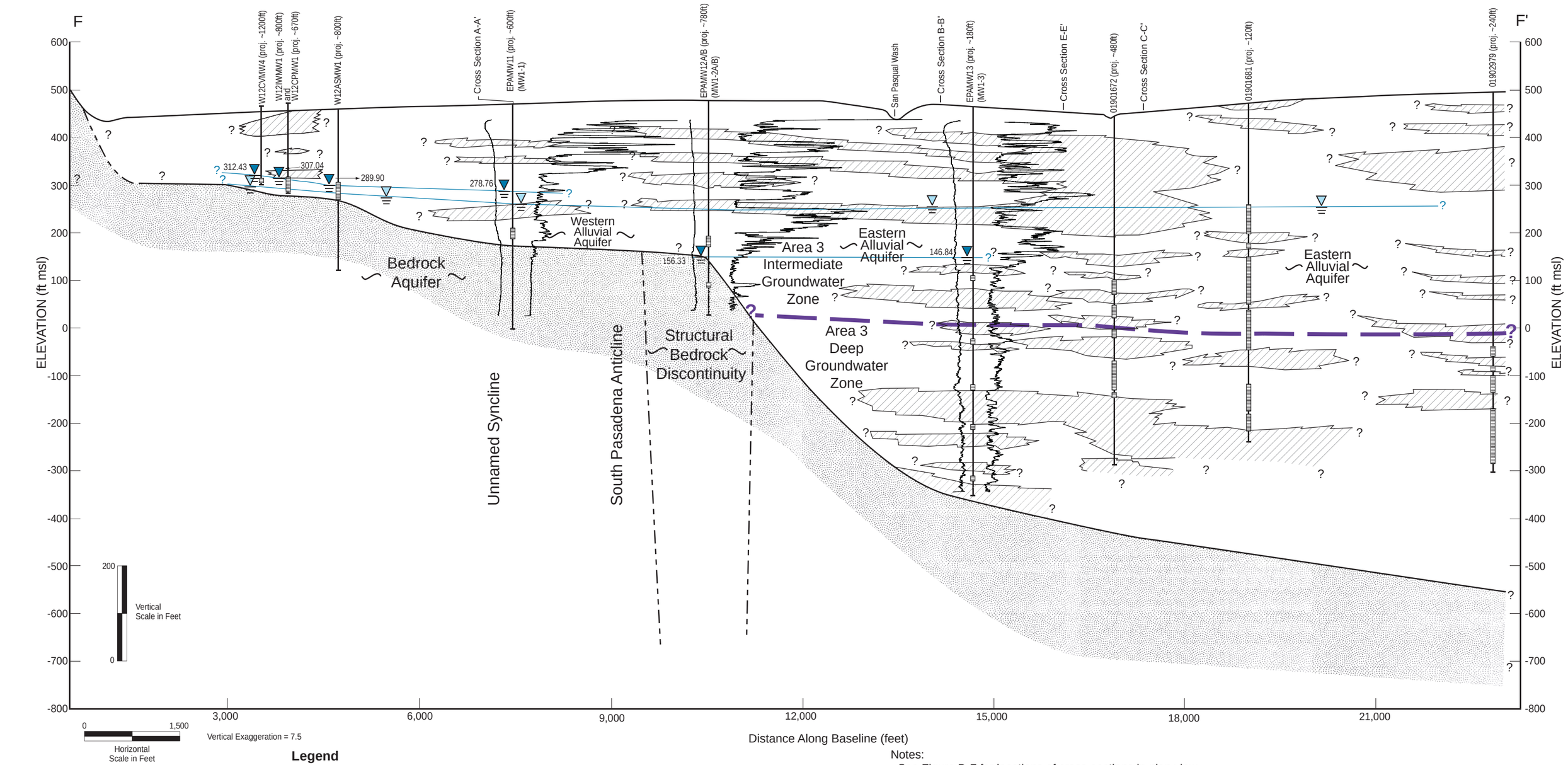
- Predominantly Coarse-grained Material
- Predominantly Fine-grained Material
- Sedimentary Bedrock

- Screened Well Intervals
- Groundwater Elevation: 2007[2], queried (?) where interpretation infeasible due to limited dataset)
- Groundwater Elevation: 1933[3], queried (?) where interpretation infeasible due to limited dataset)
- Approximate location of boundary between groundwater zones, extent queried (?) where interpretation infeasible due to limited dataset)

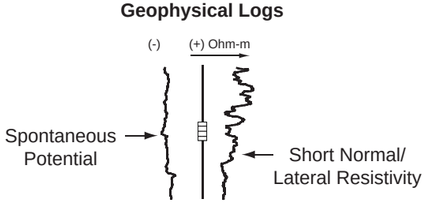
Notes:
- See Figure D-7 for locations of cross-sections in plan view.
- Groundwater zone boundaries shown are conceptual.
- These cross sections show generalized lithologies based on the following categories: predominantly coarse grained material (includes gravel, sand, silty sand, and/or clayey sand) and predominantly fine grained material (includes clay, silt, sandy silt, and/or sandy clay).
- (1) Sedimentary bedrock elevations are shown on Figure D-2.
- (2) 2007 groundwater elevations represent the water table or potentiometric surface as measured in spring 2007, in feet (relative to) mean sea level.
- (3) 1933 groundwater elevations shown on Figure 3-5.
- (4) This Figure (D-13) is the same as Figure 3-14 in Section 3.

