

## Section 9

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## Figures

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Figure 1-1. Site Location Map

Figure 1-2. Timeline of San Fernando Valley Development and General Superfund Activities

Figure 1-3. NPL Areas and Well Fields in the San Fernando Basin

Figure 1-4. Location Map of PRPs and OUs and NPL Areas

Figure 2-1. Annual Well Water Production

Figure 2-2. Investigation Process for GSIS

Figure 2-3. New Well Location Map

Figure 3-1. Geologic Map

Figure 3-2. Generalized Stratigraphic Column

Figure 3-3. Soils Map

Figure 3-4. Hydrology/Surface Water Features Map and ULARA Boundary

Figure 3-5. Cross-Section Locations

Figure 3-6. Hydrostratigraphic Correlation Figure

Figure 3-7. Cross-Section A-A'

Figure 3-8. Cross-Section B-B'

Figure 3-9. Cross-Section C-C'

Figure 3-10. Cross-Section D-D'

Figure 3-11. Cross-Section E-E'

Figure 3-12. Cross-Section F-F'

Figure 3-13. Cross-Section G-G'

Figure 3-14. Cross-Section H-H'

Figure 3-15. Cross-Section I-I'

Figure 3-16. Cross-Section J-J'

Figure 3-17. Cross-Section K-K'

Figure 3-18. Water Level Contour Map for SFB

Figure 3-19. Aquifer Geochemistry Shallow Monitoring Wells

Figure 3-20. Aquifer Geochemistry Deep Monitoring Wells



FIG-1

**Figure 3-21. Hexavalent Chromium and Dissolved Oxygen in Shallow Groundwater**

**Figure 3-22. Hexavalent Chromium and Dissolved Oxygen in Deep Groundwater**

**Figure 4-1. Generalized Release Profile for the SFB**

**Figure 4-2. Tujunga Organic and Inorganic Compounds**

**Figure 4-3. Rinaldi-Toluca Organic and Inorganic Compounds**

**Figure 4-4. North Hollywood Organic and Inorganic Compounds**

**Figure 4-5a. TCE Isoconcentration Map: Shallow Groundwater**

**Figure 4-5b. TCE Isoconcentration Map: Deep Groundwater**

**Figure 4-6a. PCE Isoconcentration Map: Shallow Groundwater**

**Figure 4-6b. PCE Isoconcentration Map: Deep Groundwater**

**Figure 4-7a. Cis-1,2-DCE Isoconcentration Map: Shallow Groundwater**

**Figure 4-7b. CIS-1,2-DCE Isoconcentration Map: Deep Groundwater**

**Figure 4-8a. 1,1-DCE Isoconcentration Map: Shallow Groundwater**

**Figure 4-8b. 1,1-DCE Isoconcentration Map: Deep Groundwater**

**Figure 4-9a. 1,2,3-TCP Isoconcentration Map: Shallow Groundwater**

**Figure 4-9b. 1,2,3-TCP Isoconcentration Map: Deep Groundwater**

**Figure 4-10a. 1,4-Dioxane Isoconcentration Map: Shallow Groundwater**

**Figure 4-10b. 1,4-Dioxane Isoconcentration Map: Deep Groundwater**

**Figure 4-11a. Hexavalent Chromium Isoconcentration Map: Shallow Groundwater**

**Figure 4-11b. Hexavalent Chromium Isoconcentration Map: Deep Groundwater**

**Figure 4-12a. Perchlorate Isoconcentration Map: Shallow Groundwater**

**Figure 4-12b. Perchlorate Isoconcentration Map: Deep Groundwater**

**Figure 4-13a. Nitrate Isoconcentration Map: Shallow Groundwater**

**Figure 4-14a. TCE Isoconcentration Cross-Section: Line A-A'**

**Figure 4-14b. TCE Isoconcentration Cross-Section: Line B-B'**

**Figure 4-14c. TCE Isoconcentration Cross-Section: Line C-C'**

**Figure 4-14d. TCE Isoconcentration Cross-Section: Line E-E'**

**Figure 4-14e. TCE Isoconcentration Cross-Section: Line J-J'**

**Figure 4-15a. PCE Isoconcentration Cross-Section: Line A-A'**

**Figure 4-15b. PCE Isoconcentration Cross-Section: Line B-B'**

**Figure 4-15c. PCE Isoconcentration Cross-Section: Line C-C'**

**Figure 4-15d. PCE Isoconcentration Cross-Section: Line E-E'**

**Figure 4-15e. PCE Isoconcentration Cross-Section: Line J-J'**

**Figure 4-16a. 1,1-DCE Isoconcentration Cross-Section: Line A-A'**

**Figure 4-16b. 1,1-DCE Isoconcentration Cross-Section: Line B-B'**

**Figure 4-16c. 1,1-DCE Isoconcentration Cross-Section: Line C-C'**

**Figure 4-16d. 1,1-DCE Isoconcentration Cross-Section: Line E-E'**

**Figure 4-16e. 1,1-DCE Isoconcentration Cross-Section: Line J-J'**

**Figure 4-17a. 1,4-Dioxane Isoconcentration Cross-Section: Line A-A'**

**Figure 4-17b. 1,4-Dioxane Isoconcentration Cross-Section: Line B-B'**



FIG-2

Figure 4-17c. 1,4-Dioxane Isoconcentration Cross-Section: Line C-C'

Figure 4-17d. 1,4-Dioxane Isoconcentration Cross-Section: Line E-E'

Figure 4-17e. 1,4-Dioxane Isoconcentration Cross-Section: Line J-J'

Figure 4-18a. Hexavalent Chromium Isoconcentration Cross-Section: Line A-A'

Figure 4-18b. Hexavalent Chromium Isoconcentration Cross-Section: Line B-B'

Figure 4-18c. Hexavalent Chromium Isoconcentration Cross-Section: Line C-C'

Figure 4-18d. Hexavalent Chromium Isoconcentration Cross-Section: Line E-E'

Figure 4-18e. Hexavalent Chromium Isoconcentration Cross-Section: Line J-J'

Figure 4-19a. Perchlorate Isoconcentration Cross-Section: Line A-A'

Figure 4-19b. Perchlorate Isoconcentration Cross-Section: Line B-B'

Figure 4-19c. Perchlorate Isoconcentration Cross-Section: Line C-C'

Figure 4-19d. Perchlorate Isoconcentration Cross-Section: Line E-E'

Figure 4-19e. Perchlorate Isoconcentration Cross-Section: Line J-J'

Figure 4-20. 3D Plume Model for TCE

Figure 4-21. 3D Plume Model for PCE

Figure 4-22. 3D Plume Model for 1,1-DCE

Figure 4-23. 3D Plume Model for 1,4-Dioxane

Figure 4-24. 3D Plume Model for Hexavalent Chromium

Figure 4-25. 3D Plume Model for Perchlorate

Figure 6-1. Model Grid from USEPA 2009 FFS and 12012 GMP

Figure 6-2. Scatter Plot of Observed versus Simulated Water Levels

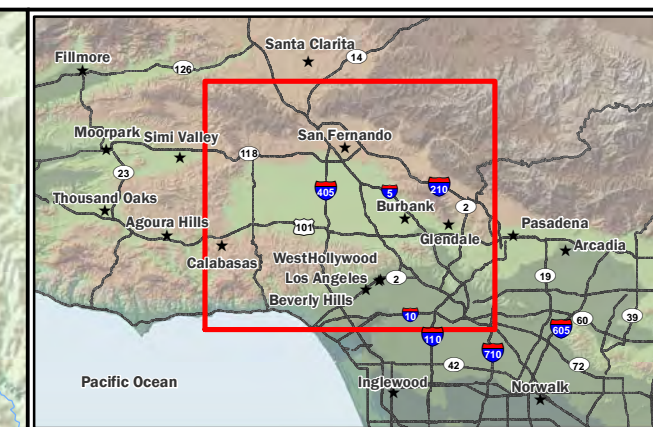
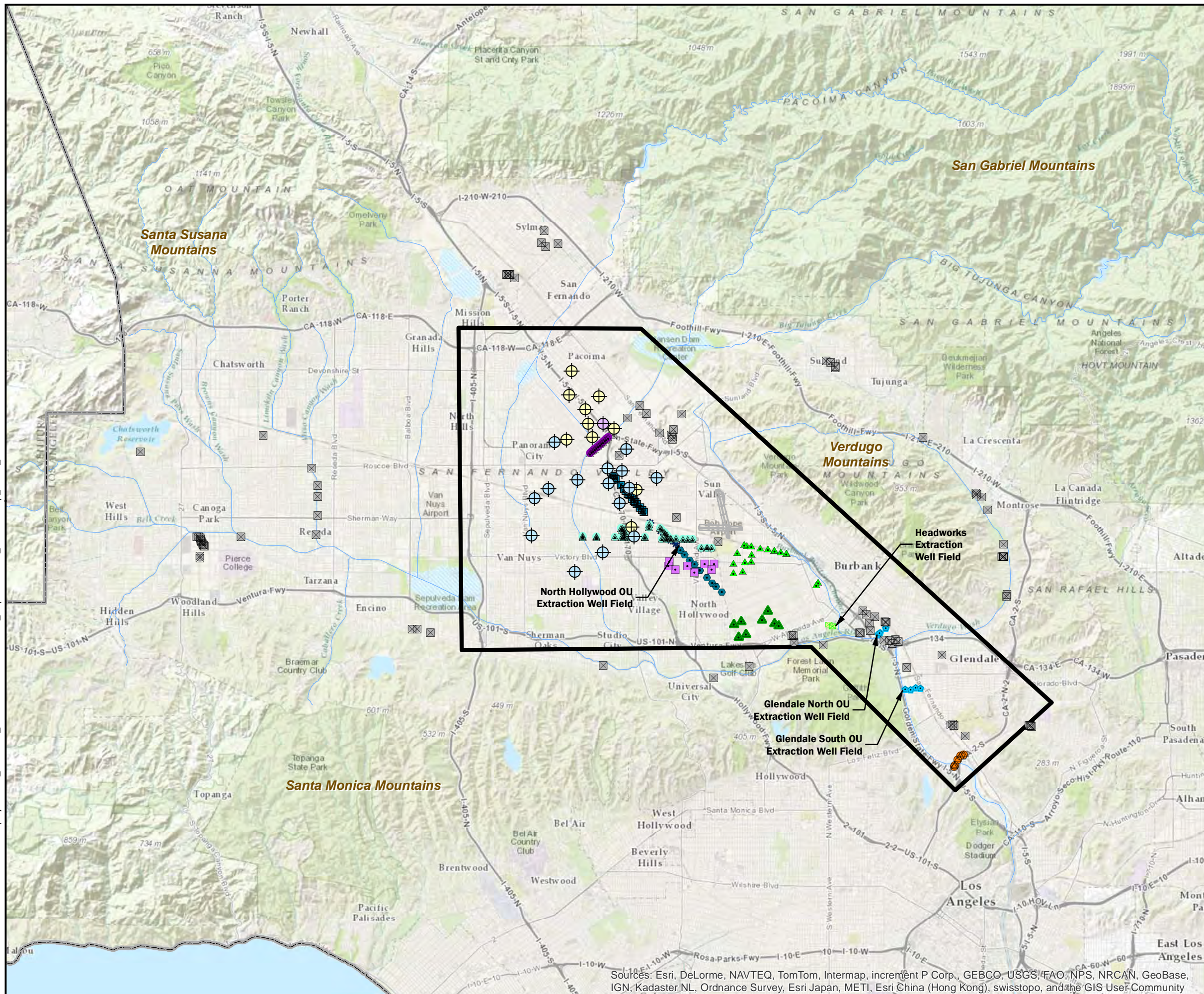
Figure 6-3. Capture Zones and relation to TCE Plume

Figure 6-4. Capture Zones and relation to PCE Plume

Figure 6-5. Capture Zones and relation to 1,4-Dioxane Plume

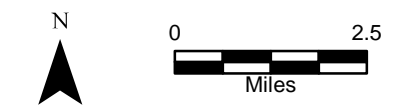


FIG-3



### Explanation

- GSIS Monitoring Wells**
- ⊕ LADWP
  - ⊕ USACE
  - ⊕ USEPA
- Production Wells by Well field**
- Erwin
  - Headworks
  - ▲ North Hollywood
  - Pollock
  - Rinaldi-Toluca
  - Tujunga
  - ▲ Verdugo
  - Whitnall
  - Other Wells
- Extraction Remediation Wells by Well field**
- ▲ Burbank OU
  - Glendale OU
  - ★ North Hollywood OU
- Other Features**
- ▭ GSIS Study Area
  - River/Stream/Drainage



**FIGURE 1-1**  
**SITE LOCATION MAP**  
**San Fernando Groundwater Basin**  
**LADWP GSIS Project**  
**Los Angeles, California**

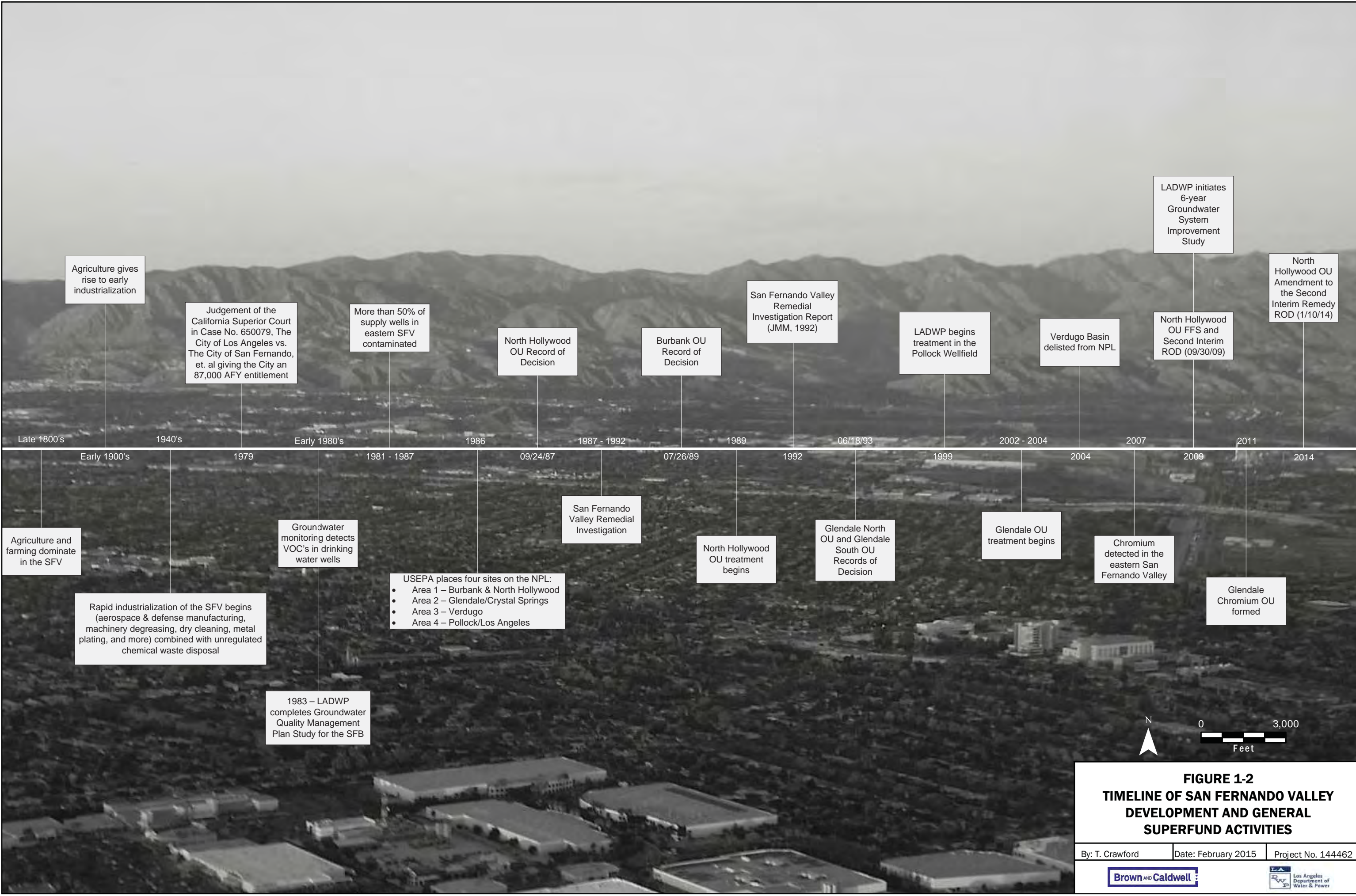
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Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community





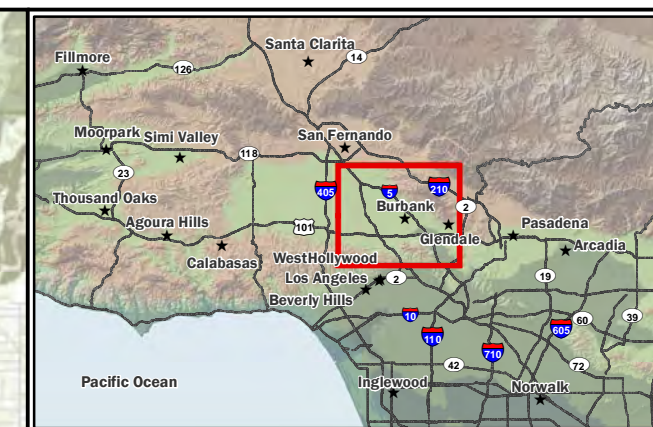
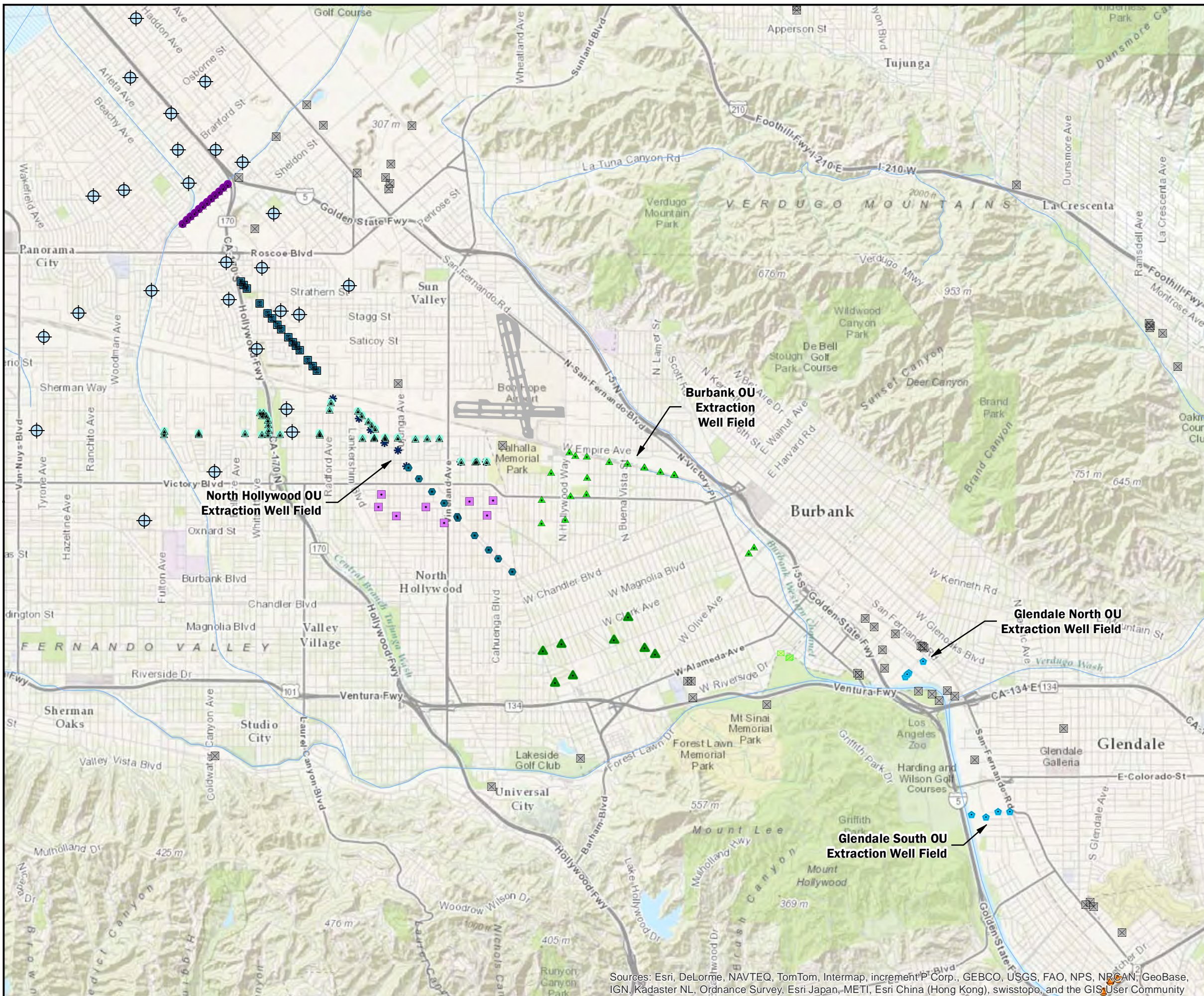
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**FIGURE 1-2  
TIMELINE OF SAN FERNANDO VALLEY  
DEVELOPMENT AND GENERAL  
SUPERFUND ACTIVITIES**

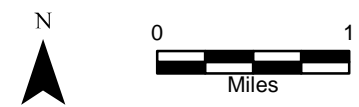
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### Explanation

- NPL Site Operable Unit Well Fields**
  - ▲ Burbank OU
  - ◆ Glendale OU
  - ✱ North Hollywood OU
- GSIS Monitoring Wells**
  - ⊕ Nested Monitoring Wells
- LADWP Production Well Well Fields**
  - Erwin
  - Headworks
  - ▲ North Hollywood
  - Pollock
  - Rinaldi-Toluca
  - Tujunga
  - ▲ Verdugo
  - Whitnall
- Other Production Wells**
  - ⊠ Non-LADWP Production Wells

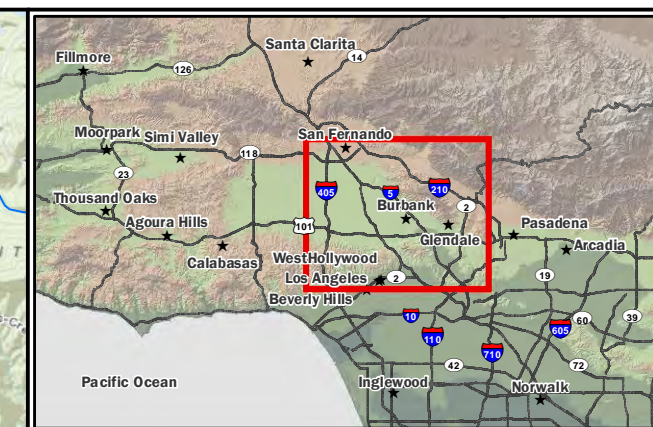
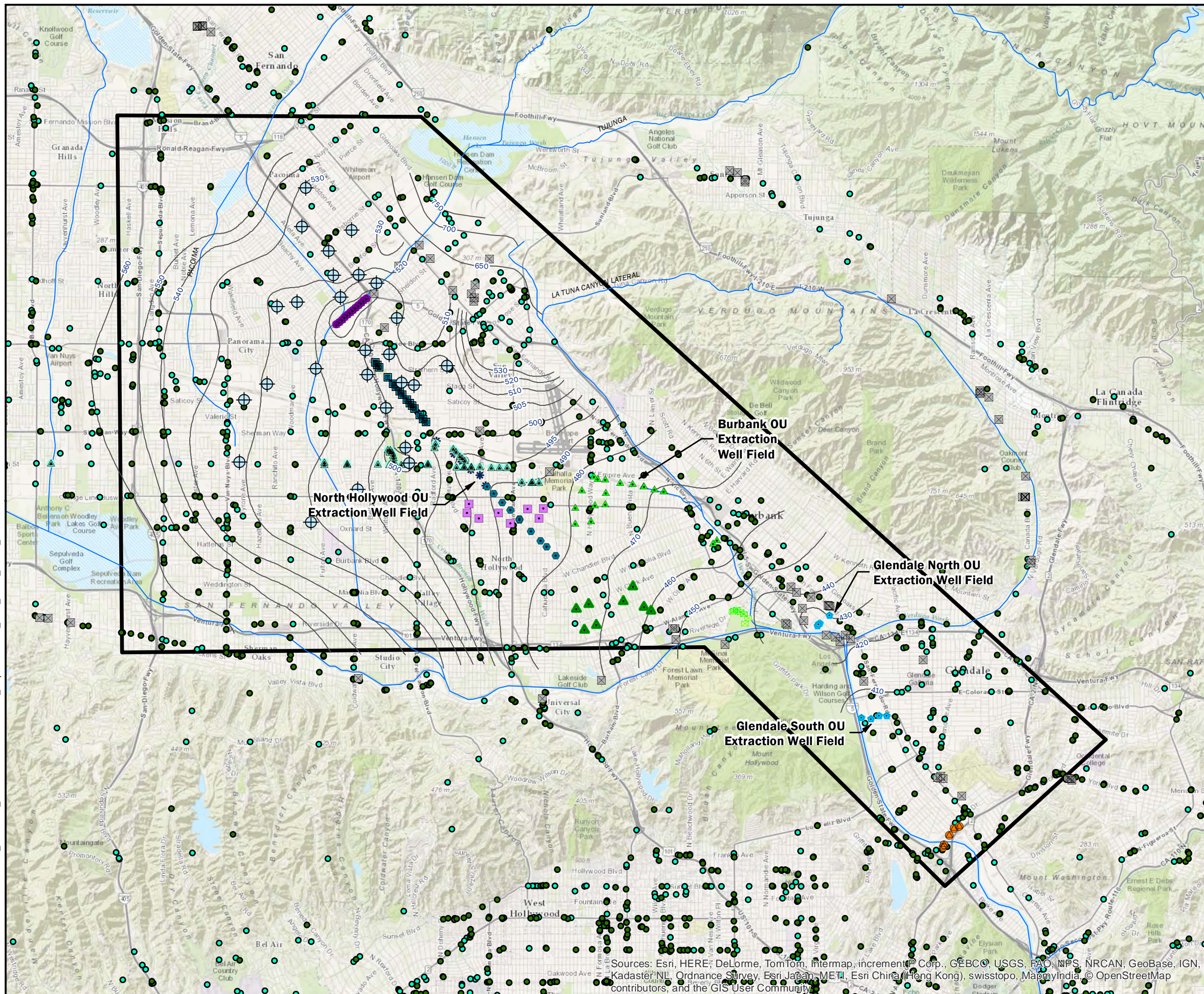


**FIGURE 1-3**  
**NPL AREAS AND WELL FIELDS**  
**San Fernando Groundwater Basin**  
**LADWP GSIS Project**  
**Los Angeles, California**

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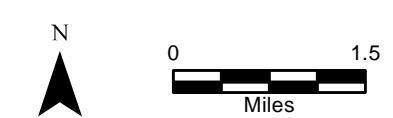


Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community



**Explanation**

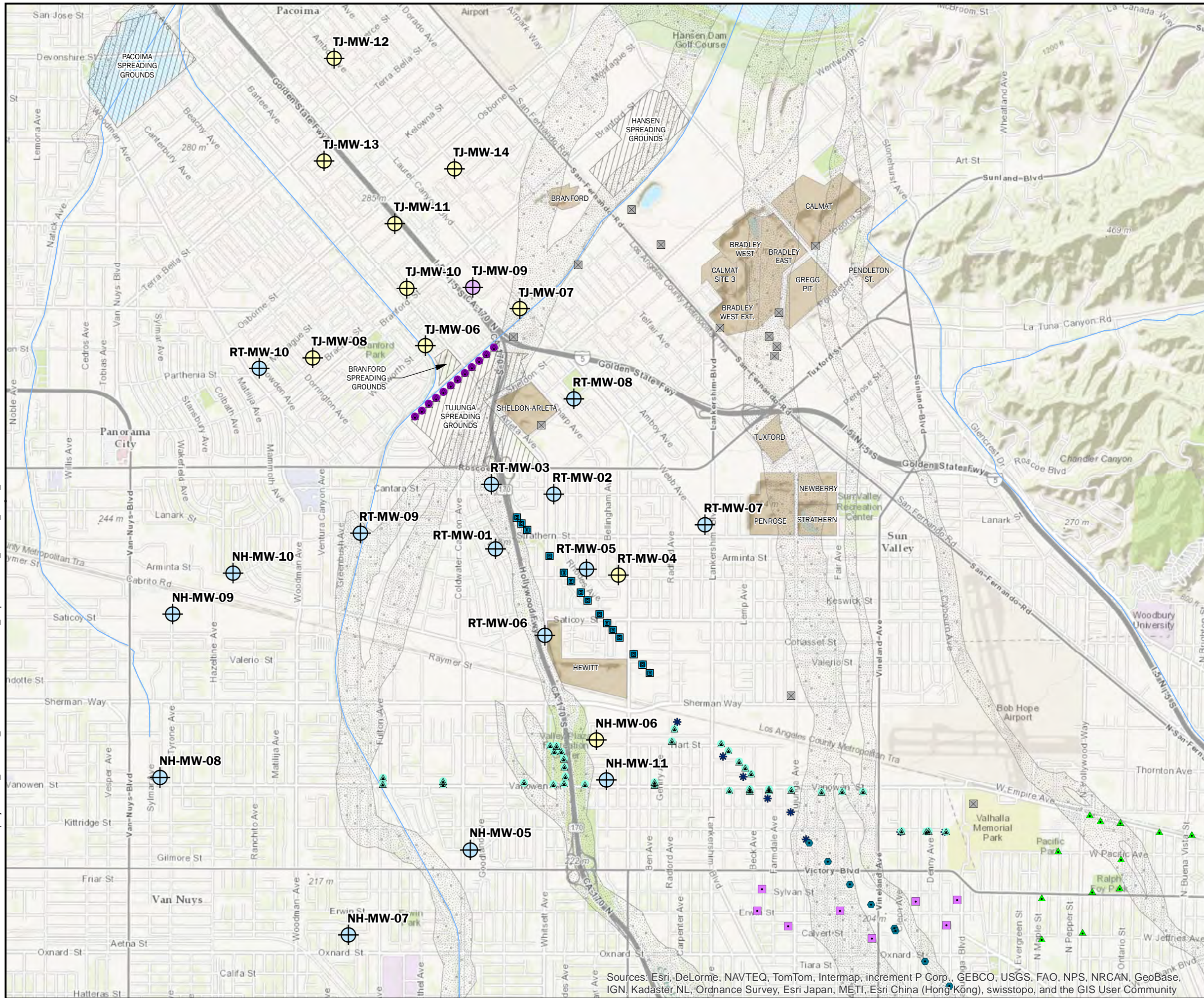
- GSIS Study Area
- Groundwater Elevation Contours (2013; ft)
- DTSC/RWQCB/Other Agency Investigation Sites**
  - 256 Chromium Sites
  - Spills, Leaks, Investigation and Cleanup Locations
  - Leaking Underground Fuel Tank (LUFT)
  - Underground Storage Tanks
- GSIS Monitoring Wells**
  - Monitoring Wells
- LADWP Production Well Well Fields**
  - Erwin
  - Headworks
  - North Hollywood
  - Pollock
  - Rinaldi-Toluca
  - Tujunga
  - Verdugo
  - Whitnall
- NPL Site Operable Unit Well Fields**
  - Burbank OU
  - Glendale OU
  - North Hollywood OU
- Other Production Wells**
  - Non-LADWP Production Wells



**FIGURE 1-4**  
**LOCATION OF PRPs, OUs AND NPL AREAS**  
**San Fernando Groundwater Basin**  
**LADWP GSIS Project**  
**Los Angeles, California**

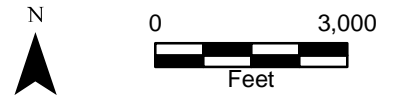
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Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community



**Explanation**

- GSIS Monitoring Wells**
  - ⊕ LADWP
  - ⊕ USACE
  - ⊕ USEPA
- Production Wells by Well field**
  - Erwin
  - ▲ North Hollywood
  - Rinaldi-Toluca
  - Tujunga
  - Whitnall
  - ⊗ Other Wells
- Extraction Remediation Wells by Well field**
  - ▲ Burbank OU
  - ★ North Hollywood OU
- Other Features**
  - River/Stream/Drainage
  - ▨ Spreading Grounds
  - ▨ Historical River Wash
  - Landfills



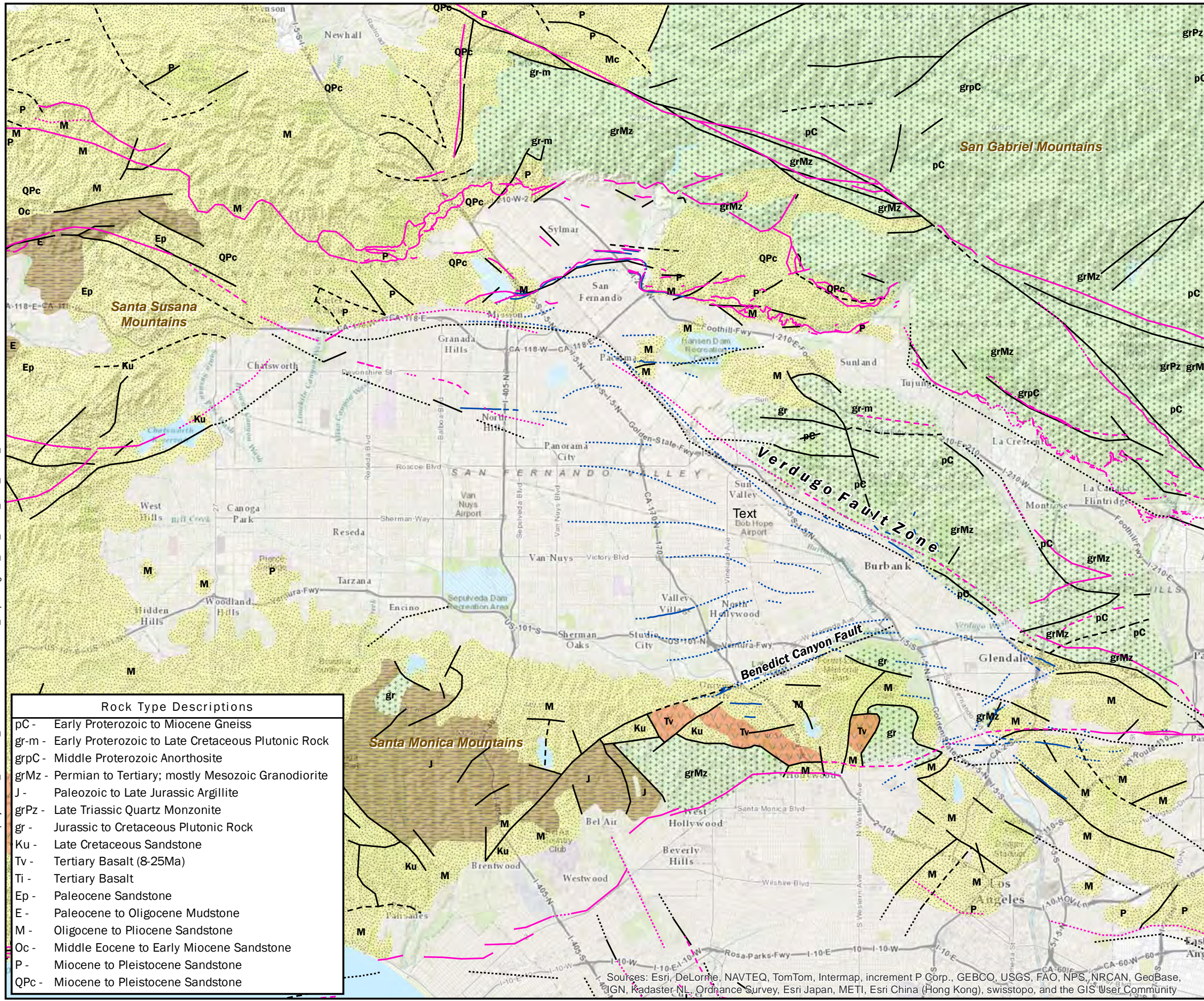
**FIGURE 2-2**  
**GSIS MONITORING WELL LOCATION MAP**  
**San Fernando Groundwater Basin**  
**LADWP GSIS Project**  
**Los Angeles, California**

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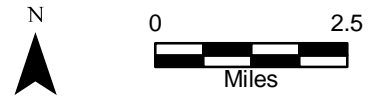
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**Explanation**

- Quaternary Faults (CGS)**
  - - - - - Approx. Located or Inferred
  - ..... Concealed
  - Well Located
- Weber OFR 80-10LA Faults**
  - - - - - Approx. Located or Inferred
  - ..... Concealed
  - Well Located
- California Faults (USGS, and CGS)**
  - - - - - Approx. Located or Inferred
  - ..... Concealed
  - Well Located
- U.S. Geological Survey and California Geological Survey Geology - Rock Type**
  - Non-Water Bearing Pre-Tertiary Crystalline Rock (grMz, pC, grpC, grPz, gr-m, gr)
  - Pre-Tertiary Mudstone and Shale (J, E)
  - Tertiary Volcanic Rock (Tv, Ti)
  - Tertiary Sandstone (M, P, Oc, Ku, QPc, Ep)
  - Quaternary Alluvium



Rock Type Descriptions	
pC -	Early Proterozoic to Miocene Gneiss
gr-m -	Early Proterozoic to Late Cretaceous Plutonic Rock
grpC -	Middle Proterozoic Anorthosite
grMz -	Permian to Tertiary; mostly Mesozoic Granodiorite
J -	Paleozoic to Late Jurassic Argillite
grPz -	Late Triassic Quartz Monzonite
gr -	Jurassic to Cretaceous Plutonic Rock
Ku -	Late Cretaceous Sandstone
Tv -	Tertiary Basalt (8-25Ma)
Ti -	Tertiary Basalt
Ep -	Paleocene Sandstone
E -	Paleocene to Oligocene Mudstone
M -	Oligocene to Pliocene Sandstone
Oc -	Middle Eocene to Early Miocene Sandstone
P -	Miocene to Pleistocene Sandstone
QPc -	Miocene to Pleistocene Sandstone

**FIGURE 3-1**  
**GEOLOGIC MAP**  
**San Fernando Groundwater Basin**  
**LADWP GSIS Project**  
**Los Angeles, California**

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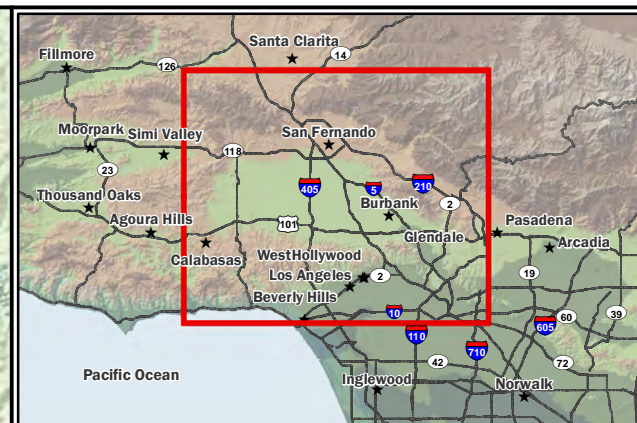
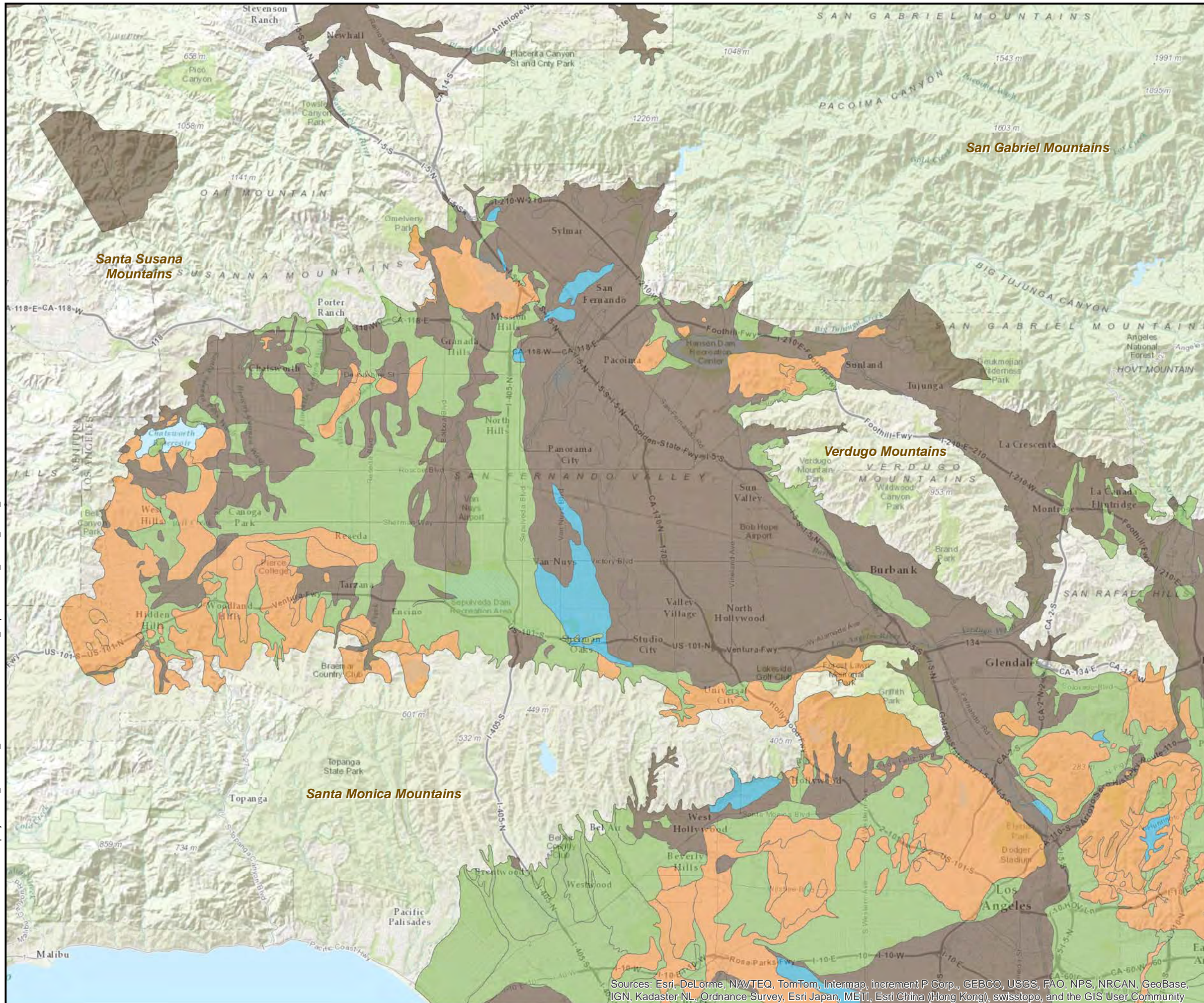
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Age <sup>a</sup>		Depositional Environment	Geologic Units	Maximum Thickness	Description
Period	Epoch				
Quaternary (Water Bearing)	Holocene (Recent) 10,000	Continental alluvial fans and fluvialite Local unconformity (?)	Alluvium	0 - 100±	Poorly sorted; unconsolidated deposits of sand, gravel, and clay. Generally undissected and undeformed. Forms thin veneer in San Fernando Valley.
	Late Pleistocene	Continental alluvial fan and fluvialite Inconformity	Older alluvium, terrace deposits, and Pacoima Formation	0 - 2,000±	Unconsolidated to poorly consolidated gravel, sand, silt, and clay with characteristic red or brown weathered surface and some fossil soils. Increasing deformation with depth.
	Early Pleistocene 2,000,000	Continental alluvial fan fluvialite, lacustrine and brackish water Unconformity	Saugus Formation (includes Sunrise Ranch member)	0 - 6,400±	Saugus Formation in northeast portion of San Fernando Valley is poorly consolidated conglomerate, sand, silt, and clay. Sunshine Ranch member in northwest portion of basin consists of conglomerate and sandstone.
Tertiary	Late Pliocene 5,000,000	Marine Local Unconformity	Townsley and Pico formations (includes Fernando Formation)	1,500 - 3,000±	Pico Formation consists of resistant sandstone and conglomerate, with minor shale and siltstone; calcareous. Townsley Formation distinguished from lower Pico Formation in northwest-central area by finer grained sediments. Fernando Formation in southeast corner of the basin consists of conglomerate and sandstone.
	Late Miocene	Marine unconformity	Modelo, Puente, and Monterey formations	3,000 - 7,000±	Time equivalent units of shale, siltstone, and sandstone. Mapped as Modelo except in Los Angeles Narrows area.
	Middle Miocene 23,000,000	Marine and continental Unconformity	Topanga Formation and volcanics	700 - 7,500±	Red and yellow beds of arkosic sandstone and conglomerate. Basaltic volcanic conglomerate, flows, and breccias (including pillow breccias). Thins westward.
Tertiary-Cretaceous	Oligocene-Late Cretaceous 65,000,000	Marine and continental Unconformity	Domengine, Marinez, Chico, and Sespe formations	250 - 900±	Eocene Domengine Formation is calcareous sandstone and conglomerate found in northwestern San Fernando Valley. Paleocene Martinez Formation is sandstone slate and conglomerate found in San Gabriel Mountains and western San Fernando Valley. Cretaceous Chico Formation is hard conglomerate and sandstone found in northwest San Fernando Valley, the lower portion of which may be continental. The fluvialite non-marine Sespe Formation occurs in the western Santa Susana Mountains.
Pre-Tertiary	Cretaceous and Older	—	Basement complex	—	Includes Cretaceous (?) granitic intrusions and a variety of metamorphic igneous crystalline rocks; also contains Jurassic Santa Monica Formation (black slate) in the Santa Monica Mountains.

Source: Modified from JMM, 1992

<sup>a</sup> Ages in years before present are approximate and refer to generally recognized time boundaries between geologic periods and epochs (from Eicher, 1976).