Figure D-13
Conceptual Hydrogeologic Cross Section E-E'
Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

SCO385133.RR.01 SGV_CrossEE 4.ai 5/09



Geophysical Logs



Legend

Lithologic Units (contacts and extents queried (?) where interpretation infeasible due to limited dataset)

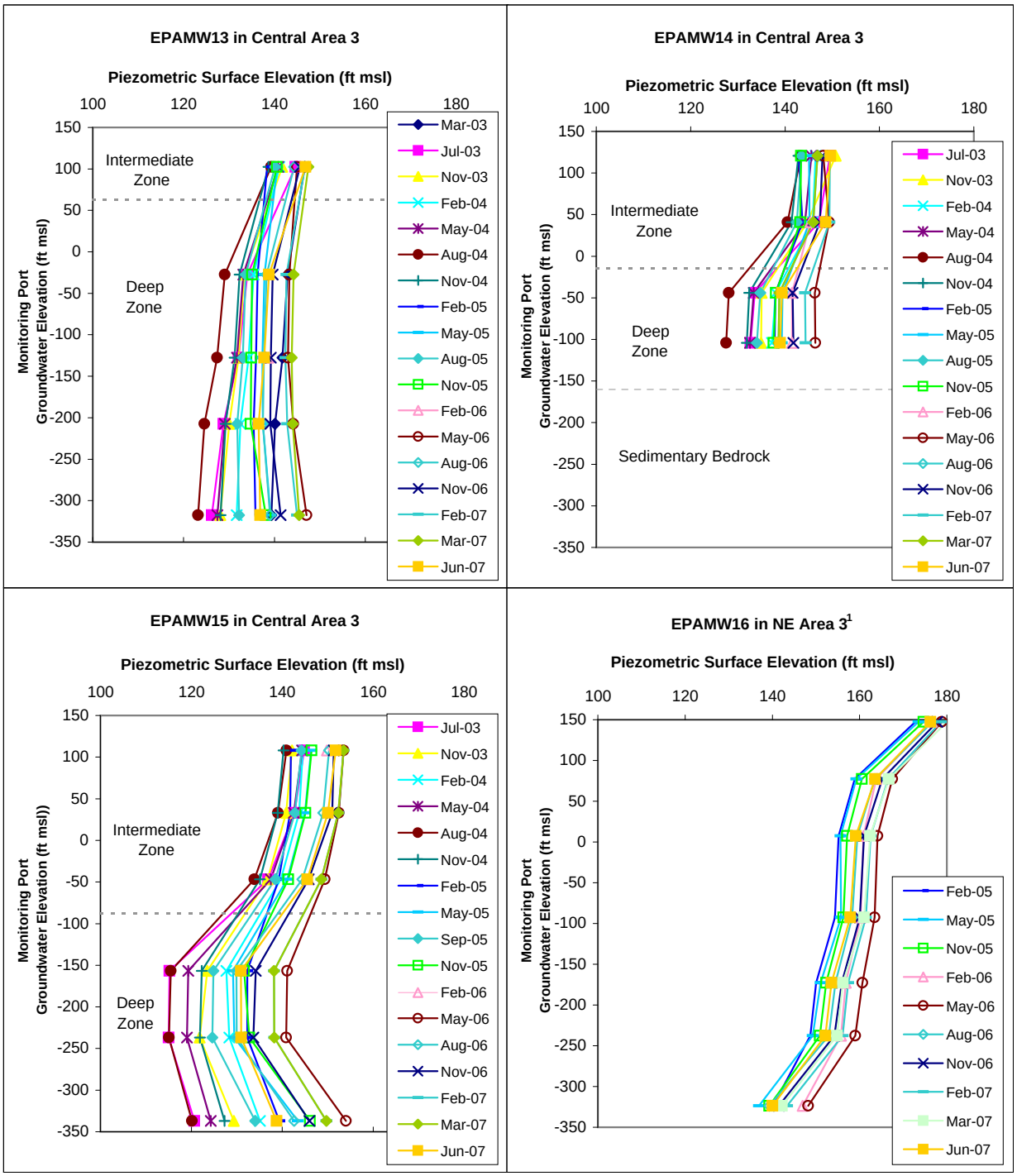
- Predominantly Coarse-grained Material
- Predominantly Fine-grained Material
- Sedimentary Bedrock

- Screened Well Intervals
- Groundwater Elevation: 2007[2], queried (?) where interpretation infeasible due to limited dataset)
- Groundwater Elevation: 1933[3], queried (?) where interpretation infeasible due to limited dataset)
- Approximate location of boundary between groundwater zones, extent queried (?) where interpretation infeasible due to limited dataset)

Notes:
- See Figure D-7 for locations of cross-sections in plan view.
- Groundwater zone boundaries shown are conceptual.
- These cross sections show generalized lithologies based on the following categories: predominantly coarse grained material (includes gravel, sand, silty sand, and/or clayey sand) and predominantly fine grained material (includes clay, silt, sandy silt, and/or sandy clay).
- (1) Sedimentary bedrock elevations are shown on Figure D-2.
- (2) 2007 groundwater elevations represent the water table or potentiometric surface as measured in spring 2007, in feet (relative to) mean sea level.
- (3) 1933 groundwater elevations shown on Figure 3-5.
- (4) This Figure (D-14) is the same as Figure 3-15 in Section 3.

Figure D-14
Conceptual Hydrogeologic Cross Section F-F'
Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

SCO385133.RR.01 SGV_CrossFF 4.ai 5/09



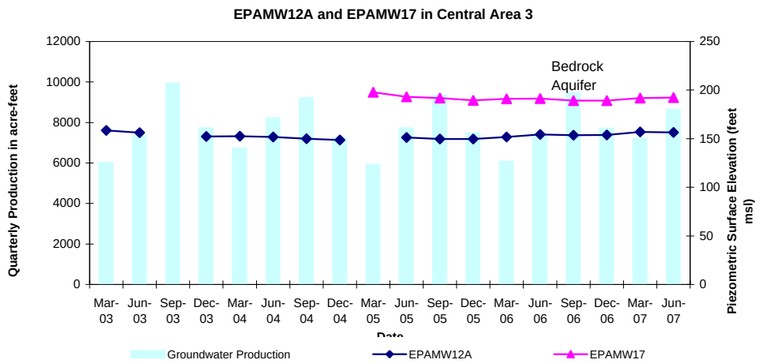
Notes:

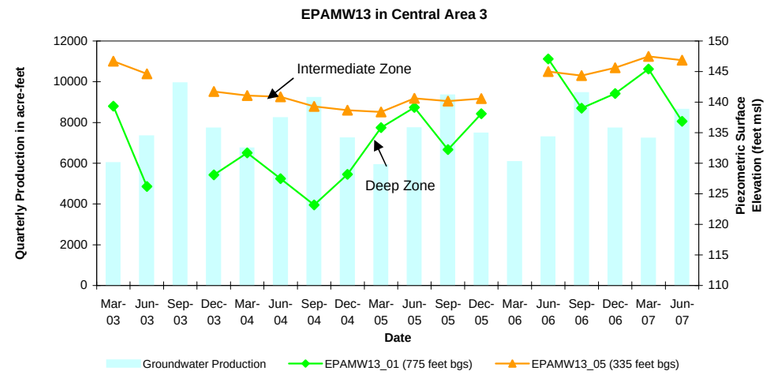
The graphs show distinct differences in the piezometric surface elevations between groundwater zones

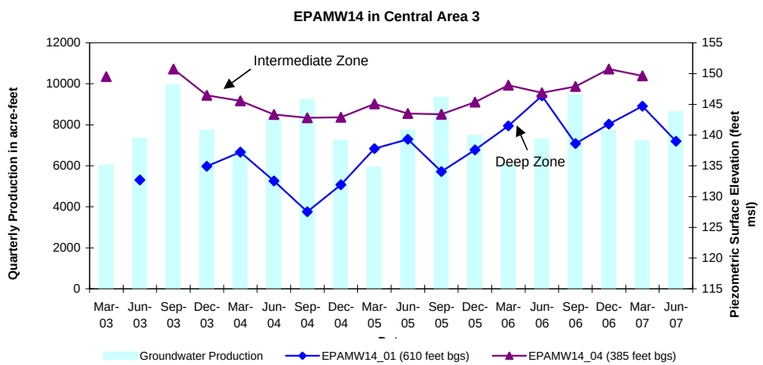
[1]The groundwater measured in the uppermost port at EPAMW16 shows the occurrence of a slight discontinuity in vertical gradient. This port might be completed in a separate, thin zone between the shallow groundwater zone and intermediate groundwater zone

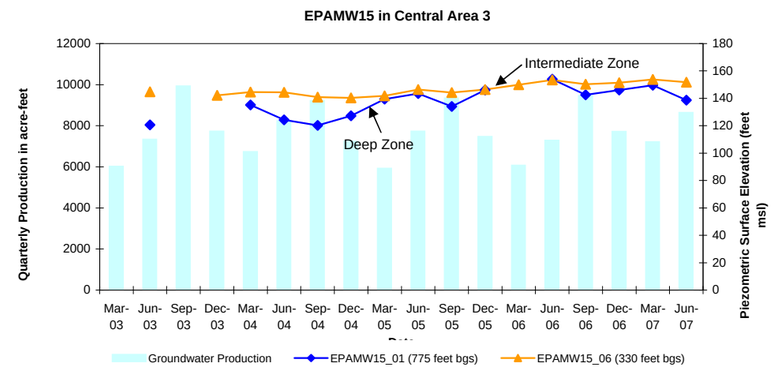
ft msl - feet (relative to) mean sea level NE - northeastern

Figure D-15
Piezometric Surface Elevation Measurements
Remedial Investigation
San Gabriel Valley Area 3 Supefund Site

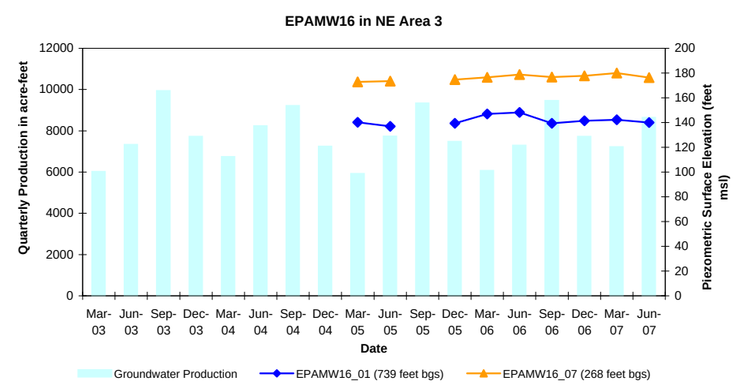








1



Notes:

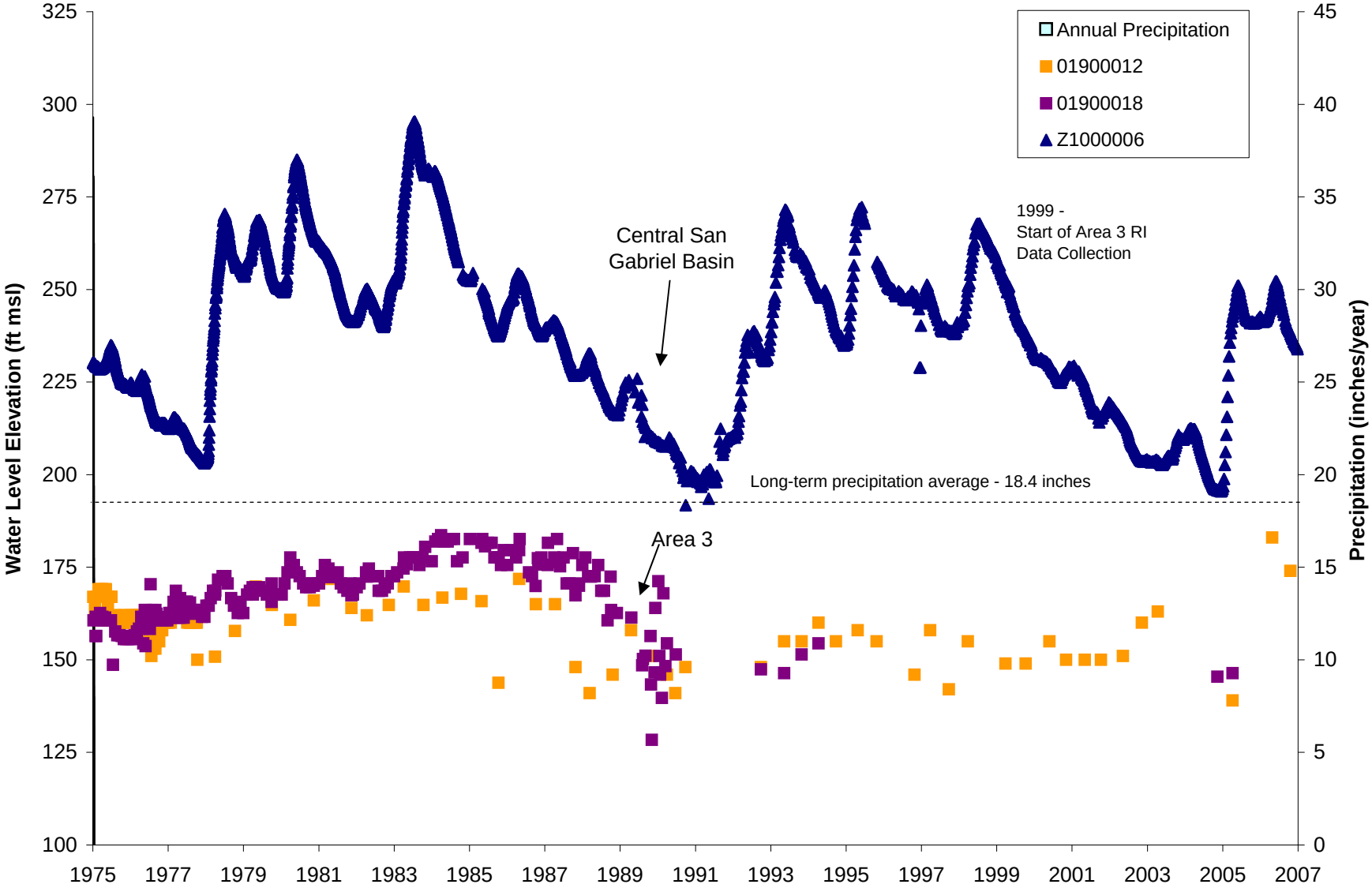
Hydrographs show influence of pumping on groundwater elevations; pumping influence tends to increase with depth.

[1]The groundwater elevation measured in the uppermost port in EPAMW16 shows the occurrence of a slight discontinuity in vertical gradients. This port might be completed in a thin zone between the shallow and intermediate zones.

feet bgs - feet below ground surface
feet msl - feet (relative to) mean sea level

NE - northeastern

Figure D-16
Hydrographs of Groundwater Elevations - Eastern Alluvial/Bedrock Aquifers
Remedial Investigation
San Gabriel Valley Area 3 Superfund Site



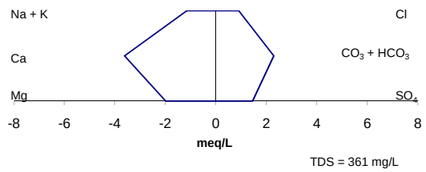
This graph compares rainfall data with groundwater levels measured in the central portion of the San Gabriel Basin and in Area 3. The locations of the wells are shown in Figure D-6. This figure (D-17) is the same as Figure 3-8 in Section 3.