**Figure 3-2**  
General Stratigraphy of the San Fernando Valley Region

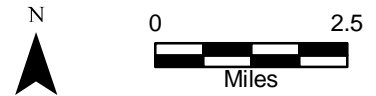


**Explanation**

**Soil Type (LA County 2004)**

- Clay Loam
- Silt Loam
- Sandy Loam
- Loam

Source: Los Angeles County GIS Data Portal



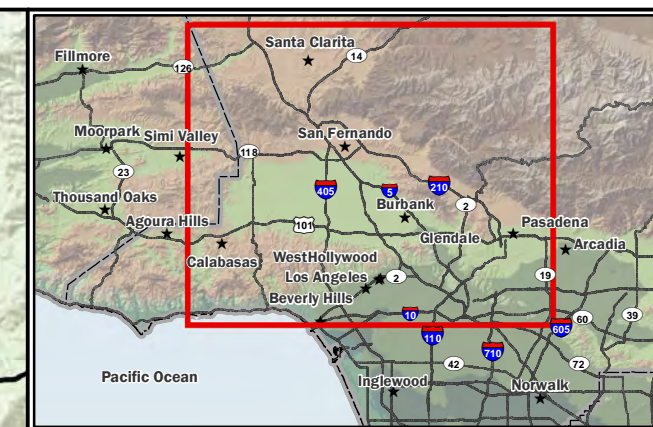
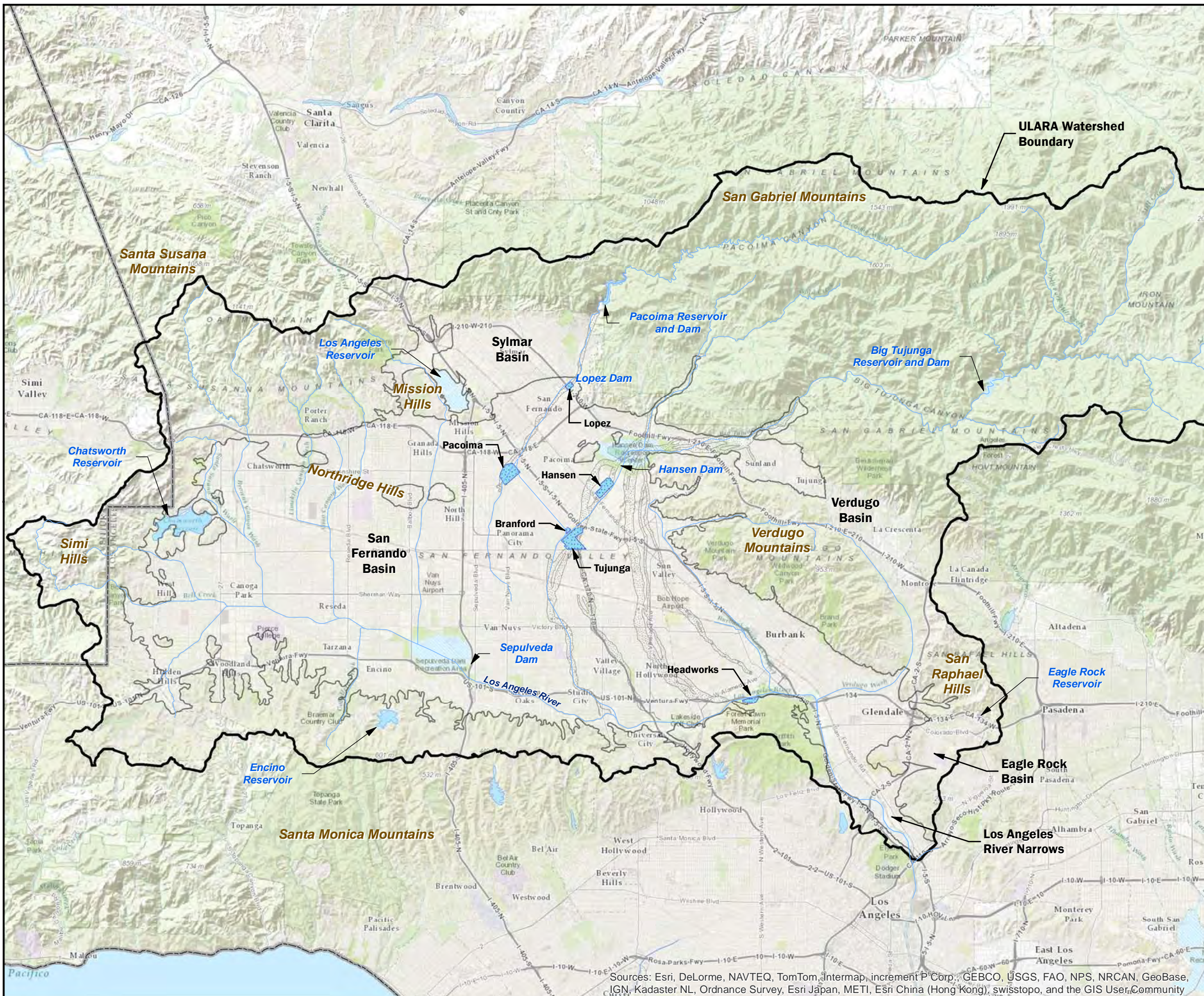
**FIGURE 3-3**  
**SOIL MAP**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

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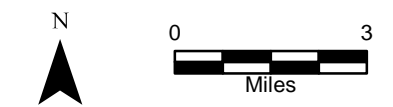
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**Explanation**

- River/Stream/Drainage
- Spreading Grounds
- Historical River Wash
- San Fernando Groundwater Basin
- Upper Los Angeles River Area Watershed
- County Boundary



**FIGURE 3-4**  
**SURFACE WATER FEATURES**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

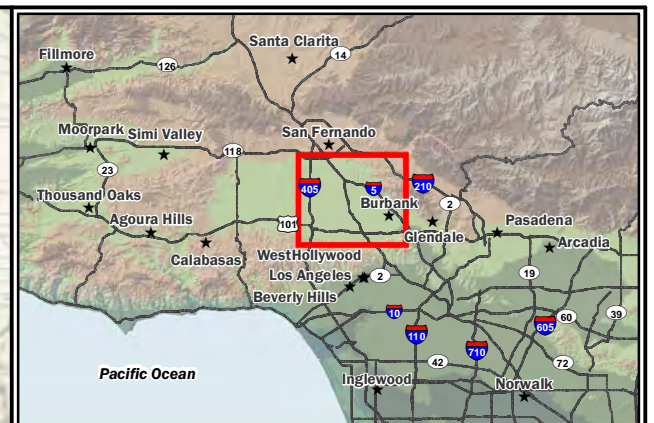
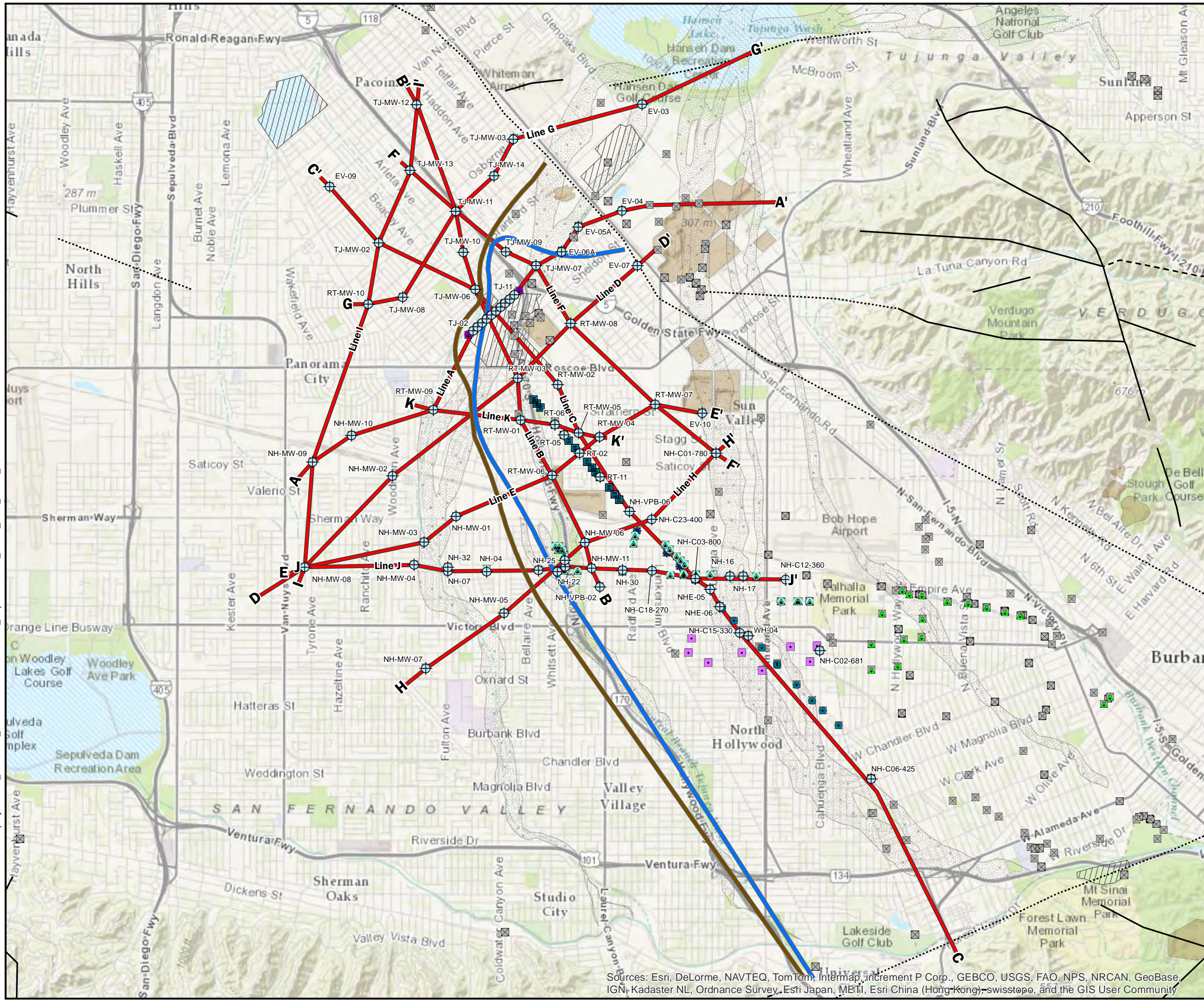
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Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community



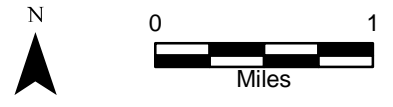


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**Explanation**

- Cross Section Well
- Cross Section Lines
- Production Wells by Well field**
- Other Wells
- Erwin
- North Hollywood
- Rinaldi-Toluca
- Tujunga
- Whitnall
- Extraction Remediation Wells by Well field**
- Burbank OU
- North Hollywood OU
- Other non-production well**
- Other non-production well
- Approximate Western and Northern Extent of Middle Zone
- Approximate Western and Northern Extent of Layer 2a
- California Faults (USGS/CGS)**
- Approx. Located or Inferred
- Concealed
- Well Located
- Other Features**
- Spreading Grounds
- Landfills
- Historical River Wash

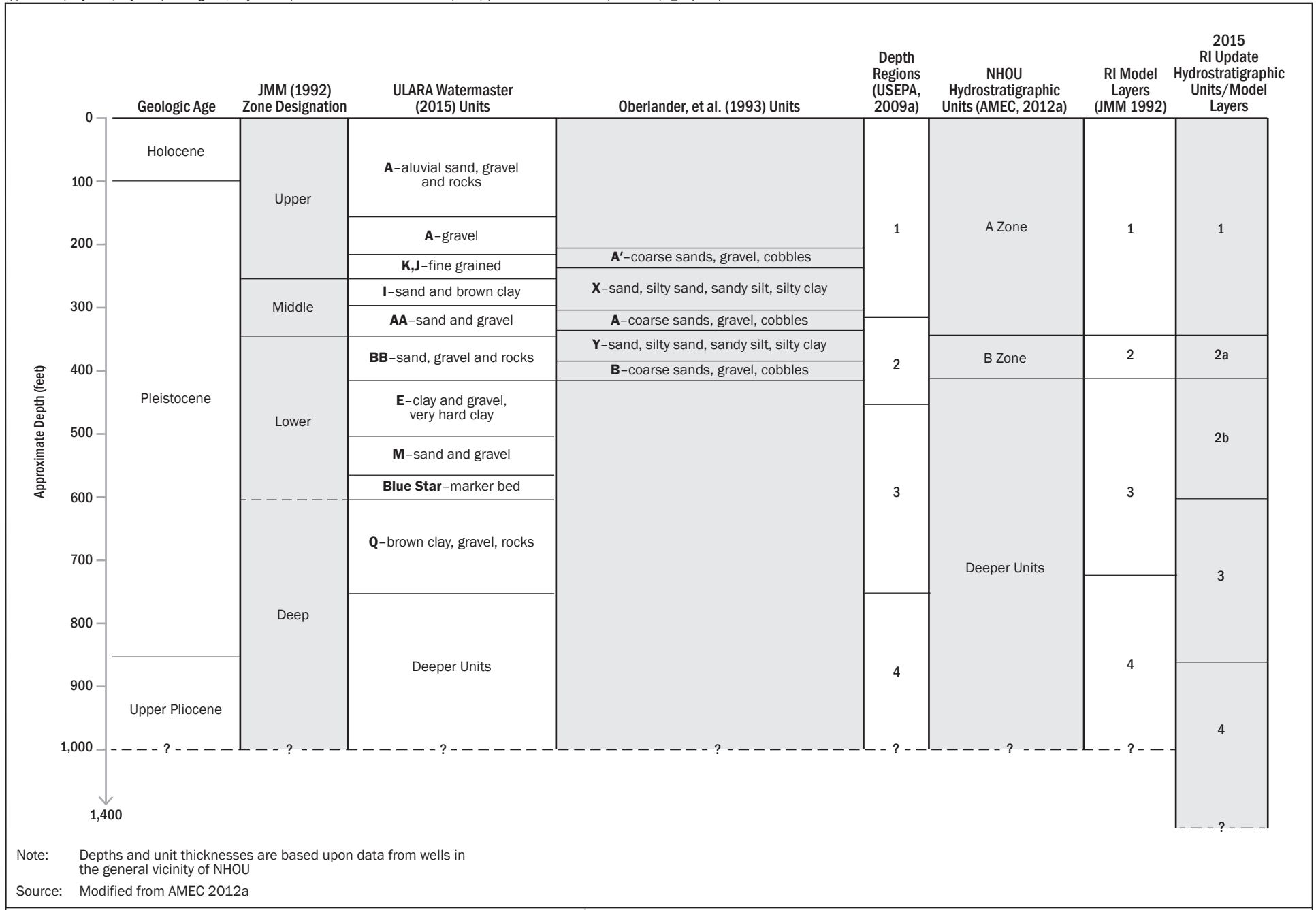


**FIGURE 3-5**  
**Cross-Section Locations**  
**San Fernando Groundwater Basin**  
**LADWP GSIS Project**  
**Los Angeles, California**

By: T. Crawford    Date: 2/25/2015    Project No. 144145.56

Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community

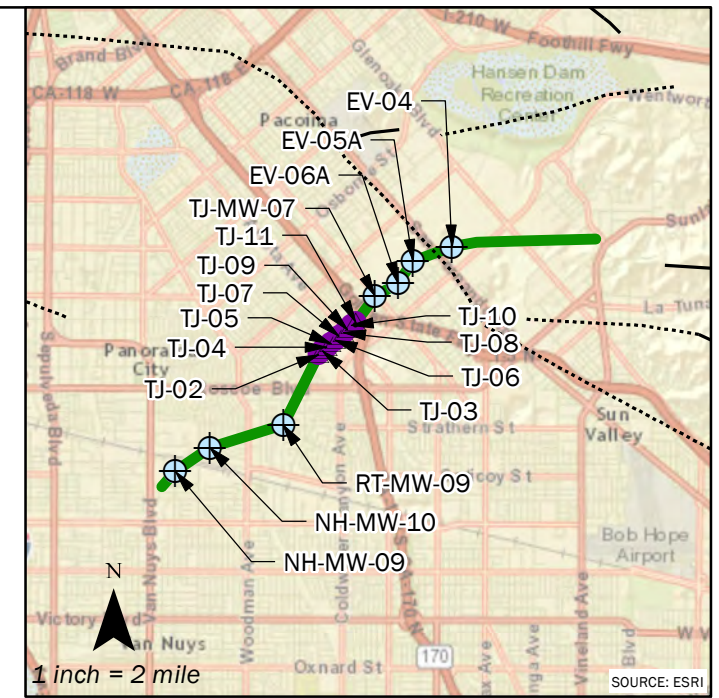
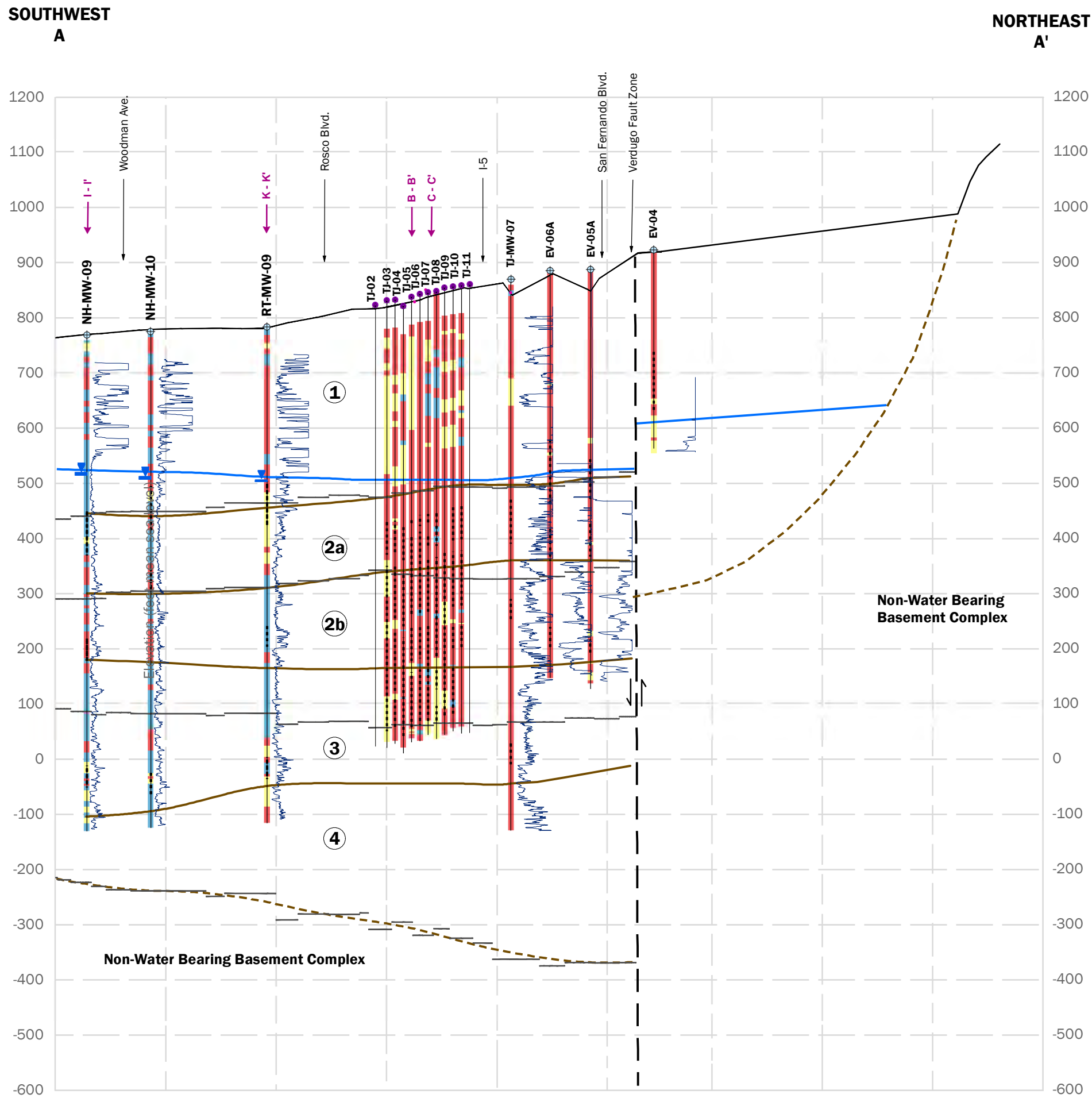




Note: Depths and unit thicknesses are based upon data from wells in the general vicinity of NHOU

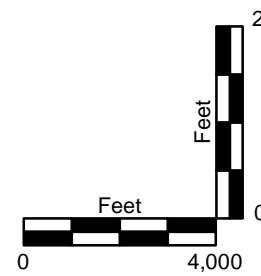
Source: Modified from AMEC 2012a

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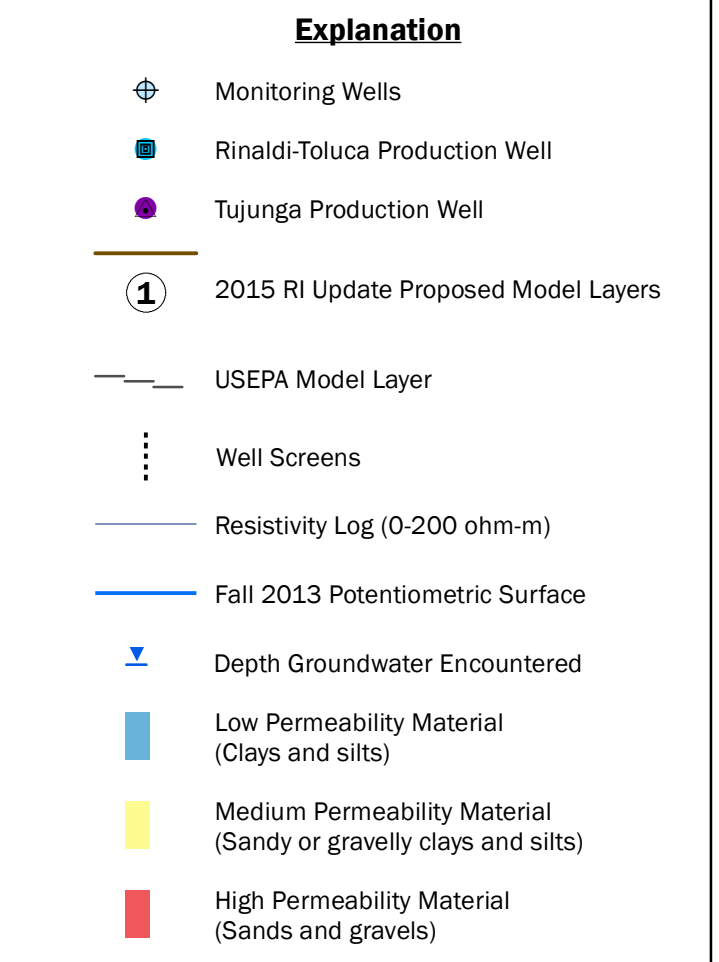
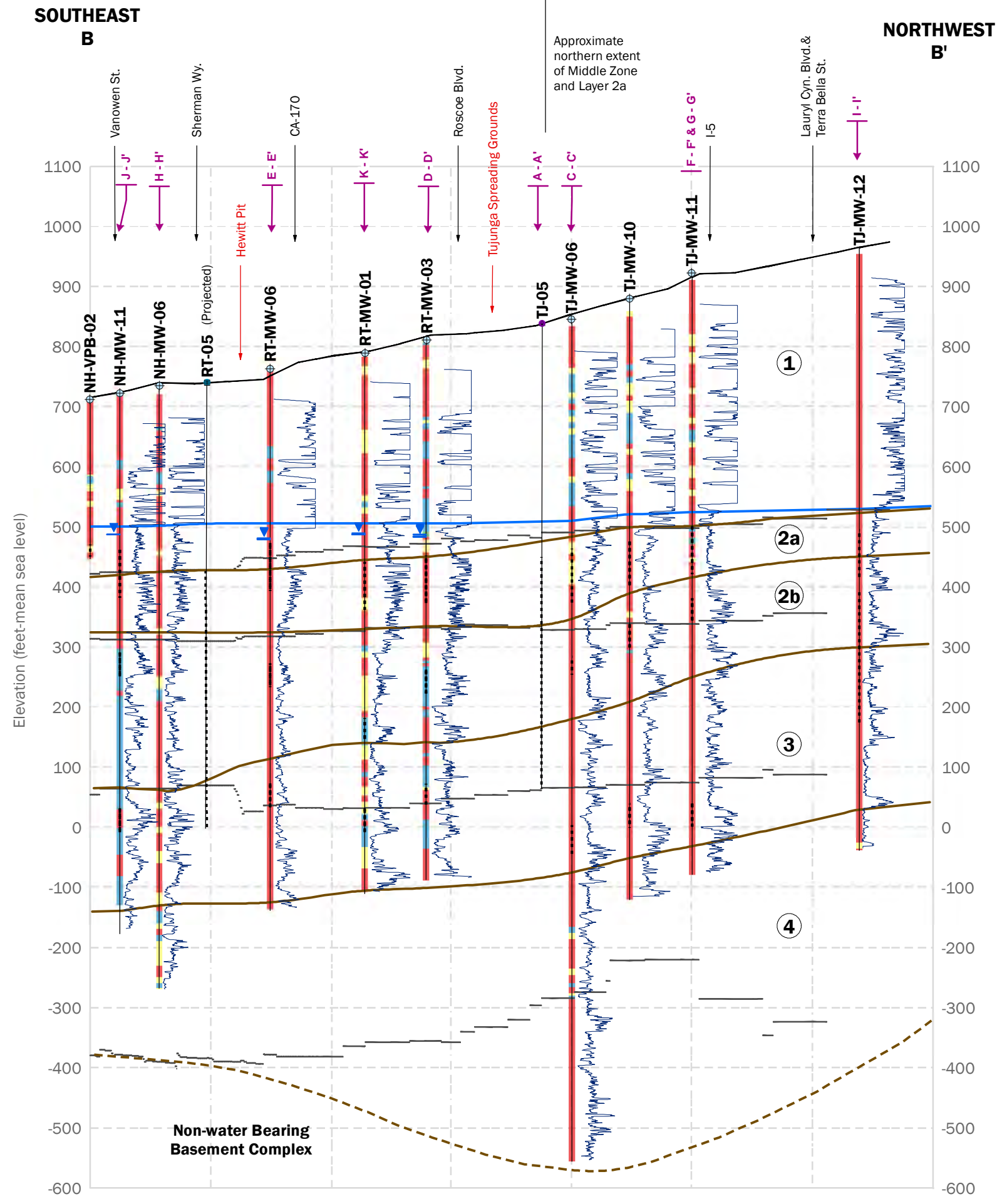
**Explanation**

- Monitoring Wells
- Tujunga Production Well
- 2015 RI Update Proposed Model Layers
- USEPA Model Layer
- Well Screens
- Resistivity Log (0-200 ohm-m)
- Fall 2013 Potentiometric Surface
- Depth Groundwater Encountered
- Low Permeability Material (Clays and silts)
- Medium Permeability Material (Sandy or gravelly clays and silts)
- High Permeability Material (Sands and gravels)



**FIGURE 3-7**  
**CROSS SECTION A - A'**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

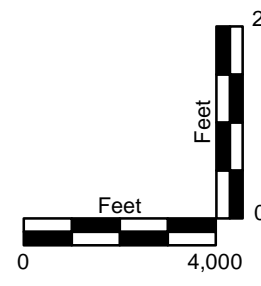
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**FIGURE 3-8  
CROSS SECTION B - B'  
San Fernando Groundwater Basin  
LADWP GIS Project  
Los Angeles, California**

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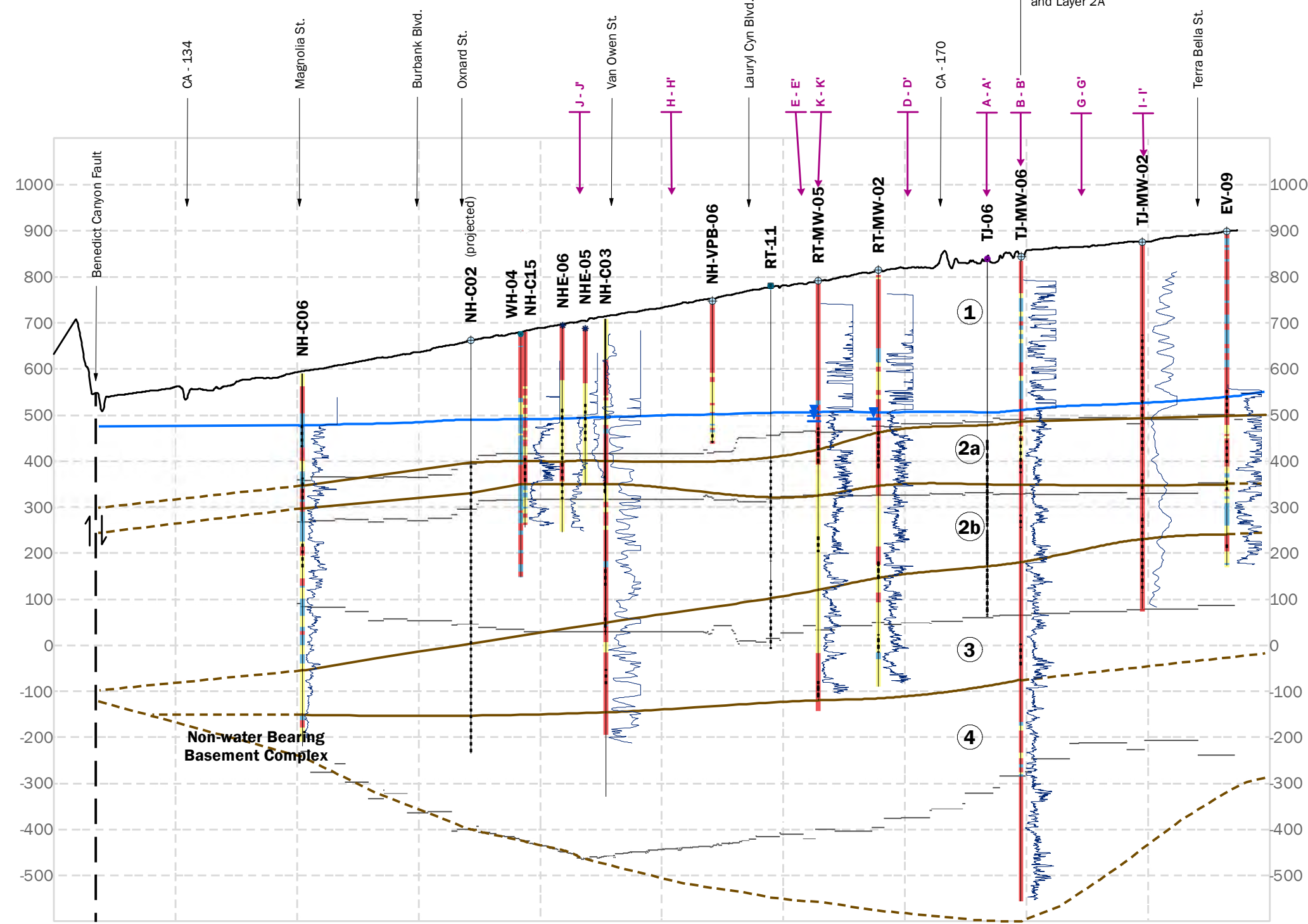
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**SOUTHEAST**  
**C**

**NORTHWEST**  
**C'**

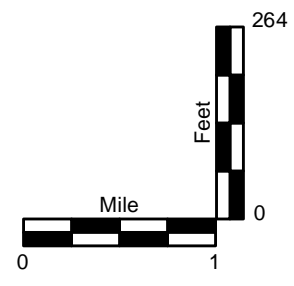


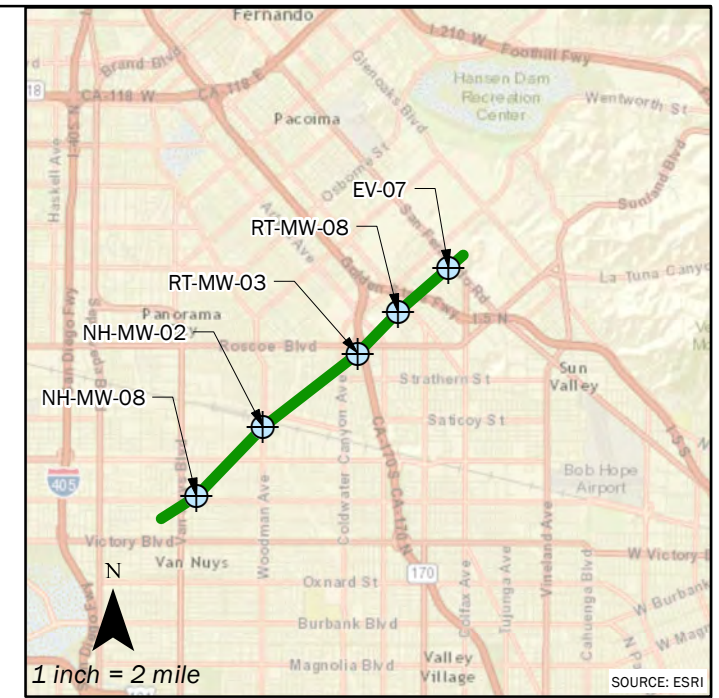
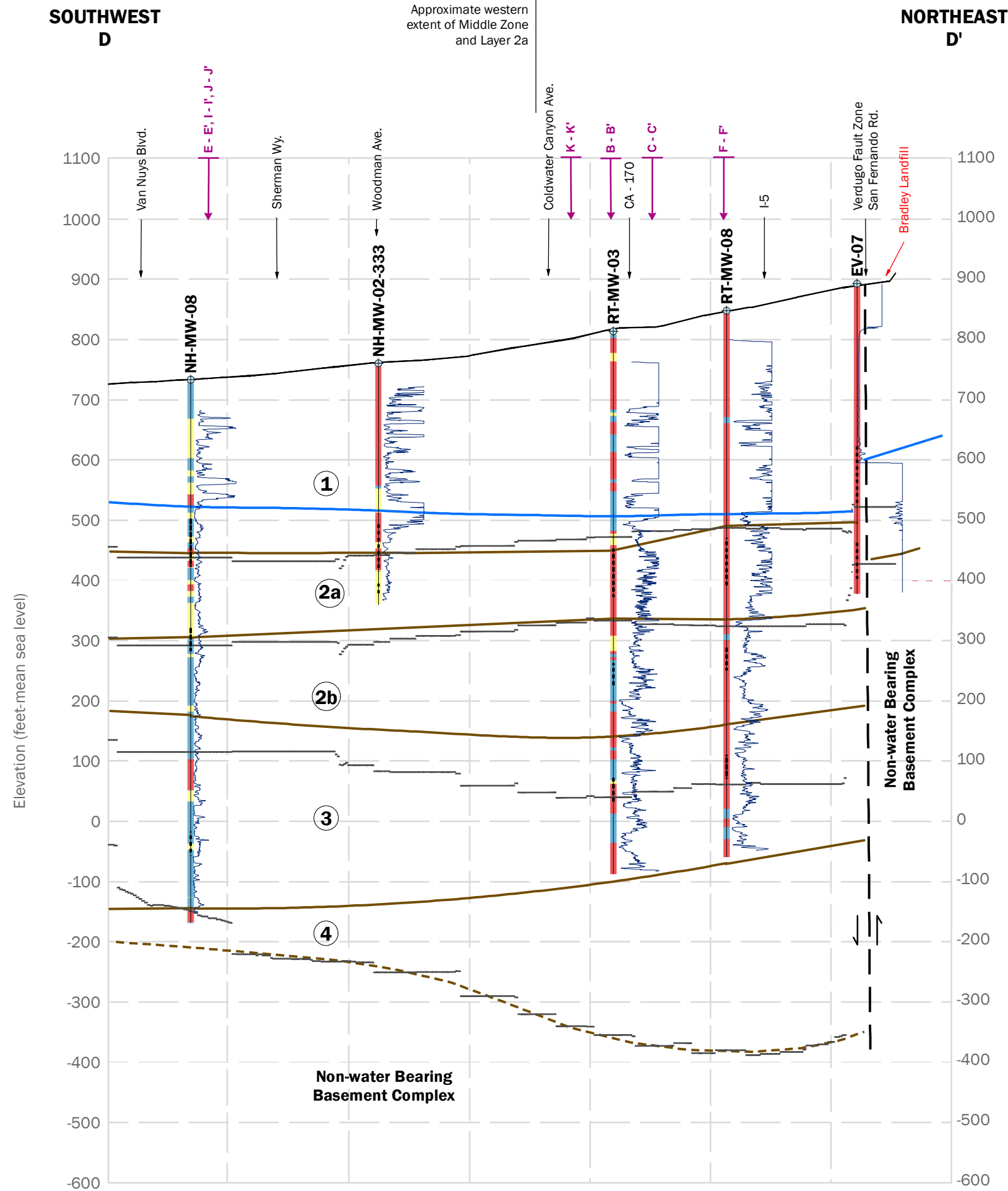
**Explanation**

- Monitoring Wells
- Rinaldi-Toluca Production Well
- Tujunga Production Well
- North Hollywood OU Extraction Well
- Whitnall Production Well
- 2015 RI Update Proposed Model Layers
- USEPA Model Layer
- Well Screens
- Resistivity Log (0-200 ohm-m)
- Fall 2013 Potentiometric Surface
- Depth Groundwater Encountered
- Low Permeability Material (Clays and silts)
- Medium Permeability Material (Sandy or gravelly clays and silts)
- High Permeability Material (Sands and gravels)

**FIGURE 3-9**  
**CROSS SECTION C - C'**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

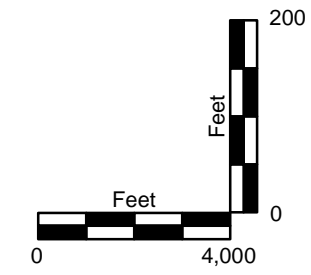
T. Crawford      Date: 2-17-2015      Project No. 146145.56





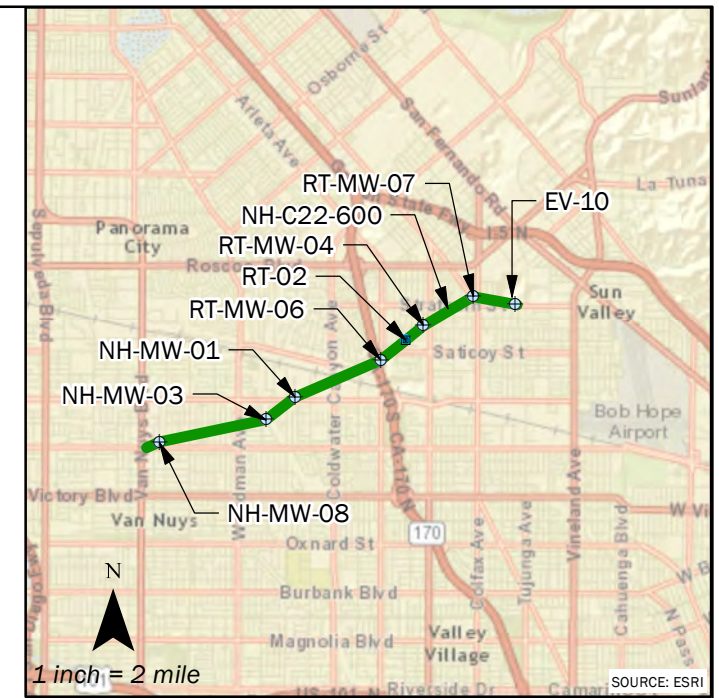
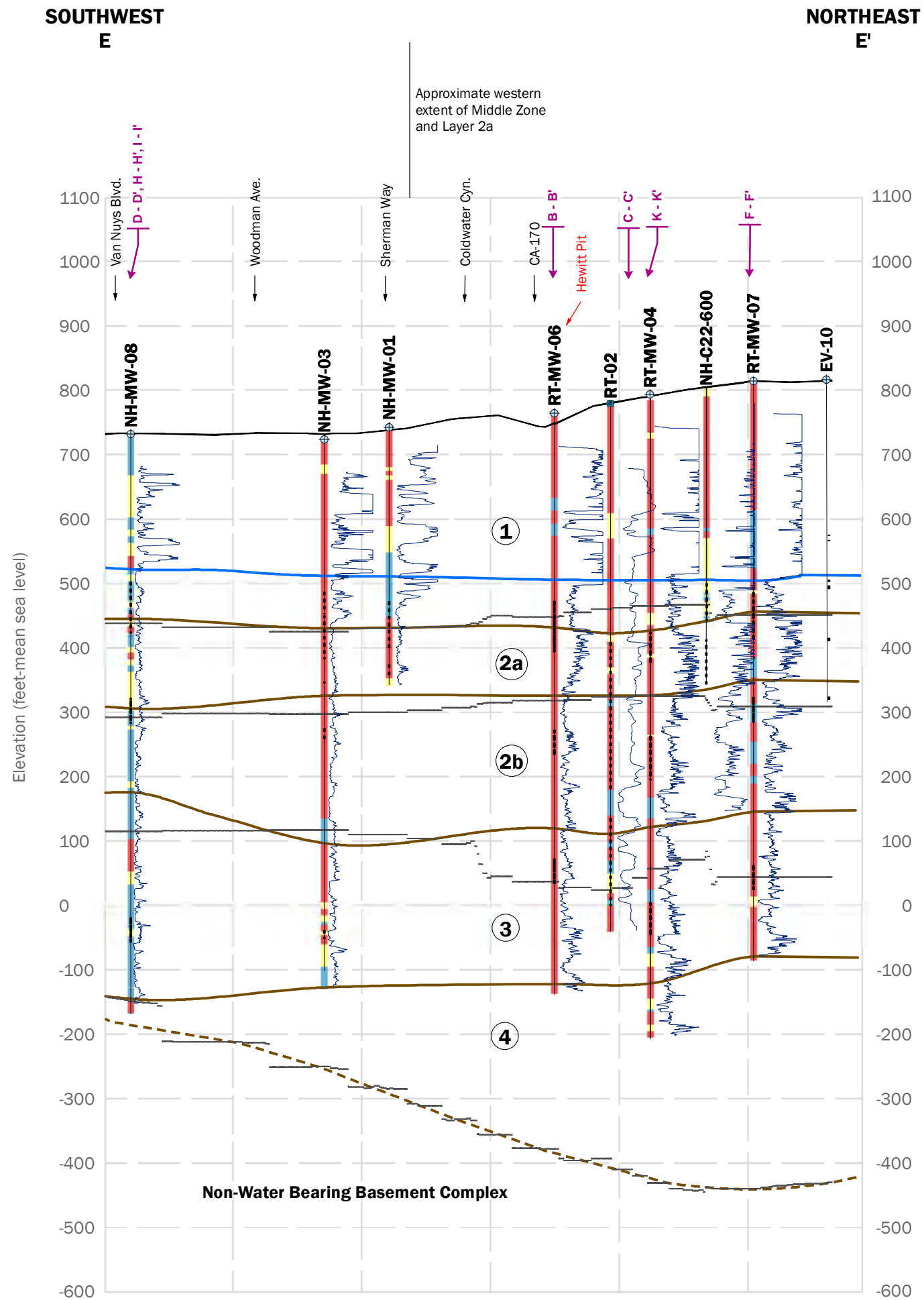
**Explanation**

- Monitoring Wells
- 2015 RI Update Proposed Model Layers
- USEPA Model Layer
- Well Screens
- Resistivity Log (0-200 ohm-m)
- Fall 2013 Potentiometric Surface
- Depth Groundwater Encountered
- Low Permeability Material (Clays and silts)
- Medium Permeability Material (Sandy or gravelly clays and silts)
- High Permeability Material (Sands and gravels)

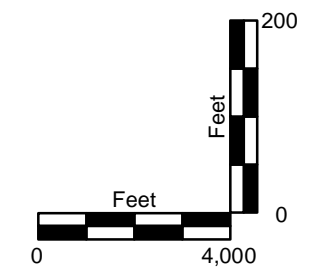


**FIGURE 3-10**  
**CROSS SECTION D - D'**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

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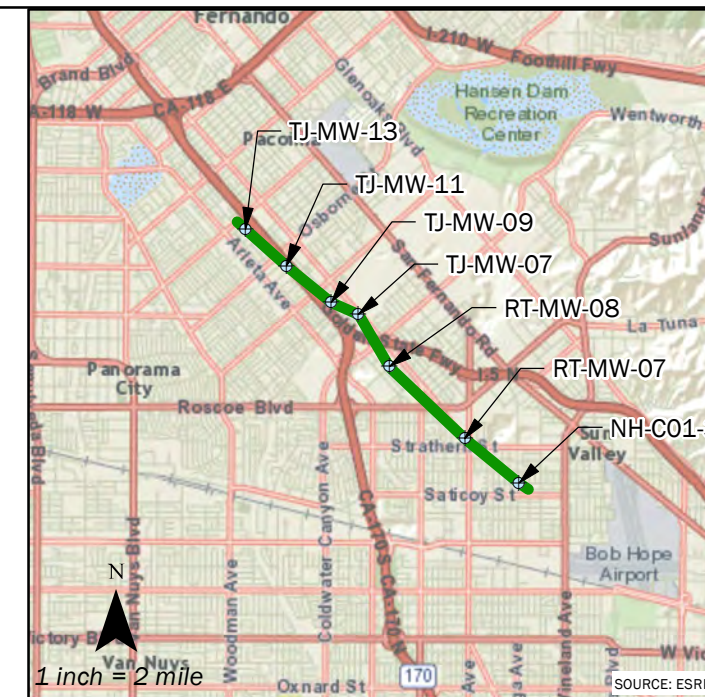
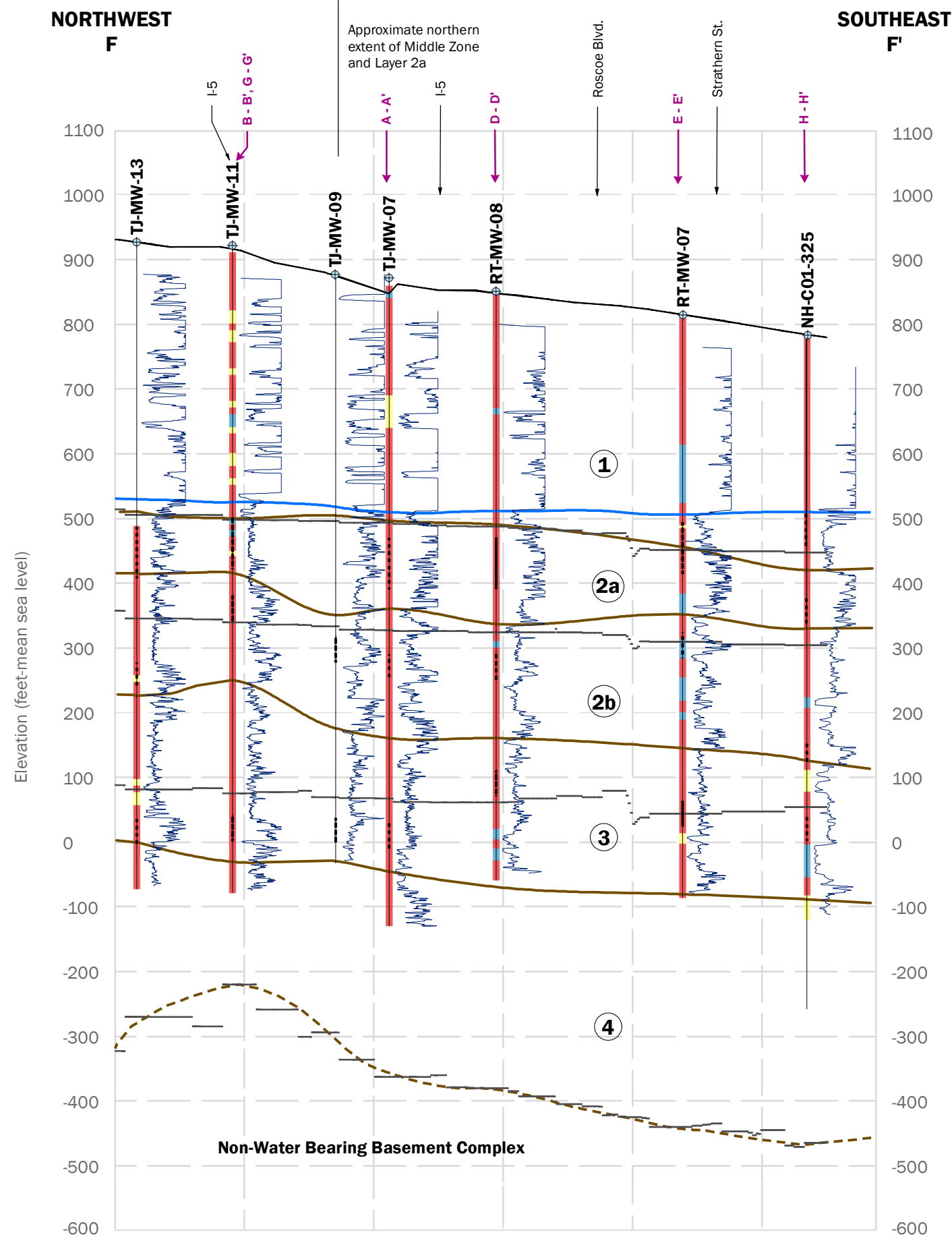
- Explanation**
- Monitoring Wells
  - Rinaldi-Toluca Production Well
  - 2015 RI Update Proposed Model Layers
  - USEPA Model Layer
  - Well Screens
  - Resistivity Log (0-200 ohm-m)
  - Fall 2013 Potentiometric Surface
  - Depth Groundwater Encountered
  - Low Permeability Material (Clays and silts)
  - Medium Permeability Material (Sandy or gravelly clays and silts)
  - High Permeability Material (Sands and gravels)



**FIGURE 3-11**  
**CROSS SECTION E - E'**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

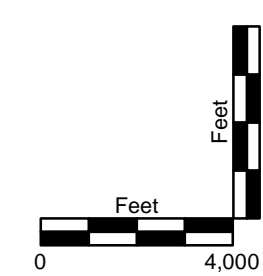
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**Explanation**

- Monitoring Wells
- 2015 RI Update Proposed Model Layers
- USEPA Model Layer
- Well Screens
- Resistivity Log (0-200 ohm-m)
- Fall 2013 Potentiometric Surface
- Depth Groundwater Encountered
- Low Permeability Material (Clays and silts)
- Medium Permeability Material (Sandy or gravelly clays and silts)
- High Permeability Material (Sands and gravels)



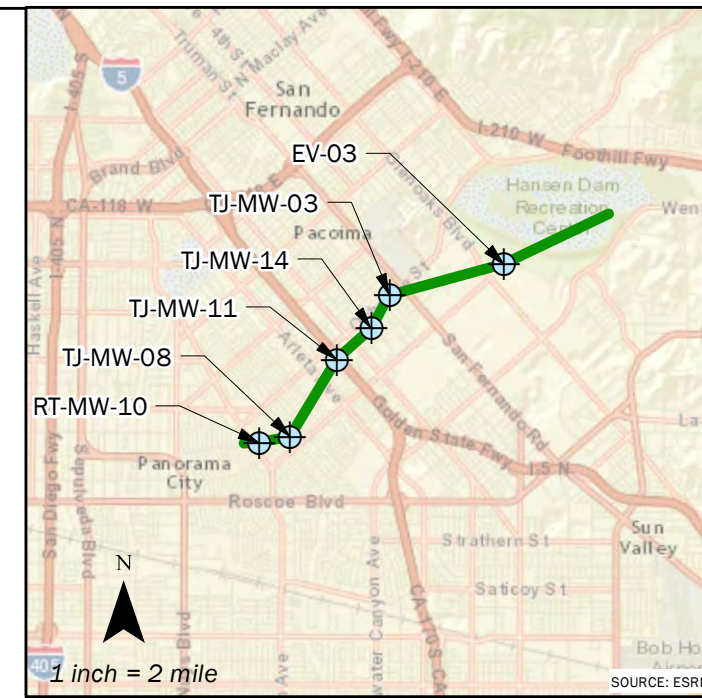
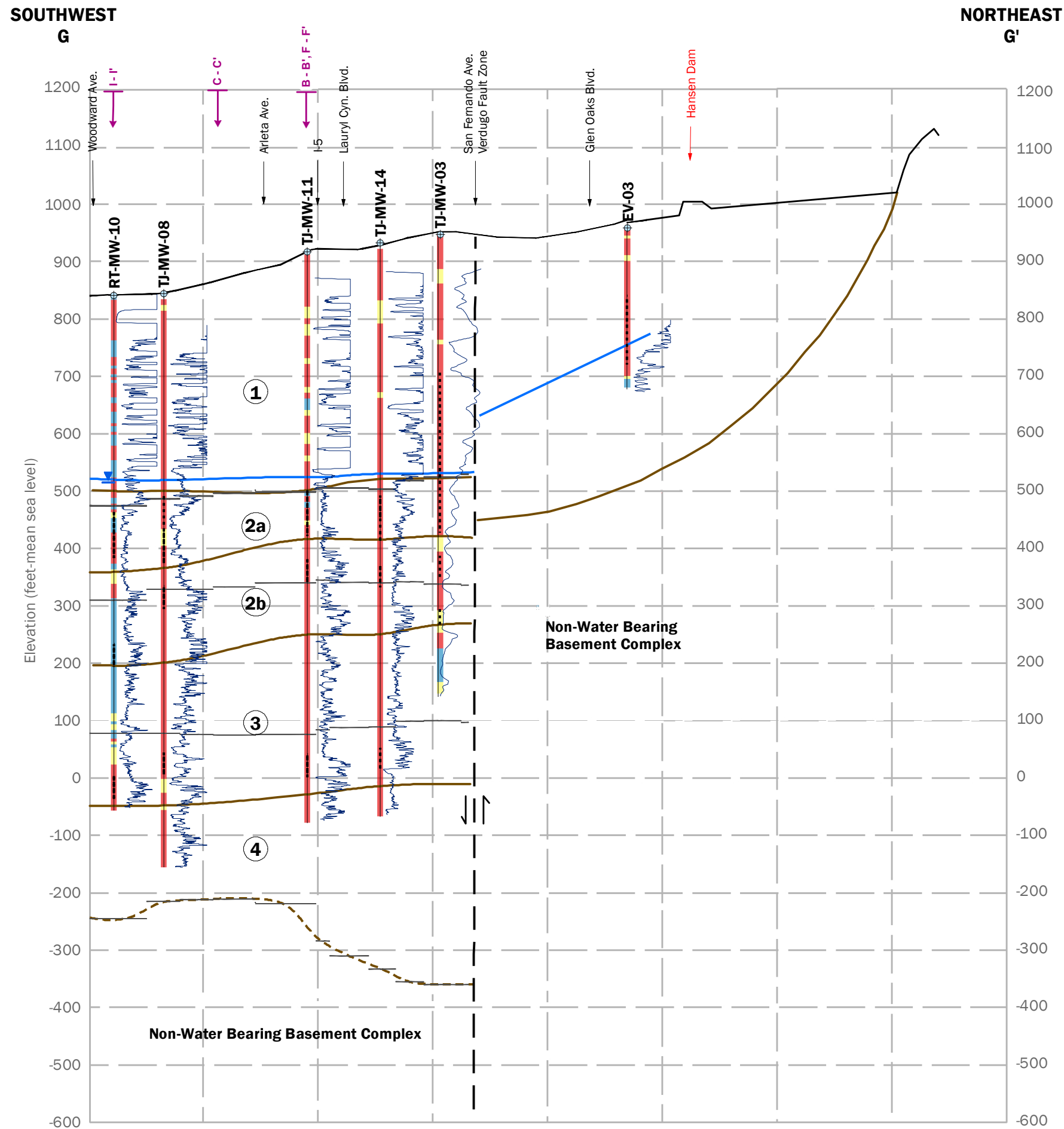
**FIGURE 3-12  
CROSS SECTION F - F'  
San Fernando Groundwater Basin  
LADWP GIS Project  
Los Angeles, California**

T. Crawford	Date: 2-18-2015	Project No. 146145.56
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**Brown AND Caldwell**

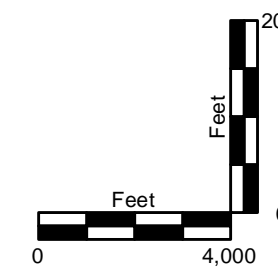
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**Explanation**

- Monitoring Wells
- 2015 RI Update Proposed Model Layers
- USEPA Model Layer
- Well Screens
- Resistivity Log (0-200 ohm-m)
- Fall 2013 Potentiometric Surface
- Depth Groundwater Encountered
- Low Permeability Material (Clays and silts)
- Medium Permeability Material (Sandy or gravelly clays and silts)
- High Permeability Material (Sands and gravels)

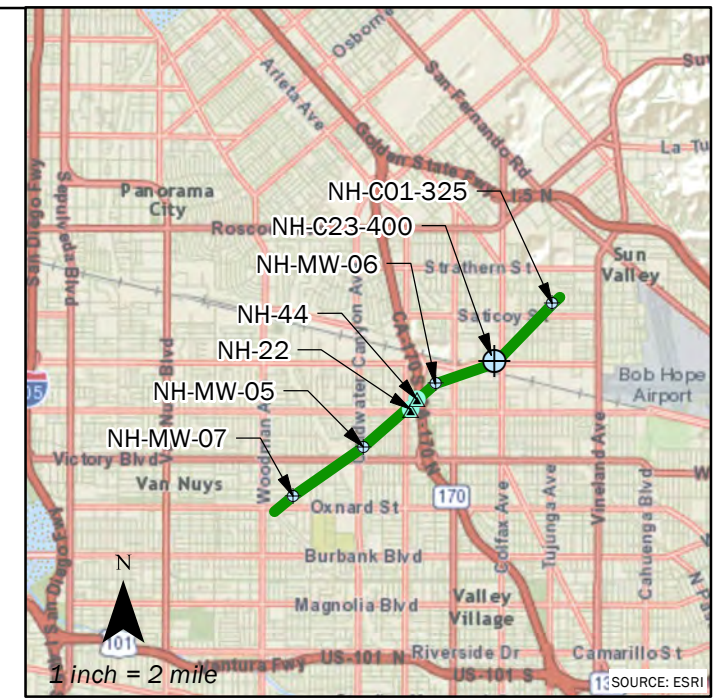
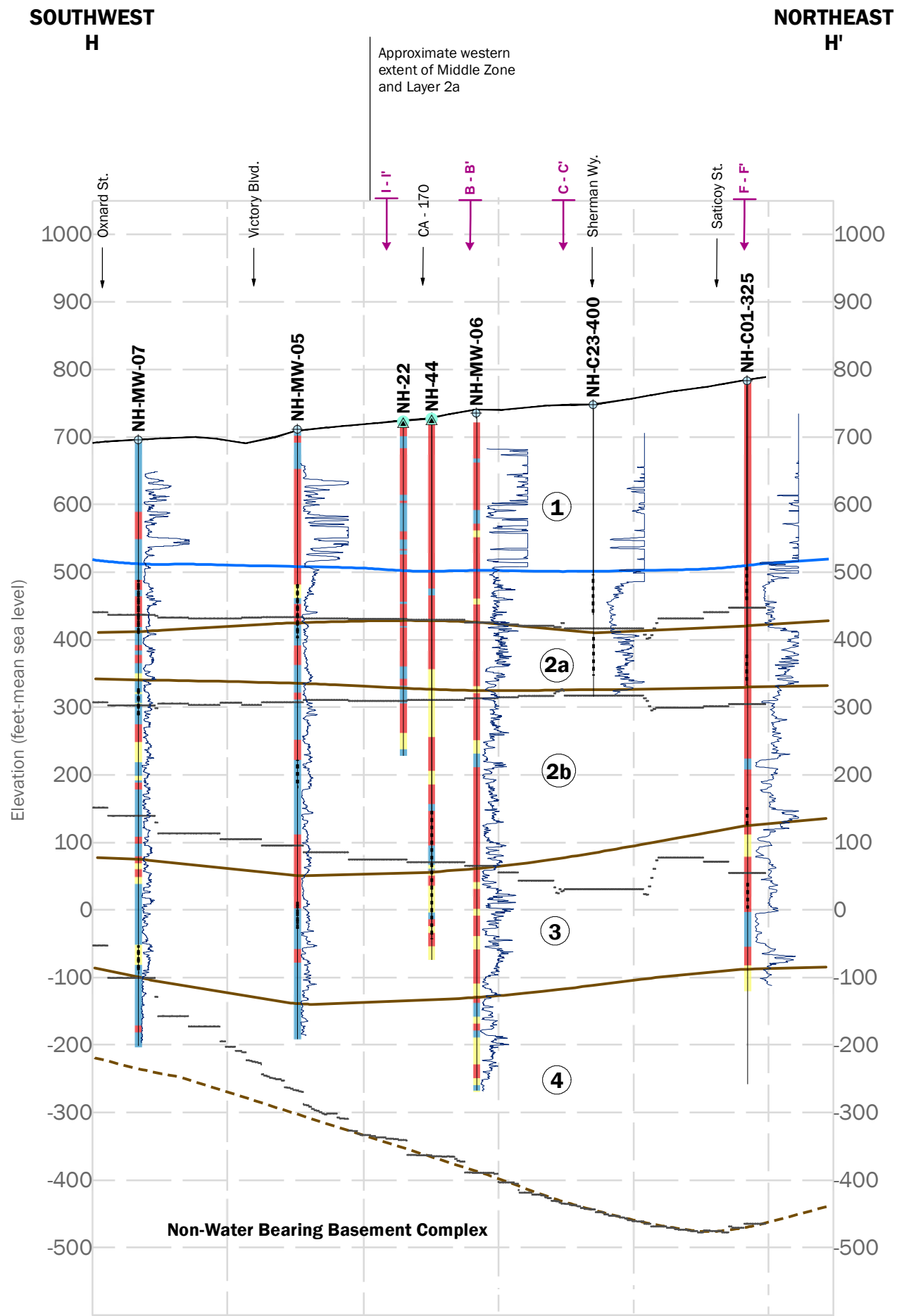


**FIGURE 3-13**  
**CROSS SECTION G - G'**  
**San Fernando Groundwater Basin**  
**LADWP GSIS Project**  
**Los Angeles, California**

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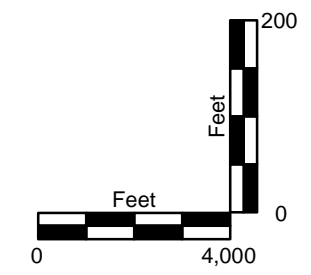
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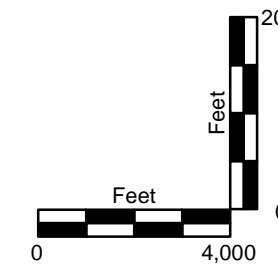
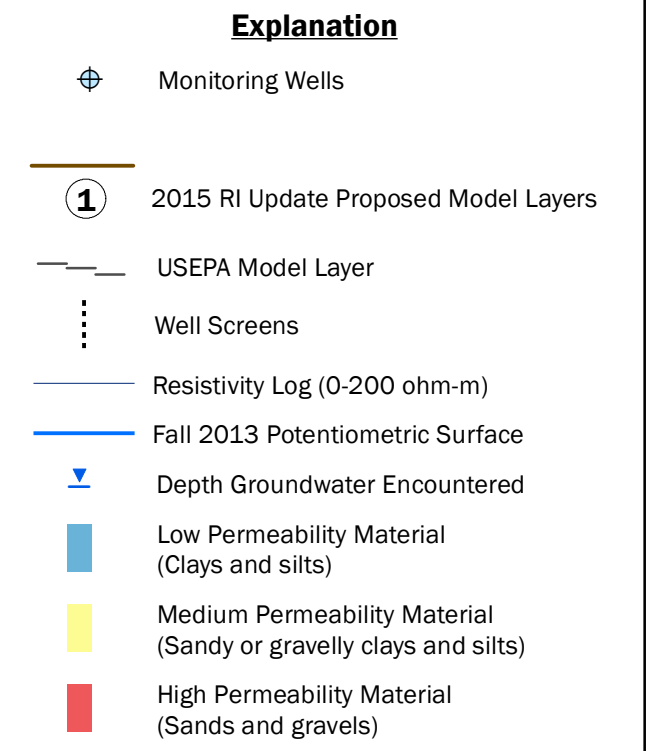
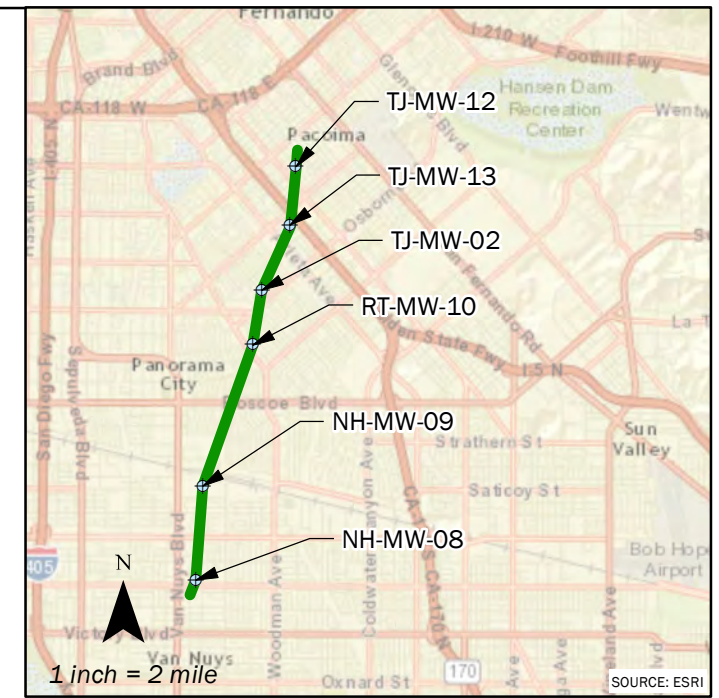
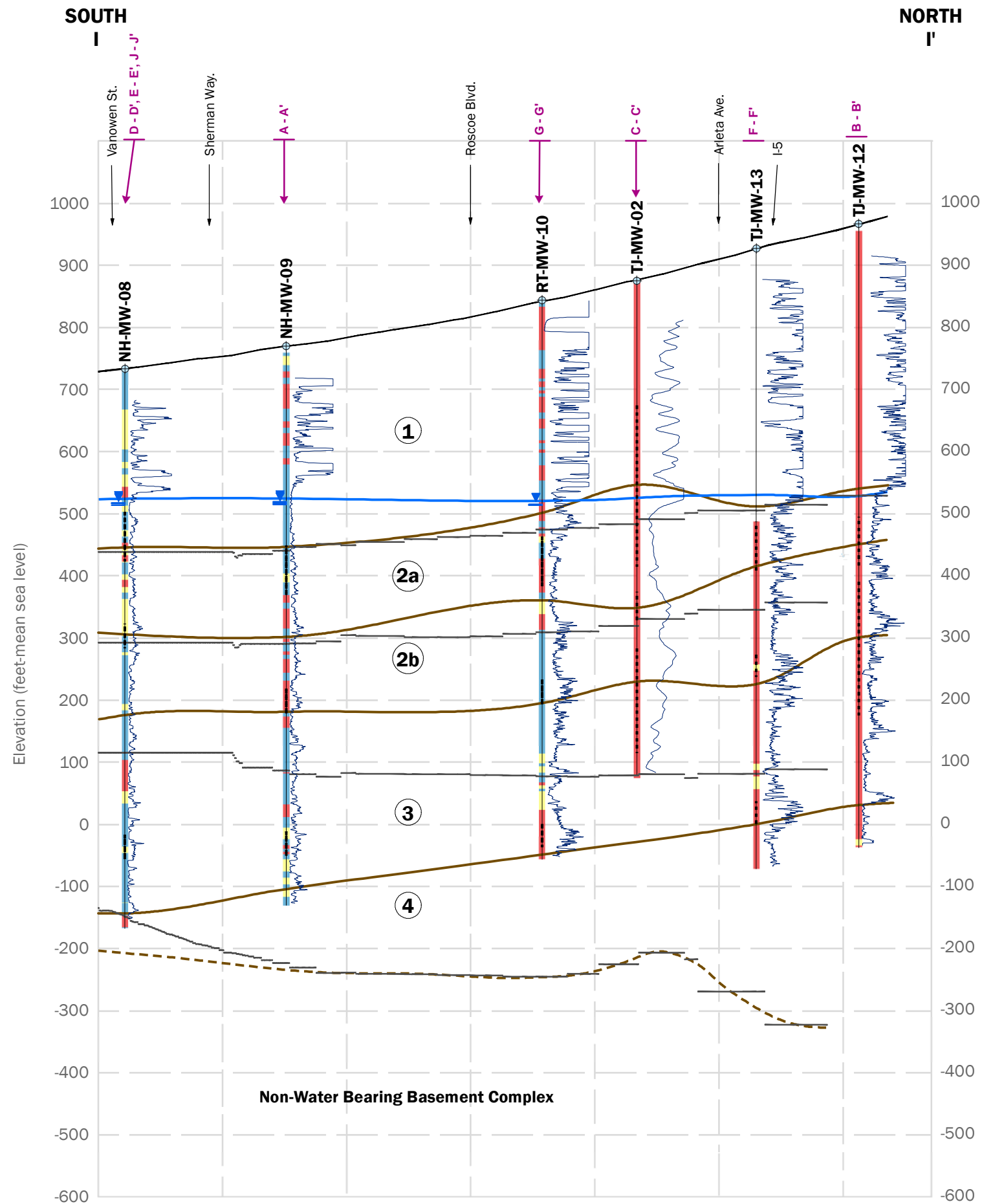
**Explanation**

- Monitoring Wells
- North Hollywood Production Wells
- 2015 RI Update Proposed Model Layers
- USEPA Model Layer
- Well Screens
- Resistivity Log (0-200 ohm-m)
- Fall 2013 Potentiometric Surface
- Depth Groundwater Encountered
- Low Permeability Material (Clays and silts)
- Medium Permeability Material (Sandy or gravelly clays and silts)
- High Permeability Material (Sands and gravels)



**FIGURE 3-14**  
**CROSS SECTION H - H'**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

T. Crawford	Date: 2-19-2015	Project No. 146145.56

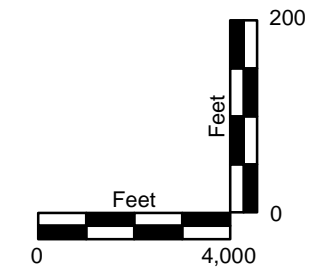
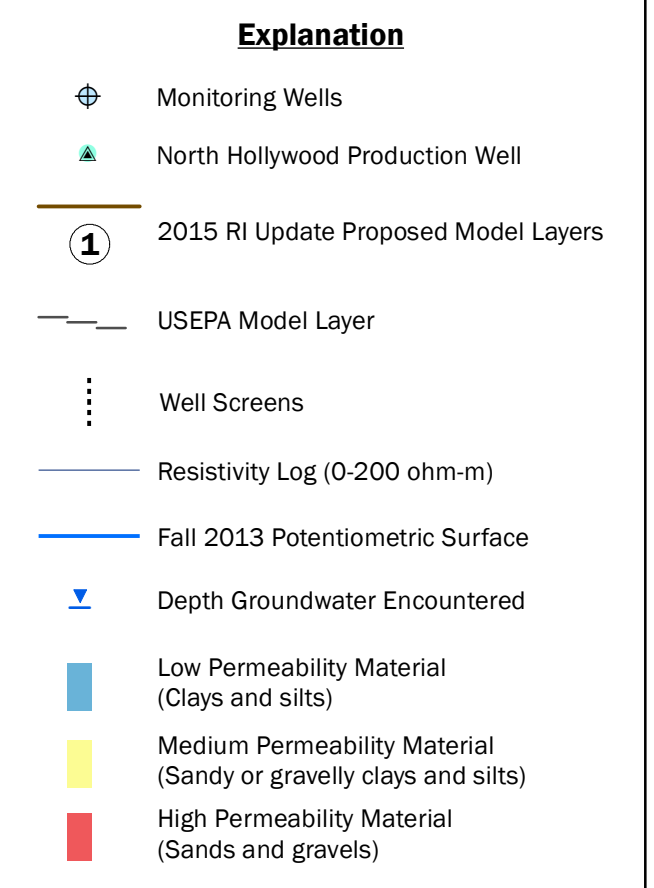
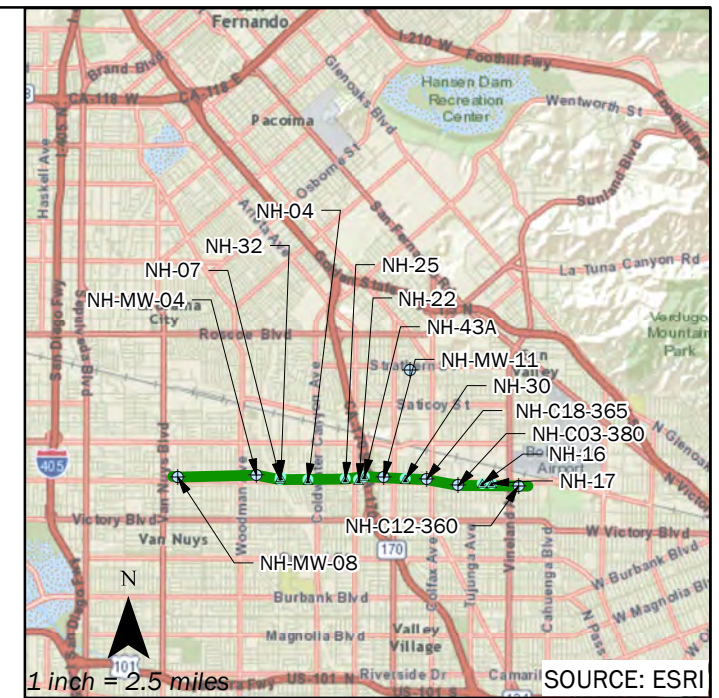
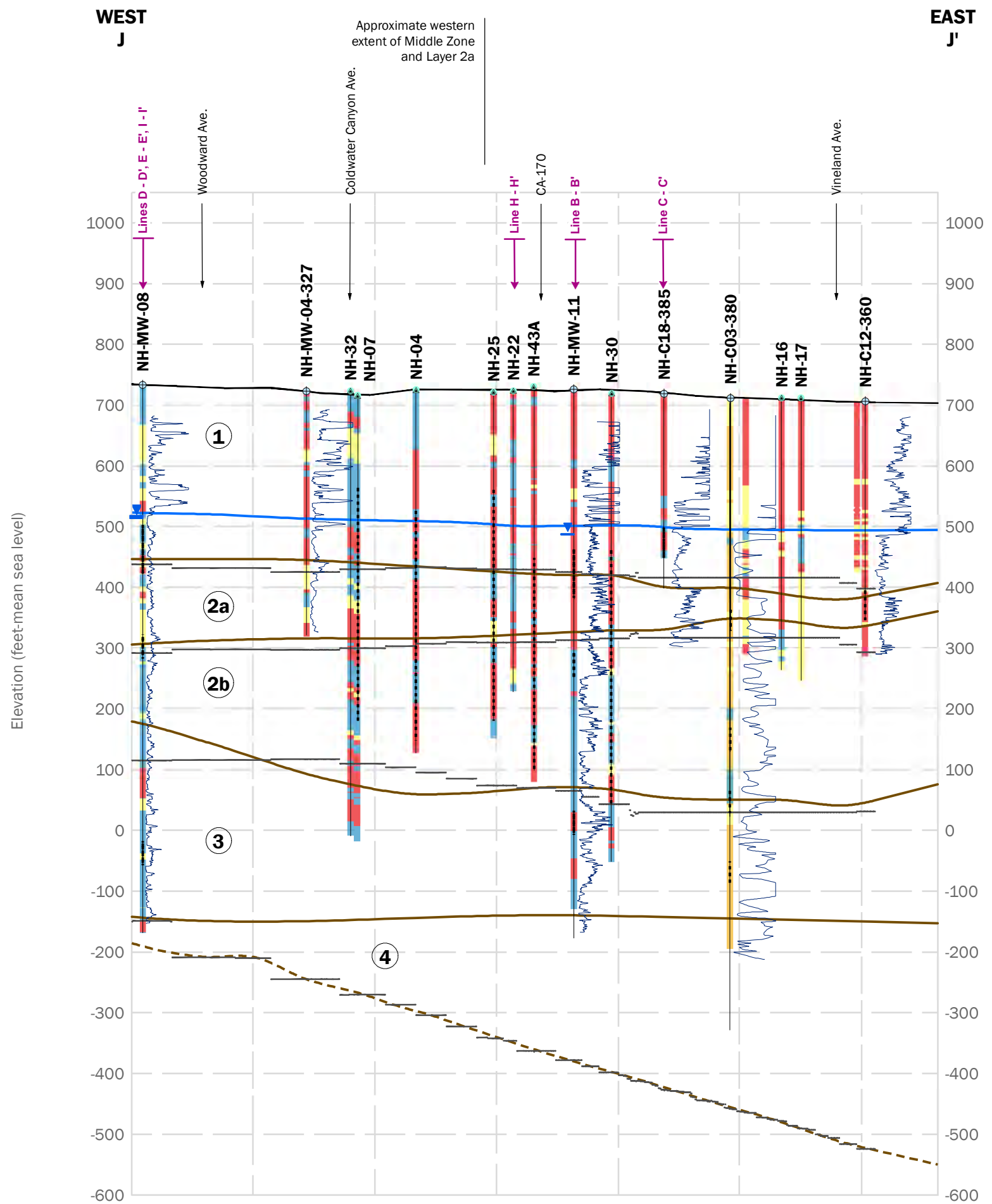


**FIGURE 3-15**  
**CROSS SECTION I - I'**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

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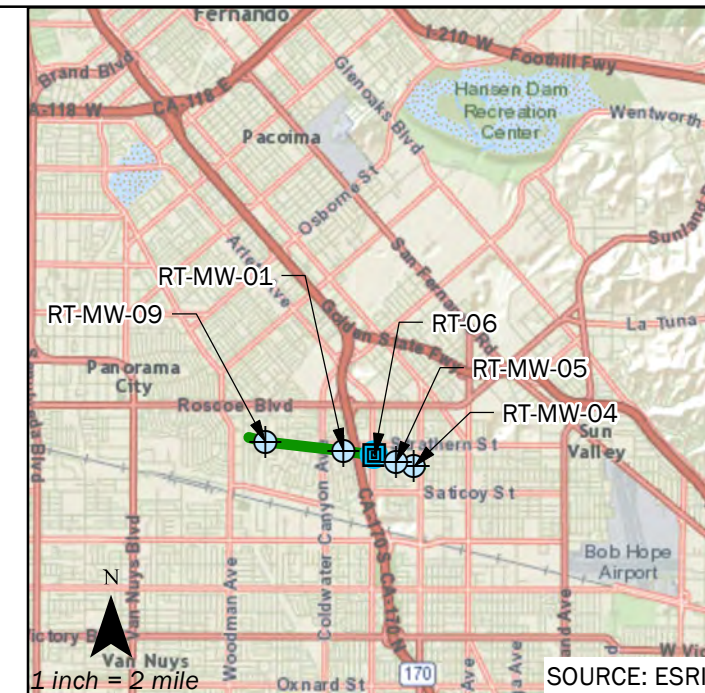
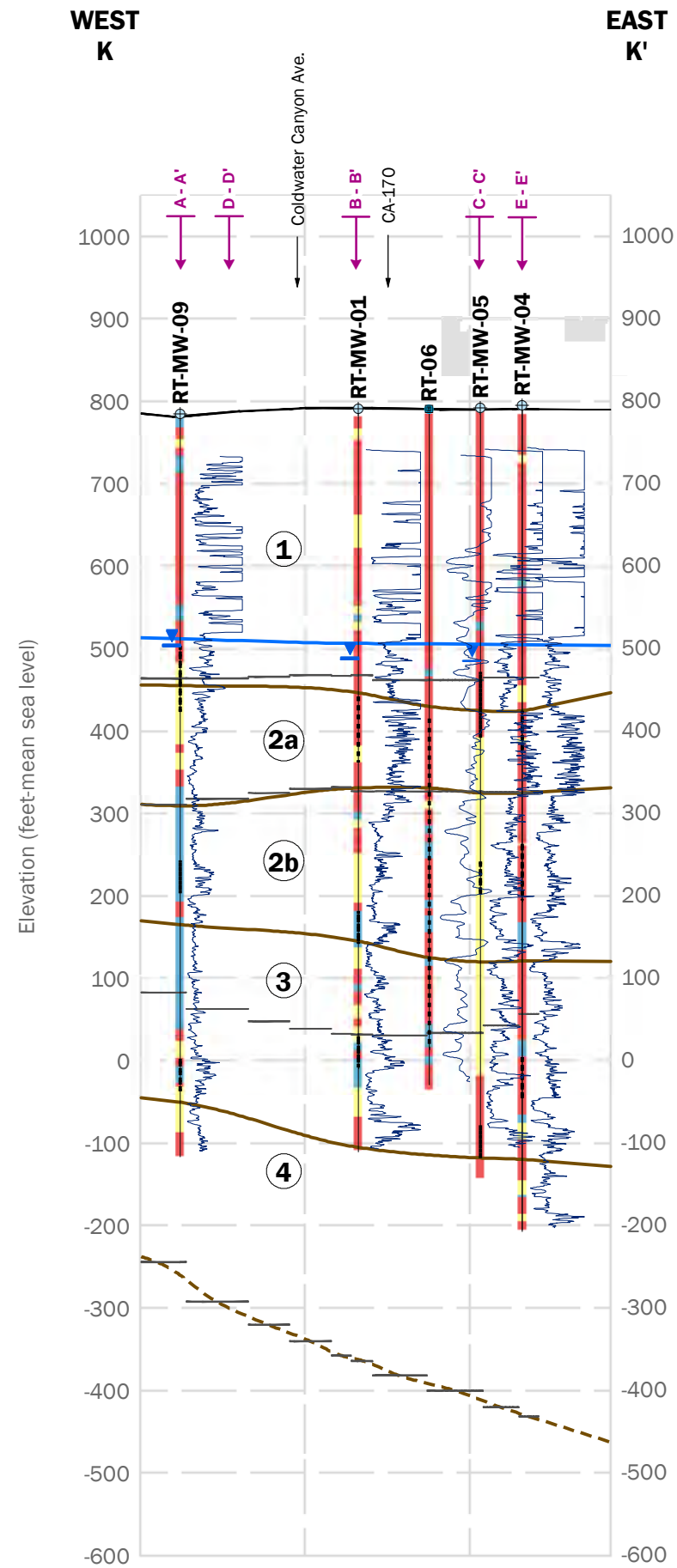
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**FIGURE 3-16**  
**CROSS SECTION J - J'**  
**San Fernando Groundwater Basin**  
**LADWP GSIS Project**  
**Los Angeles, California**

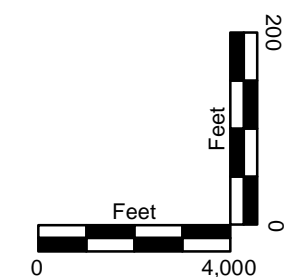
T. Crawford      Date: 2-19-2015      Project No. 146145.56

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**Explanation**

- Monitoring Wells
- Rinaldi-Toluca Production Well
- 2015 RI Update Proposed Model Layers
- USEPA Model Layer
- Well Screens
- Resistivity Log (0-200 ohm-m)
- Fall 2013 Potentiometric Surface
- Depth Groundwater Encountered
- Low Permeability Material (Clays and silts)
- Medium Permeability Material (Sandy or gravelly clays and silts)
- High Permeability Material (Sands and gravels)

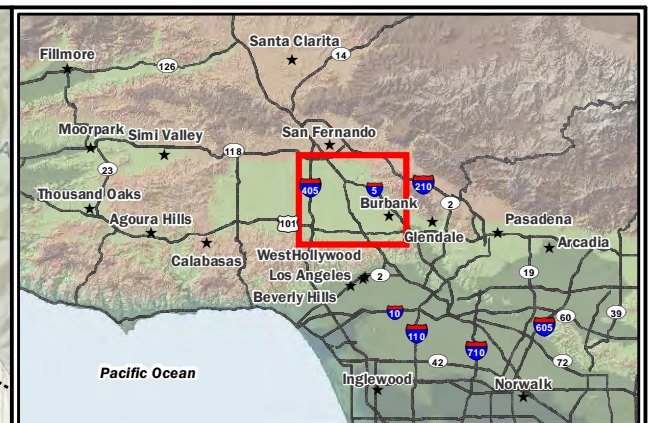
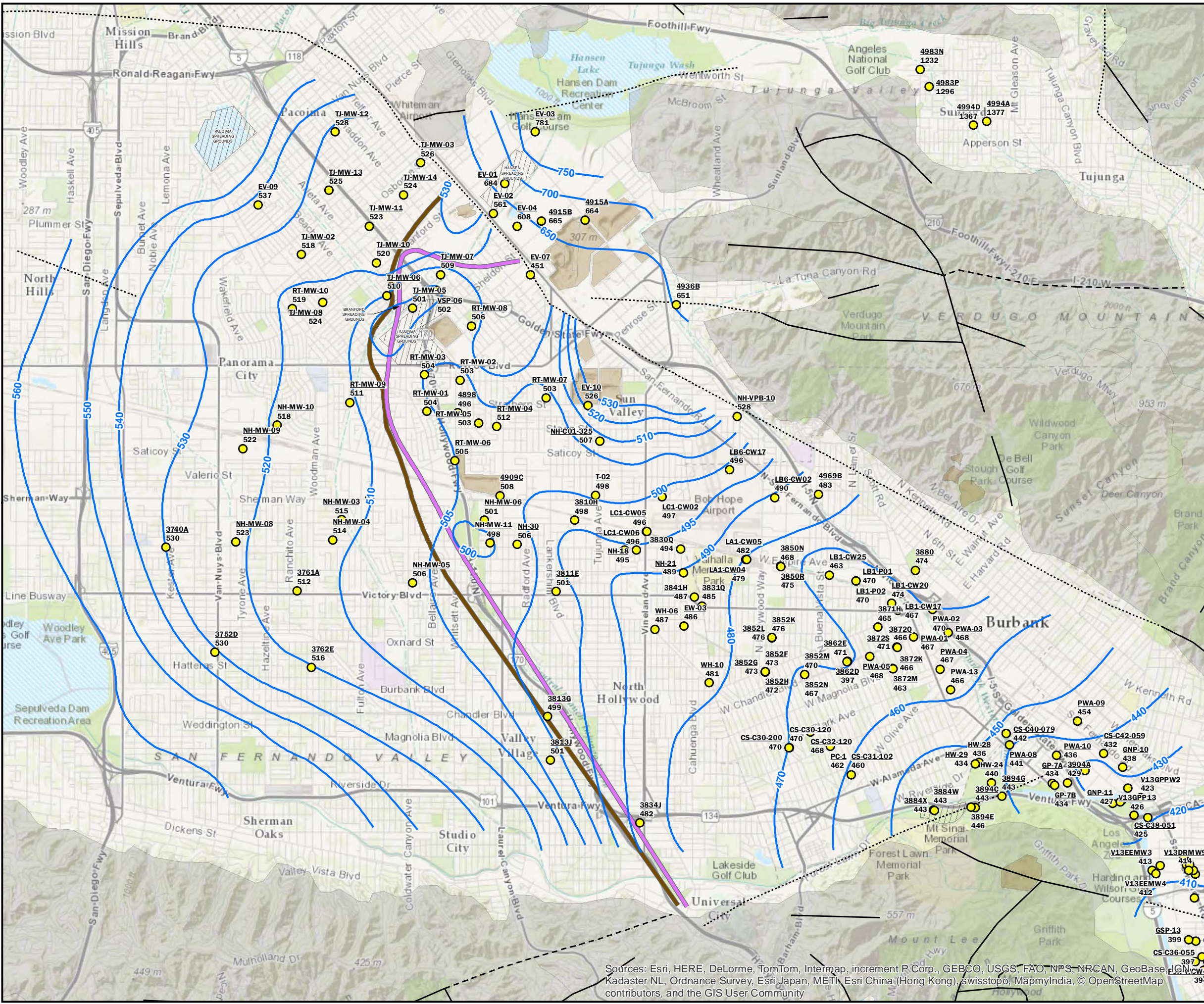


Elevation (ft) Mean Sea Level

**FIGURE 3-17**  
**CROSS SECTION K - K'**  
**San Fernando Groundwater Basin**  
**LADWP GSIS Project**  
**Los Angeles, California**

T. Crawford	Date: 2-23-2015	Project No. 146145.56
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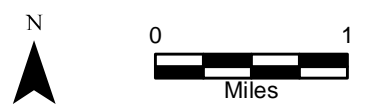
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### Explanation

- Fall 2013 Water Level Well
  - Groundwater Elevation Contour (Fall 2013; ft-msl)
  - Approximate Western and Northern Extent of Middle Zone
  - Approximate Western and Northern Extent of Layer 2a
  - Landfills
  - Spreading Grounds
  - Non-water bearing material
- California Faults (USGS/CGS)**
- Approx. Located or Inferred
  - Concealed
  - Well Located

Note: Contours on this map represent the most recent understanding of groundwater levels in the SFB as of the submittal of this report. Changes to these contours based on recent interpretations are not included on related figures showing water levels.

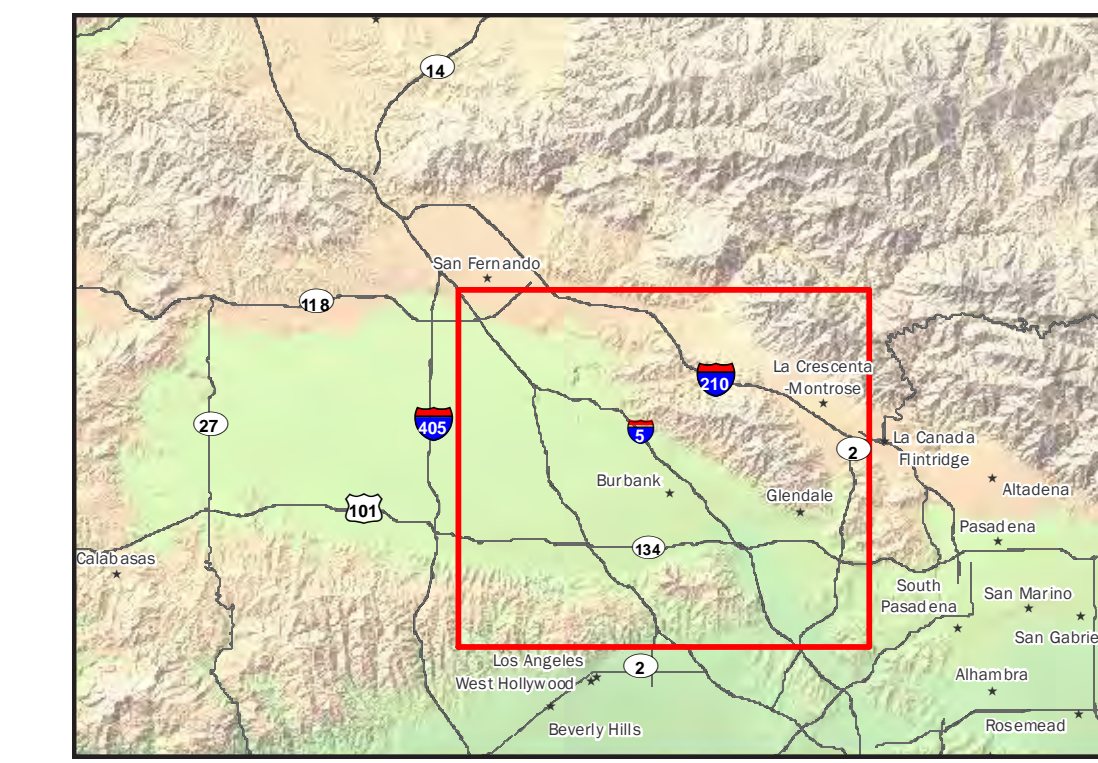


**FIGURE 3-18**  
**GROUNDWATER ELEVATION CONTOUR MAP**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

By: T. Crawford      Date: 3/6/2015      Project No. 146145.56

Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

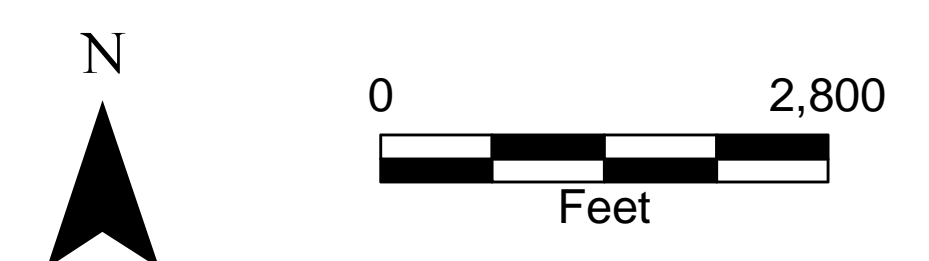
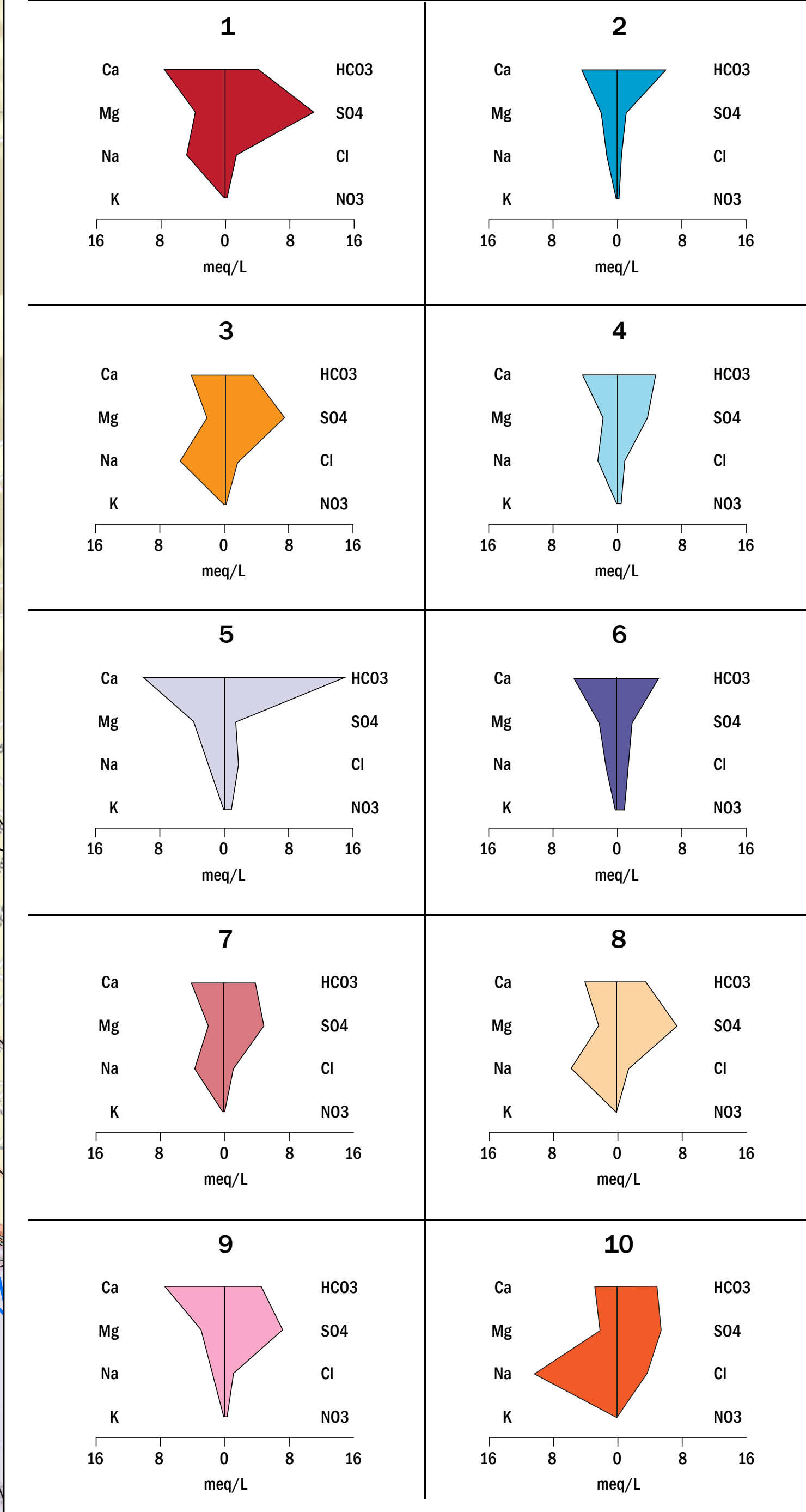