ft msl - feet (relative to) mean sea level

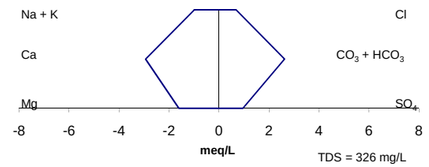
Figure D-17
Precipitation Effect
on Groundwater Elevations
San Gabriel Basin and Area 3
Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

Figure D-18
Groundwater Geochemistry - Eastern Alluvial Aquifer - Intermediate Zone
Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

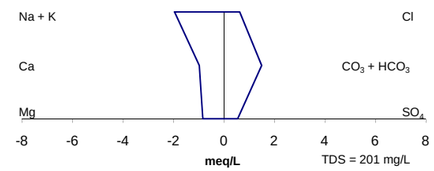
EPAMW16; Zone 7 in NE Area 3



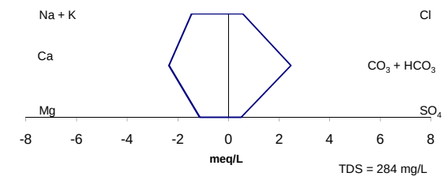
EPAMW16; Zone 6 in NE Area 3



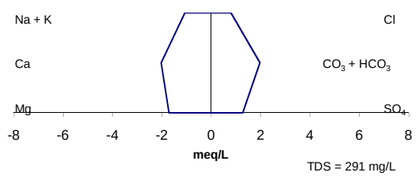
EPAMW15; Zone 6 in Central Area 3



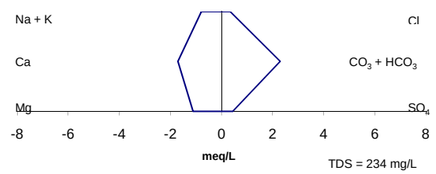
EPAMW15; Zone 5 in Central Area 3



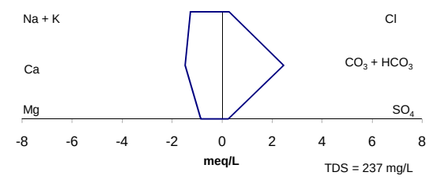
EPAMW16; Zone 5 in NE Area 3



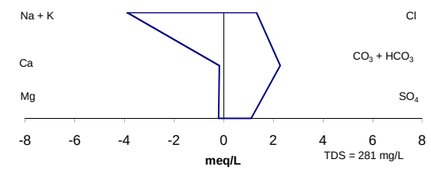
EPAMW16; Zone 4 in NE Area 3



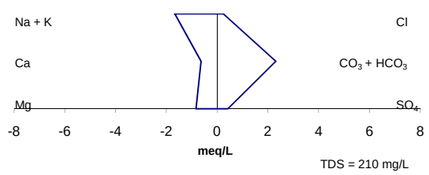
EPAMW15; Zone 4 in Central Area 3



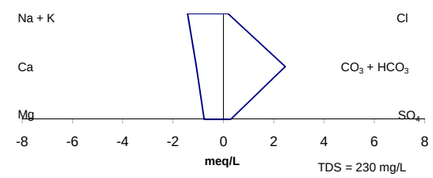
EPAMW14; Zone 4 in Central Area 3



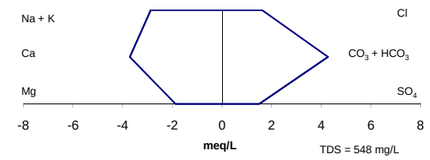
EPAMW16; Zone 3 in NE Area 3



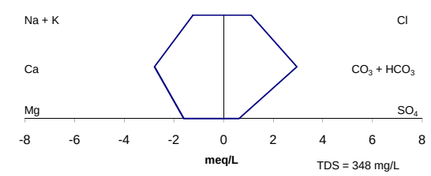
EPAMW16; Zone 2 in NE Area 3



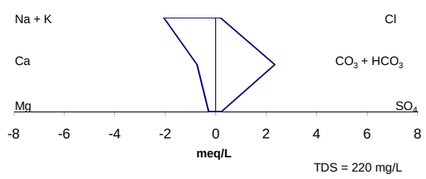
EPAMW14; Zone 3 in Central Area 3



EPAMW13; Zone 5 in Central Area 3

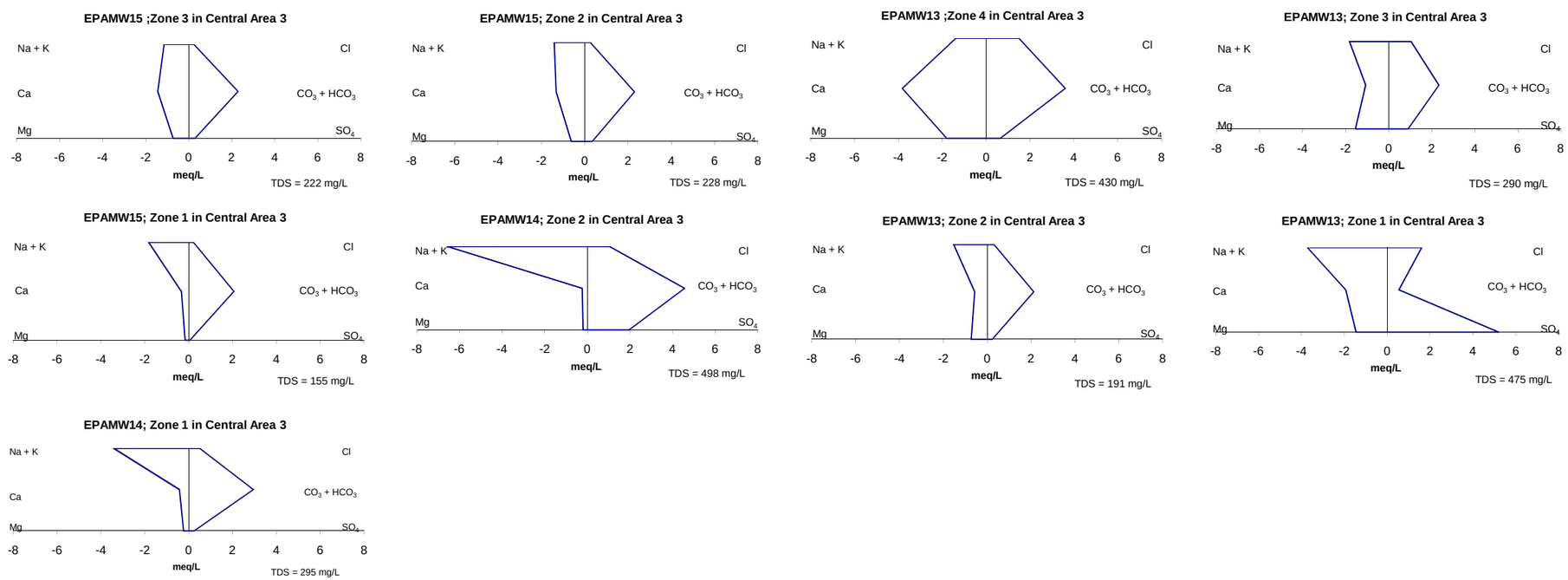


EPAMW16; Zone 1 in NE Area 3



Notes:
Data collected in August 2006. Data is expected to be constant in the future.
meq/L - milliequivalents per liter
TDS - total dissolved solids
NE - northeastern
Chemical Symbols for Major Ions
Na^{+1} - sodium
K^{+1} - potassium
Ca^{+2} - calcium
Mg^{+2} - magnesium
Cl^{-1} - chloride
CO_3^{-2} - carbonate
HCO_3^{-2} - bicarbonate
SO_4^{-2} - sulfate

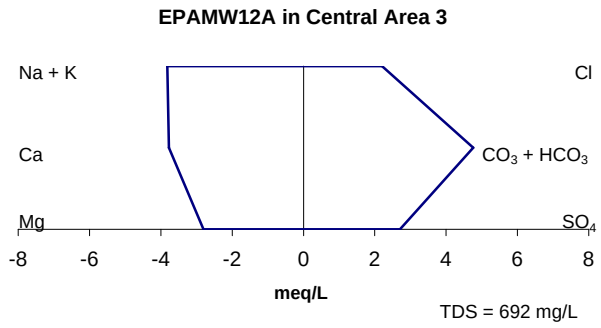
Figure D-19
Groundwater Geochemistry - Eastern Alluvial Aquifer - Deep Zone
Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

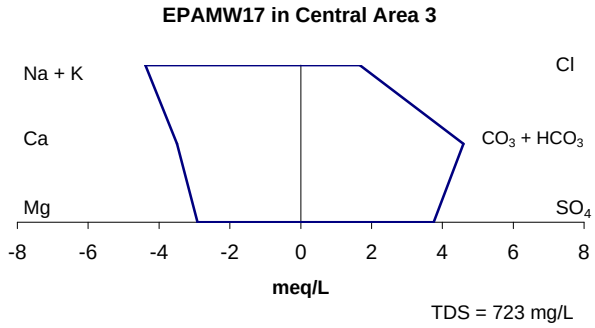


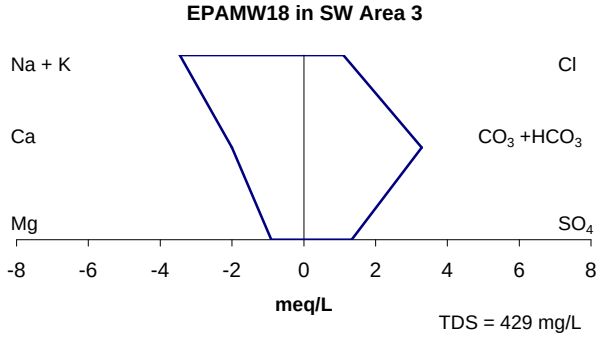
Notes:
Data collected in August 2006. Data is expected to be constant in the future.
meq/L - milliequivalents per liter
TDS - total dissolved solids

Chemical Symbols for Major Ions
Na^{+1} - sodium
K^{+1} - potassium
Ca^{+2} - calcium
Mg^{+2} - magnesium
Cl^{-1} - chloride
CO_3^{-2} - carbonate
HCO_3^{-2} - bicarbonate
SO_4^{-2} - sulfate

Figure D-20
Groundwater Geochemistry - Bedrock Aquifer
Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