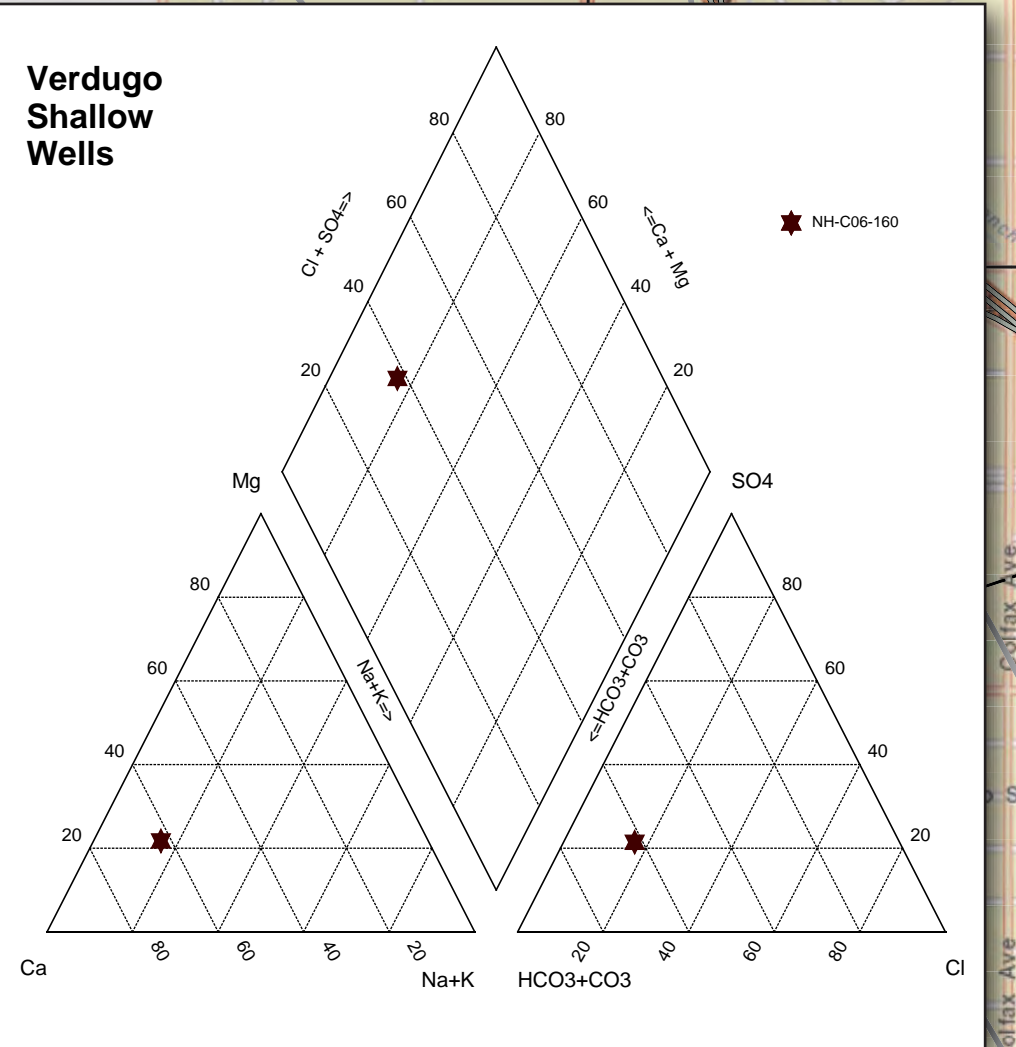
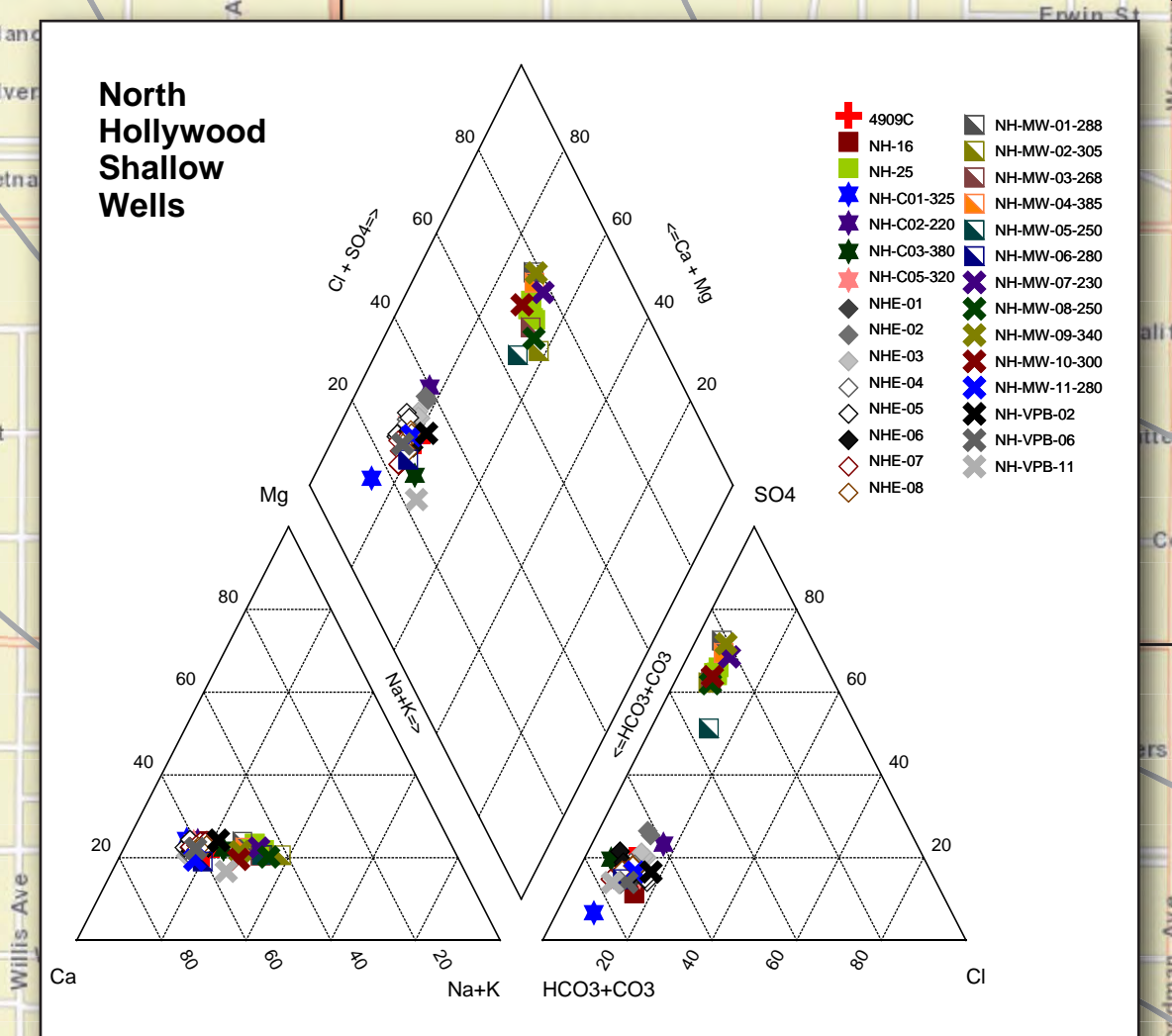
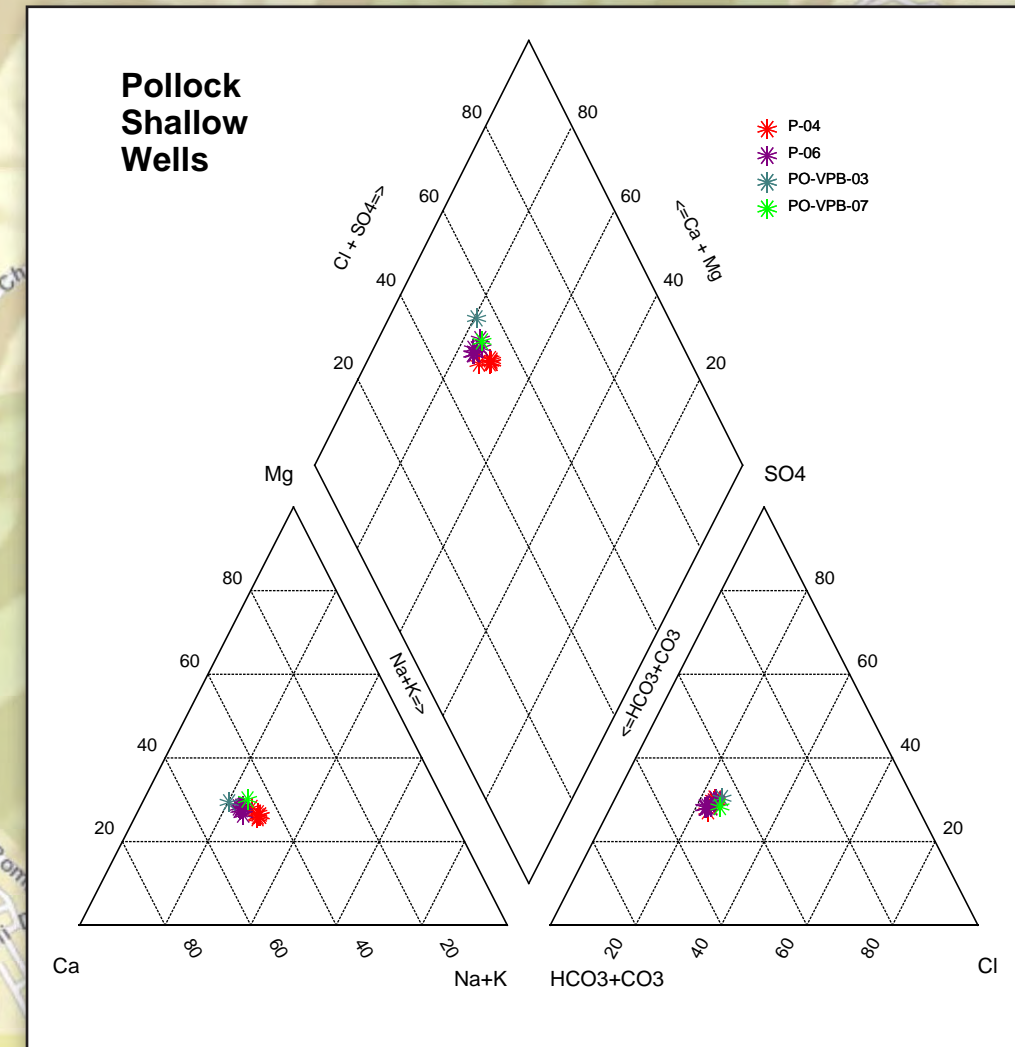
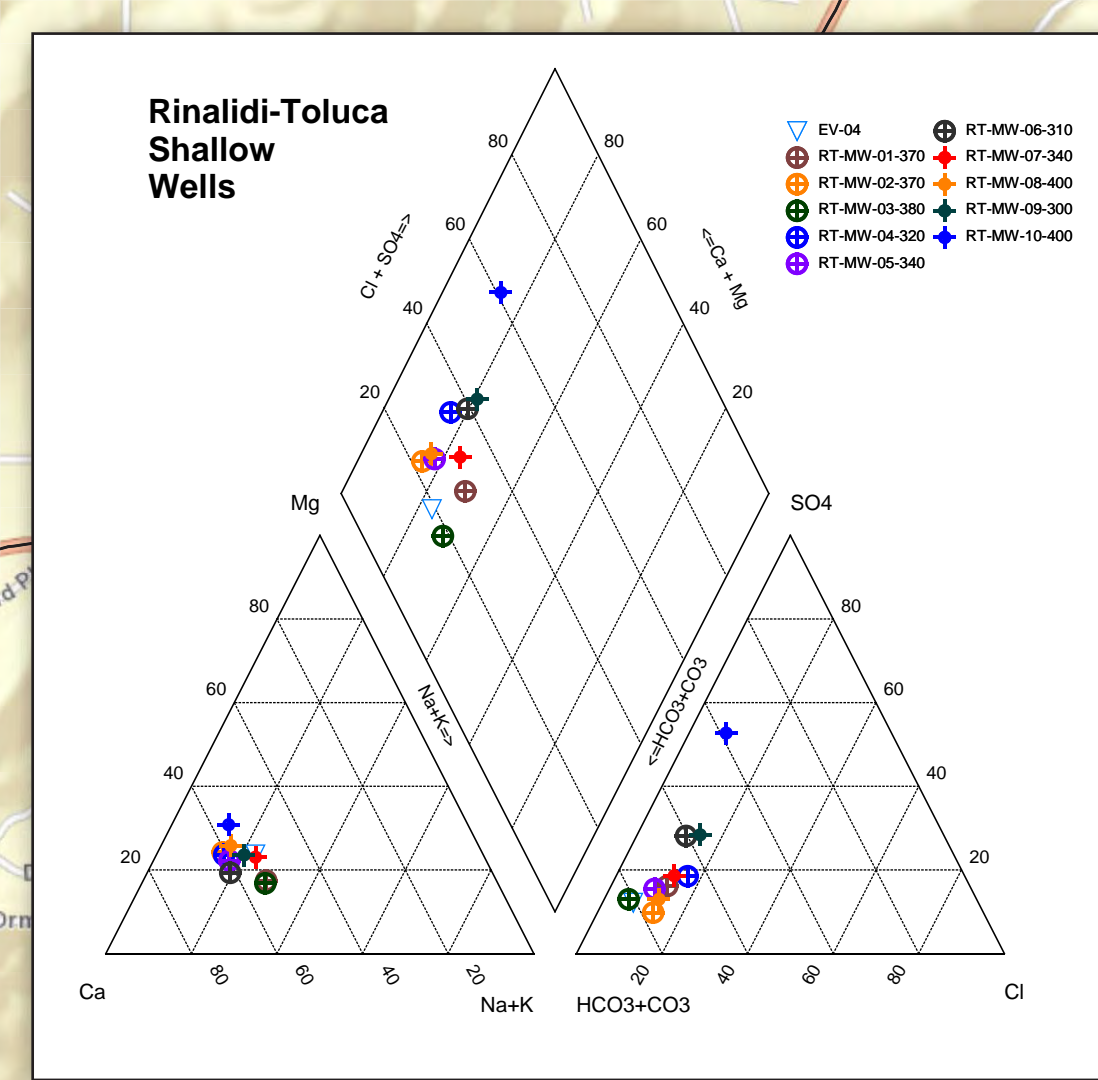
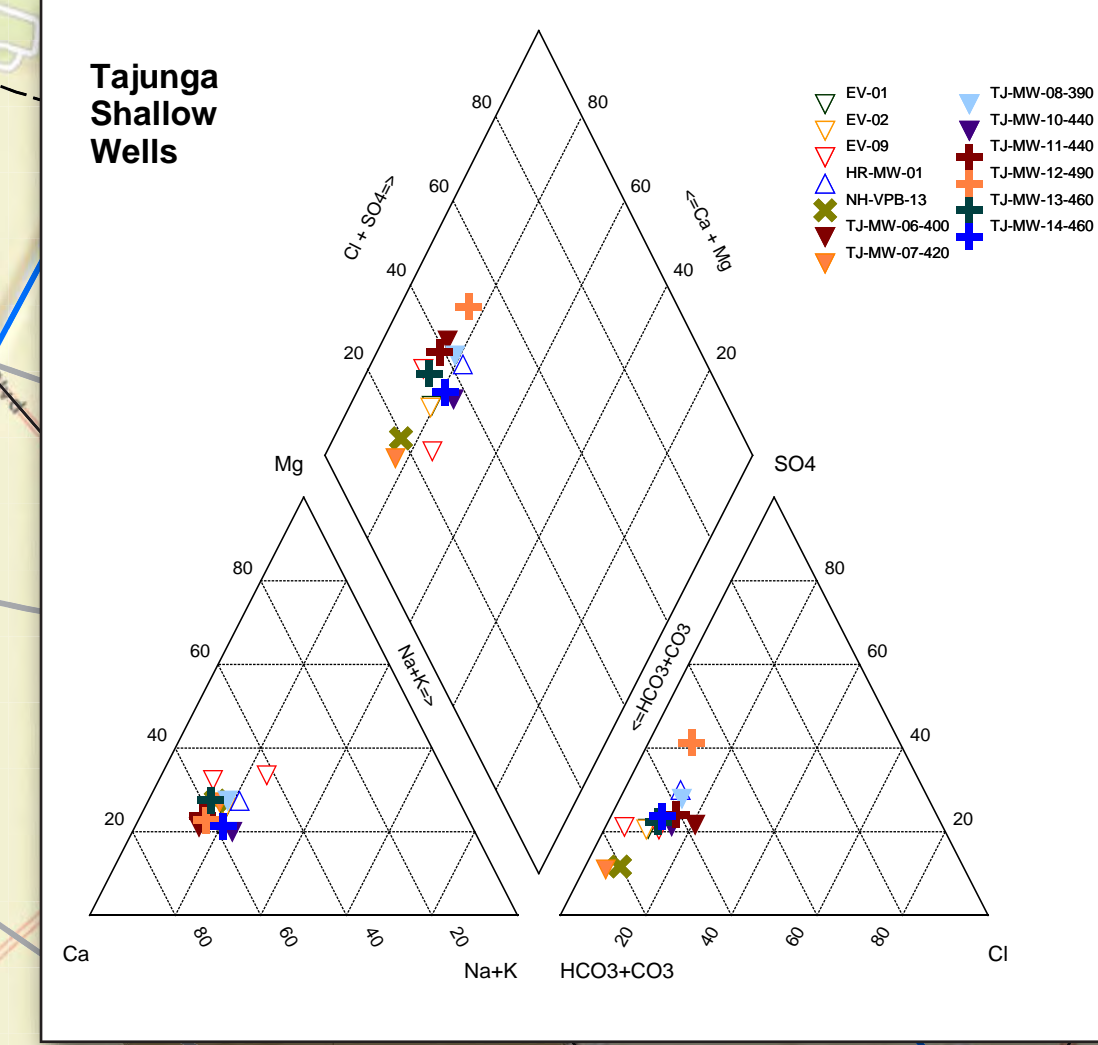
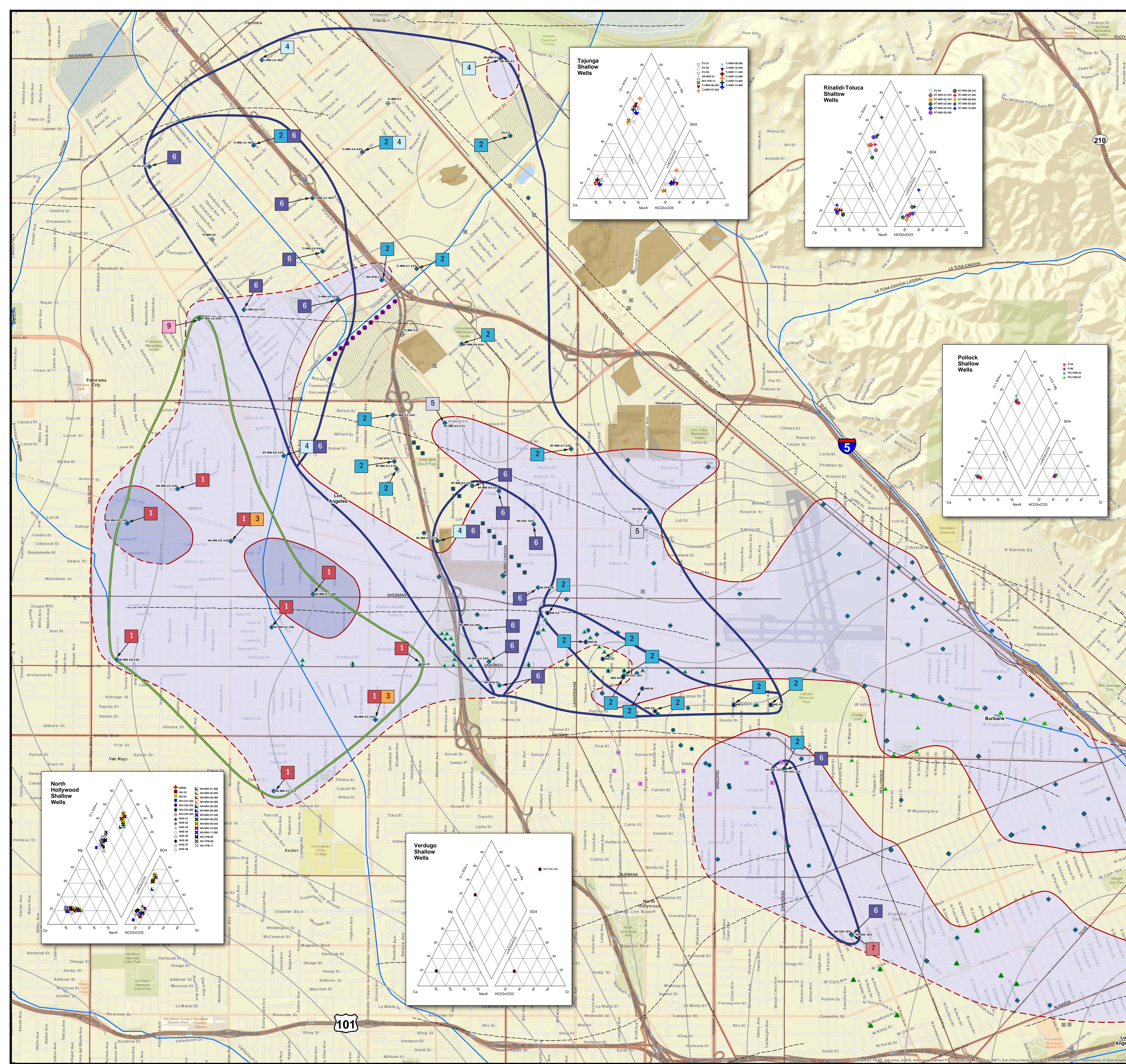
**Explanation**

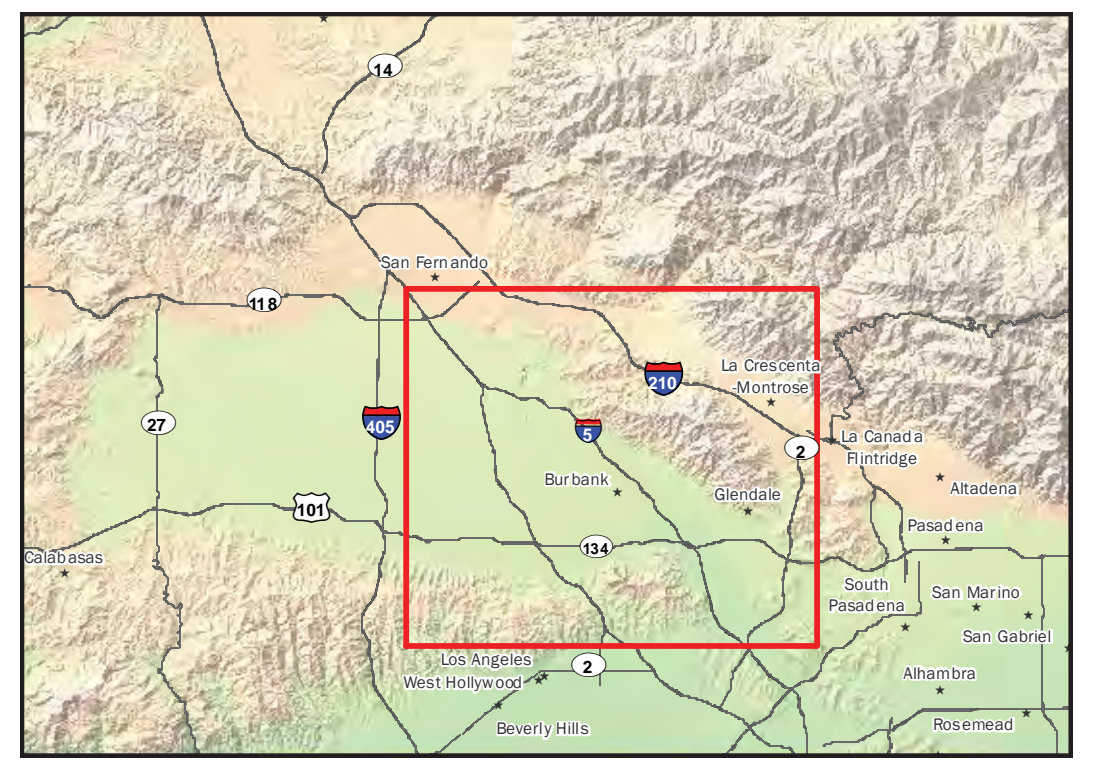
- Total Dissolved Solid concentration (mg/L)**
  - 500 - 1000
  - ≥ 1000
- Extraction Remediation Wells by Wellfield**
  - Burbank OU
  - Glendale OU
  - North Hollywood OU
- Production Wells by Wellfield**
  - Erwin
  - Headworks
  - North Hollywood
  - Pollock
  - Rinaldi-Toluca
  - Tujunga
  - Verdugo
  - Whitnall
  - Other Wells
- Other Features**
  - Groundwater Elevation Contours (2014; ft)
  - Faults
  - River/Stream/Drainage
  - Spreading Grounds
  - Landfills
  - Aquifer Geochemistry
  - CaHCO3 Water
  - CaSO4 Water

**STIFF Diagrams**



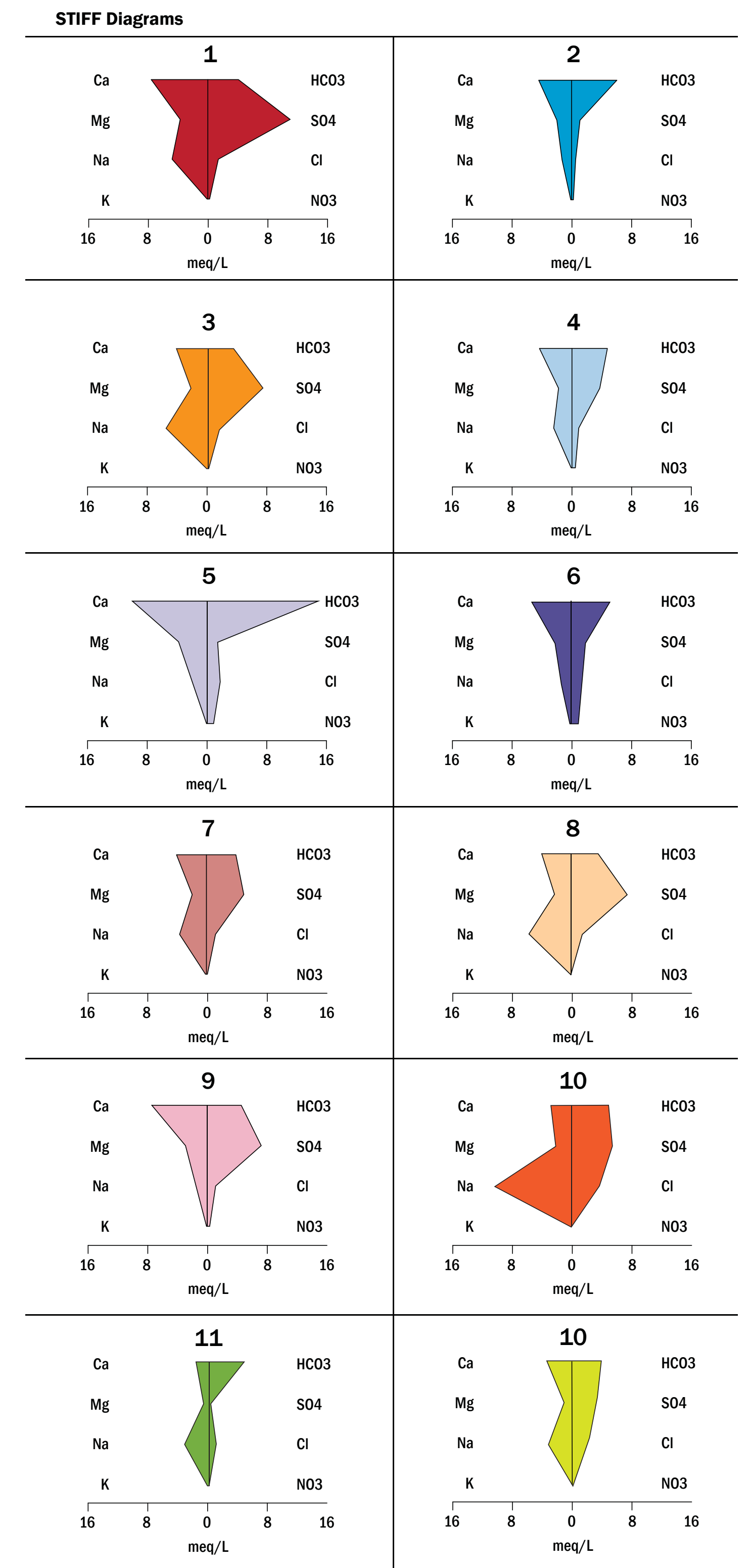
**FIGURE 3-19**  
**AQUIFER GEOCHEMISTRY**  
**SHALLOW GROUNDWATER - 2014**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**





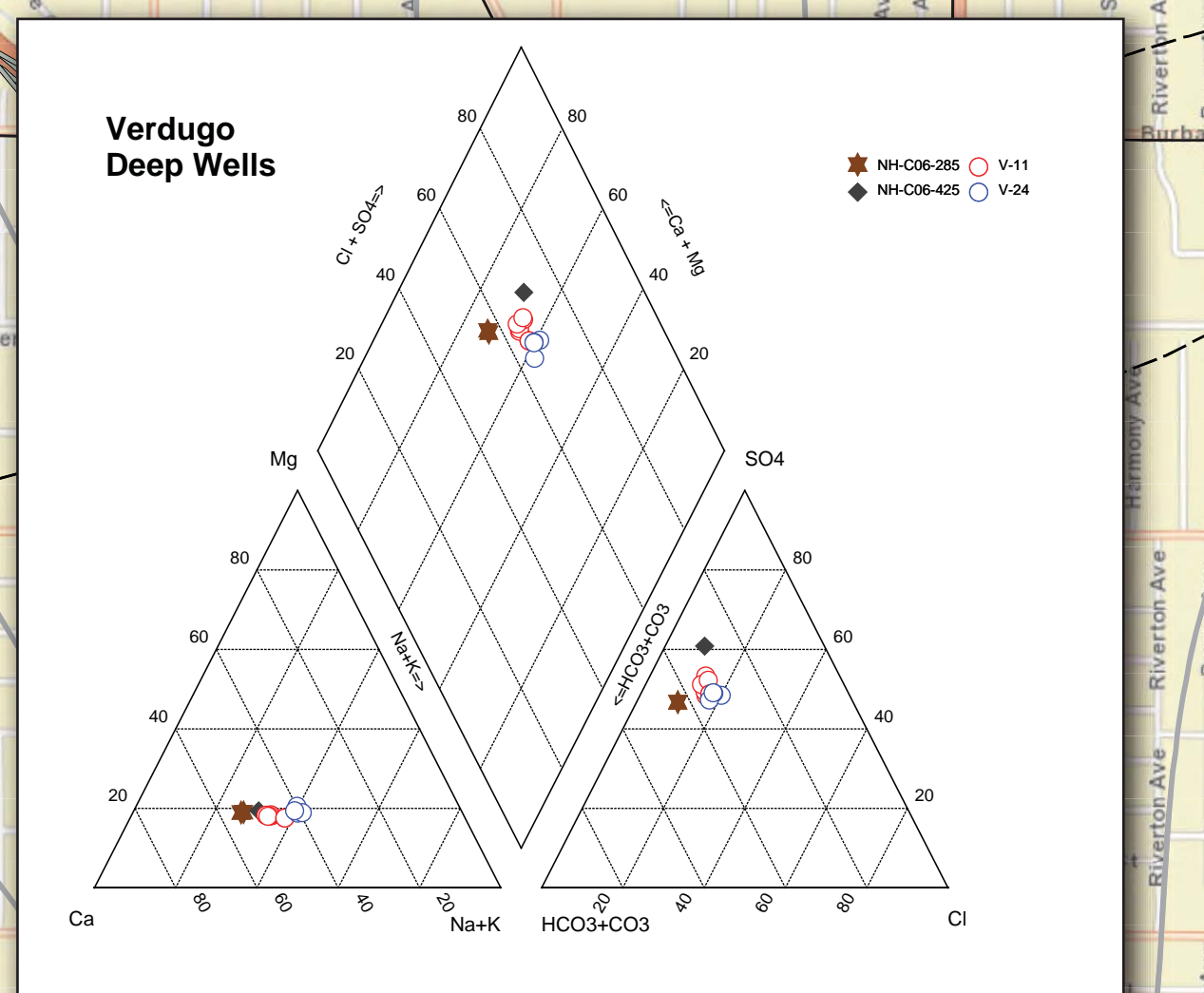
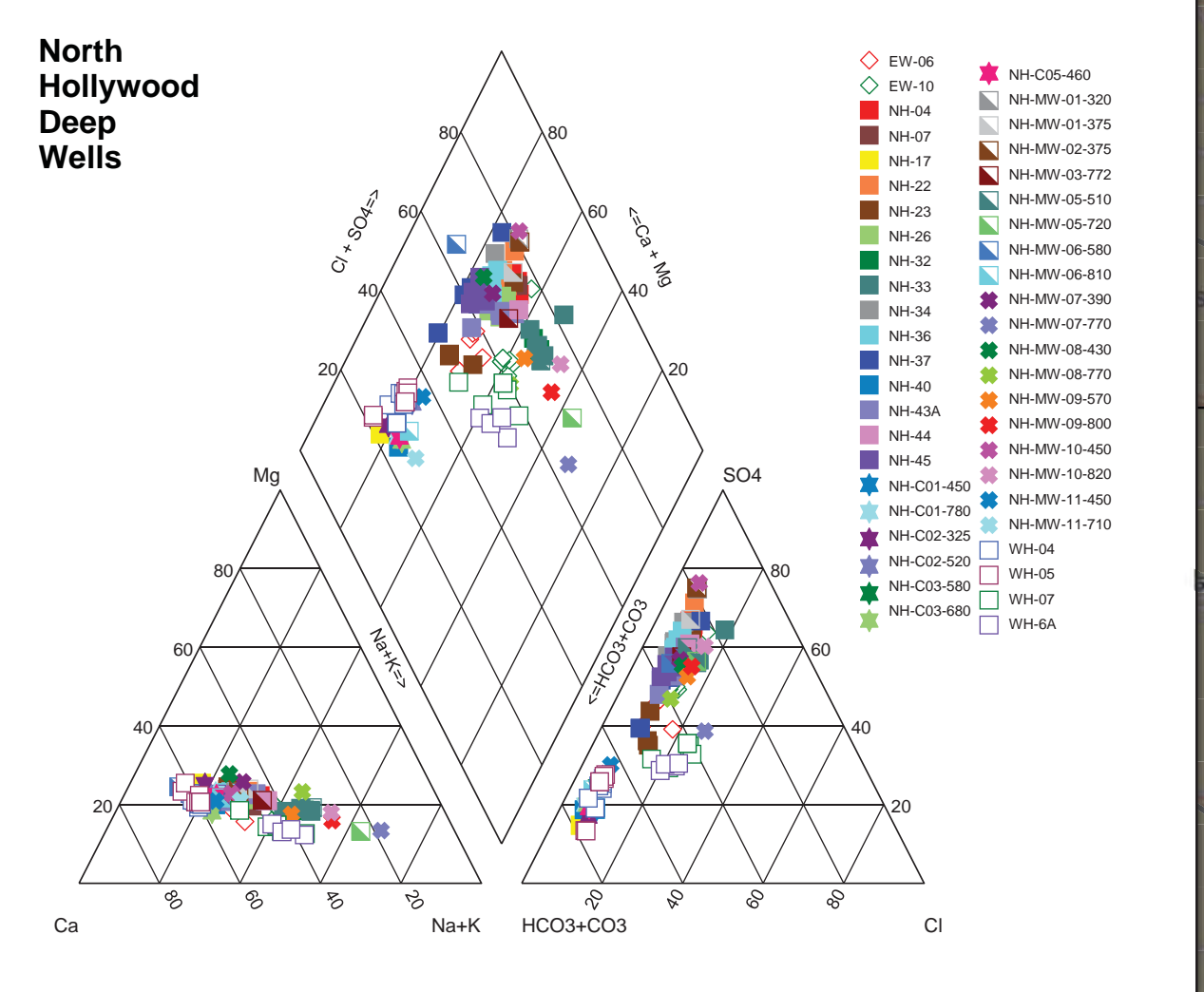
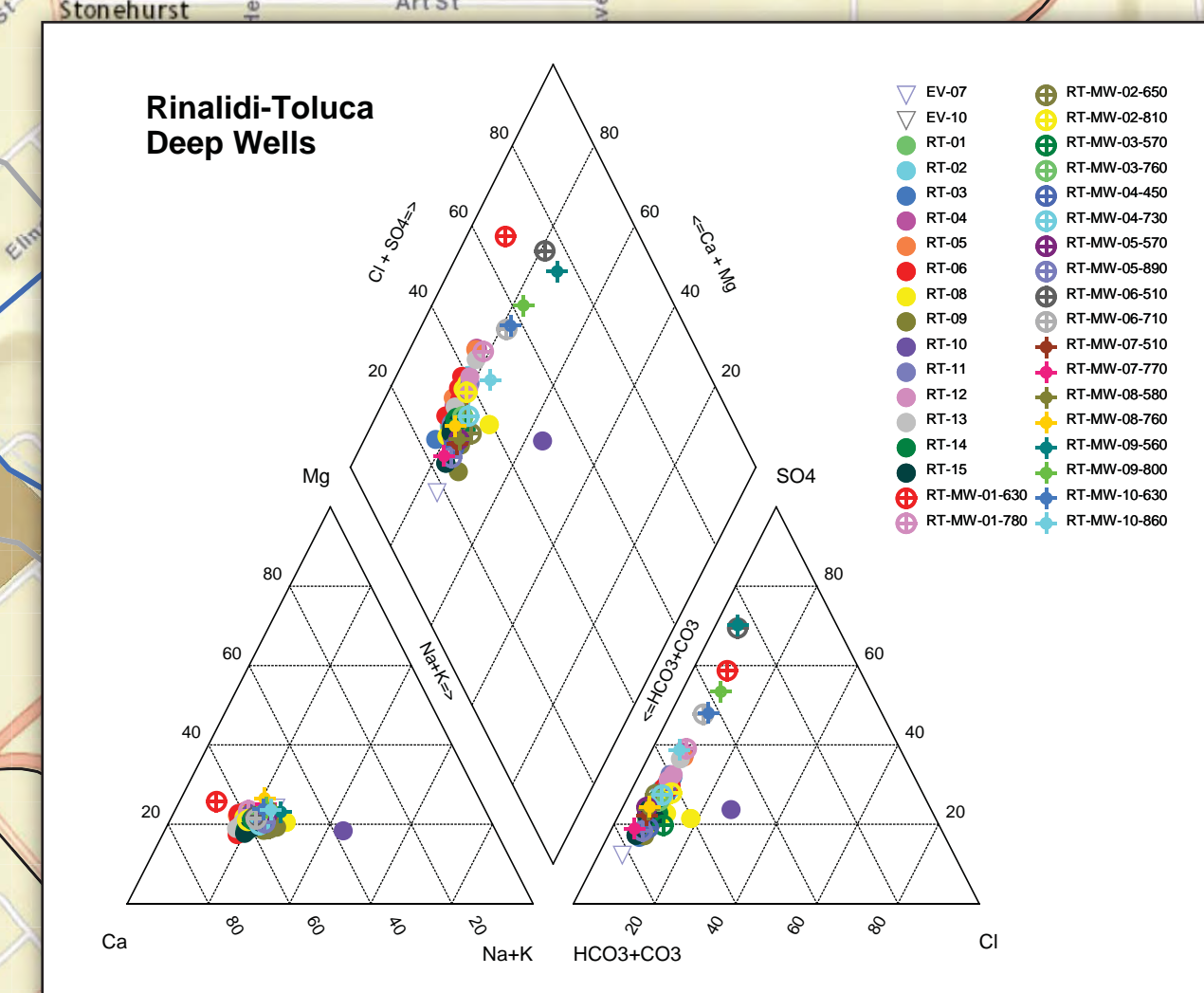
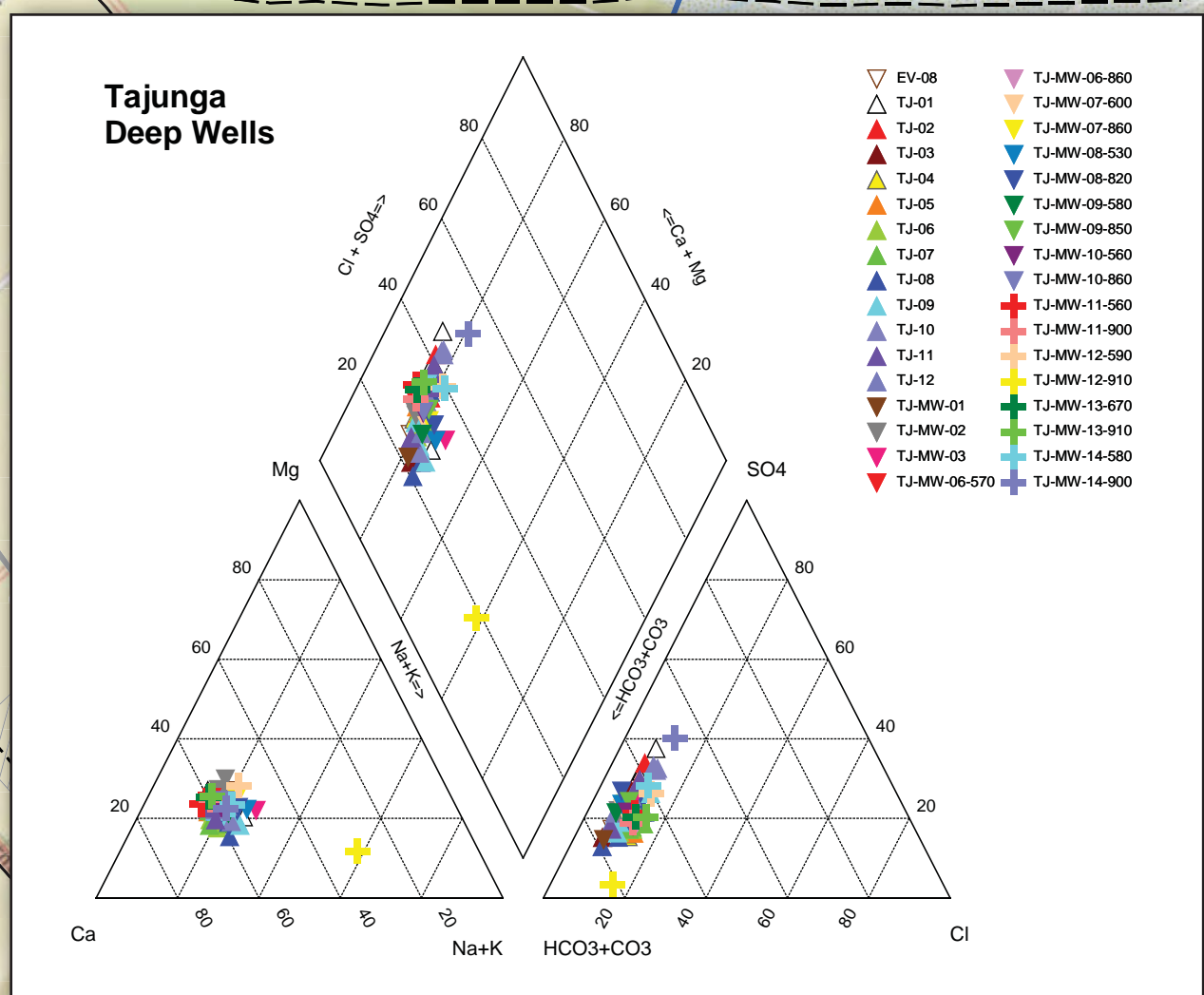
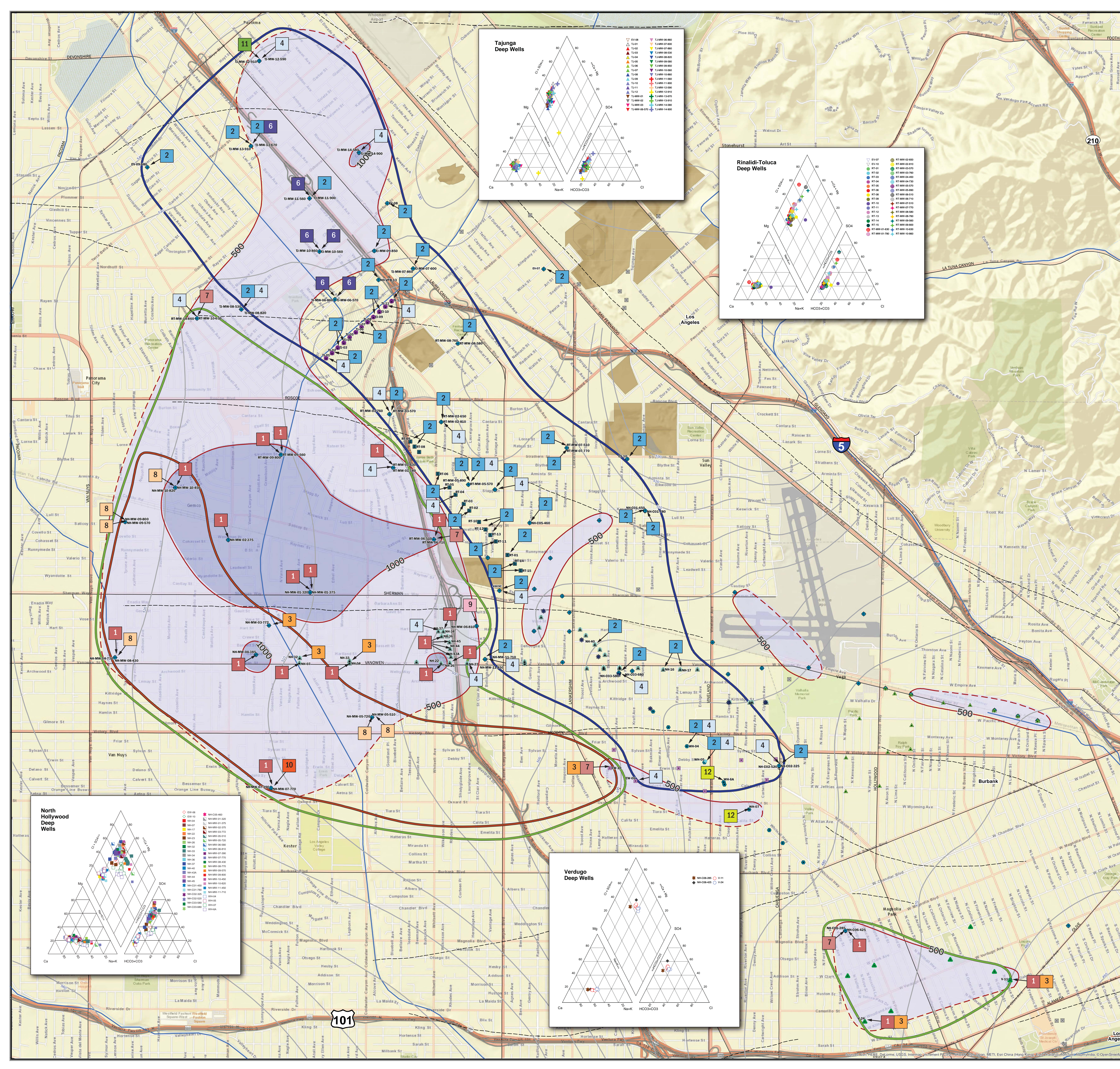
**Explanation**

- Total Dissolved Solid concentration (mg/L)**
  - 500 - 1000
  - ≥ 1000
- Total Dissolved Solid contours**
- Total Dissolved Solid contours - Inferred**
- Monitoring Wells**
- Production Wells by Wellfield**
  - Erwin
  - Headworks
  - North Hollywood
  - Pollock
  - Rinaldi-Toluca
  - Tujunga
  - Verdugo
  - Whitnall
  - Other Wells
- Extraction Remediation Wells by Wellfield**
  - Burbank OU
  - Glendale OU
  - North Hollywood OU
- Aquifer Geochemistry**
  - CaHCO3 Water
  - CaSO4 Water
  - NaCaSO4 Water
- Other Features**
  - Groundwater Elevation Contours (2014; ft)
  - Faults
  - River/Stream/Drainage
  - Spreading Grounds
  - Landfills