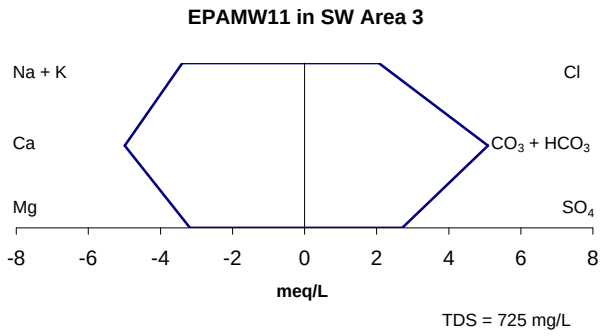




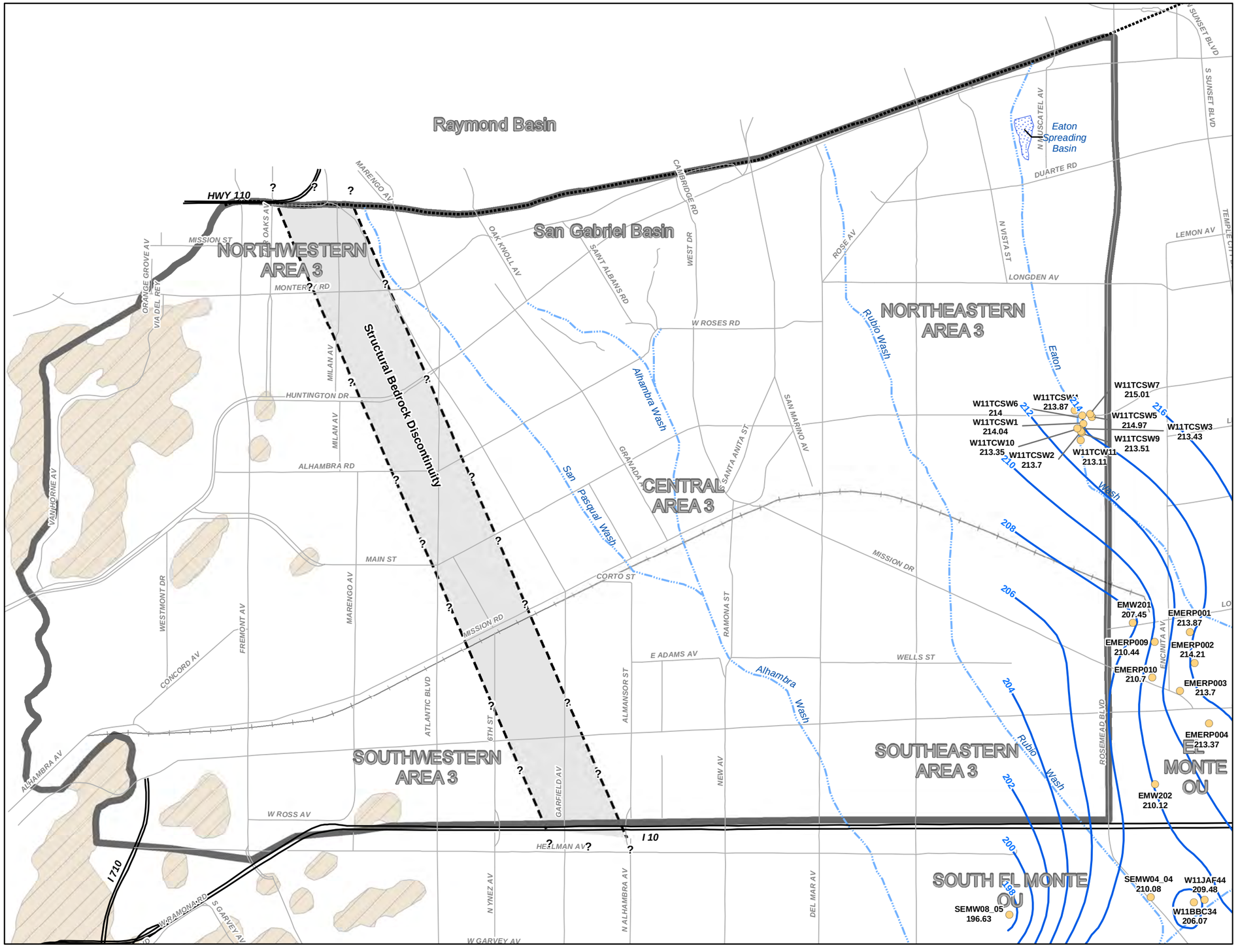


Notes:
Data collected in August 2006. Data is expected to be constant in the future.
meq/L - milliequivalents per liter
TDS - total dissolved solids
SW - southwestern
Chemical Symbols for Major Ions
Na^{+1} - sodium
K^{+1} - potassium
Ca^{+2} - calcium
Mg^{+2} - magnesium
Cl^{-1} - chloride
CO_3^{-2} - carbonate
HCO_3^{-2} - bicarbonate
SO_4^{-2} - sulfate

Figure D-21
Groundwater Geochemistry - Western Alluvial Aquifer
Remedial Investigation
San Gabriel Valley Area 3 Superfund Site



Notes:
Data collected in August 2006. Data is expected to be constant in the future.
meq/L - milliequivalents per liter
TDS - total dissolved solids
SW - southwestern
Chemical Symbols for Major Ions
Na^{+1} - sodium
K^{+1} - potassium
Ca^{+2} - calcium
Mg^{+2} - magnesium
Cl^{-1} - chloride
CO_3^{-2} - carbonate
HCO_3^{-2} - bicarbonate
SO_4^{-2} - sulfate



Legend

- Well Location
- Shallow Zone Groundwater Elevation Contour (ft msl)
- Fault (short dash indicates that fault impedes groundwater flow)
- Highway
- Major Street
- Railway
- Streams
- Structural Bedrock Discontinuity
- Area 3 Site
- Spreading Ground
- Bedrock

Notes:

ft msl - feet above mean sea level.