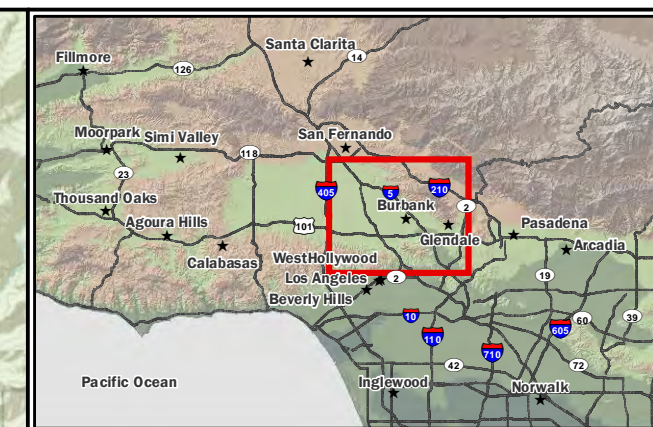
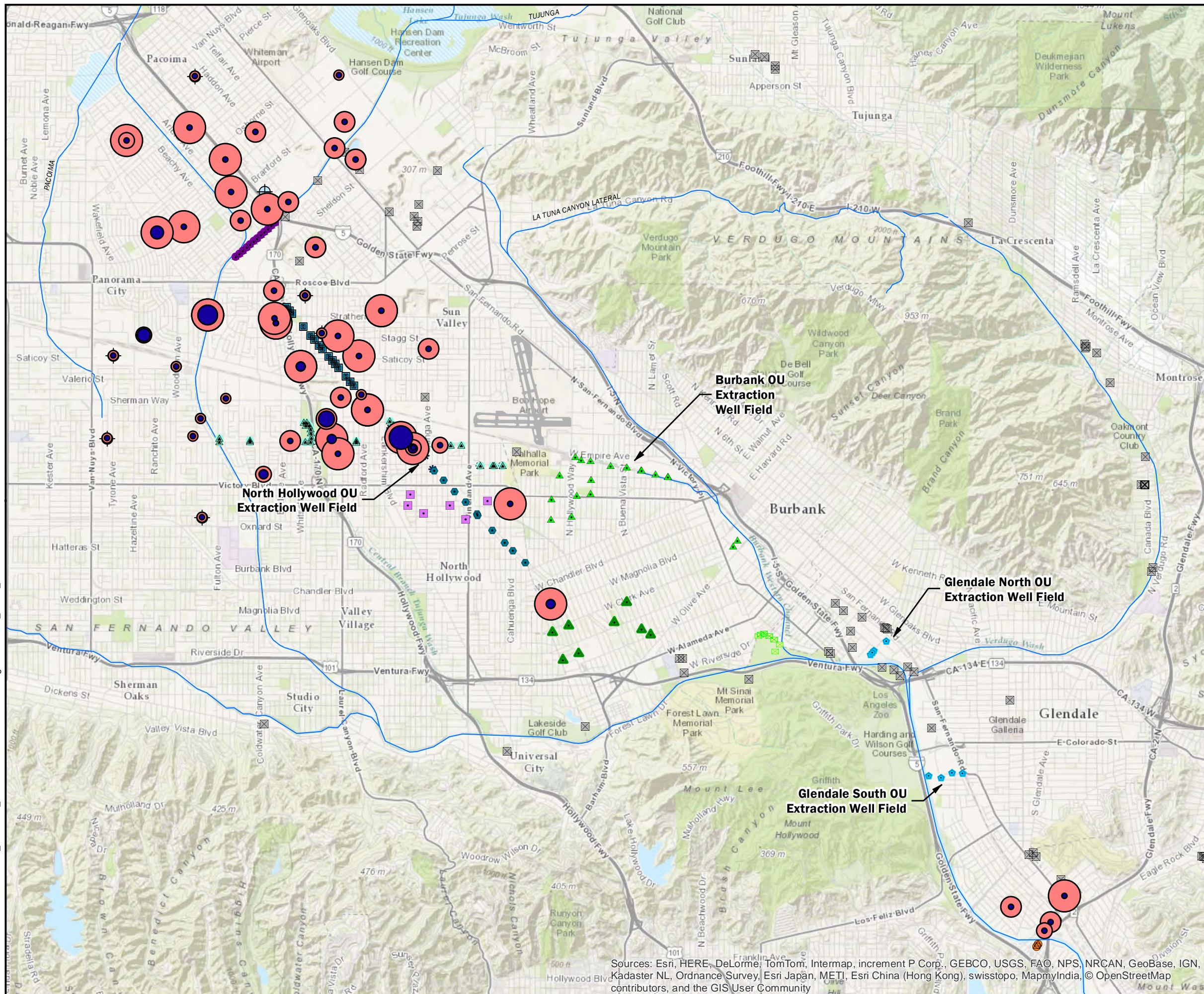


**FIGURE 3-20**  
**AQUIFER GEOCHEMISTRY**  
**DEEP GROUNDWATER - 2014**  
**San Fernando Groundwater Basin**  
**LADWP GSJ Project**  
**Los Angeles, California**

By: McLean/Crawford Date: 2-8-2015 Project No. 146806







**Explanation**

Hexavalent Chromium (µg/L)		Dissolved Oxygen (mg/L)	
●	0 - 4	●	0 - 4
●	4 - 6	●	4 - 6
●	6 - 8	●	6 - 8
●	8 - 10	●	8 - 10
●	10 - 12	●	10 - 12
●	55		

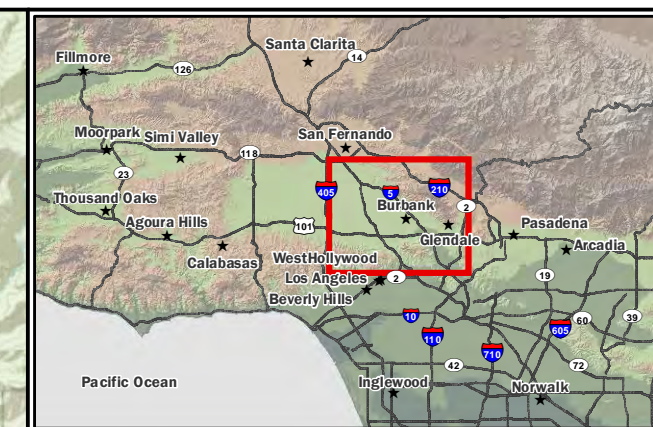
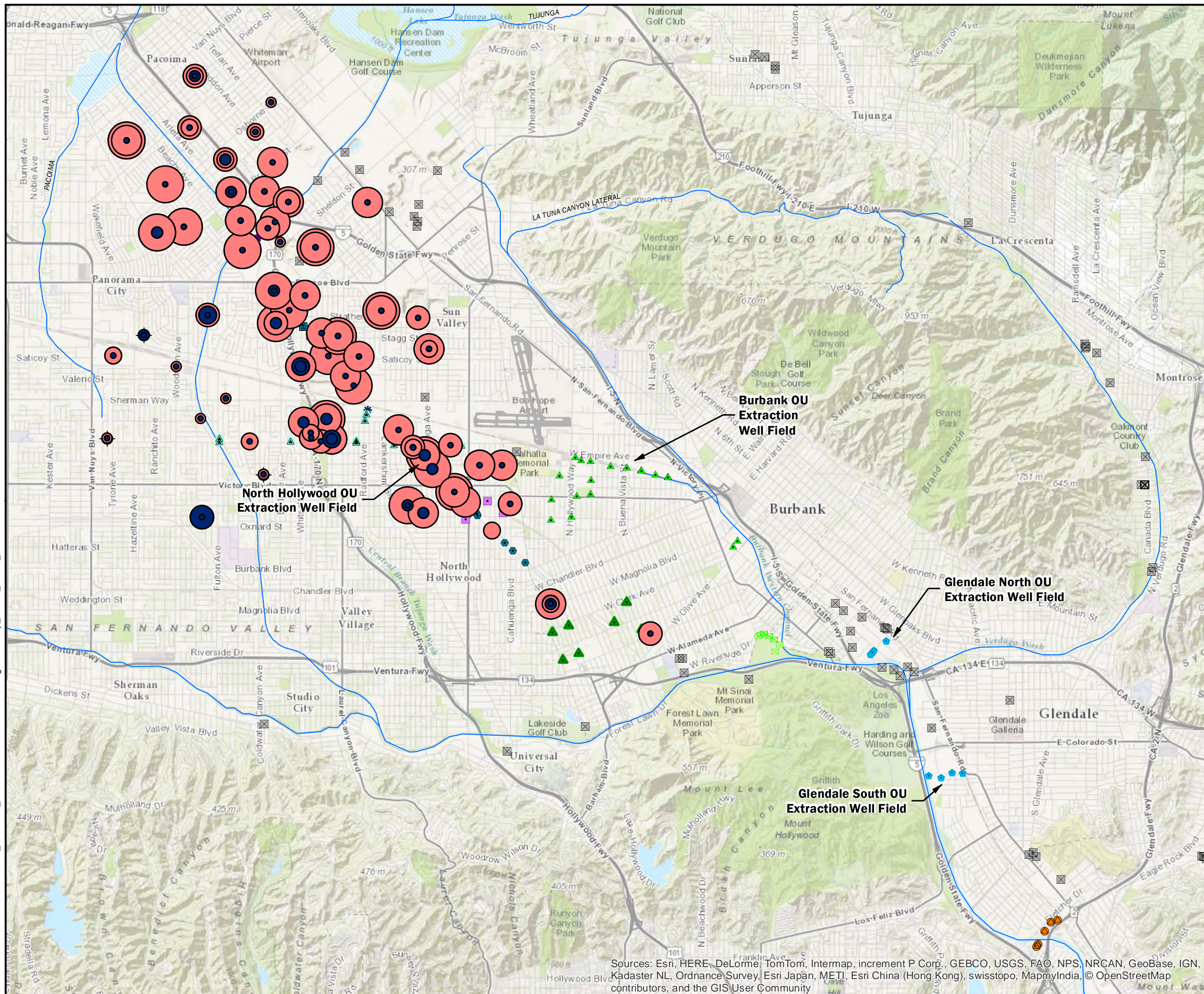


**FIGURE 3-21  
HEXAVALENT CHROMIUM AND DISSOLVED OXYGEN  
IN SHALLOW GROUNDWATER  
San Fernando Groundwater Basin  
LADWP GIS Project  
Los Angeles, California**

By: T. Crawford      Date: 2/26/2015      Project No. 146145.56

Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

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**Explanation**

**Hexavalent Chromium**

µg/L	mg/L
● 0 - 2	● 0 - 1
● 2 - 4	● 2 - 4
● 4 - 6	● 4 - 6
● 6 - 8	● 6 - 8
● 8 - 10	● 8 - 10

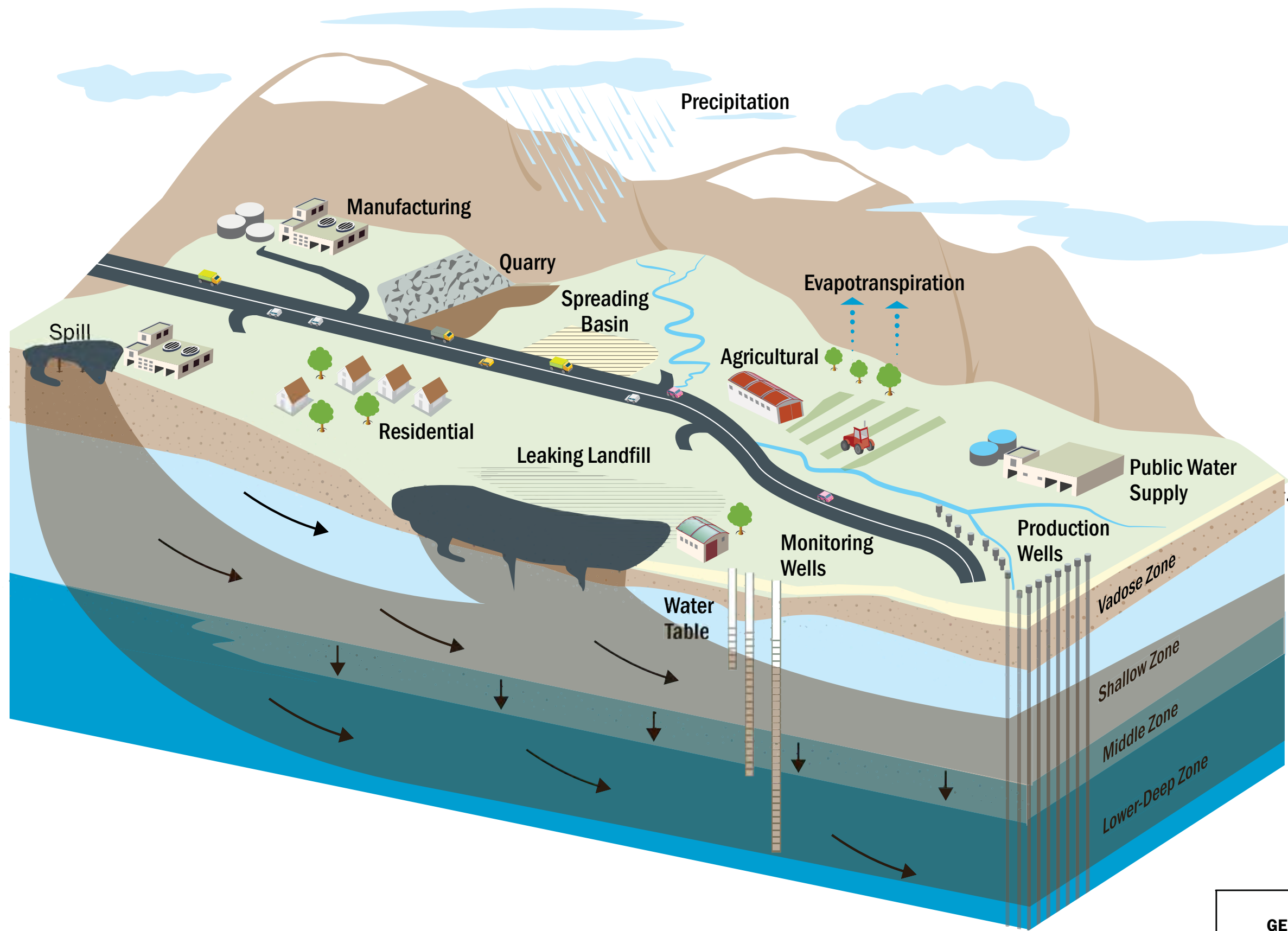


**FIGURE 3-22**  
**HEXAVALENT CHROMIUM AND DISSOLVED OXYGEN**  
**IN DEEP GROUNDWATER**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

By: T. Crawford      Date: 2/26/2015      Project No. 146145.56

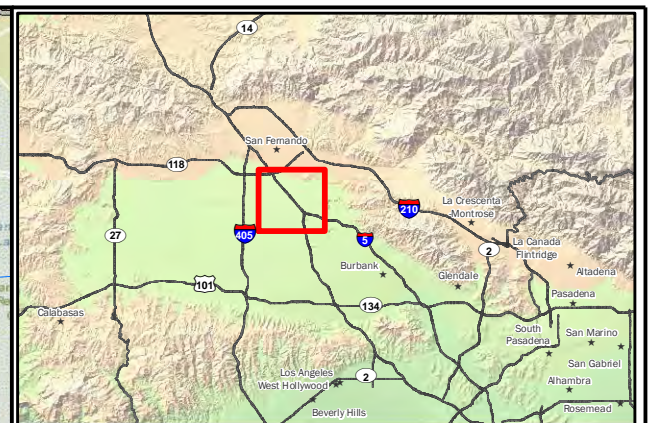
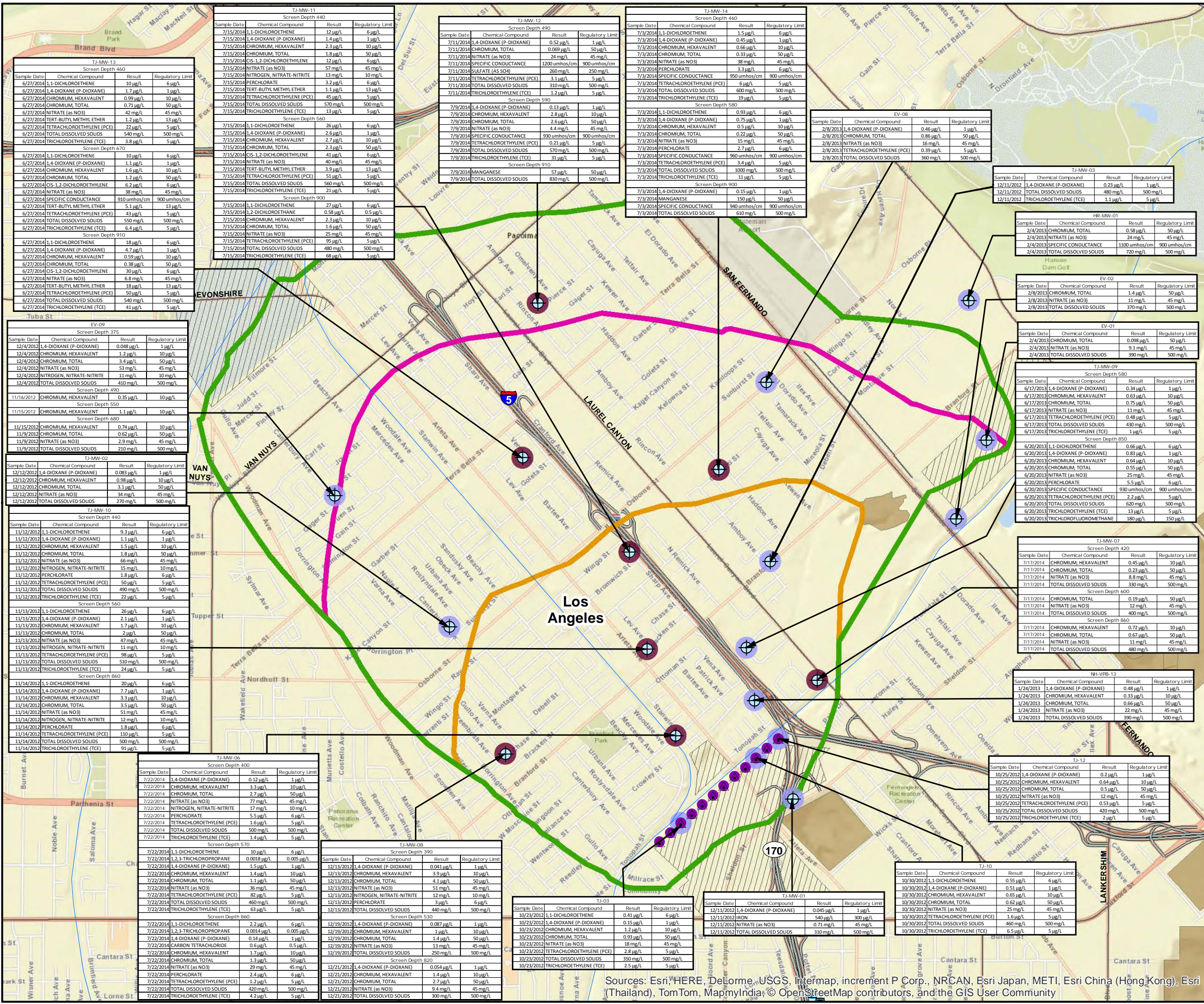
Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community





**FIGURE 4-1  
GENERALIZED RELEASE PROFILE  
FOR THE SFB**

By: T. Crawford	Date: February 2015	Project No. 144462
Brown AND Caldwell		



**Explanation**

- Monitoring Well
- TuJunga Production Well
- Rinaldi-Toluca Production Well
- Well Sampled during 2012/2013 (Task 4.1)
- Well Sampled during 2014 (Task 4.2)
- 10-Year Capture Zone (See Note 1)
- 5-Year Capture Zone (See Note 1)
- 2-Year Capture Zone (See Note 1)
- Landfills
- Spreading Grounds
- River/Stream/Drainage

- NOTES:**
1. Production well field capture areas are based on groundwater modeling performed by the LADWP for proposed centralized groundwater remediation system operation.
  2. Data flags for analytical results show detected concentrations (only) for the following analytes: Trichloroethylene (TCE); Tetrachloroethylene (PCE); 1,1-Dichloroethene; 1,2,3-Trichloropropane; Tert-butyl methyl ether (MTBE); carbon tetrachloride; N-Nitrosodihethylamine (NDMA); 1,4-Dioxane (P-Dioxane); Nitrate (NO3); Total Dissolved Solids (TDS) Perchlorate; Total Chromium; and Chromium, Hexavalent [Cr(VI)].
  3. Data flags also show maximum concentrations for other analytes that exceed established State of California MCLs and NLS.
  4. Well locations obtained from databases maintained by Regional Water Quality Control Board and Department of Toxic Substances Control.

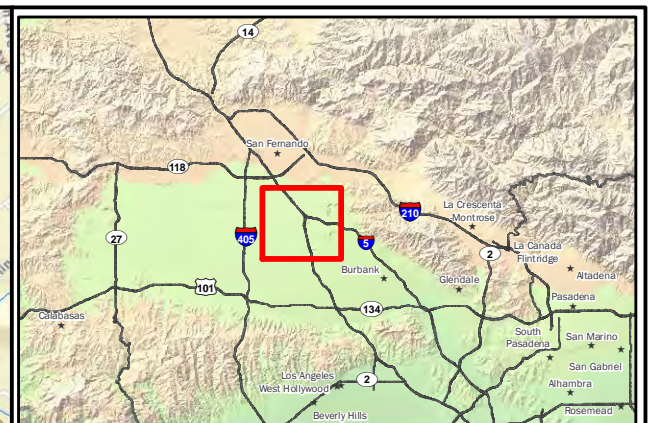
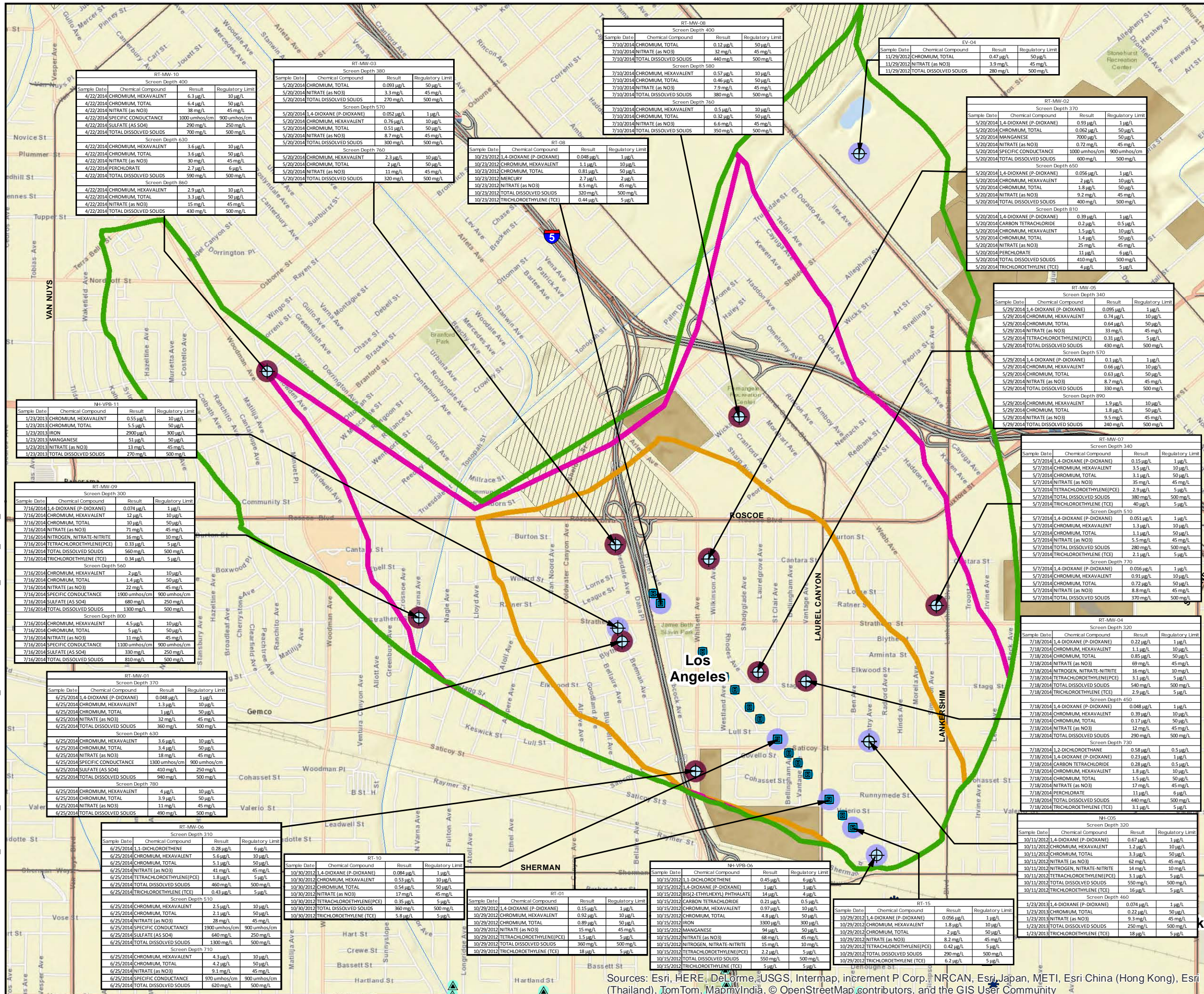


**FIGURE 4-2  
TUJUNGA WELL FIELD MAP  
FINAL RESULTS FOR GROUNDWATER  
MONITORING  
San Fernando Groundwater Basin  
LADWP GIS Project  
Los Angeles, California**

By: T. Crawford Date: 1-30-2015 Project No. 146088



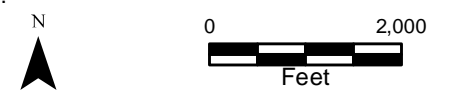
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community



**Explanation**

- Monitoring Well
- Rinaldi-Toluca Production Well
- North Hollywood Production Well
- North Hollywood OU Production Well
- Well Sampled during 2012/2013 (Task 4.1)
- Well Sampled during 2014 (Task 4.2)
- 10-Year Capture Zone (See Note 1)
- 5-Year Capture Zone (See Note 1)
- 2-Year Capture Zone (See Note 1)
- Landfills
- Spreading Grounds
- River/Stream/Drainage

- NOTES:**
1. Production well field capture areas are based on groundwater modeling performed by the LADWP for proposed centralized groundwater remediation system operation.
  2. Data flags for analytical results show detected concentrations (only) for the following analytes: Trichloroethylene (TCE); Tetrachloroethylene (PCE); 1,1-Dichloroethene; 1,2,3-Trichloropropane; Tert-butyl methyl ether (MTBE); carbon tetrachloride; N-Nitrosodiethylamine (NDMA); 1,4-Dioxane (P-Dioxane); Nitrate (NO3); Total Dissolved Solids (TDS) Perchlorate; Total Chromium; and Chromium, Hexavalent [Cr(VI)].
  3. Data flags also show maximum concentrations for other analytes that exceed established State of California MCLs and NLs.
  4. Well locations obtained from databases maintained by Regional Water Quality Control Board and Department of Toxic Substances Control.

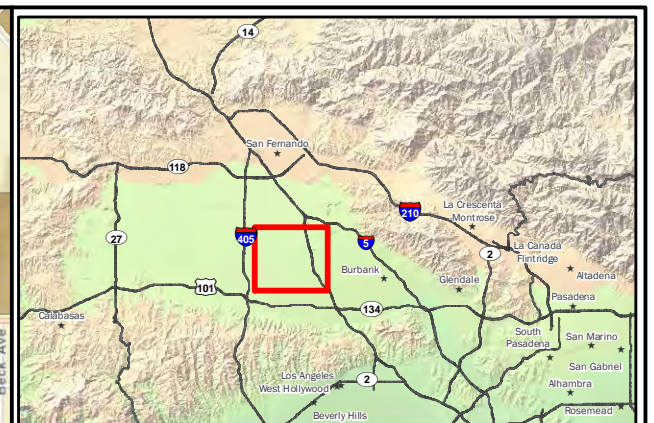
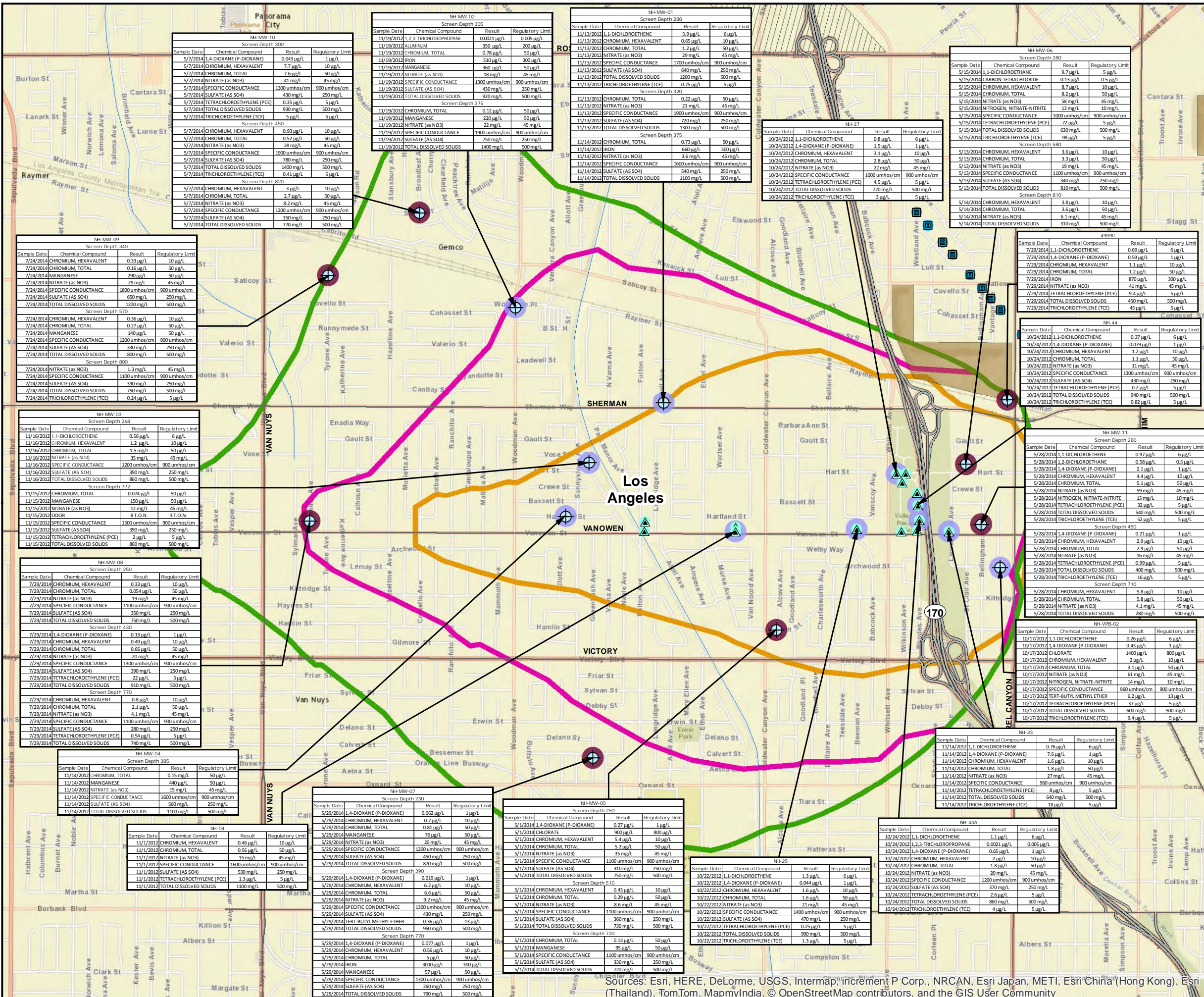


**FIGURE 4-3**  
**RINALDI TOLUCA WELL FIELD MAP**  
**FINAL RESULTS FOR GROUNDWATER**  
**MONITORING**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

By: T. Crawford      Date: 2-11-2015      Project No. 146088



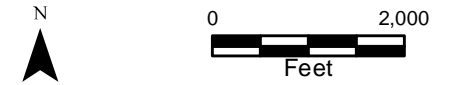
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community



### Explanation

- Monitoring Well
- North Hollywood Production Well
- Rinaldi-Toluca Production Well
- Well Sampled during 2012/2013 (Task 4.1)
- Well Sampled during 2014 (Task 4.2)
- 10-Year Capture Zone (See Note 1)
- 5-Year Capture Zone (See Note 1)
- 2-Year Capture Zone (See Note 1)
- Landfills
- Spreading Grounds
- River/Stream/Drainage

- NOTES:**
- Production well field capture areas are based on groundwater modeling performed by the LADWP for proposed centralized groundwater remediation system operation.
  - Data flags for analytical results show detected concentrations (only) for the following analytes: Trichloroethylene (TCE); Tetrachloroethylene (PCE); 1,1-Dichloroethene; 1,2,3-Trichloropropane; Tert-butyl methyl ether (MTBE); carbon tetrachloride; N-Nitrosodiethylamine (NDMA); 1,4-Dioxane (P-Dioxane); Nitrate (NO3); Total Dissolved Solids (TDS) Perchlorate; Total Chromium; and Chromium, Hexavalent [Cr(VI)].
  - Data flags also show maximum concentrations for other analytes that exceed established State of California MCLs and NLS.
  - Well locations obtained from databases maintained by Regional Water Quality Control Board and Department of Toxic Substances Control.



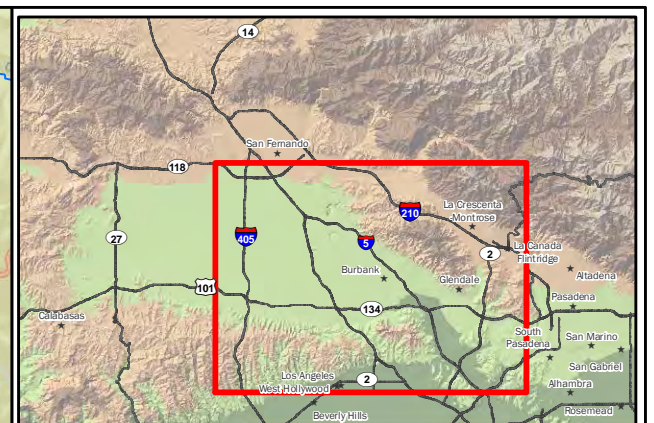
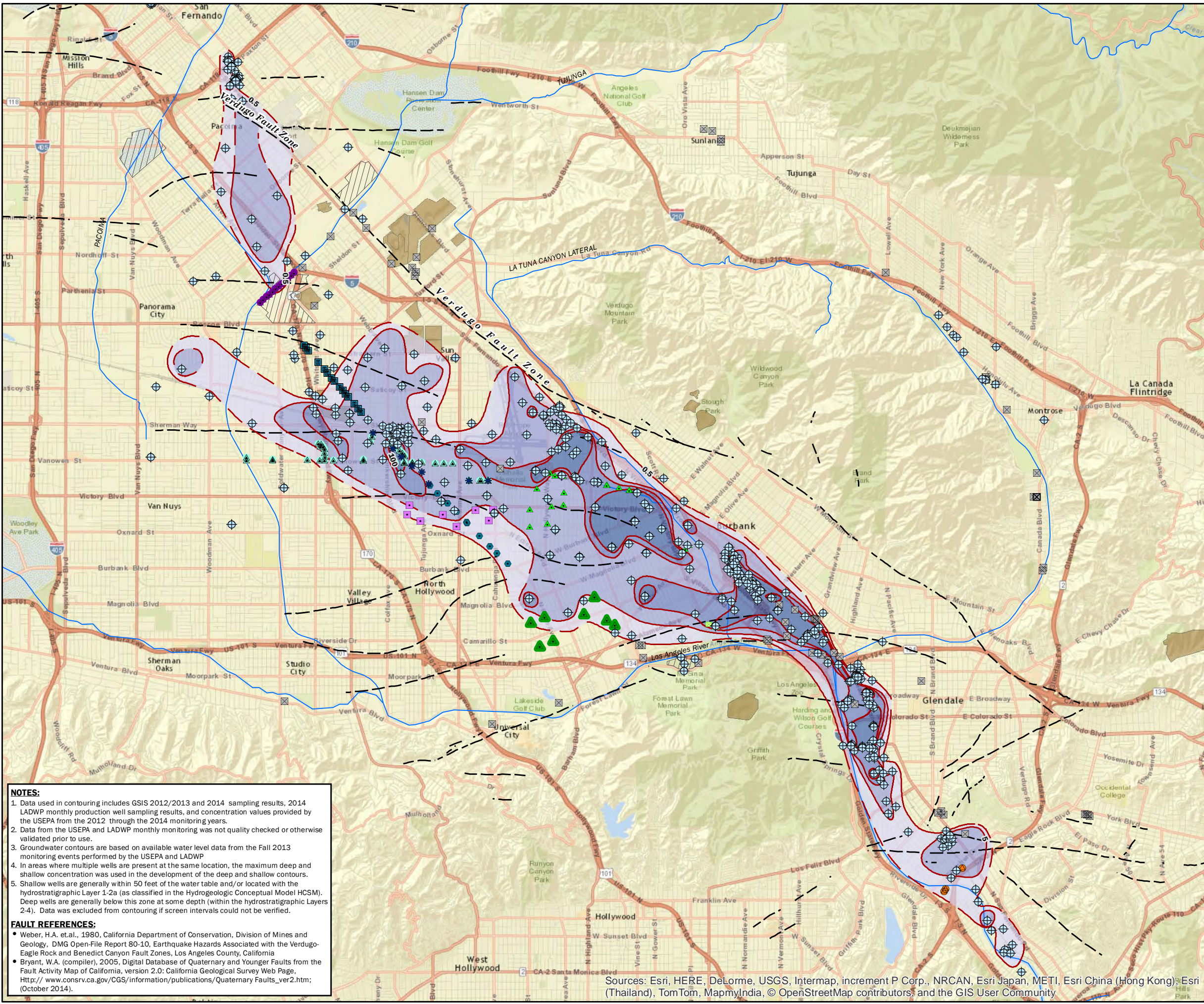
**FIGURE 4-4**  
**NORTH HOLLYWOOD WEST WELL FIELD MAP**  
**FINAL RESULTS FOR GROUNDWATER**  
**MONITORING**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

By: T. Crawford      Date: 2-11-2015      Project No. 146088



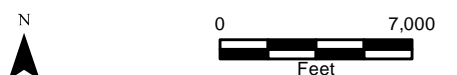
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the ©IS User Community

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**Explanation**

- Trichloroethylene (TCE) concentration**
- 0.5 - 5 µg/L
  - 5 - 50 µg/L
  - 50 - 100 µg/L
  - 100 - 1000 µg/L
  - ≥ 1000 µg/L
- Trichloroethylene (TCE) contours
- Trichloroethylene (TCE) contours - Inferred
  - Trichloroethylene (TCE) contours - Inferred through Fault Zone
- Monitoring Wells
- Production Wells by Wellfield**
- Erwin
  - Headworks
  - North Hollywood
  - Pollock
  - Rinaldi-Toluca
  - Tujunga
  - Verdugo
  - Whitnall
  - Other Wells
- Extraction Remediation Wells by Wellfield**
- Burbank OU
  - Glendale OU
  - North Hollywood OU
- Other Features**
- Faults
  - River/Stream/Drainage
  - Spreading Grounds
  - Landfills



**NOTES:**

- Data used in contouring includes GIS 2012/2013 and 2014 sampling results, 2014 LADWP monthly production well sampling results, and concentration values provided by the USEPA from the 2012 through the 2014 monitoring years.
- Data from the USEPA and LADWP monthly monitoring was not quality checked or otherwise validated prior to use.
- Groundwater contours are based on available water level data from the Fall 2013 monitoring events performed by the USEPA and LADWP.
- In areas where multiple wells are present at the same location, the maximum deep and shallow concentration was used in the development of the deep and shallow contours.
- Shallow wells are generally within 50 feet of the water table and/or located with the hydrostratigraphic Layer 1-2a (as classified in the Hydrogeologic Conceptual Model HCMSM). Deep wells are generally below this zone at some depth (within the hydrostratigraphic Layers 2-4). Data was excluded from contouring if screen intervals could not be verified.

**FAULT REFERENCES:**

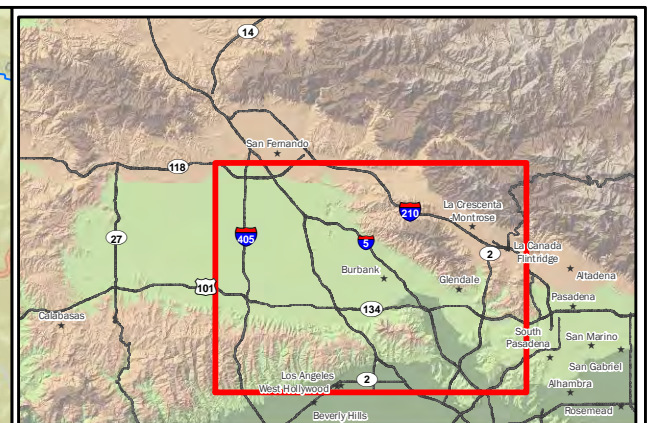
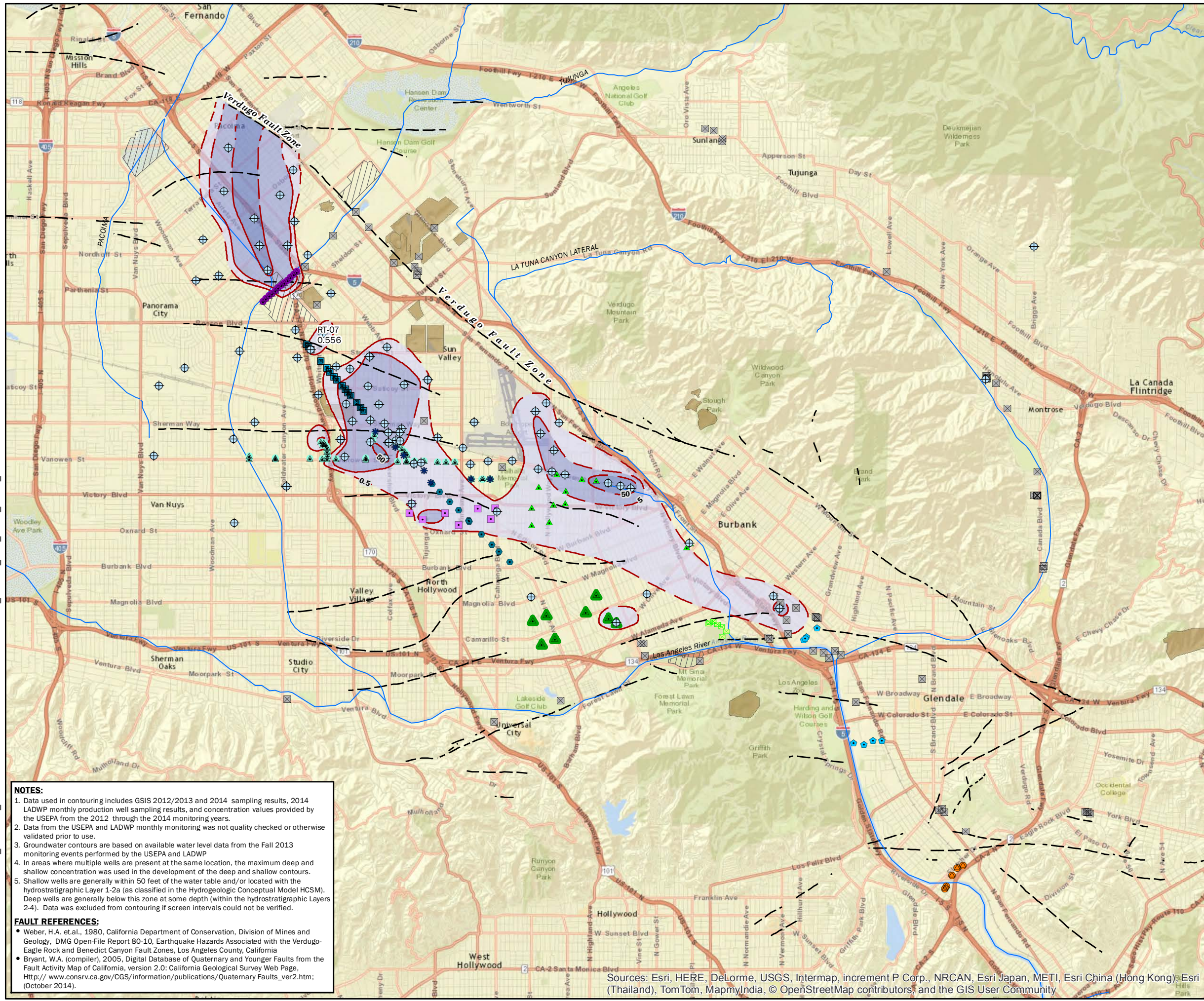
- Weber, H.A. et al., 1980, California Department of Conservation, Division of Mines and Geology, DMG Open-File Report 80-10, Earthquake Hazards Associated with the Verdugo-Eagle Rock and Benedict Canyon Fault Zones, Los Angeles County, California
- Bryant, W.A. (compiler), 2005, Digital Database of Quaternary and Younger Faults from the Fault Activity Map of California, version 2.0: California Geological Survey Web Page, [http://www.consrv.ca.gov/CGS/information/publications/Quaternary\\_Faults\\_ver2.htm](http://www.consrv.ca.gov/CGS/information/publications/Quaternary_Faults_ver2.htm); (October 2014).

**FIGURE 4-5a**  
**TRICHLOROETHYLENE (TCE) ISOCONCENTRATION**  
**SHALLOW GROUNDWATER - 2014**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

By: Seeno/Crawford | Date: 2-8-2015 | Project No. 146806

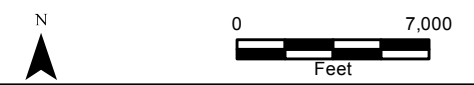


Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community



**Explanation**

- Trichloroethylene (TCE) concentration**
- 0.5 - 5 µg/L
  - 5 - 50 µg/L
  - ≥ 50 µg/L
- Trichloroethylene (TCE) contours**
- Trichloroethylene (TCE) contours
  - Trichloroethylene (TCE) contours - Inferred
  - Trichloroethylene (TCE) contours - Inferred through Fault Zone
- Monitoring Wells**
- Monitoring Wells
- Production Wells by Wellfield**
- Erwin
  - Headworks
  - North Hollywood
  - Pollock
  - Rinaldi-Toluca
  - Tujunga
  - Verdugo
  - Whitnall
  - Other Wells
- Extraction Remediation Wells by Wellfield**
- Burbank OU
  - Glendale OU
  - North Hollywood OU
- Other Features**
- Faults
  - River/Stream/Drainage
  - Spreading Grounds
  - Landfills



**NOTES:**

- Data used in contouring includes GIS 2012/2013 and 2014 sampling results, 2014 LADWP monthly production well sampling results, and concentration values provided by the USEPA from the 2012 through the 2014 monitoring years.
- Data from the USEPA and LADWP monthly monitoring was not quality checked or otherwise validated prior to use.
- Groundwater contours are based on available water level data from the Fall 2013 monitoring events performed by the USEPA and LADWP
- In areas where multiple wells are present at the same location, the maximum deep and shallow concentration was used in the development of the deep and shallow contours.
- Shallow wells are generally within 50 feet of the water table and/or located with the hydrostratigraphic Layer 1-2a (as classified in the Hydrogeologic Conceptual Model HCMSM). Deep wells are generally below this zone at some depth (within the hydrostratigraphic Layers 2-4). Data was excluded from contouring if screen intervals could not be verified.

**FAULT REFERENCES:**

- Weber, H.A. et al., 1980, California Department of Conservation, Division of Mines and Geology, DMG Open-File Report 80-10, Earthquake Hazards Associated with the Verdugo-Eagle Rock and Benedict Canyon Fault Zones, Los Angeles County, California
- Bryant, W.A. (compiler), 2005, Digital Database of Quaternary and Younger Faults from the Fault Activity Map of California, version 2.0: California Geological Survey Web Page, [http://www.consrv.ca.gov/CGS/information/publications/Quaternary\\_Faults\\_ver2.htm](http://www.consrv.ca.gov/CGS/information/publications/Quaternary_Faults_ver2.htm); (October 2014).

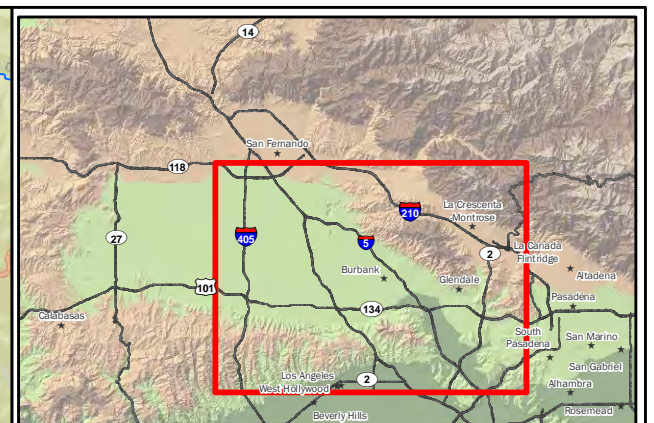
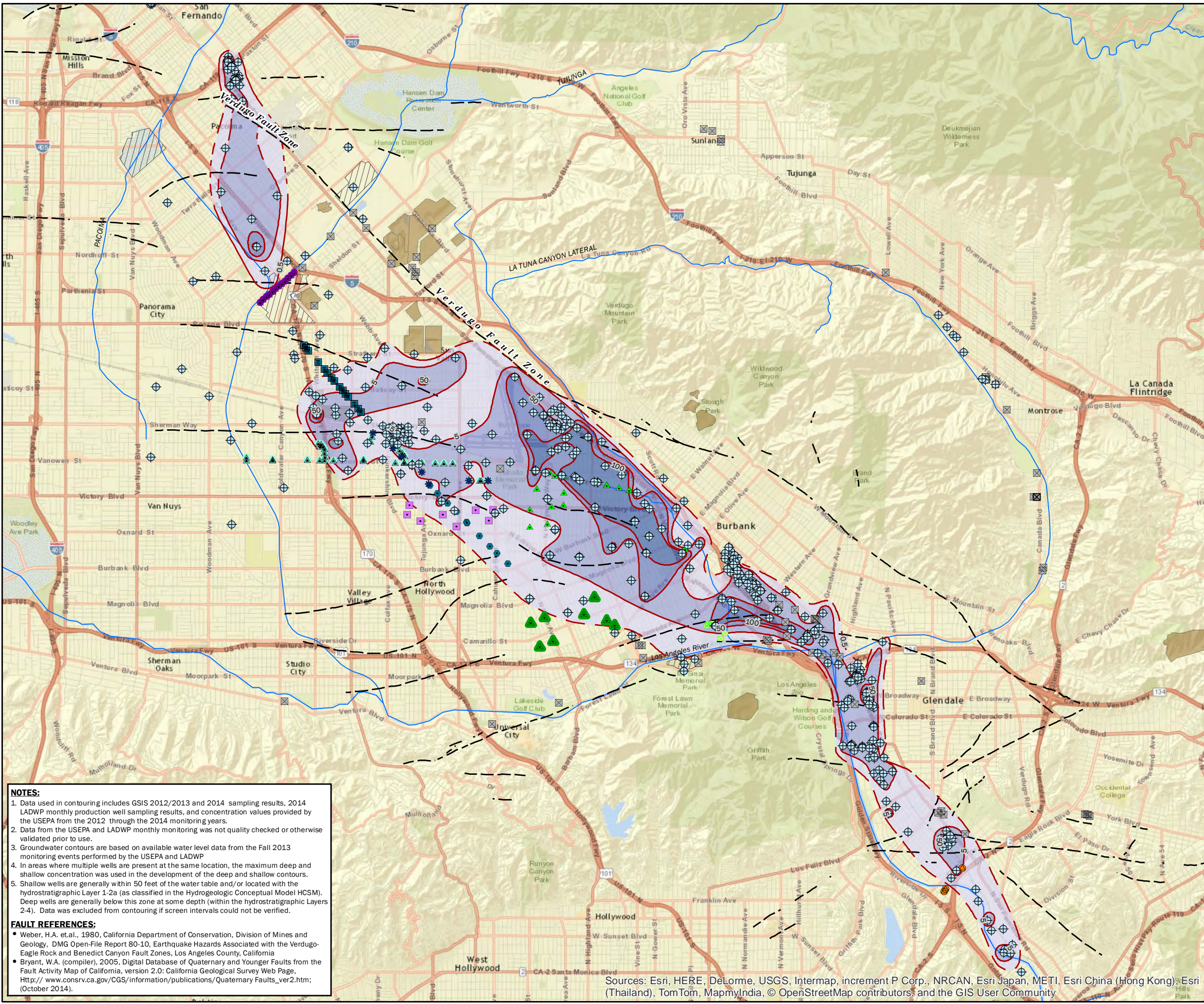
**FIGURE 4-5b**  
**TRICHLOROETHYLENE (TCE) ISOCONCENTRATION**  
**DEEP GROUNDWATER - 2014**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

By: Seeno/Crawford | Date: 2-8-2015 | Project No. 146806



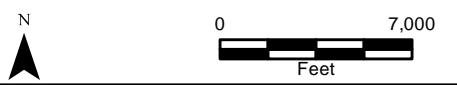


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**Explanation**

- Tetrachloroethylene (PCE) concentration**
- 0.5 - 5 µg/L
  - 5 - 50 µg/L
  - 50 - 100 µg/L
  - ≥ 100 µg/L
- Tetrachloroethylene (PCE) contours**
- Tetrachloroethylene (PCE) contours
  - Tetrachloroethylene (PCE) contours - Inferred
  - Tetrachloroethylene (PCE) contours - Inferred through Fault Zone
- Monitoring Wells**
- Monitoring Wells
- Production Wells by Wellfield**
- Erwin
  - Headworks
  - North Hollywood
  - Pollock
  - Rinaldi-Toluca
  - Tujunga
  - Verdugo
  - Whitnall
  - Other Wells
- Extraction Remediation Wells by Wellfield**
- Burbank OU
  - Glendale OU
  - North Hollywood OU
- Other Features**
- Faults
  - River/Stream/Drainage
  - Spreading Grounds
  - Landfills



**NOTES:**

- Data used in contouring includes GIS 2012/2013 and 2014 sampling results, 2014 LADWP monthly production well sampling results, and concentration values provided by the USEPA from the 2012 through the 2014 monitoring years.
- Data from the USEPA and LADWP monthly monitoring was not quality checked or otherwise validated prior to use.
- Groundwater contours are based on available water level data from the Fall 2013 monitoring events performed by the USEPA and LADWP.
- In areas where multiple wells are present at the same location, the maximum deep and shallow concentration was used in the development of the deep and shallow contours.
- Shallow wells are generally within 50 feet of the water table and/or located with the hydrostratigraphic Layer 1-2a (as classified in the Hydrogeologic Conceptual Model HCMSM). Deep wells are generally below this zone at some depth (within the hydrostratigraphic Layers 2-4). Data was excluded from contouring if screen intervals could not be verified.

**FAULT REFERENCES:**

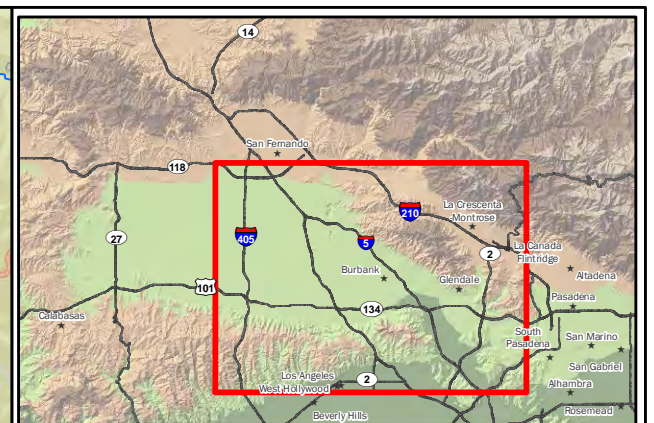
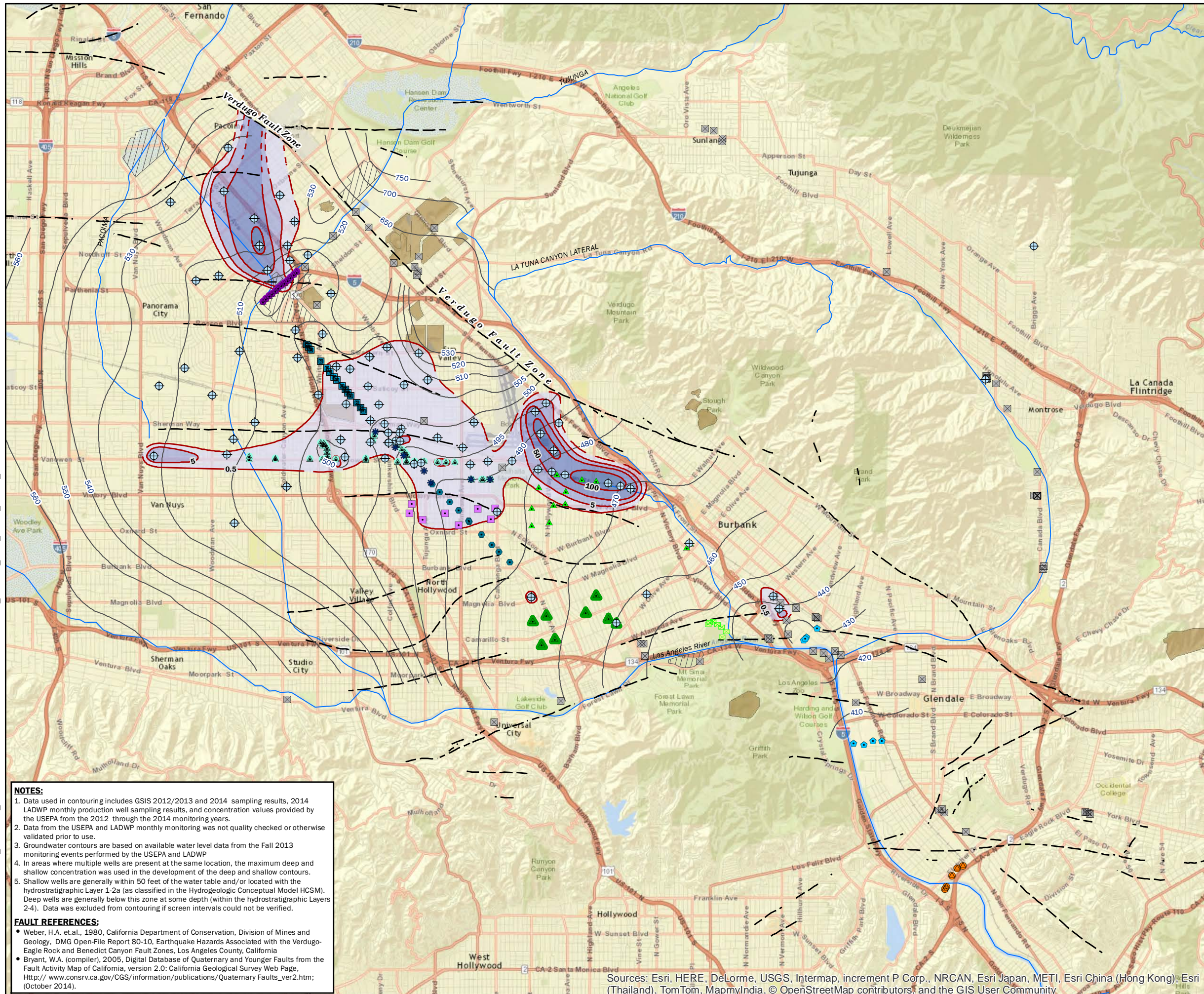
- Weber, H.A. et al., 1980, California Department of Conservation, Division of Mines and Geology, DMG Open-File Report 80-10, Earthquake Hazards Associated with the Verdugo-Eagle Rock and Benedict Canyon Fault Zones, Los Angeles County, California
- Bryant, W.A. (compiler), 2005, Digital Database of Quaternary and Younger Faults from the Fault Activity Map of California, version 2.0: California Geological Survey Web Page, [http://www.consrv.ca.gov/CGS/information/publications/Quaternary\\_Faults\\_ver2.htm](http://www.consrv.ca.gov/CGS/information/publications/Quaternary_Faults_ver2.htm); (October 2014).

**FIGURE 4-6a**  
**TETRACHLOROETHYLENE (PCE) ISOCONCENTRATION**  
**SHALLOW GROUNDWATER - 2014**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

By: Seeno/Crawford | Date: 2-8-2015 | Project No. 146806

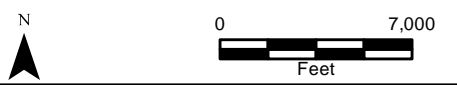


Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community



**Explanation**

- Tetrachloroethylene (PCE) concentration**
- 0.5 - 5 µg/L
  - 5 - 50 µg/L
  - 50 - 100 µg/L
  - 100 - 1000 µg/L
  - ≥ 1000 µg/L
- Tetrachloroethylene (PCE) contours  
 - - Tetrachloroethylene (PCE) contours - Inferred  
 - - - Tetrachloroethylene (PCE) contours - Inferred through Fault Zone
- ⊕ Monitoring Wells
- Production Wells by Wellfield**
- Erwin
  - Headworks
  - North Hollywood
  - Pollock
  - Rinaldi-Toluca
  - Tujunga
  - Verdugo
  - Whitnall
  - Other Wells
- Extraction Remediation Wells by Wellfield**
- Burbank OU
  - Glendale OU
  - North Hollywood OU
- Other Features**
- Groundwater Elevation Contours (2013; ft)
  - Faults
  - River/Stream/Drainage
  - Spreading Grounds
  - Landfills



**NOTES:**

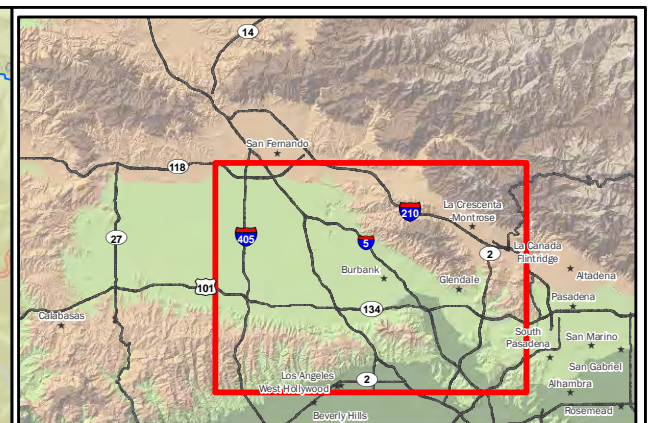
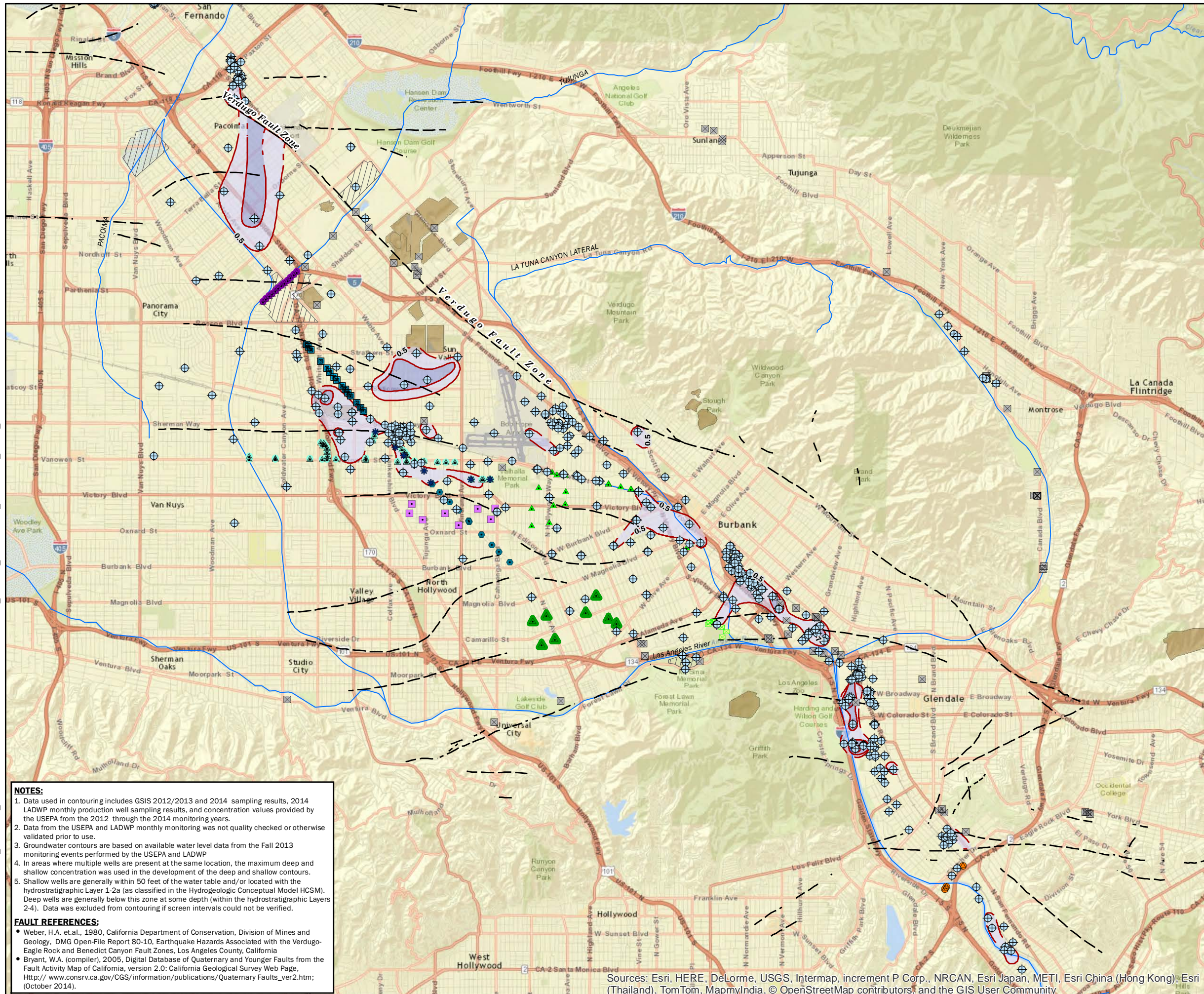
- Data used in contouring includes GIS 2012/2013 and 2014 sampling results, 2014 LADWP monthly production well sampling results, and concentration values provided by the USEPA from the 2012 through the 2014 monitoring years.
- Data from the USEPA and LADWP monthly monitoring was not quality checked or otherwise validated prior to use.
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**FAULT REFERENCES:**

- Weber, H.A. et al., 1980, California Department of Conservation, Division of Mines and Geology, DMG Open-File Report 80-10, Earthquake Hazards Associated with the Verdugo-Eagle Rock and Benedict Canyon Fault Zones, Los Angeles County, California
- Bryant, W.A. (compiler), 2005, Digital Database of Quaternary and Younger Faults from the Fault Activity Map of California, version 2.0: California Geological Survey Web Page, [http://www.consrv.ca.gov/CGS/information/publications/Quaternary\\_Faults\\_ver2.htm](http://www.consrv.ca.gov/CGS/information/publications/Quaternary_Faults_ver2.htm); (October 2014).

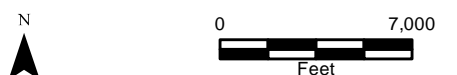
**FIGURE 4-6b**  
**TETRACHLOROETHYLENE (PCE) ISOCONCENTRATION**  
**DEEP GROUNDWATER - 2014**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

By: Seeno/Crawford | Date: 2-8-2015 | Project No. 146806



**Explanation**

- CIS-1,2-Dichloroethylene concentration**
- 0.5 - 7 µg/L
  - 7 - 50 µg/L
  - 50 - 100 µg/L
  - ≥ 100 µg/L
- CIS-1,2-Dichloroethylene contours**
- CIS-1,2-Dichloroethylene contours
  - - - CIS-1,2-Dichloroethylene contours - Inferred
  - - - CIS-1,2-Dichloroethylene contours - Inferred through Fault Zone
- Monitoring Wells**
- ⊕ Monitoring Wells
- Production Wells by Wellfield**
- Erwin
  - Headworks
  - ▲ North Hollywood
  - Pollock
  - Rinaldi-Toluca
  - Tujunga
  - ▲ Verdugo
  - Whitnall
  - ⊕ Other Wells
- Extraction Remediation Wells by Wellfield**
- ▲ Burbank OU
  - Glendale OU
  - ★ North Hollywood OU
- Other Features**
- - - Faults
  - River/Stream/Drainage
  - ▨ Spreading Grounds
  - Landfills



**NOTES:**

1. Data used in contouring includes GIS 2012/2013 and 2014 sampling results, 2014 LADWP monthly production well sampling results, and concentration values provided by the USEPA from the 2012 through the 2014 monitoring years.
2. Data from the USEPA and LADWP monthly monitoring was not quality checked or otherwise validated prior to use.
3. Groundwater contours are based on available water level data from the Fall 2013 monitoring events performed by the USEPA and LADWP.
4. In areas where multiple wells are present at the same location, the maximum deep and shallow concentration was used in the development of the deep and shallow contours.
5. Shallow wells are generally within 50 feet of the water table and/or located with the hydrostratigraphic Layer 1-2a (as classified in the Hydrogeologic Conceptual Model HCMSM). Deep wells are generally below this zone at some depth (within the hydrostratigraphic Layers 2-4). Data was excluded from contouring if screen intervals could not be verified.

**FAULT REFERENCES:**

- Weber, H.A. et al., 1980, California Department of Conservation, Division of Mines and Geology, DMG Open-File Report 80-10, Earthquake Hazards Associated with the Verdugo-Eagle Rock and Benedict Canyon Fault Zones, Los Angeles County, California
- Bryant, W.A. (compiler), 2005, Digital Database of Quaternary and Younger Faults from the Fault Activity Map of California, version 2.0: California Geological Survey Web Page, [http://www.consrv.ca.gov/CGS/information/publications/Quaternary\\_Faults\\_ver2.htm](http://www.consrv.ca.gov/CGS/information/publications/Quaternary_Faults_ver2.htm); (October 2014).

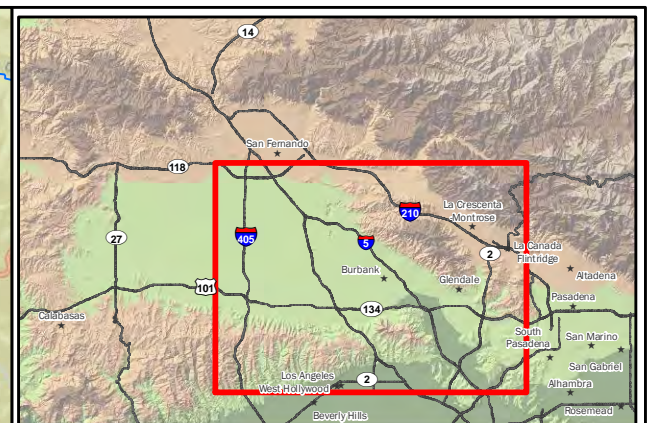
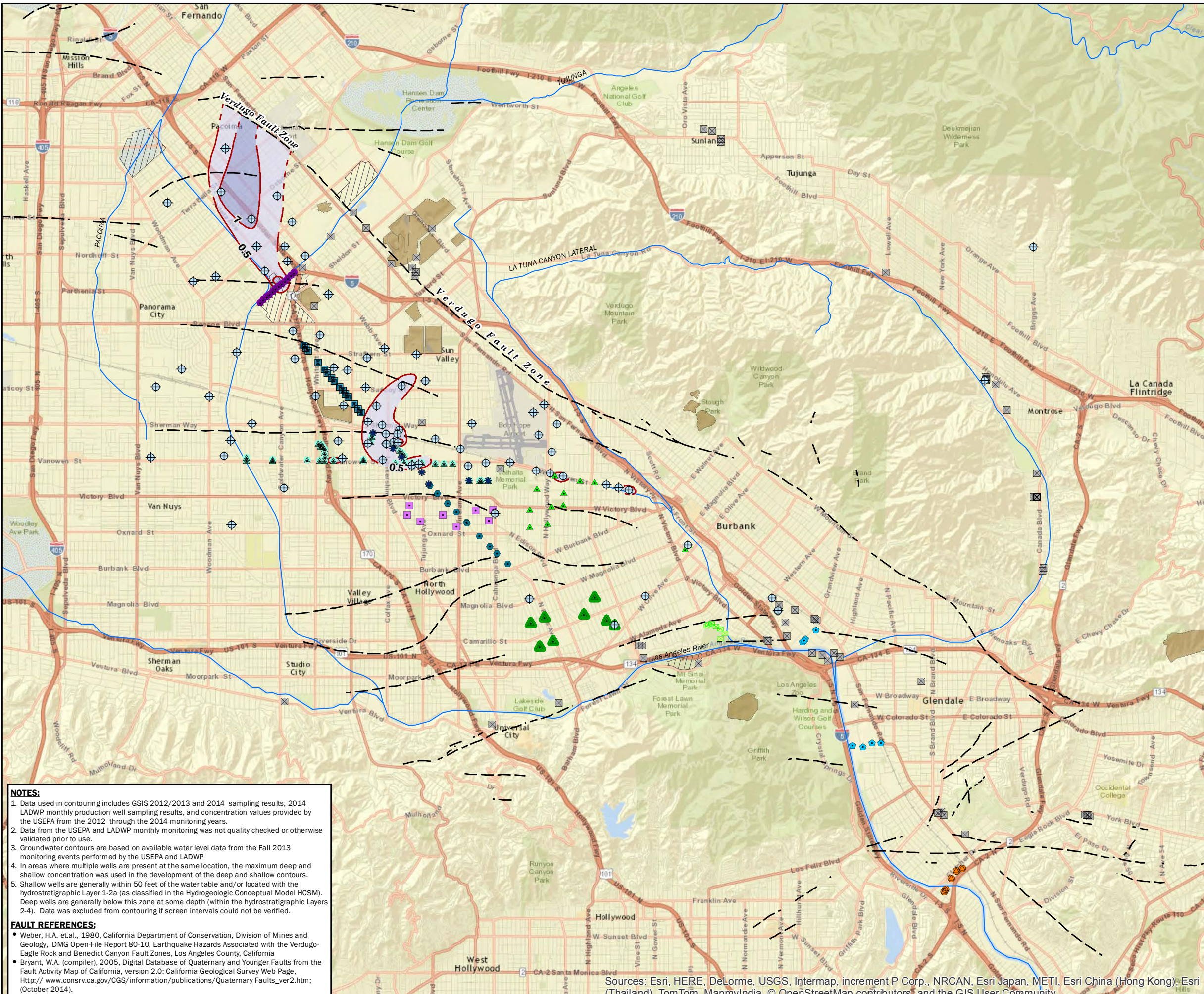
**FIGURE 4-7a**  
**CIS-1,2-DICHLOROETHYLENE ISOCONCENTRATION**  
**SHALLOW GROUNDWATER - 2014**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

By: Seeno/Crawford | Date: 2-8-2015 | Project No. 146806



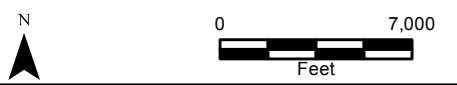
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Document Path: \\BCSAC01P-IBC\_LAXIGIS\_MAPDOCS\WORKING\CONTOURING\FIG4-07b\_LADWP\_CIS-11-DCE\_DEEP\_11x17\_2010208.mxd



**Explanation**

- CIS-1,2-Dichloroethylene concentration**
- 0.5 - 7 µg/L
  - ≥ 7 µg/L
- CIS-1,2-Dichloroethylene contours**
- CIS-1,2-Dichloroethylene contours - Inferred
  - CIS-1,2-Dichloroethylene contours - Inferred through Fault Zone
- Monitoring Wells**
- Monitoring Wells
- Production Wells by Wellfield**
- Erwin
  - Headworks
  - North Hollywood
  - Pollock
  - Rinaldi-Toluca
  - Tujunga
  - Verdugo
  - Whitnall
  - Other Wells
- Extraction Remediation Wells by Wellfield**
- Burbank OU
  - Glendale OU
  - North Hollywood OU
- Other Features**
- Faults
  - River/Stream/Drainage
  - Spreading Grounds
  - Landfills



**NOTES:**

- Data used in contouring includes GIS 2012/2013 and 2014 sampling results, 2014 LADWP monthly production well sampling results, and concentration values provided by the USEPA from the 2012 through the 2014 monitoring years.
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**FAULT REFERENCES:**

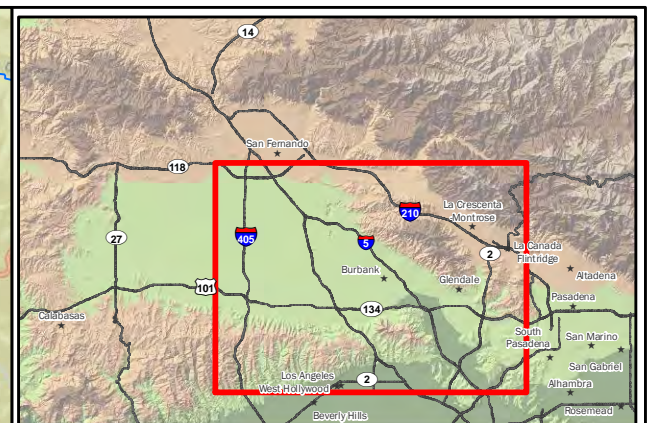
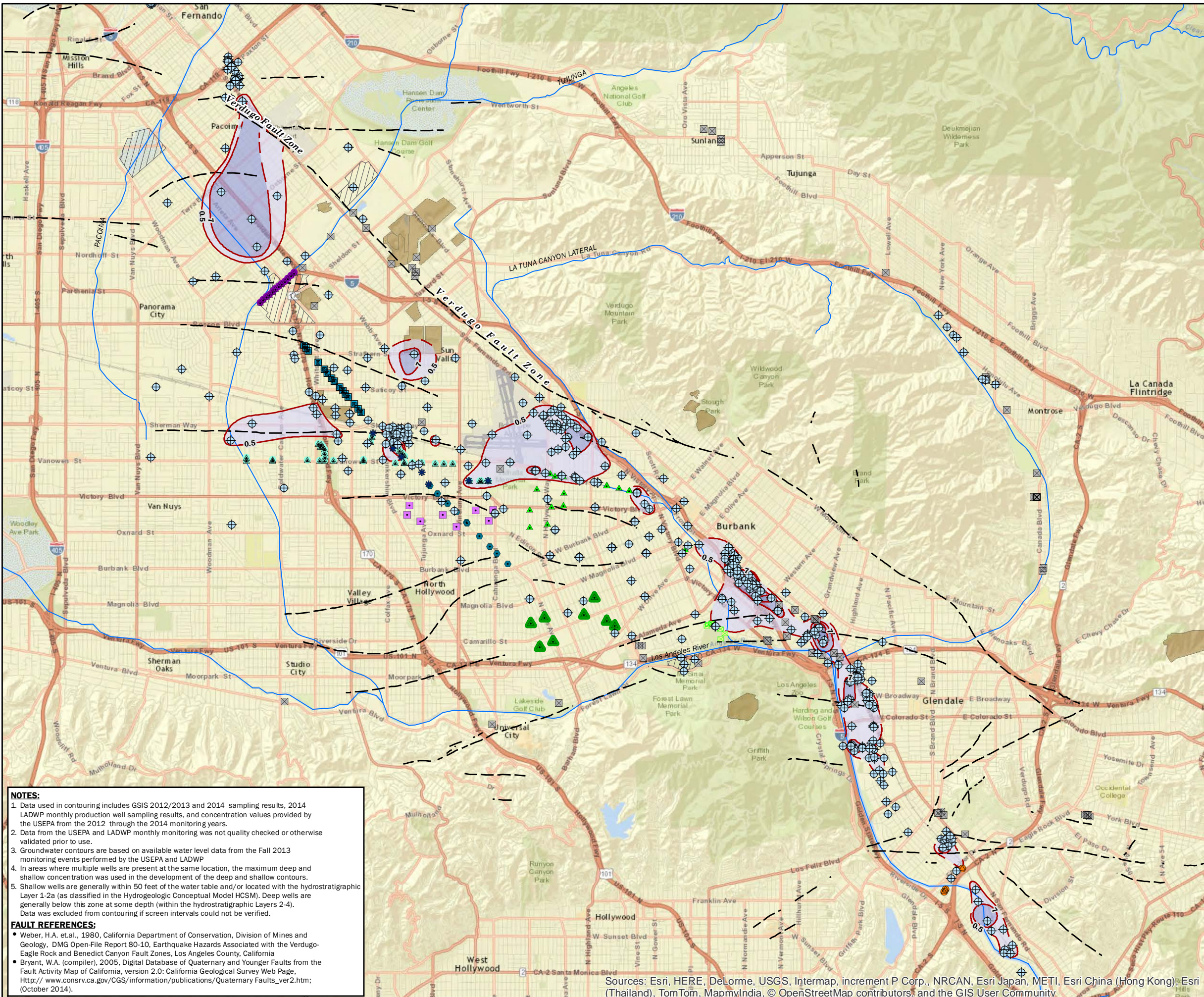
- Weber, H.A. et al., 1980, California Department of Conservation, Division of Mines and Geology, DMG Open-File Report 80-10, Earthquake Hazards Associated with the Verdugo-Eagle Rock and Benedict Canyon Fault Zones, Los Angeles County, California
- Bryant, W.A. (compiler), 2005, Digital Database of Quaternary and Younger Faults from the Fault Activity Map of California, version 2.0: California Geological Survey Web Page, [http://www.consrv.ca.gov/CGS/information/publications/Quaternary\\_Faults\\_ver2.htm](http://www.consrv.ca.gov/CGS/information/publications/Quaternary_Faults_ver2.htm); (October 2014).

**FIGURE 4-7b**  
**CIS-1,2-DICHLOROETHYLENE ISOCONCENTRATION**  
**DEEP GROUNDWATER - 2014**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

By: Seeno/Crawford | Date: 2-8-2015 | Project No. 146806

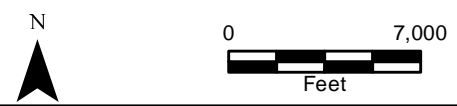


Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community



**Explanation**

- 1,1 Dichloroethylene concentration**
- 0.5 - 7 µg/L
  - 7 - 50 µg/L
  - 50 - 100 µg/L
  - ≥ 100 µg/L
- 1,1 Dichloroethylene contours
- - - 1,1 Dichloroethylene contours - Inferred
- - - 1,1 Dichloroethylene contours - Inferred through Fault Zone
- ⊕ Monitoring Wells
- Production Wells by Wellfield**
- Erwin
  - Headworks
  - North Hollywood
  - Pollock
  - Rinaldi-Toluca
  - Tujunga
  - Verdugo
  - Whitnall
  - Other Wells
- Extraction Remediation Wells by Wellfield**
- Burbank OU
  - Glendale OU
  - North Hollywood OU
- Other Features**
- Faults
  - River/Stream/Drainage
  - Spreading Grounds
  - Landfills



**NOTES:**

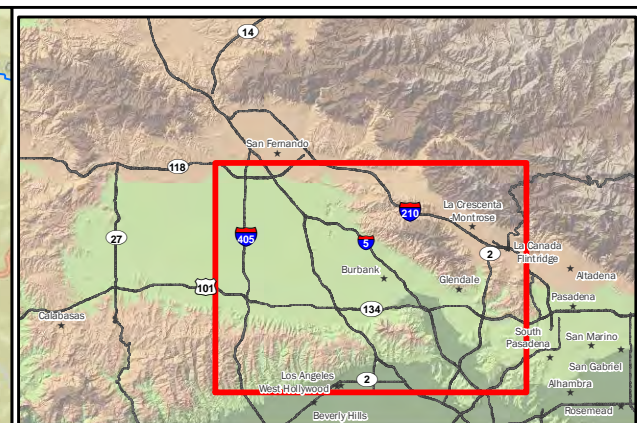
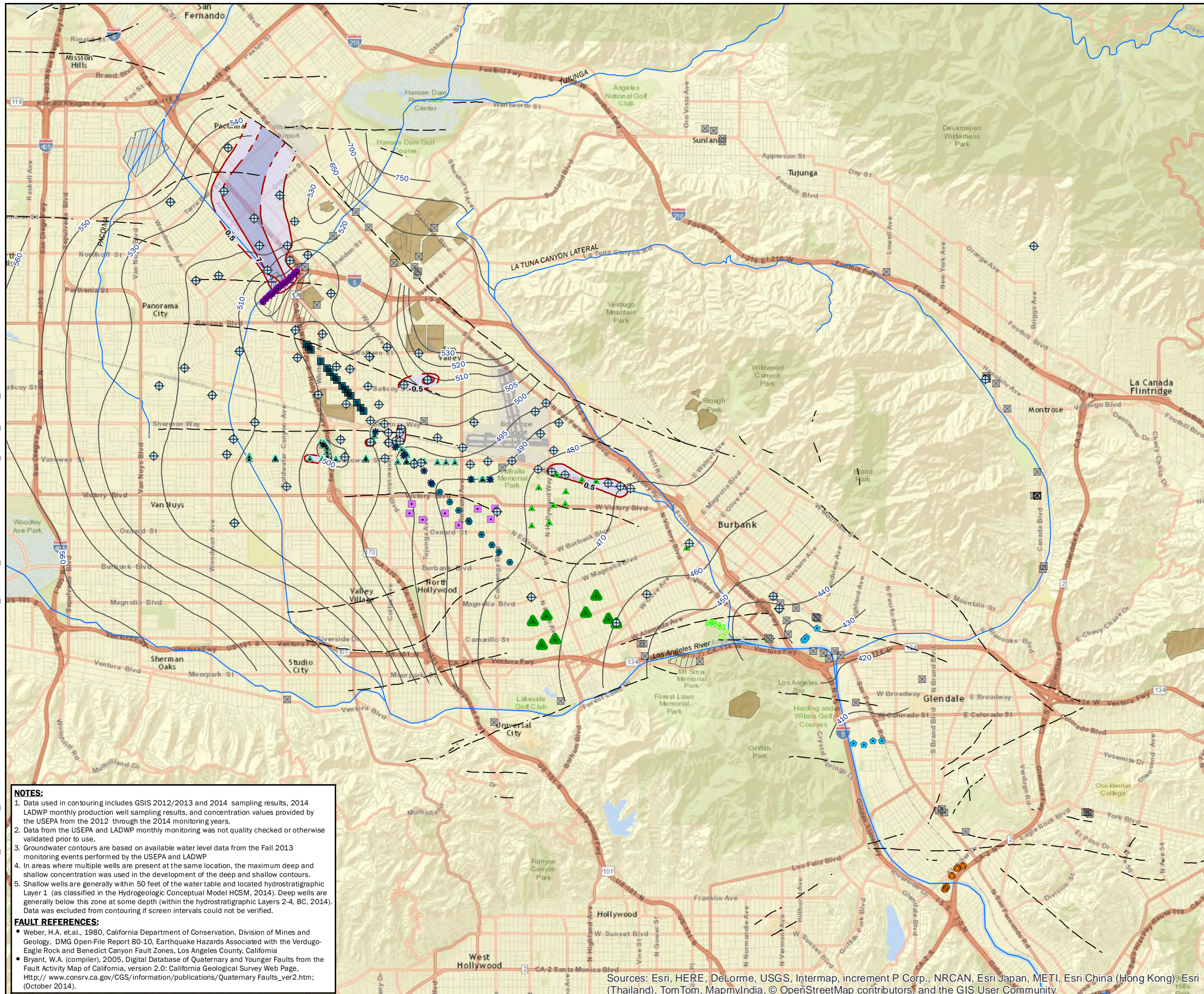
1. Data used in contouring includes GISIS 2012/2013 and 2014 sampling results, 2014 LADWP monthly production well sampling results, and concentration values provided by the USEPA from the 2012 through the 2014 monitoring years.
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5. Shallow wells are generally within 50 feet of the water table and/or located with the hydrostratigraphic Layer 1-2a (as classified in the Hydrogeologic Conceptual Model HCSM). Deep wells are generally below this zone at some depth (within the hydrostratigraphic Layers 2-4). Data was excluded from contouring if screen intervals could not be verified.

**FAULT REFERENCES:**

- Weber, H.A. et al., 1980, California Department of Conservation, Division of Mines and Geology, DMG Open-File Report 80-10, Earthquake Hazards Associated with the Verdugo-Eagle Rock and Benedict Canyon Fault Zones, Los Angeles County, California
- Bryant, W.A. (compiler), 2005, Digital Database of Quaternary and Younger Faults from the Fault Activity Map of California, version 2.0: California Geological Survey Web Page, [http://www.consrv.ca.gov/CGS/information/publications/Quaternary\\_Faults\\_ver2.htm](http://www.consrv.ca.gov/CGS/information/publications/Quaternary_Faults_ver2.htm); (October 2014).

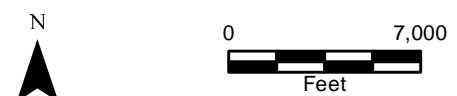
**FIGURE 4-8a**  
**1,1-DICHLOROETHYLENE ISOCONCENTRATION**  
**SHALLOW GROUNDWATER - 2014**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

By: Seeno/Crawford | Date: 2-8-2015 | Project No. 146806



**Explanation**

- 1,1 Dichloroethene concentration**
- 0.5 - 7 µg/L
  - ≥ 7 µg/L
- 1,1 Dichloroethene contours**
- 1,1 Dichloroethene contours
  - 1,1 Dichloroethene contours - Inferred
  - 1,1 Dichloroethene contours - Inferred through Fault Zone
- Monitoring Wells**
- Monitoring Wells
- Production Wells by Wellfield**
- Erwin
  - Headworks
  - North Hollywood
  - Pollock
  - Rinaldi-Toluca
  - Tujunga
  - Verdugo
  - Whitnall
  - Other Wells
- Extraction Remediation Wells by Wellfield**
- Burbank OU
  - Glendale OU
  - North Hollywood OU
- Other Features**
- Groundwater Elevation Contours (2013; ft)
  - Faults
  - River/Stream/Drainage
  - Spreading Grounds
  - Landfills



**NOTES:**

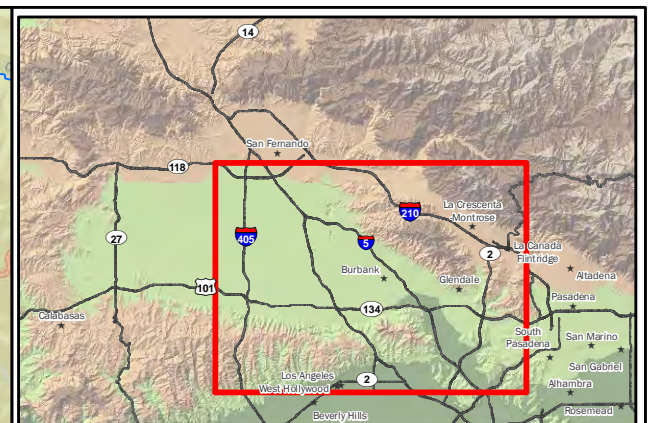
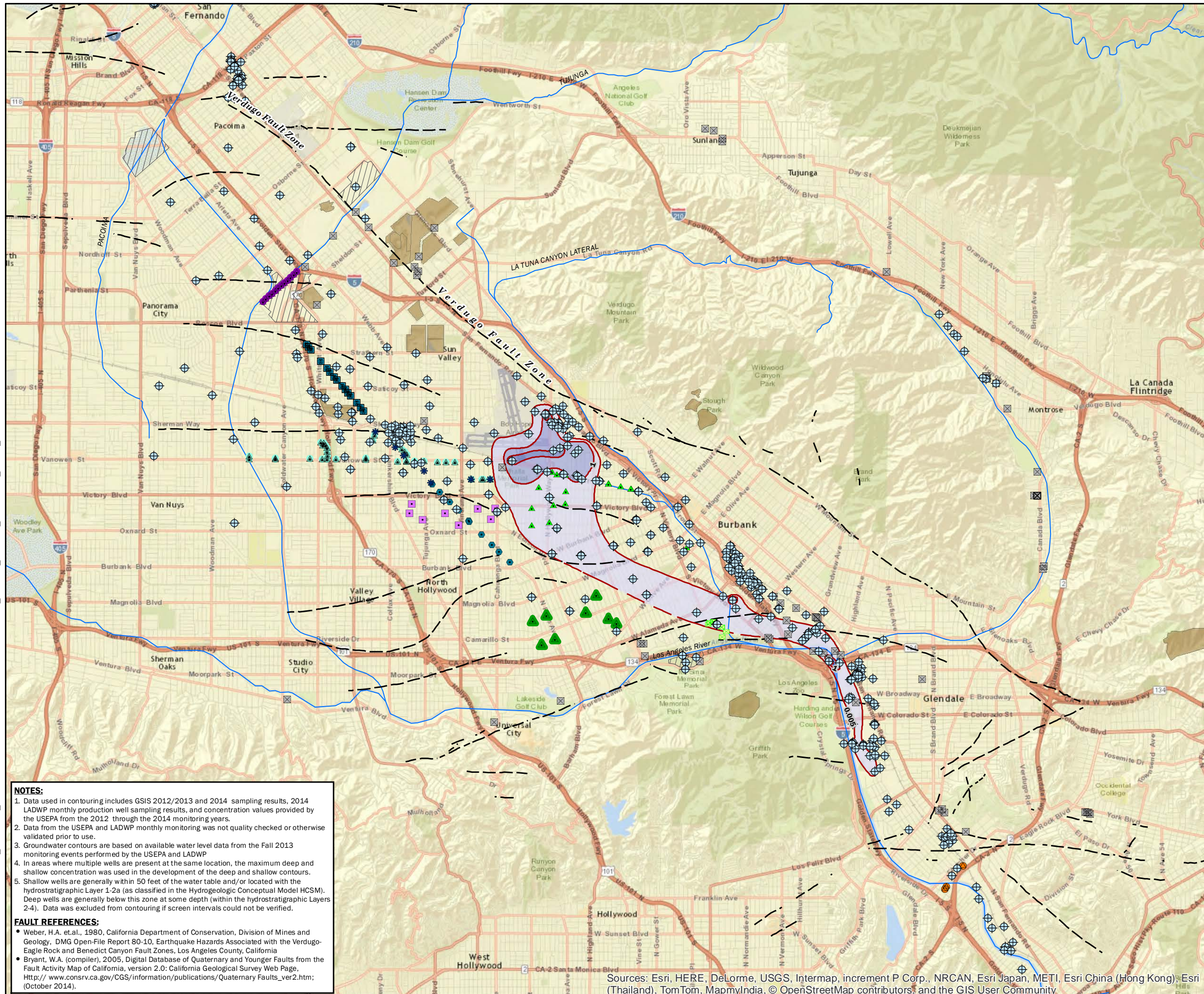
1. Data used in contouring includes GSI 2012/2013 and 2014 sampling results, 2014 LADWP monthly production well sampling results, and concentration values provided by the USEPA from the 2012 through the 2014 monitoring years.
2. Data from the USEPA and LADWP monthly monitoring was not quality checked or otherwise validated prior to use.
3. Groundwater contours are based on available water level data from the Fall 2013 monitoring events performed by the USEPA and LADWP
4. In areas where multiple wells are present at the same location, the maximum deep and shallow concentration was used in the development of the deep and shallow contours.
5. Shallow wells are generally within 50 feet of the water table and located hydrostratigraphic Layer 1 (as classified in the Hydrogeologic Conceptual Model HCSM, 2014). Deep wells are generally below this zone at some depth (within the hydrostratigraphic Layers 2-4, BC, 2014). Data was excluded from contouring if screen intervals could not be verified.