This Figure (D-22) is the same as Figure 3-19 in Section 3.

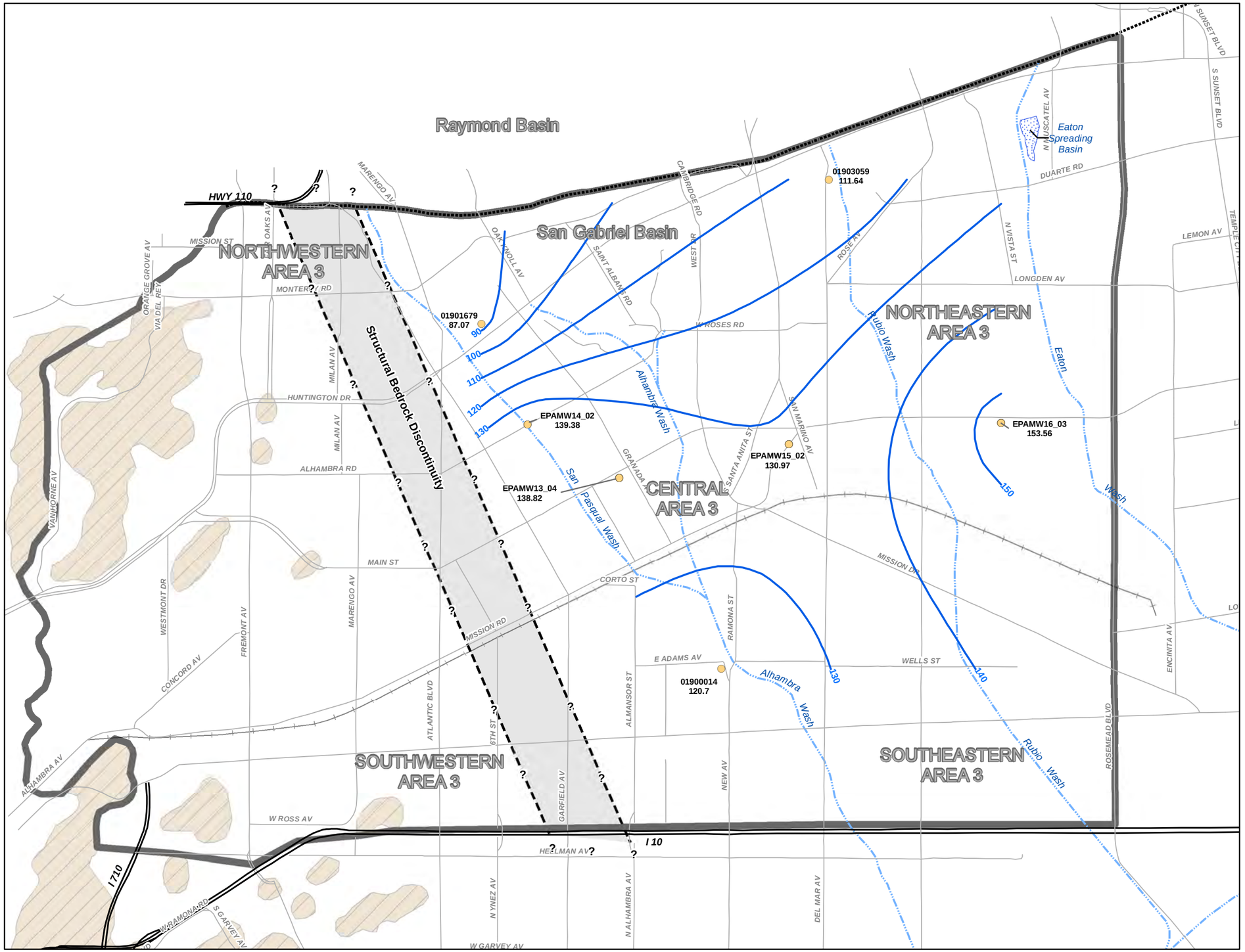
N

0 1,375 2,750 5,500

Feet

Figure D-22
Groundwater Elevation Contours
Eastern Alluvial Aquifer -
Shallow Groundwater Zone
Spring 2007
Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

\\galt\proj\EPAF\ALOU\MapFiles\ALOU_GeologicShallowContour.mxd



Legend

- Well Location
- Deep Zone Groundwater Elevation Contour (ft msl)
- Fault (short dash indicates that fault impedes groundwater flow)
- Highway
- Major Street
- Railway
- Streams
- Structural Bedrock Discontinuity
- Area 3 Site
- Spreading Ground
- Bedrock

Notes:

ft msl - feet above mean sea level.

This Figure (D-23) is the same as Figure 3-20 in Section 3.

N

0 1,375 2,750 5,500

Feet

Figure D-23
Groundwater Elevation Contours
Eastern Alluvial Aquifer -
Deep Groundwater Zone
Spring 2007
Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

\\galt\proj\EPAF\ALOU\MapFiles\ALOU_GeologicDeepContour.mxd