**FAULT REFERENCES:**

- Weber, H.A. et al., 1980, California Department of Conservation, Division of Mines and Geology, DMG Open-File Report 80-10, Earthquake Hazards Associated with the Verdugo-Eagle Rock and Benedict Canyon Fault Zones, Los Angeles County, California
- Bryant, W.A. (compiler), 2005, Digital Database of Quaternary and Younger Faults from the Fault Activity Map of California, version 2.0: California Geological Survey Web Page, [http://www.consrv.ca.gov/CGS/information/publications/Quaternary\\_Faults\\_ver2.htm](http://www.consrv.ca.gov/CGS/information/publications/Quaternary_Faults_ver2.htm); (October 2014).

**FIGURE 4-8b**  
**1,1-DICHLOROETHYLENE ISOCONCENTRATION**  
**DEEP GROUNDWATER - 2014**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

By: Seeno/Crawford | Date: 2-8-2015 | Project No. 146806



**Explanation**

**1,2,3-Trichloropropane concentration**

- 0.005 - 1 µg/L
- 1 - 10 µg/L
- ≥ 10 µg/L

— 1,2,3-Trichloropropane contours

- - - 1,2,3-Trichloropropane contours - Inferred

⊕ Monitoring Wells

**Production Wells by Wellfield**

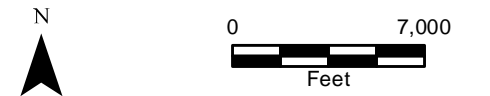
- Erwin
- Headworks
- North Hollywood
- Pollock
- Rinaldi-Toluca
- Tujunga
- Verdugo
- Whitnall
- Other Wells

**Extraction Remediation Wells by Wellfield**

- Burbank OU
- Glendale OU
- North Hollywood OU

**Other Features**

- Faults
- River/Stream/Drainage
- Spreading Grounds
- Landfills



**NOTES:**

- Data used in contouring includes GIS 2012/2013 and 2014 sampling results, 2014 LADWP monthly production well sampling results, and concentration values provided by the USEPA from the 2012 through the 2014 monitoring years.
- Data from the USEPA and LADWP monthly monitoring was not quality checked or otherwise validated prior to use.
- Groundwater contours are based on available water level data from the Fall 2013 monitoring events performed by the USEPA and LADWP.
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- Shallow wells are generally within 50 feet of the water table and/or located with the hydrostratigraphic Layer 1-2a (as classified in the Hydrogeologic Conceptual Model HCMSM). Deep wells are generally below this zone at some depth (within the hydrostratigraphic Layers 2-4). Data was excluded from contouring if screen intervals could not be verified.

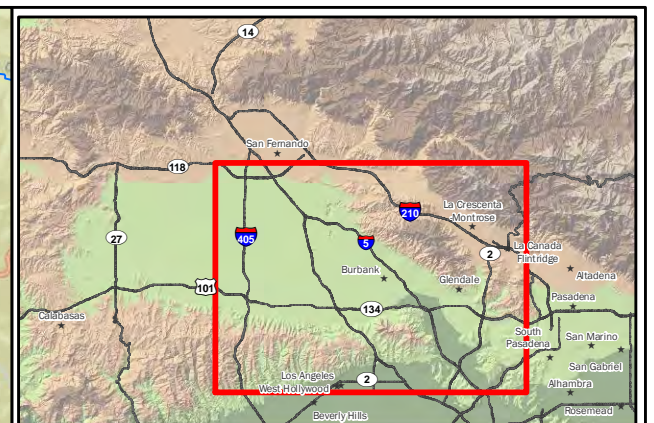
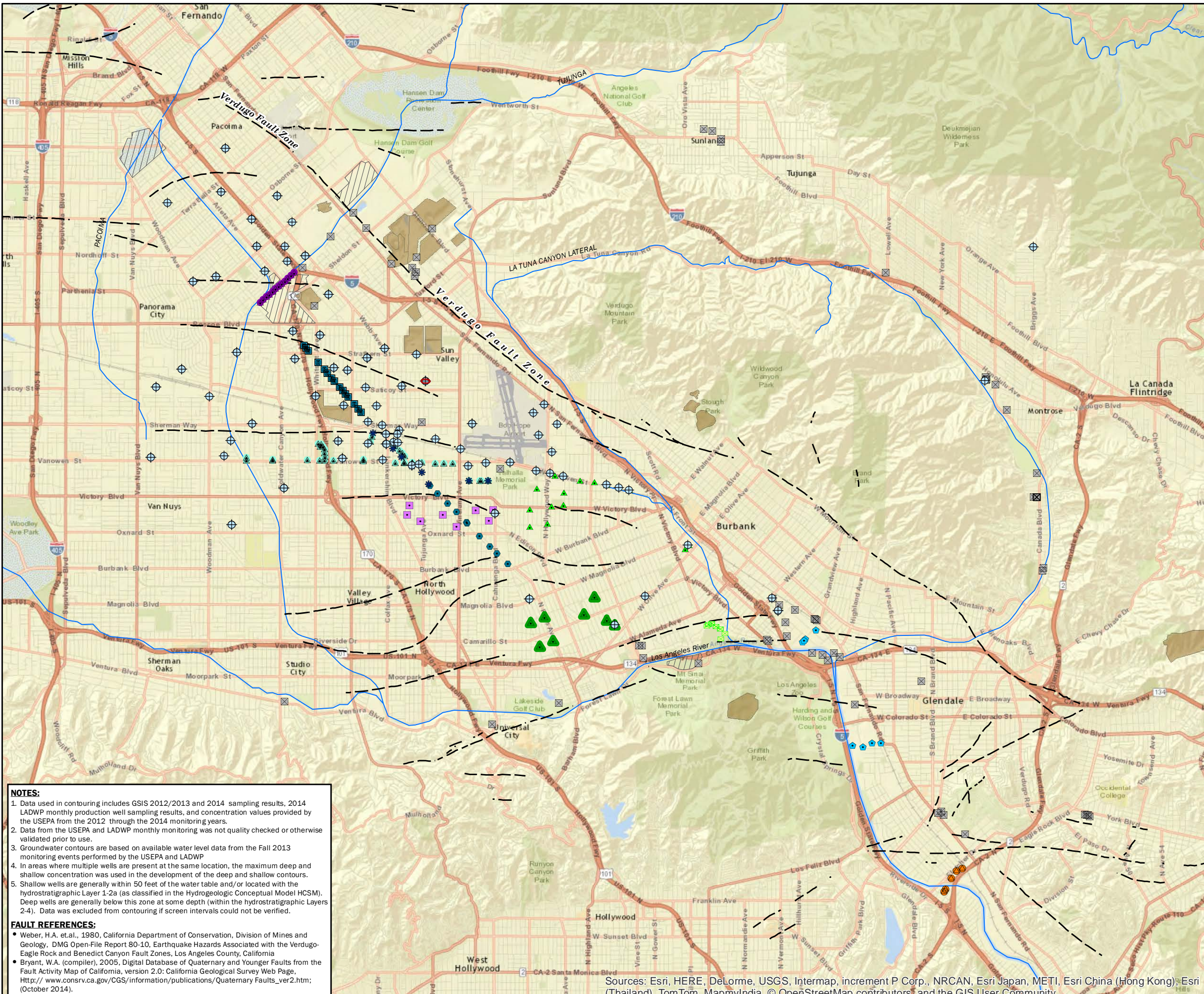
**FAULT REFERENCES:**

- Weber, H.A. et al., 1980, California Department of Conservation, Division of Mines and Geology, DMG Open-File Report 80-10, Earthquake Hazards Associated with the Verdugo-Eagle Rock and Benedict Canyon Fault Zones, Los Angeles County, California
- Bryant, W.A. (compiler), 2005, Digital Database of Quaternary and Younger Faults from the Fault Activity Map of California, version 2.0: California Geological Survey Web Page, [http://www.consrv.ca.gov/CGS/information/publications/Quaternary\\_Faults\\_ver2.htm](http://www.consrv.ca.gov/CGS/information/publications/Quaternary_Faults_ver2.htm); (October 2014).

**FIGURE 4-9a**  
**1,2,3-TRICHLOROPROPANE ISOCONCENTRATION**  
**SHALLOW GROUNDWATER - 2014**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

By: Seeno/Crawford | Date: 2-8-2015 | Project No. 146806

Document Path: \\BCSAC01P-IBC\_LAX\GIS\_MAPDOCS\WORKING\CONTOURING\FIG4-09b\_LADWP\_TCP123\_DEEP\_11x17\_20150208.mxd



**Explanation**

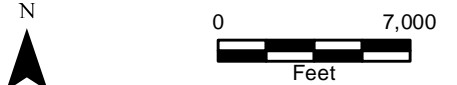
- 1,2,3-Trichloropropane concentration**
- ≥ 0.005 µg/L
- 1,2,3-Trichloropropane contours
- Monitoring Wells
- Production Wells by Wellfield**
- Erwin
- Headworks
- North Hollywood
- Pollock
- Rinaldi-Toluca
- Tujunga
- Verdugo
- Whitnall
- Other Wells
- Extraction Remediation Wells by Wellfield**
- Burbank OU
- Glendale OU
- North Hollywood OU
- Other Features**
- Faults
- River/Stream/Drainage
- Spreading Grounds
- Landfills

**NOTES:**

- Data used in contouring includes GIS 2012/2013 and 2014 sampling results, 2014 LADWP monthly production well sampling results, and concentration values provided by the USEPA from the 2012 through the 2014 monitoring years.
- Data from the USEPA and LADWP monthly monitoring was not quality checked or otherwise validated prior to use.
- Groundwater contours are based on available water level data from the Fall 2013 monitoring events performed by the USEPA and LADWP
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- Shallow wells are generally within 50 feet of the water table and/or located with the hydrostratigraphic Layer 1-2a (as classified in the Hydrogeologic Conceptual Model HCMSM). Deep wells are generally below this zone at some depth (within the hydrostratigraphic Layers 2-4). Data was excluded from contouring if screen intervals could not be verified.

**FAULT REFERENCES:**

- Weber, H.A. et al., 1980, California Department of Conservation, Division of Mines and Geology, DMG Open-File Report 80-10, Earthquake Hazards Associated with the Verdugo-Eagle Rock and Benedict Canyon Fault Zones, Los Angeles County, California
- Bryant, W.A. (compiler), 2005, Digital Database of Quaternary and Younger Faults from the Fault Activity Map of California, version 2.0: California Geological Survey Web Page, [http://www.consrv.ca.gov/CGS/information/publications/Quaternary\\_Faults\\_ver2.htm](http://www.consrv.ca.gov/CGS/information/publications/Quaternary_Faults_ver2.htm); (October 2014).



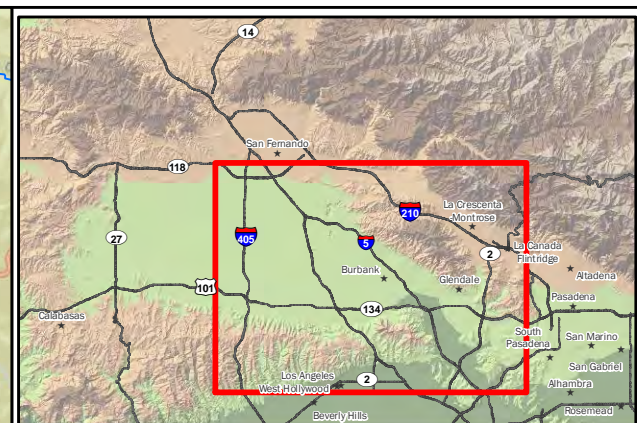
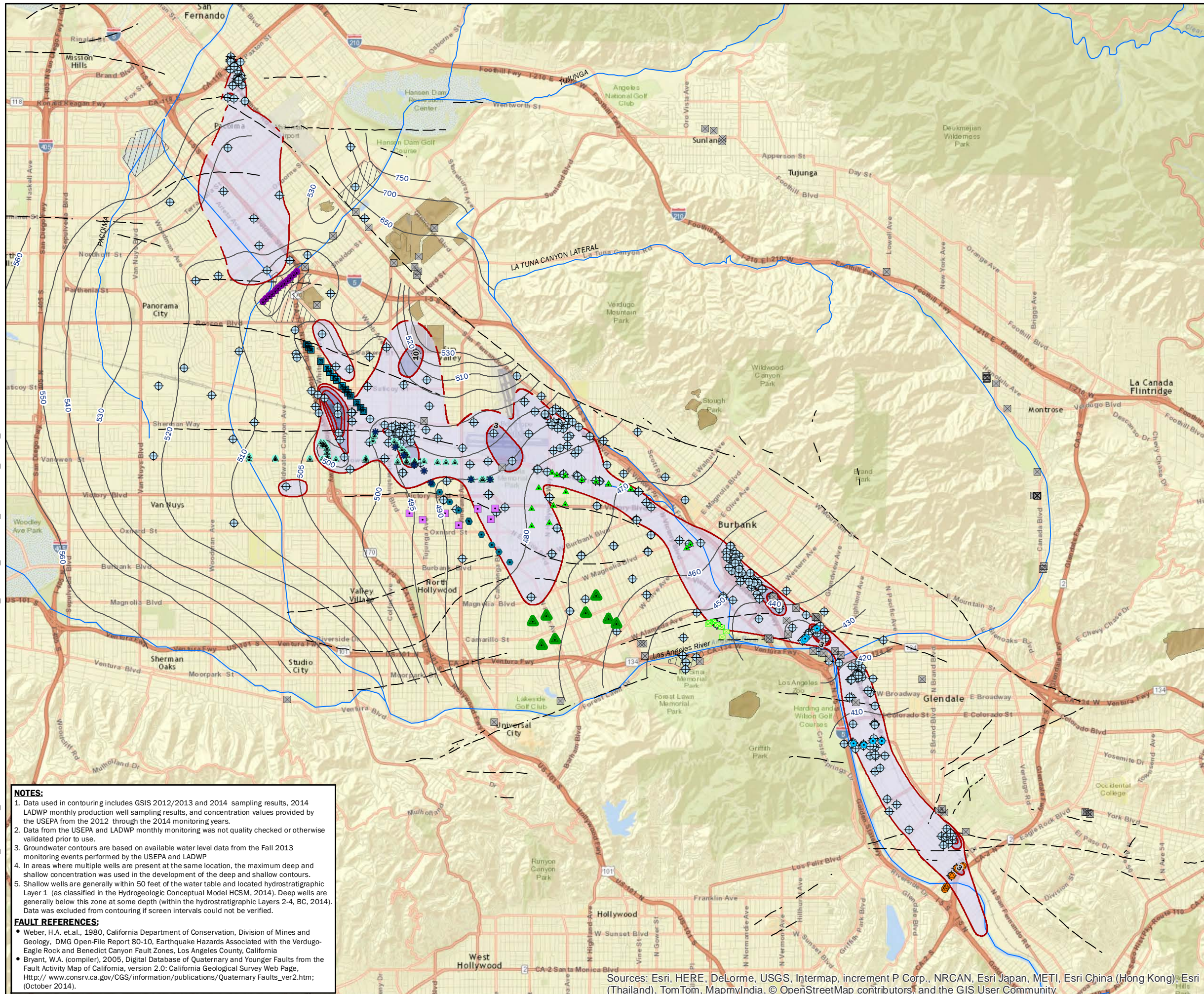
**FIGURE 4-9b**  
**1,2,3-TRICHLOROPROPANE ISOCONCENTRATION**  
**DEEP GROUNDWATER - 2014**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

By: Seeno/Crawford | Date: 2-8-2015 | Project No. 146806



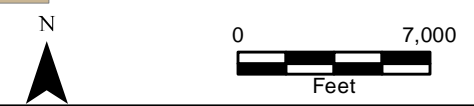
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community





**Explanation**

- 1,4-Dioxane concentration**
- 0.1 - 3 µg/L
  - 3 - 10 µg/L
  - 10 - 100 µg/L
  - ≥ 100 µg/L
- 1,4-Dioxane contours**
- 1,4-Dioxane contours
  - 1,4-Dioxane contours - Inferred
  - 1,4-Dioxane contours - Inferred through Fault Zone
- Monitoring Wells**
- Monitoring Wells
- Production Wells by Wellfield**
- Erwin
  - Headworks
  - North Hollywood
  - Pollock
  - Rinaldi-Toluca
  - Tujunga
  - Verdugo
  - Whitnall
  - Other Wells
- Extraction Remediation Wells by Wellfield**
- Burbank OU
  - Glendale OU
  - North Hollywood OU
- Other Features**
- Groundwater Elevation Contours (2013; ft)
  - Faults
  - River/Stream/Drainage
  - Spreading Grounds
  - Landfills



**NOTES:**

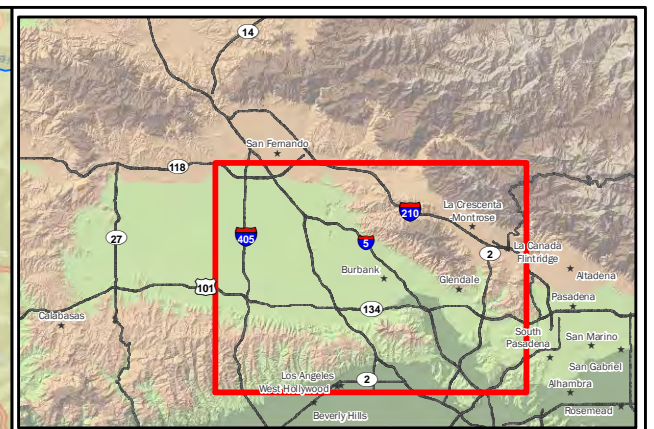
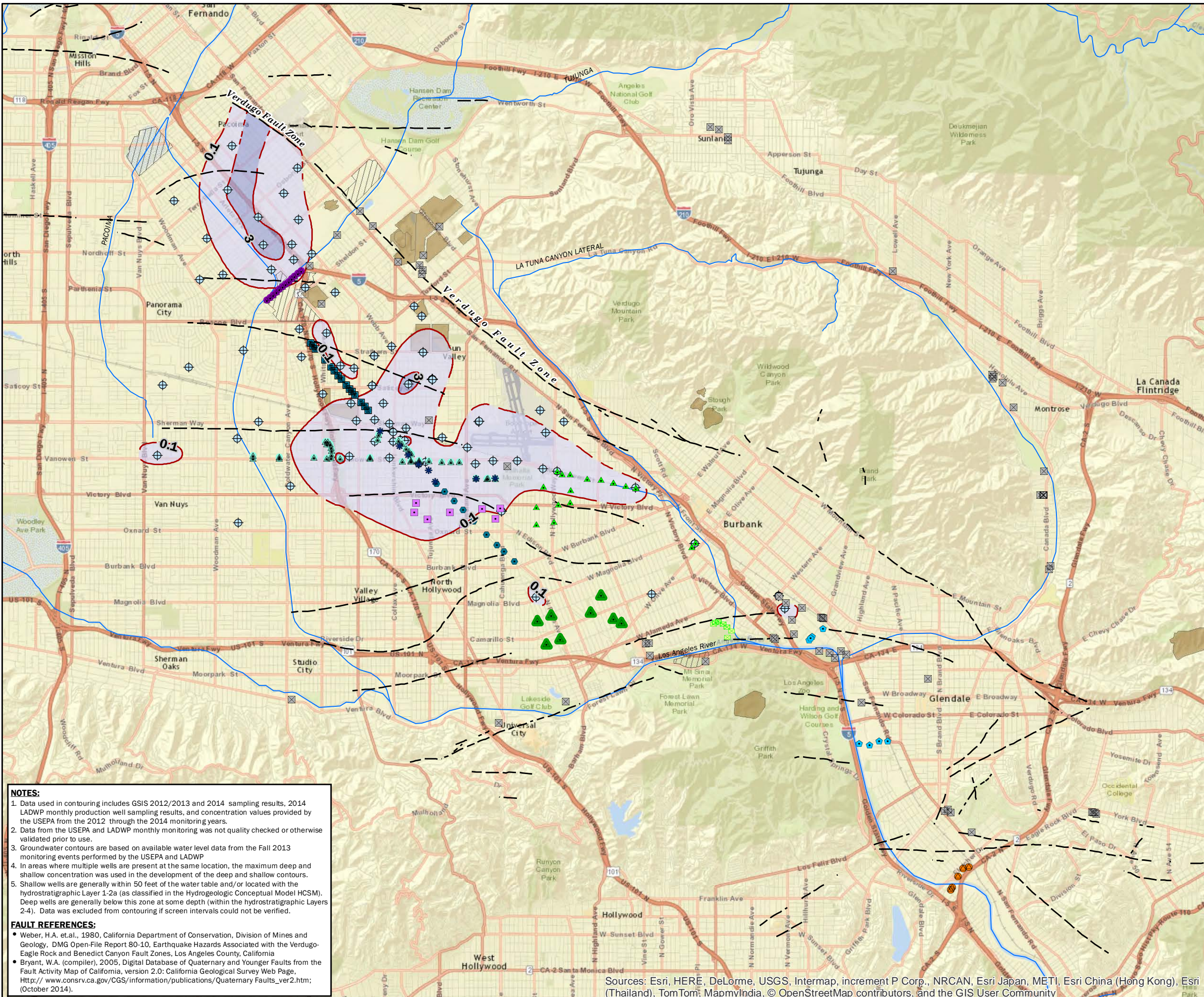
1. Data used in contouring includes GSI 2012/2013 and 2014 sampling results, 2014 LADWP monthly production well sampling results, and concentration values provided by the USEPA from the 2012 through the 2014 monitoring years.
2. Data from the USEPA and LADWP monthly monitoring was not quality checked or otherwise validated prior to use.
3. Groundwater contours are based on available water level data from the Fall 2013 monitoring events performed by the USEPA and LADWP.
4. In areas where multiple wells are present at the same location, the maximum deep and shallow concentration was used in the development of the deep and shallow contours.
5. Shallow wells are generally within 50 feet of the water table and located hydrostratigraphic Layer 1 (as classified in the Hydrogeologic Conceptual Model HCSM, 2014). Deep wells are generally below this zone at some depth (within the hydrostratigraphic Layers 2-4, BC, 2014). Data was excluded from contouring if screen intervals could not be verified.

**FAULT REFERENCES:**

- Weber, H.A. et al., 1980, California Department of Conservation, Division of Mines and Geology, DMG Open-File Report 80-10, Earthquake Hazards Associated with the Verdugo-Eagle Rock and Benedict Canyon Fault Zones, Los Angeles County, California
- Bryant, W.A. (compiler), 2005, Digital Database of Quaternary and Younger Faults from the Fault Activity Map of California, version 2.0: California Geological Survey Web Page, [http://www.consrv.ca.gov/CGS/information/publications/Quaternary\\_Faults\\_ver2.htm](http://www.consrv.ca.gov/CGS/information/publications/Quaternary_Faults_ver2.htm); (October 2014).

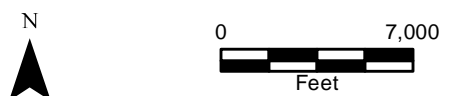
**FIGURE 4-10a**  
**1,4-DIOXANE ISOCONCENTRATION**  
**SHALLOW GROUNDWATER - 2014**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

By: Seeno/Crawford | Date: 2-8-2015 | Project No. 146806



**Explanation**

- 1,4-Dioxane concentration**
  - 0.1 - 3 µg/L
  - ≥ 3 µg/L
- 1,4-Dioxane contours
- 1,4-Dioxane contours - Inferred
- 1,4-Dioxane contours - Inferred through Fault Zone
- Monitoring Wells
- Production Wells by Wellfield**
  - Erwin
  - Headworks
  - North Hollywood
  - Pollock
  - Rinaldi Toluca
  - Tujunga
  - Verdugo
  - Whitnall
  - Other Wells
- Extraction Remediation Wells by Wellfield**
  - Burbank OU
  - Glendale OU
  - North Hollywood OU
- Other Features**
  - Faults
  - River/Stream/Drainage
  - Spreading Grounds
  - Landfills



**NOTES:**

1. Data used in contouring includes GIS 2012/2013 and 2014 sampling results, 2014 LADWP monthly production well sampling results, and concentration values provided by the USEPA from the 2012 through the 2014 monitoring years.
2. Data from the USEPA and LADWP monthly monitoring was not quality checked or otherwise validated prior to use.
3. Groundwater contours are based on available water level data from the Fall 2013 monitoring events performed by the USEPA and LADWP.
4. In areas where multiple wells are present at the same location, the maximum deep and shallow concentration was used in the development of the deep and shallow contours.
5. Shallow wells are generally within 50 feet of the water table and/or located with the hydrostratigraphic Layer 1-2a (as classified in the Hydrogeologic Conceptual Model HCMSM). Deep wells are generally below this zone at some depth (within the hydrostratigraphic Layers 2-4). Data was excluded from contouring if screen intervals could not be verified.

**FAULT REFERENCES:**

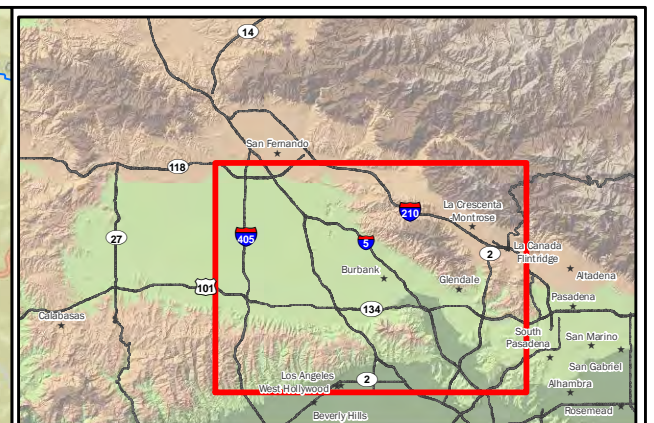
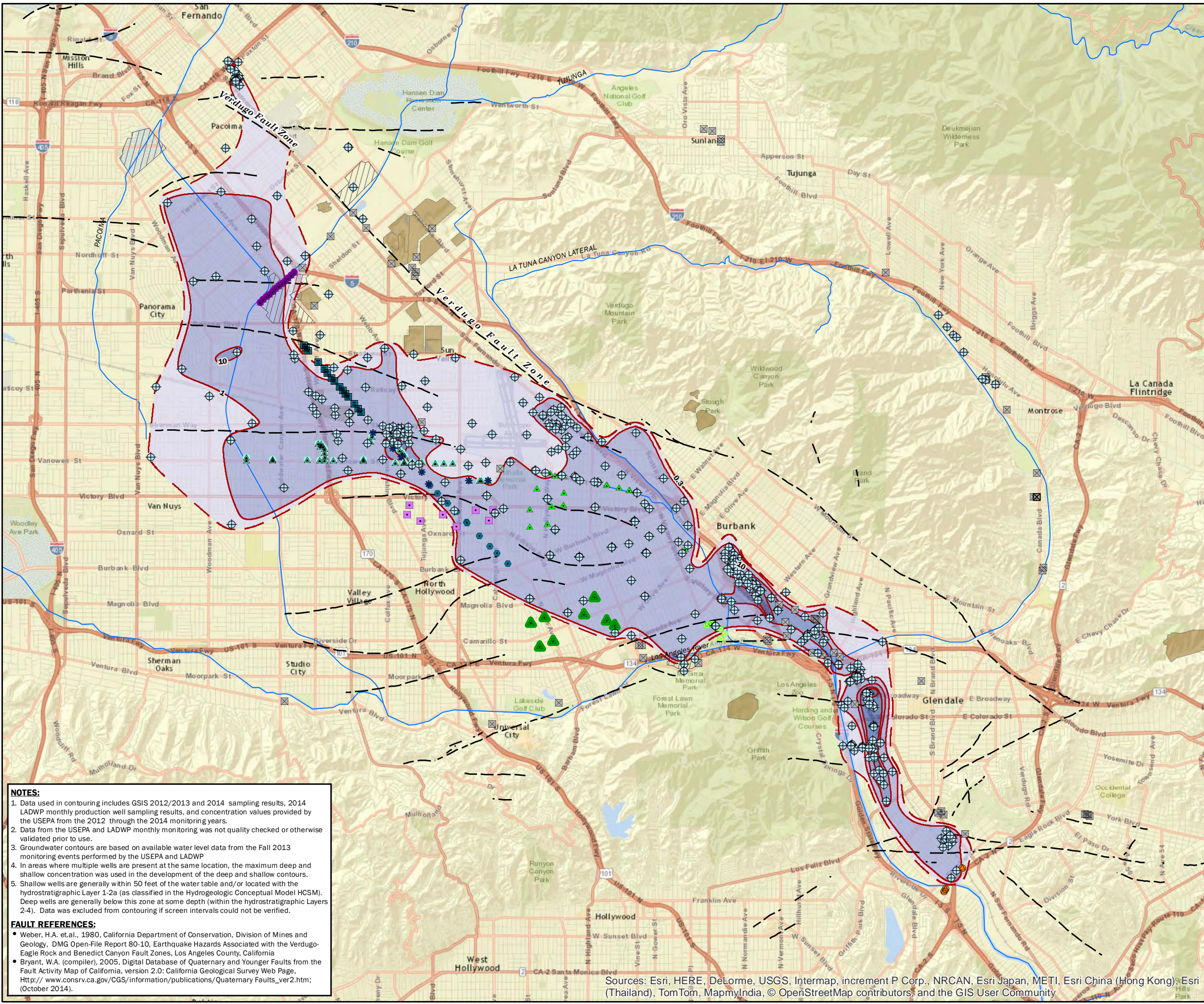
- Weber, H.A. et al., 1980, California Department of Conservation, Division of Mines and Geology, DMG Open-File Report 80-10, Earthquake Hazards Associated with the Verdugo-Eagle Rock and Benedict Canyon Fault Zones, Los Angeles County, California
- Bryant, W.A. (compiler), 2005, Digital Database of Quaternary and Younger Faults from the Fault Activity Map of California, version 2.0: California Geological Survey Web Page, [http://www.consrv.ca.gov/CGS/information/publications/Quaternary\\_Faults\\_ver2.htm](http://www.consrv.ca.gov/CGS/information/publications/Quaternary_Faults_ver2.htm); (October 2014).

**FIGURE 4-10b**  
**1,4-DIOXANE ISOCONCENTRATION**  
**DEEP GROUNDWATER - 2014**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

By: Seeno/Crawford | Date: 2-8-2015 | Project No. 146806

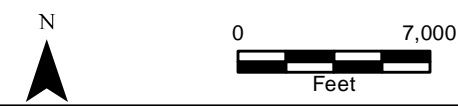


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**Explanation**

- Hexavalent Chromium concentration**
- 0.3 - 1 µg/L
  - 1 - 10 µg/L
  - 10 - 100 µg/L
  - 100 - 1000 µg/L
  - ≥ 1000 µg/L
- Hexavalent Chromium contours
- Hexavalent Chromium contours - Inferred
  - Hexavalent Chromium contours - Inferred through Fault Zone
- Monitoring Wells
- Production Wells by Wellfield**
- Erwin
  - Headworks
  - North Hollywood
  - Pollock
  - Rinaldi-Toluca
  - Tujunga
  - Verdugo
  - Whitnall
  - Other Wells
- Extraction Remediation Wells by Wellfield**
- Burbank OU
  - Glendale OU
  - North Hollywood OU
- Other Features**
- Faults
  - River/Stream/Drainage
  - Spreading Grounds
  - Landfills



**NOTES:**

- Data used in contouring includes GIS 2012/2013 and 2014 sampling results, 2014 LADWP monthly production well sampling results, and concentration values provided by the USEPA from the 2012 through the 2014 monitoring years.
- Data from the USEPA and LADWP monthly monitoring was not quality checked or otherwise validated prior to use.
- Groundwater contours are based on available water level data from the Fall 2013 monitoring events performed by the USEPA and LADWP.
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- Shallow wells are generally within 50 feet of the water table and/or located with the hydrostratigraphic Layer 1-2a (as classified in the Hydrogeologic Conceptual Model HCMSM). Deep wells are generally below this zone at some depth (within the hydrostratigraphic Layers 2-4). Data was excluded from contouring if screen intervals could not be verified.

**FAULT REFERENCES:**

- Weber, H.A. et al., 1980, California Department of Conservation, Division of Mines and Geology, DMG Open-File Report 80-10, Earthquake Hazards Associated with the Verdugo-Eagle Rock and Benedict Canyon Fault Zones, Los Angeles County, California
- Bryant, W.A. (compiler), 2005, Digital Database of Quaternary and Younger Faults from the Fault Activity Map of California, version 2.0: California Geological Survey Web Page, [http://www.consrv.ca.gov/CGS/information/publications/Quaternary\\_Faults\\_ver2.htm](http://www.consrv.ca.gov/CGS/information/publications/Quaternary_Faults_ver2.htm); (October 2014).

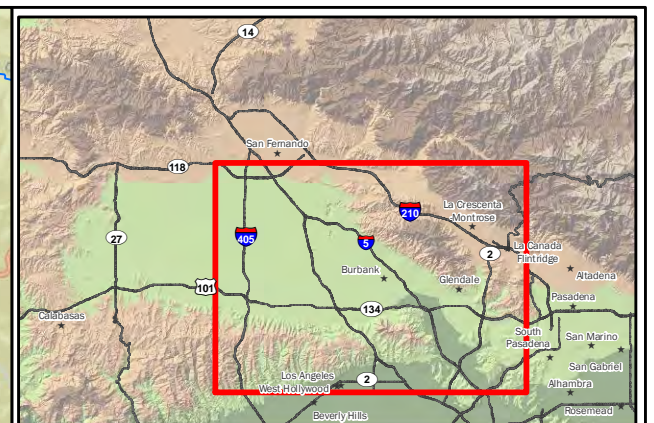
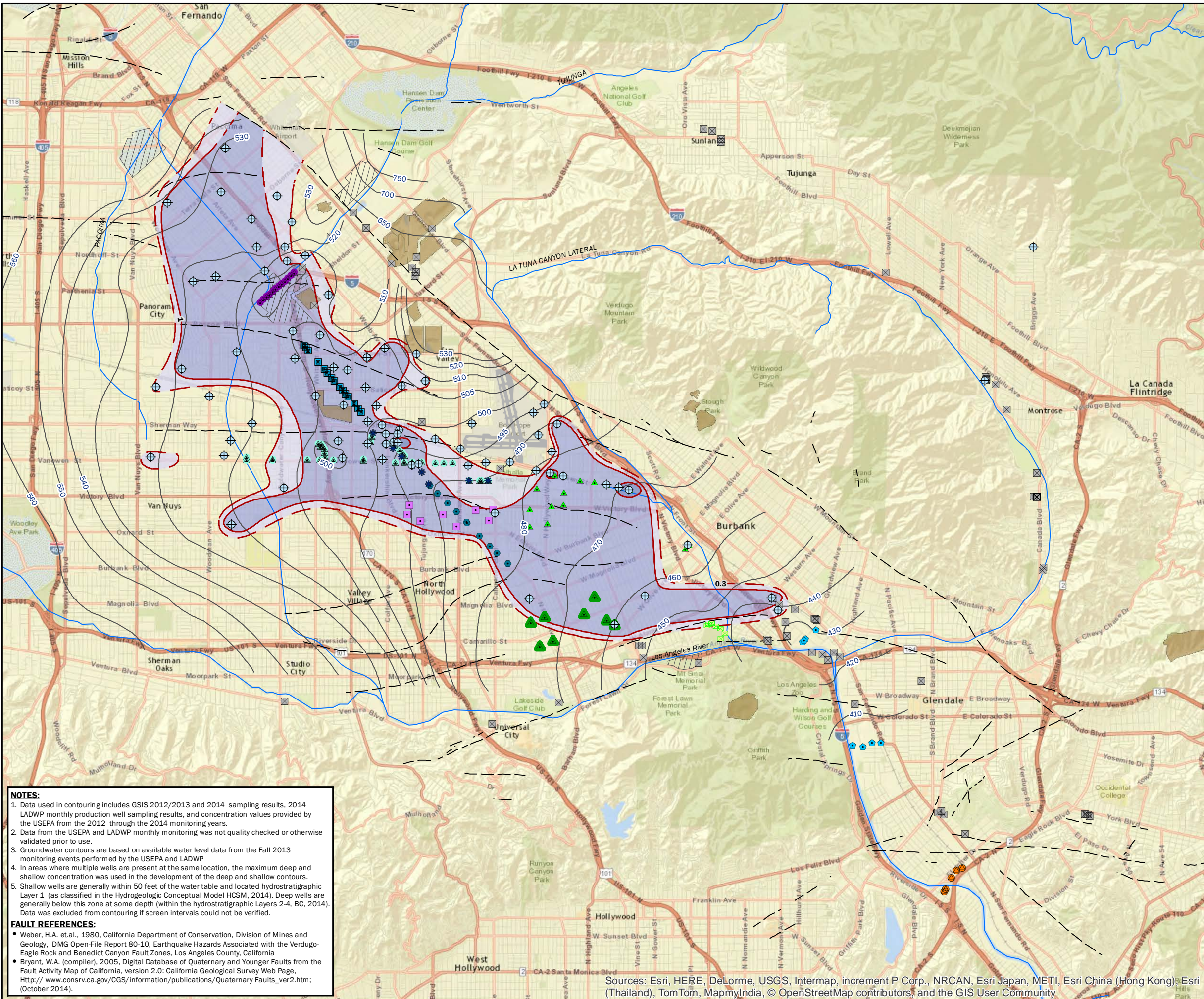
**FIGURE 4-11a**  
**CHROMIUM, HEXAVALENT ISOCONCENTRATION**  
**SHALLOW GROUNDWATER - 2014**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

By: Seeno/Crawford | Date: 2-8-2015 | Project No. 146806



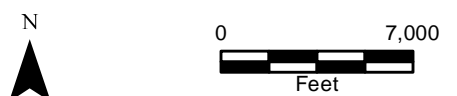
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Document Path: \\BCSAC01P\BC\_LAX\GIS\_MAPDOCS\WORKING\CONTOURING\FIG4-11b\_LADWP\_HEXCHROME\_DEEP\_11x17\_20150208.mxd



**Explanation**

- Hexavalent Chromium concentration**
- 0.3 - 1 µg/L
  - 1 - 10 µg/L
  - ≥ 10 µg/L
- Hexavalent Chromium contours**
- Hexavalent Chromium contours
  - Hexavalent Chromium contours - Inferred
  - Hexavalent Chromium contours - Inferred through Fault Zone
- Monitoring Wells**
- Monitoring Wells
- Production Wells by Wellfield**
- Erwin
  - Headworks
  - North Hollywood
  - Pollock
  - Rinaldi-Toluca
  - Tujunga
  - Verdugo
  - Whitnall
  - Other Wells
- Extraction Remediation Wells by Wellfield**
- Burbank OU
  - Glendale OU
  - North Hollywood OU
- Other Features**
- Groundwater Elevation Contours (2013; ft)
  - Faults
  - River/Stream/Drainage
  - Spreading Grounds
  - Landfills



**NOTES:**

1. Data used in contouring includes GSI 2012/2013 and 2014 sampling results, 2014 LADWP monthly production well sampling results, and concentration values provided by the USEPA from the 2012 through the 2014 monitoring years.
2. Data from the USEPA and LADWP monthly monitoring was not quality checked or otherwise validated prior to use.
3. Groundwater contours are based on available water level data from the Fall 2013 monitoring events performed by the USEPA and LADWP.
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**FAULT REFERENCES:**

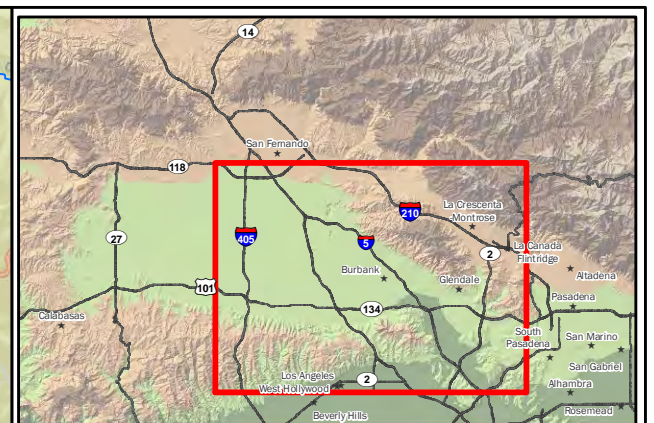
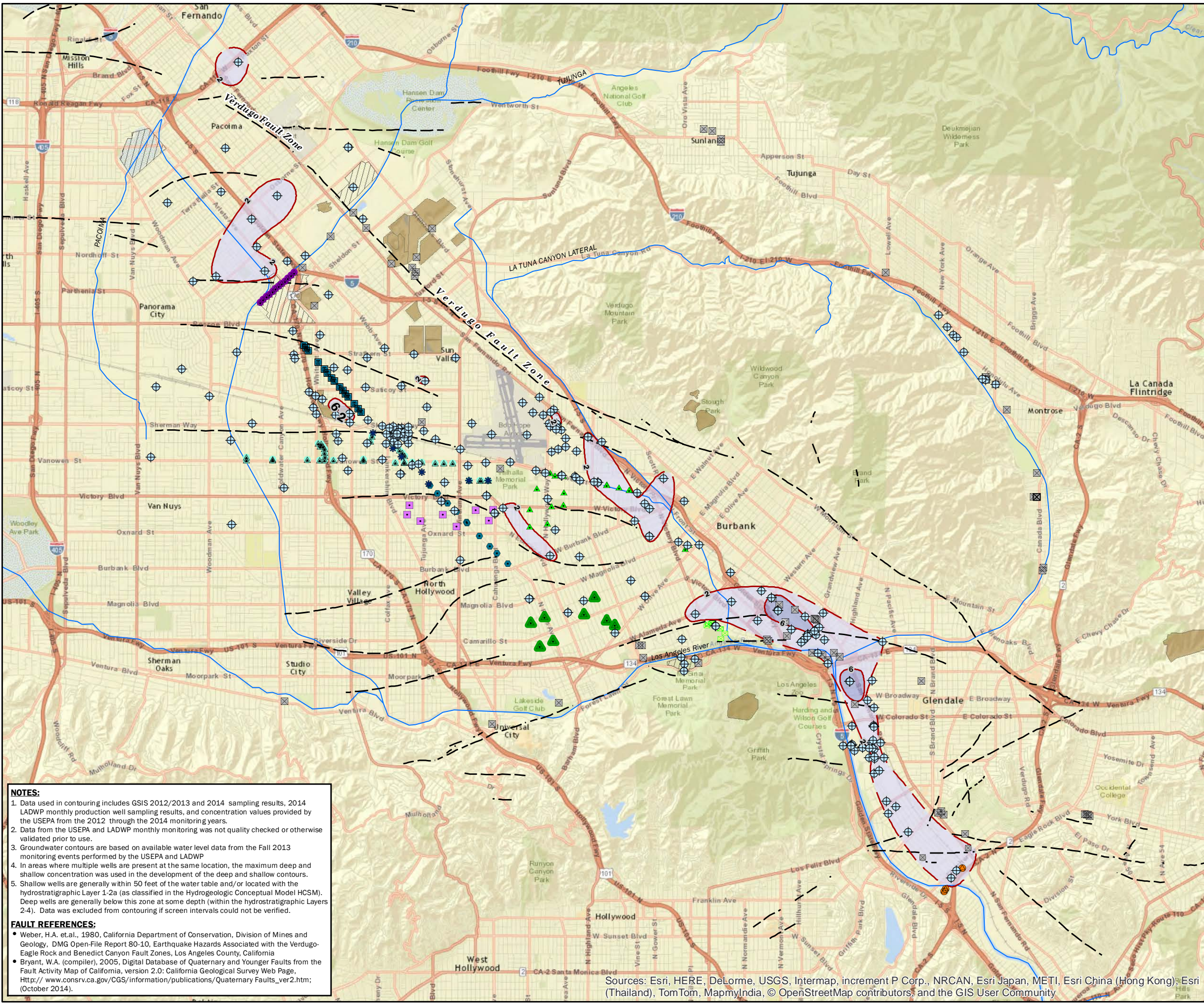
- Weber, H.A. et al., 1980, California Department of Conservation, Division of Mines and Geology, DMG Open-File Report 80-10, Earthquake Hazards Associated with the Verdugo-Eagle Rock and Benedict Canyon Fault Zones, Los Angeles County, California
- Bryant, W.A. (compiler), 2005, Digital Database of Quaternary and Younger Faults from the Fault Activity Map of California, version 2.0: California Geological Survey Web Page, [http://www.consrv.ca.gov/CGS/information/publications/Quaternary\\_Faults\\_ver2.htm](http://www.consrv.ca.gov/CGS/information/publications/Quaternary_Faults_ver2.htm); (October 2014).

**FIGURE 4-11b**  
**CHROMIUM, HEXAVALENT ISOCONCENTRATION**  
**DEEP GROUNDWATER - 2014**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

By: Seeno/Crawford | Date: 2-8-2015 | Project No. 146806

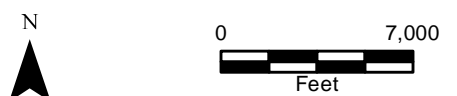


Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community



**Explanation**

- Perchlorate concentration**
  - 2 - 6 µg/L
  - ≥ 6 µg/L
- Perchlorate contours
- Perchlorate contours - Inferred
- Monitoring Wells
- Production Wells by Wellfield**
  - Erwin
  - Headworks
  - North Hollywood
  - Pollock
  - Rinaldi-Toluca
  - Tujunga
  - Verdugo
  - Whitnall
  - Other Wells
- Extraction Remediation Wells by Wellfield**
  - Burbank OU
  - Glendale OU
  - North Hollywood OU
- Other Features**
  - Faults
  - River/Stream/Drainage
  - Spreading Grounds
  - Landfills



**NOTES:**

- Data used in contouring includes GIS 2012/2013 and 2014 sampling results, 2014 LADWP monthly production well sampling results, and concentration values provided by the USEPA from the 2012 through the 2014 monitoring years.
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**FAULT REFERENCES:**

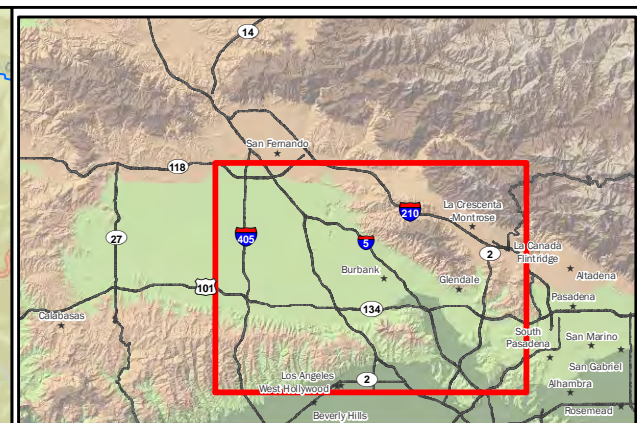
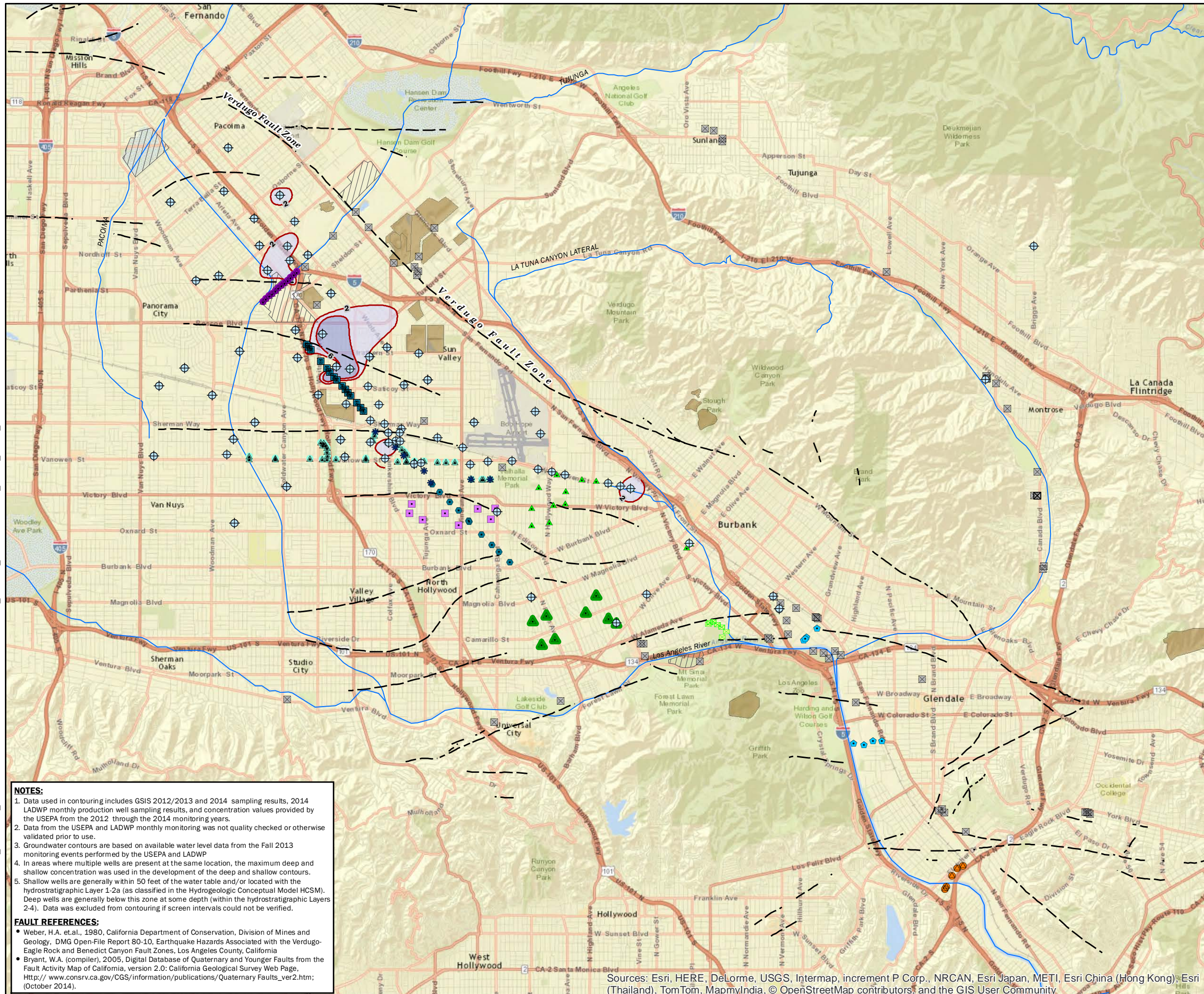
- Weber, H.A. et al., 1980, California Department of Conservation, Division of Mines and Geology, DMG Open-File Report 80-10, Earthquake Hazards Associated with the Verdugo-Eagle Rock and Benedict Canyon Fault Zones, Los Angeles County, California
- Bryant, W.A. (compiler), 2005, Digital Database of Quaternary and Younger Faults from the Fault Activity Map of California, version 2.0: California Geological Survey Web Page, [http://www.consrv.ca.gov/CGS/information/publications/Quaternary\\_Faults\\_ver2.htm](http://www.consrv.ca.gov/CGS/information/publications/Quaternary_Faults_ver2.htm); (October 2014).

**FIGURE 4-12a**  
**PERCHLORATE ISOCONCENTRATION**  
**SHALLOW GROUNDWATER - 2014**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

By: Seeno/Crawford | Date: 2-8-2015 | Project No. 146806



Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community



**Explanation**

**Perchlorate concentration**

- 2 - 6 µg/L
- ≥ 6 µg/L

Perchlorate contours

- Perchlorate contours - Inferred

Monitoring Wells

**Production Wells by Wellfield**

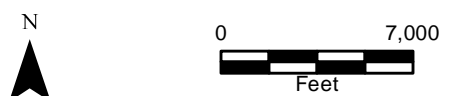
- Erwin
- Headworks
- North Hollywood
- Pollock
- Rinaldi-Toluca
- Tujunga
- Verdugo
- Whitnall
- Other Wells

**Extraction Remediation Wells by Wellfield**

- Burbank OU
- Glendale OU
- North Hollywood OU

**Other Features**

- Faults
- River/Stream/Drainage
- Spreading Grounds
- Landfills



**NOTES:**

1. Data used in contouring includes GIS 2012/2013 and 2014 sampling results, 2014 LADWP monthly production well sampling results, and concentration values provided by the USEPA from the 2012 through the 2014 monitoring years.
2. Data from the USEPA and LADWP monthly monitoring was not quality checked or otherwise validated prior to use.
3. Groundwater contours are based on available water level data from the Fall 2013 monitoring events performed by the USEPA and LADWP.
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**FAULT REFERENCES:**

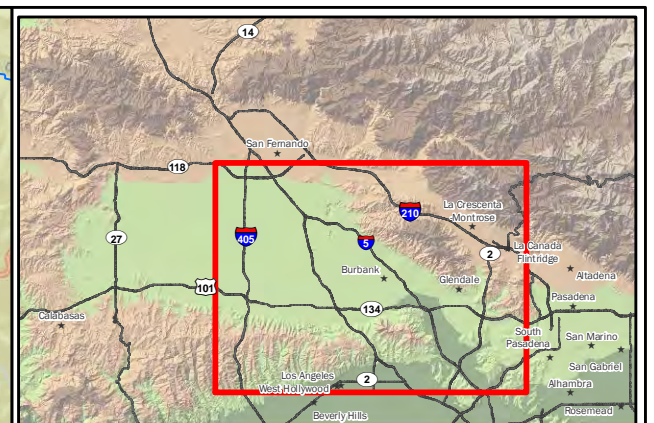
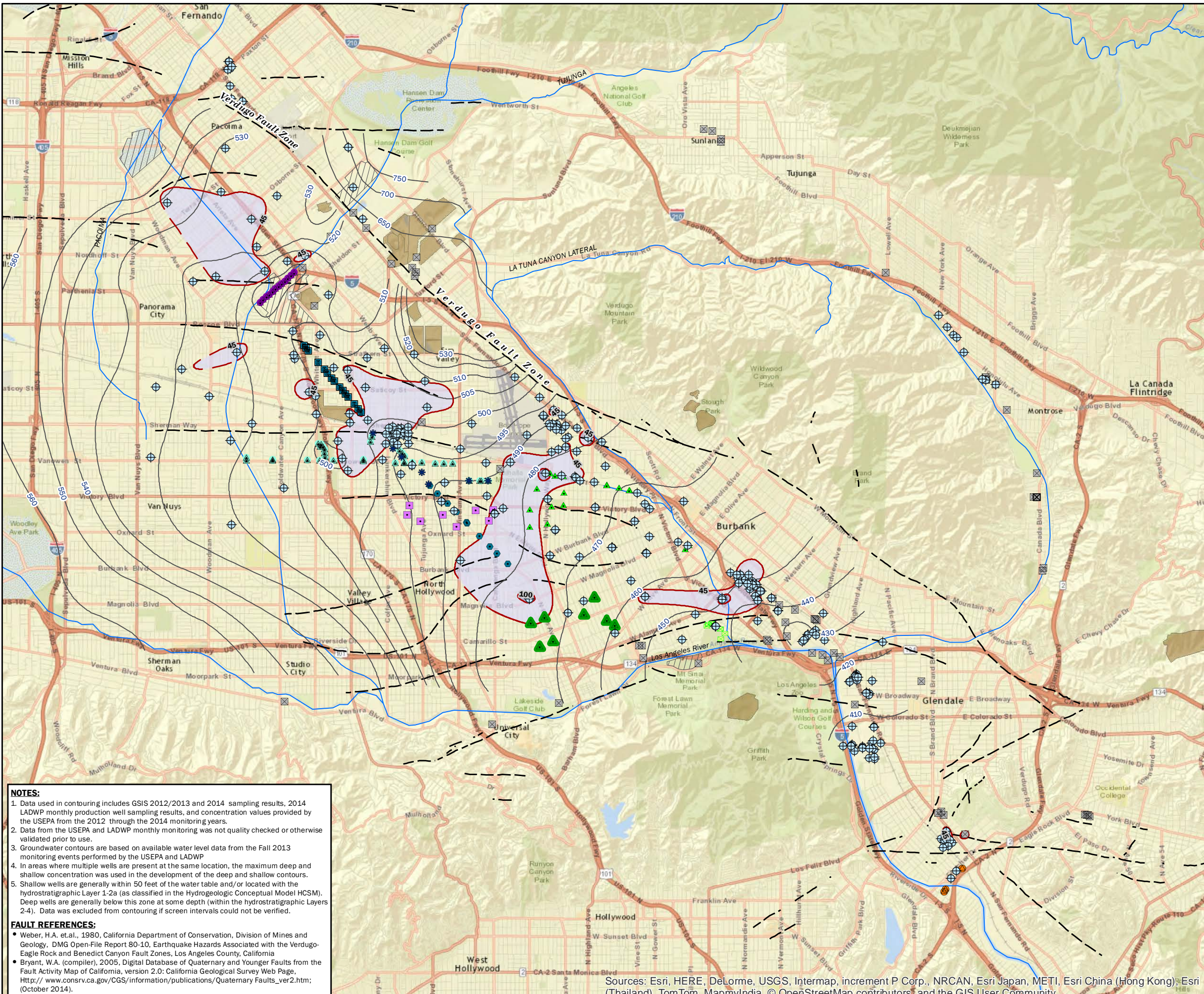
- Weber, H.A. et al., 1980, California Department of Conservation, Division of Mines and Geology, DMG Open-File Report 80-10, Earthquake Hazards Associated with the Verdugo-Eagle Rock and Benedict Canyon Fault Zones, Los Angeles County, California
- Bryant, W.A. (compiler), 2005, Digital Database of Quaternary and Younger Faults from the Fault Activity Map of California, version 2.0: California Geological Survey Web Page, [http://www.consrv.ca.gov/CGS/information/publications/Quaternary\\_Faults\\_ver2.htm](http://www.consrv.ca.gov/CGS/information/publications/Quaternary_Faults_ver2.htm); (October 2014).

**FIGURE 4-12b**  
**PERCHLORATE ISOCONCENTRATION**  
**DEEP GROUNDWATER - 2014**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

By: Seeno/Crawford | Date: 2-8-2015 | Project No. 146806

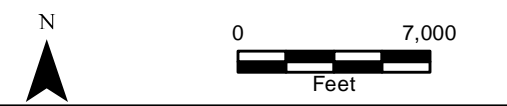


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**Explanation**

- Nitrate No3 concentration**
- 45 - 100 mg/L
  - ≥ 100 mg/L
- Nitrate contours**
- Nitrate contours - Inferred
- Monitoring Wells**
- Monitoring Wells
- Production Wells by Wellfield**
- Erwin
  - Headworks
  - North Hollywood
  - Pollock
  - Rinaldi-Toluca
  - Tujunga
  - Verdugo
  - Whitnall
  - Other Wells
- Extraction Remediation Wells by Wellfield**
- Burbank OU
  - Glendale OU
  - North Hollywood OU
- Other Features**
- Groundwater Elevation Contours (2013; ft)
  - Faults
  - River/Stream/Drainage
  - Spreading Grounds
  - Landfills



**NOTES:**

- Data used in contouring includes GIS 2012/2013 and 2014 sampling results, 2014 LADWP monthly production well sampling results, and concentration values provided by the USEPA from the 2012 through the 2014 monitoring years.
- Data from the USEPA and LADWP monthly monitoring was not quality checked or otherwise validated prior to use.
- Groundwater contours are based on available water level data from the Fall 2013 monitoring events performed by the USEPA and LADWP
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**FAULT REFERENCES:**

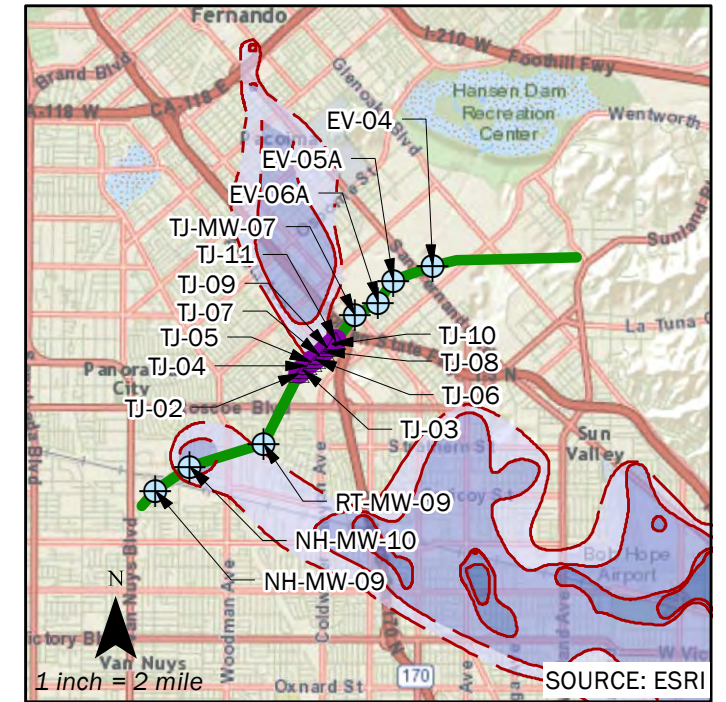
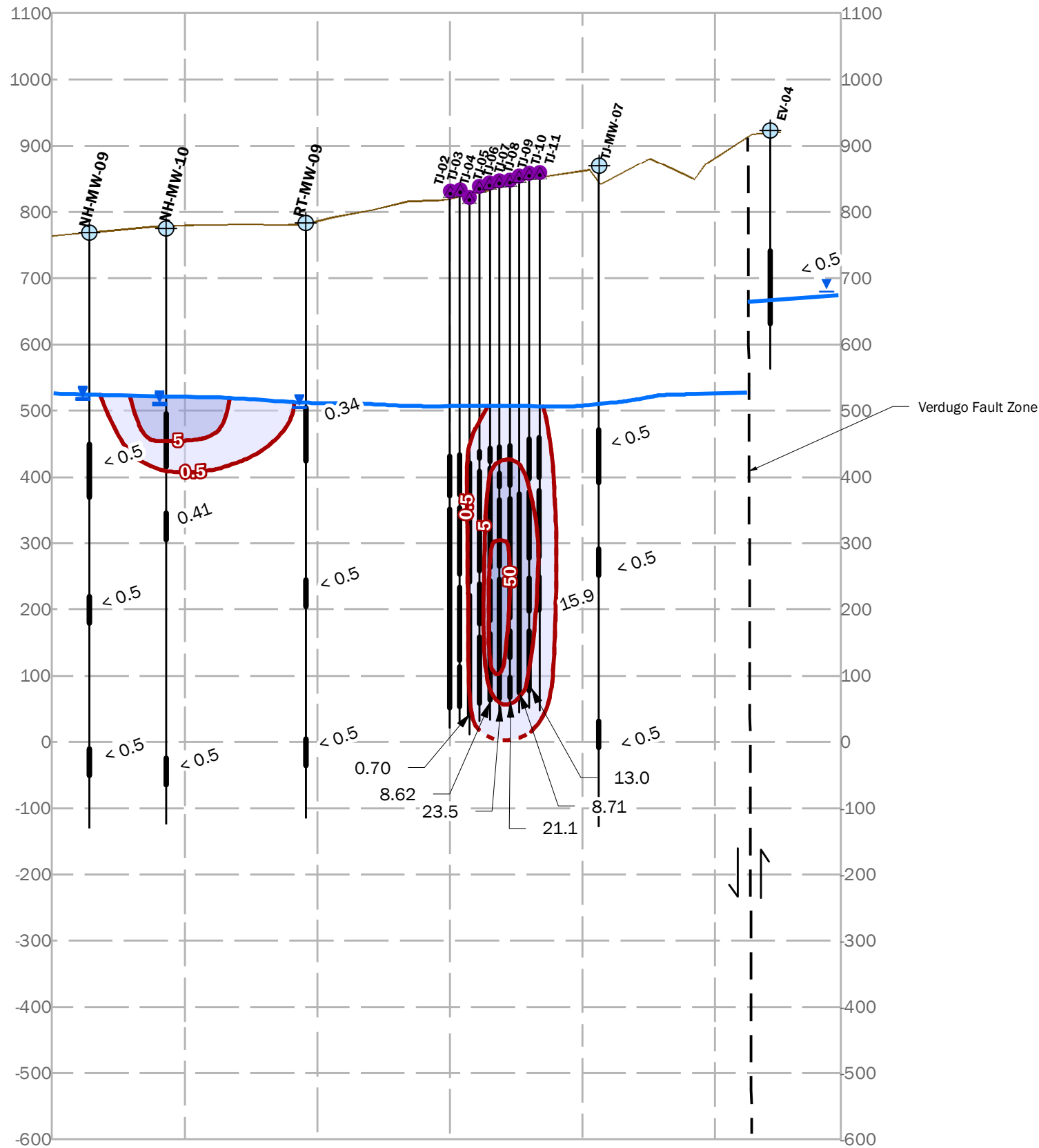
- Weber, H.A. et al., 1980, California Department of Conservation, Division of Mines and Geology, DMG Open-File Report 80-10, Earthquake Hazards Associated with the Verdugo-Eagle Rock and Benedict Canyon Fault Zones, Los Angeles County, California
- Bryant, W.A. (compiler), 2005, Digital Database of Quaternary and Younger Faults from the Fault Activity Map of California, version 2.0: California Geological Survey Web Page, [http://www.consrv.ca.gov/CGS/information/publications/Quaternary\\_Faults\\_ver2.htm](http://www.consrv.ca.gov/CGS/information/publications/Quaternary_Faults_ver2.htm); (October 2014).

**FIGURE 4-13a**  
**NITRATE (as NO3) ISOCONCENTRATION**  
**SHALLOW GROUNDWATER - 2014**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

By: Seeno/Crawford | Date: 2-8-2015 | Project No. 146806

**SOUTHWEST**  
**A**

**NORTHEAST**  
**A'**

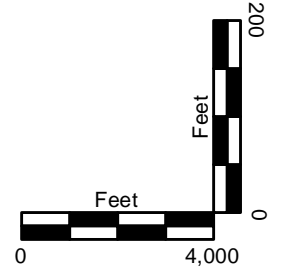


**Explanation**

- Trichloroethylene TCE concentration**
- 0.5 - 5 µg/L
  - 5 - 50 µg/L
  - 50 - 100 µg/L
  - Trichloroethylene TCE contours
  - Trichloroethylene TCE contours - Inferred
  - ⊕ Monitoring Well
  - Tujunga Production Wells
  - Water Level Elevation
  - Depth Groundwater Encountered
  - Ground Surface
  - Well Screens
  - Boreholes
  - Fault

**FIGURE 4-14a**  
**TRICHLOROETHYLENE (TCE) ISOCONCENTRATION**  
**CROSS SECTION - LINE A - A'**  
**San Fernando Groundwater Basin**  
**LADWP GSIS Project**  
**Los Angeles, California**

T. Crawford      Date: 3-6-2015      Project No. 146806



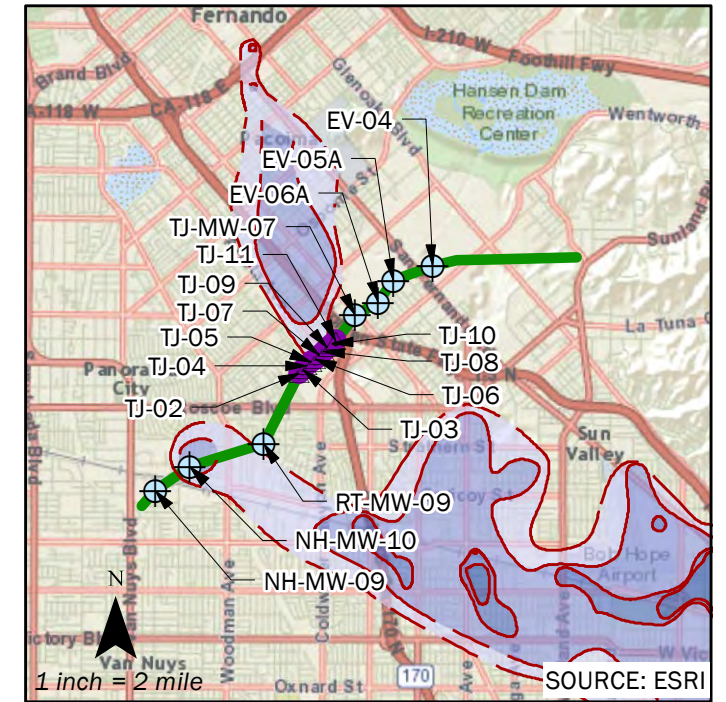
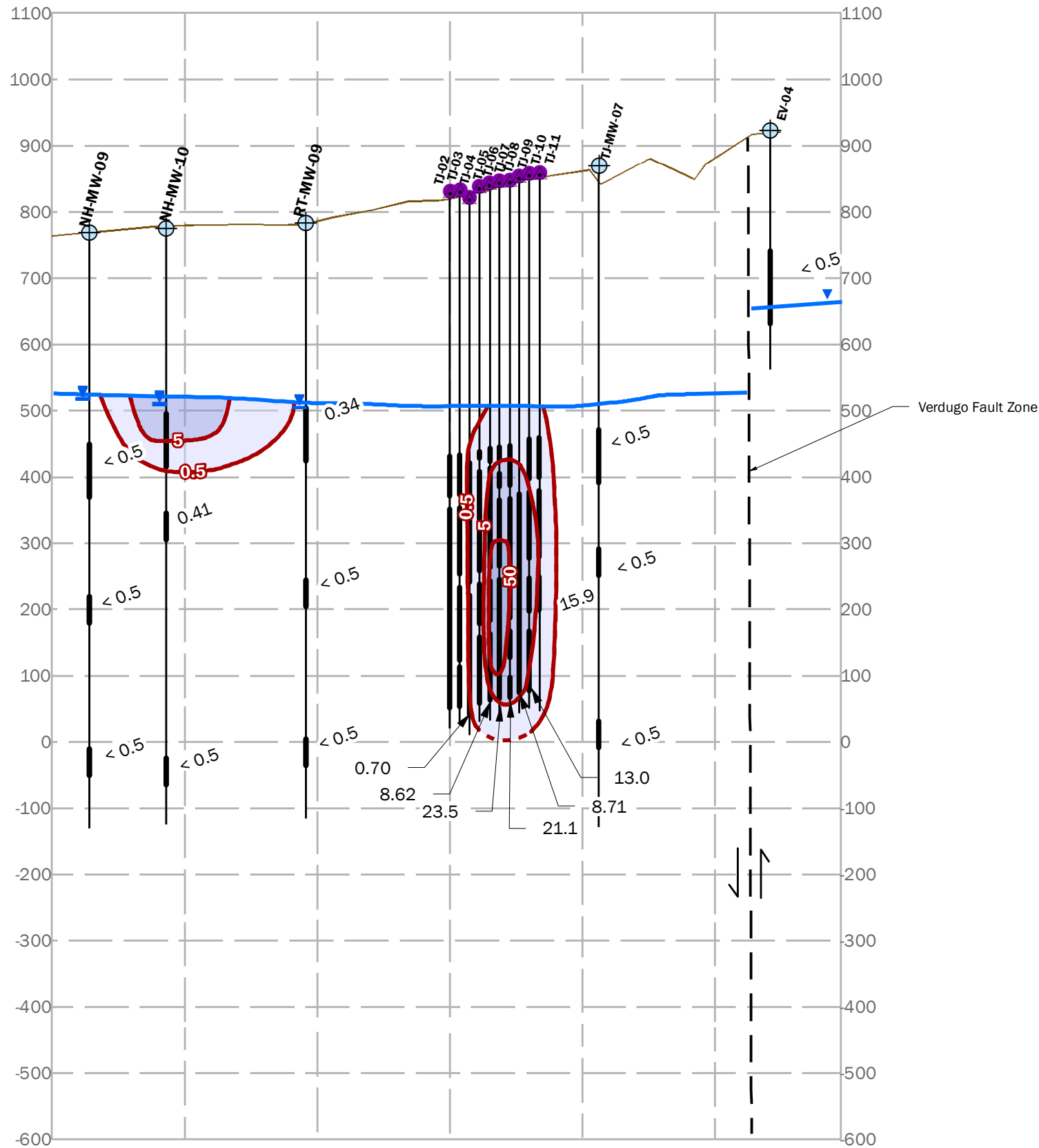
Note:  
1. The location map includes the shallow groundwater isoconcentration contours.  
2. Contours are based on plume maps (Appendix I) when well information or analytical data was unavailable for cross-section development.



Document Path: \\BCSAC01P\BC\_LAX\GIS\MAPDOCS\WORKING\CrossSections\FIG4-14a\_CrsSect\_LineA\_TCE\_11x17\_20150224.mxd

**SOUTHWEST  
A**

**NORTHEAST  
A'**

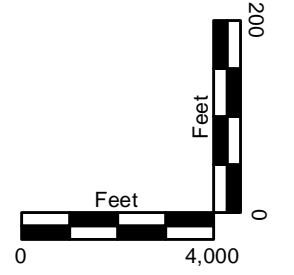


**Explanation**

- Trichloroethylene TCE concentration**
- 0.5 - 5 µg/L
  - 5 - 50 µg/L
  - 50 - 100 µg/L
  - Trichloroethylene TCE contours
  - Trichloroethylene TCE contours - Inferred
  - ⊕ Monitoring Well
  - Tujung Production Wells
  - Water Level Elevation
  - ▼ Depth Groundwater Encountered
  - Ground Surface
  - Well Screens
  - Boreholes
  - Fault

**FIGURE 4-14a  
TRICHLOROETHYLENE (TCE) ISOCONCENTRATION  
CROSS SECTION - LINE A - A'  
San Fernando Groundwater Basin  
LADWP GSIS Project  
Los Angeles, California**

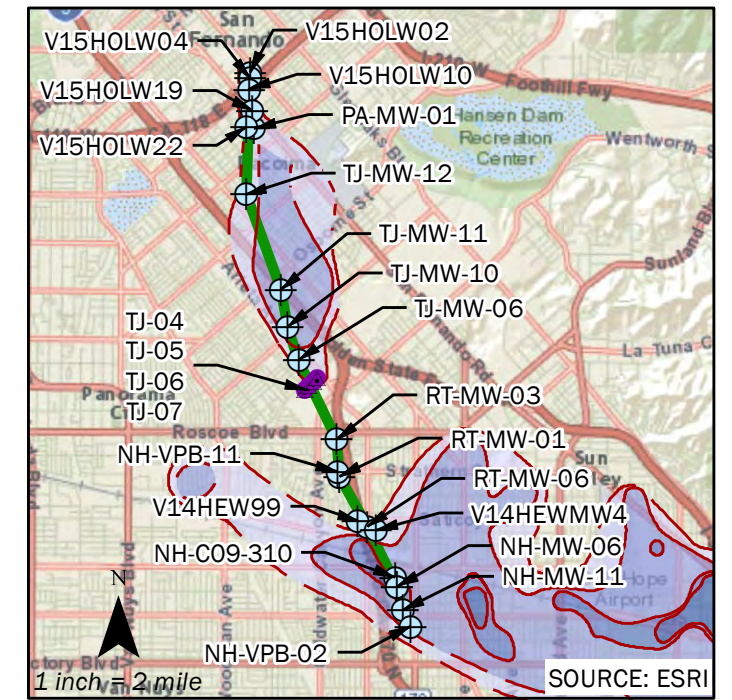
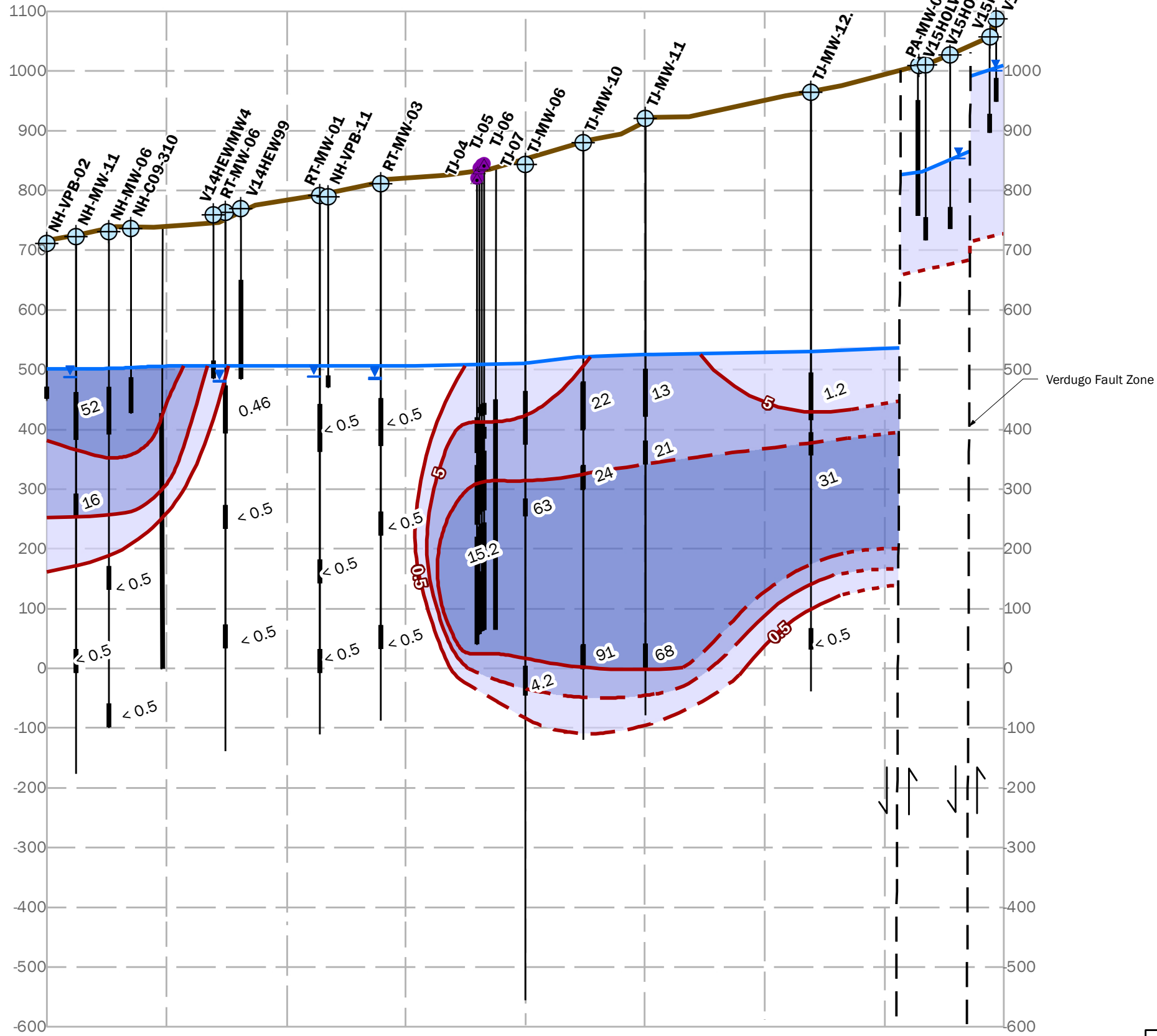
T. Crawford      Date: 3-6-2015      Project No. 146806



Note:  
 1. The location map includes the shallow groundwater isoconcentration contours.  
 2. Contours are based on plume maps (Appendix I) when well information or analytical data was unavailable for cross-section development.

SOUTH  
B

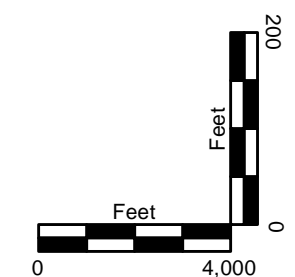
NORTH  
B'



**Explanation**

- Trichloroethylene (TCE) Concentration**
- 0.5 - 5  $\mu\text{g/L}$
  - 5 - 50  $\mu\text{g/L}$
  - $\geq 50 \mu\text{g/L}$
- Trichloroethylene (TCE) contours
  - Trichloroethylene (TCE) contours - Inferred
  - Trichloroethylene (TCE) contours - Inferred through Fault Zone
  - ⊕ Monitoring Wells
  - Tujunga Production Well
  - Water Level Elevation
  - Depth Groundwater Encountered
  - Ground Surface
  - Well Screens
  - Boreholes
  - Faults

**FIGURE 4-14b**  
**TRICHLOROETHYLENE (TCE) ISOCONCENTRATION**  
**CROSS SECTION - LINE B - B'**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

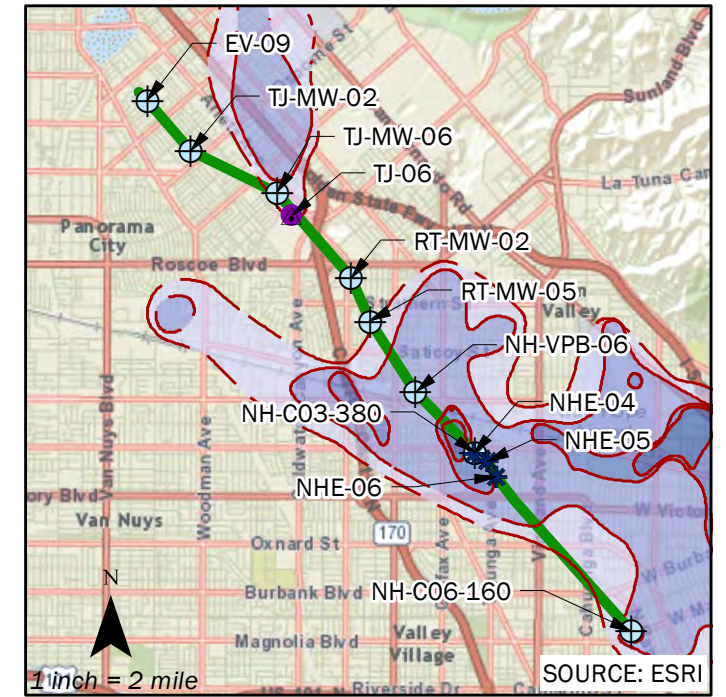
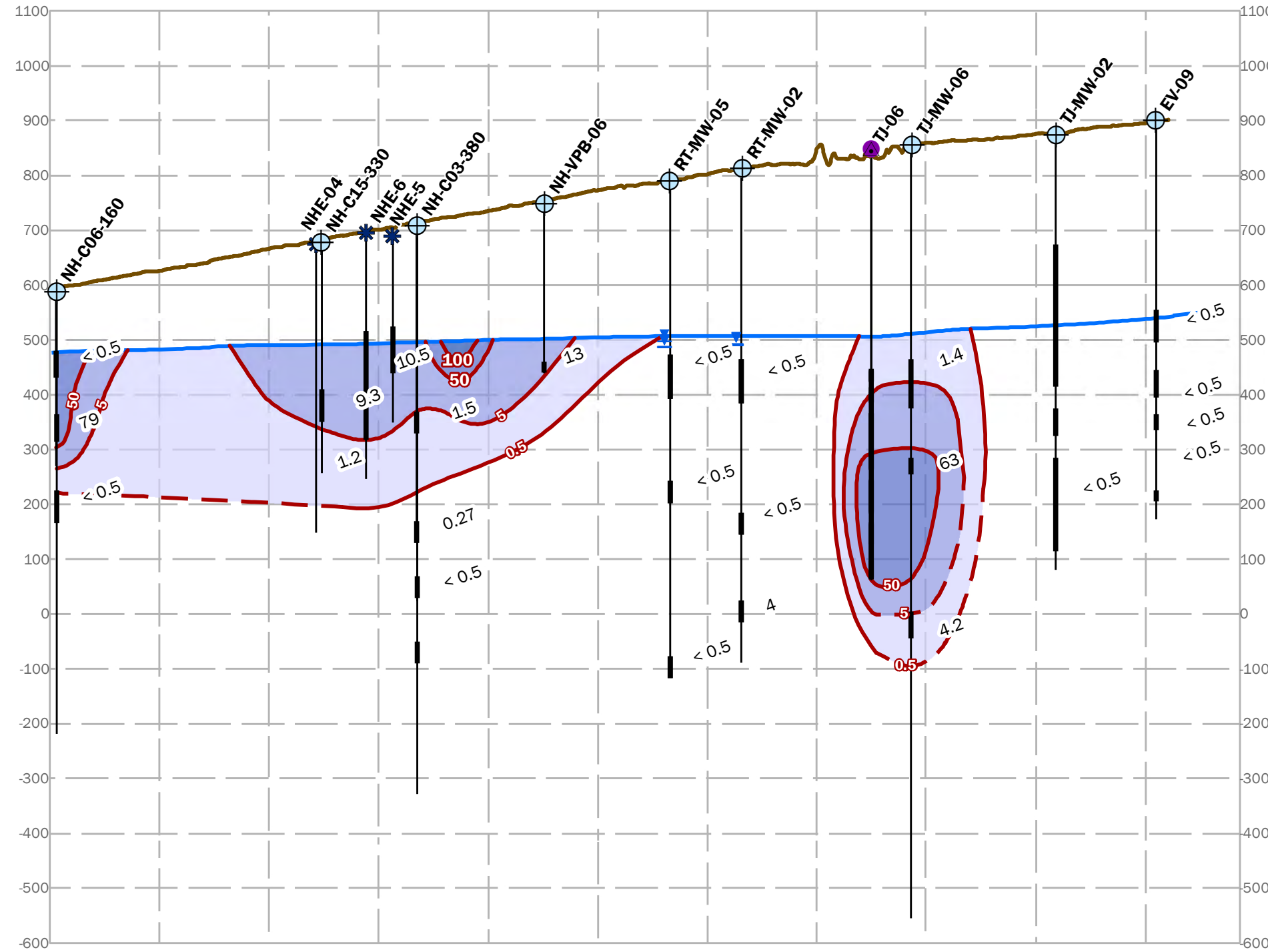


Note:  
 1. The location map includes the shallow groundwater isoconcentration contours.  
 2. Contours are based on plume maps (Appendix I) when well information or analytical data was unavailable for cross-section development.

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**SOUTH  
C**

**NORTH  
C'**

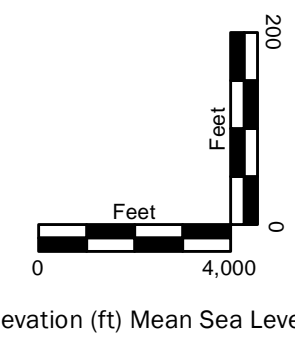


**Explanation**

- Trichloroethylene TCE concentration**
- 0.5 - 5 µg/L
  - 5 - 50 µg/L
  - 50 - 100 µg/L
  - 100 - 1000 µg/L
  - Trichloroethylene TCE contours
  - Trichloroethylene TCE contours - Inferred
  - Monitoring Well
  - Tujunga Production Wells
  - North Hollywood OU Extraction Well
  - Water Level Elevation
  - Ground Surface
  - Well Screens
  - Boreholes

**FIGURE 4-14c**  
**TRICHLOROETHYLENE (TCE) ISOCONCENTRATION**  
**CROSS SECTION - LINE C - C'**  
**San Fernando Groundwater Basin**  
**LADWP GSIS Project**  
**Los Angeles, California**

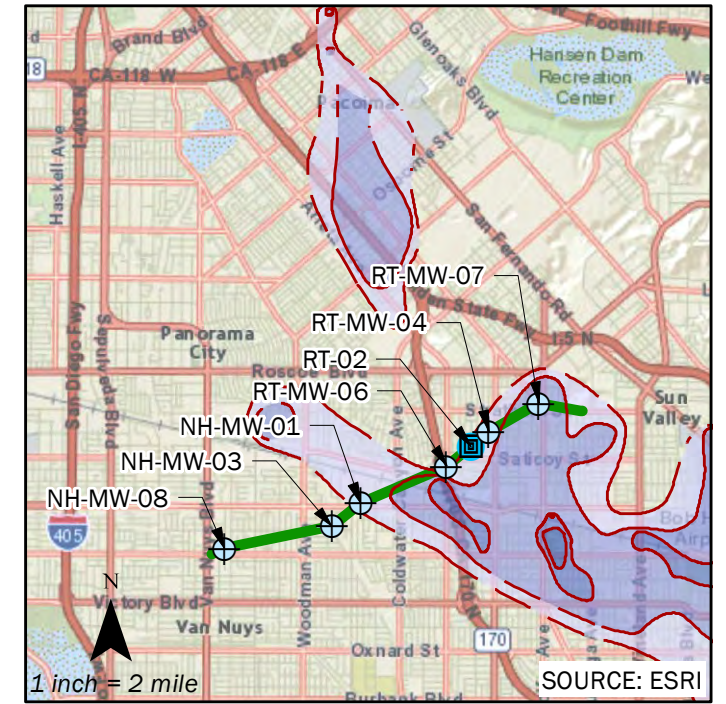
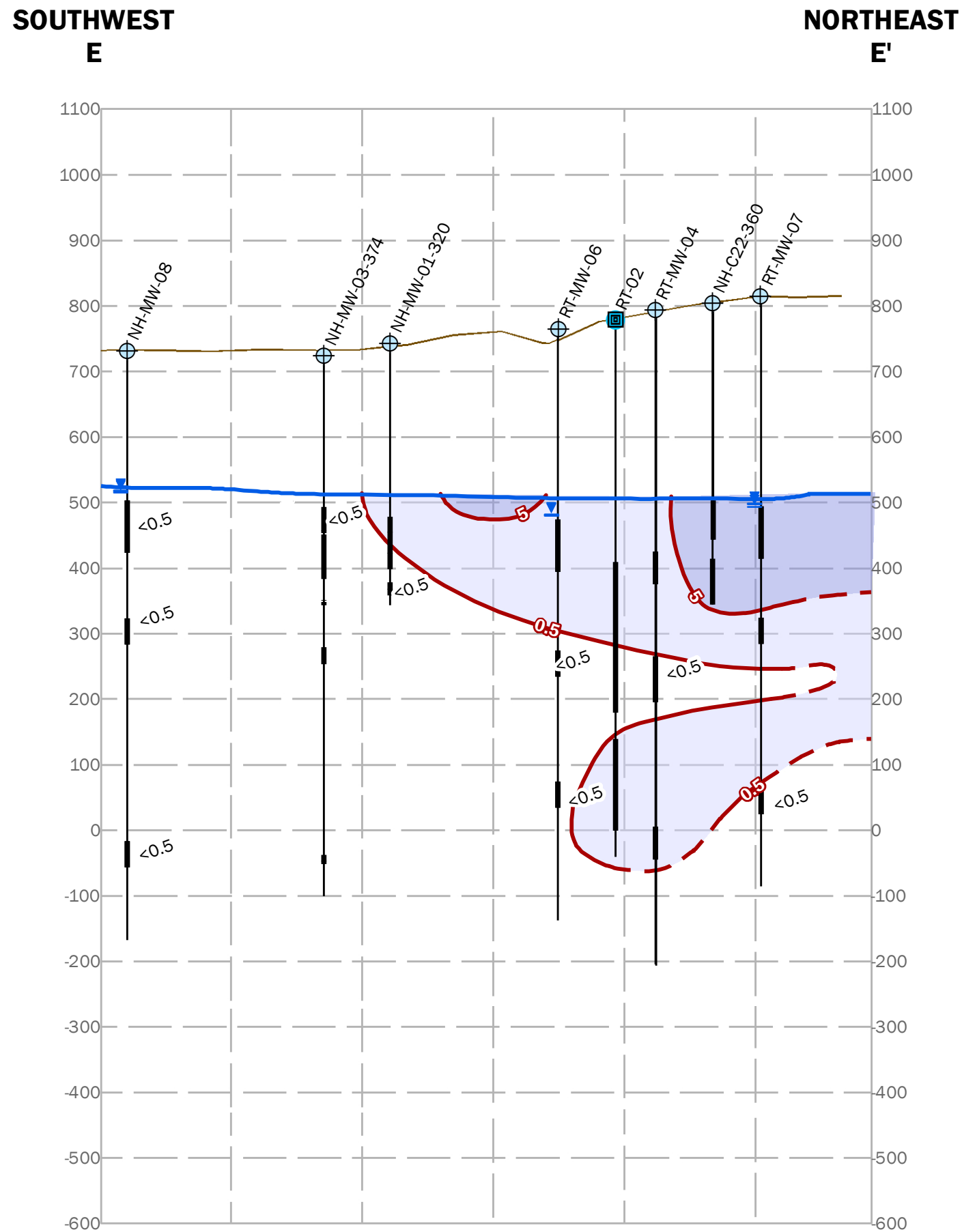
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- Note:
1. The location map includes the shallow groundwater isoconcentration contours.
  2. Contours are based on plume maps (Appendix I) when well information or analytical data was unavailable for cross-section development.

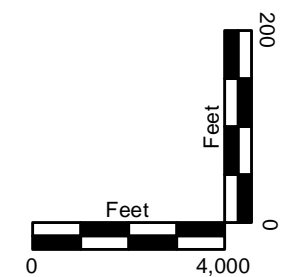
Document Path: \\BCSAC01P\BC\_LAX\GIS\MAPDOCS\WORKING\CrossSections\FIG4-14d\_CrsSect\_LineE\_TCE\_11x17\_20150224.mxd



**Explanation**

- Trichloroethylene (TCE) Concentration**
- 0.5 - 5 µg/L
  - 5 - 50 µg/L
  - Trichloroethylene (TCE) contours
  - Trichloroethylene (TCE) contours - Inferred
  - ⊕ Monitoring Wells
  - ⊞ Rinaldi-Toluca Production Well
  - Water Level Elevation
  - ▼ Depth Groundwater Encountered
  - Ground Surface
  - Well Screens
  - Boreholes

- Note:
1. The location map includes the shallow groundwater isoconcentration contours.
  2. Contours are based on plume maps (Appendix I) when well information or analytical data was unavailable for cross-section development.



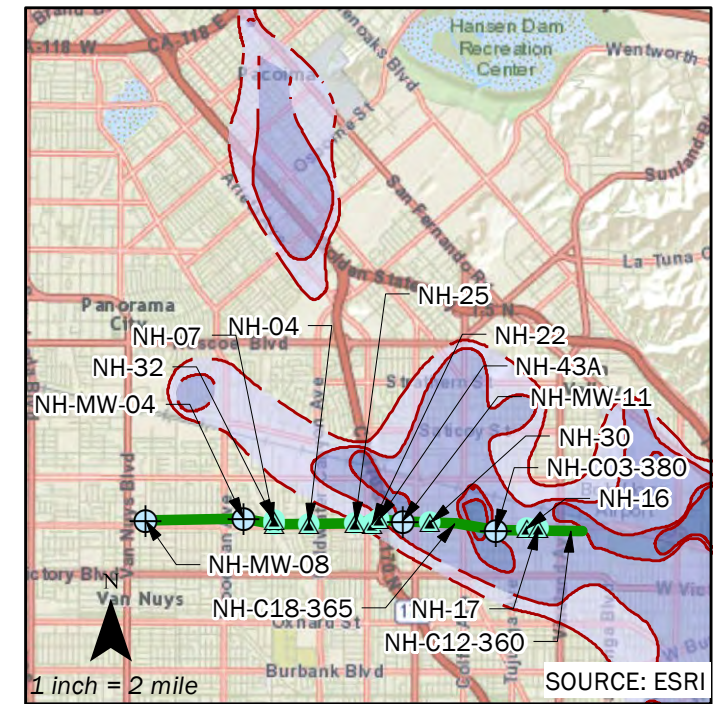
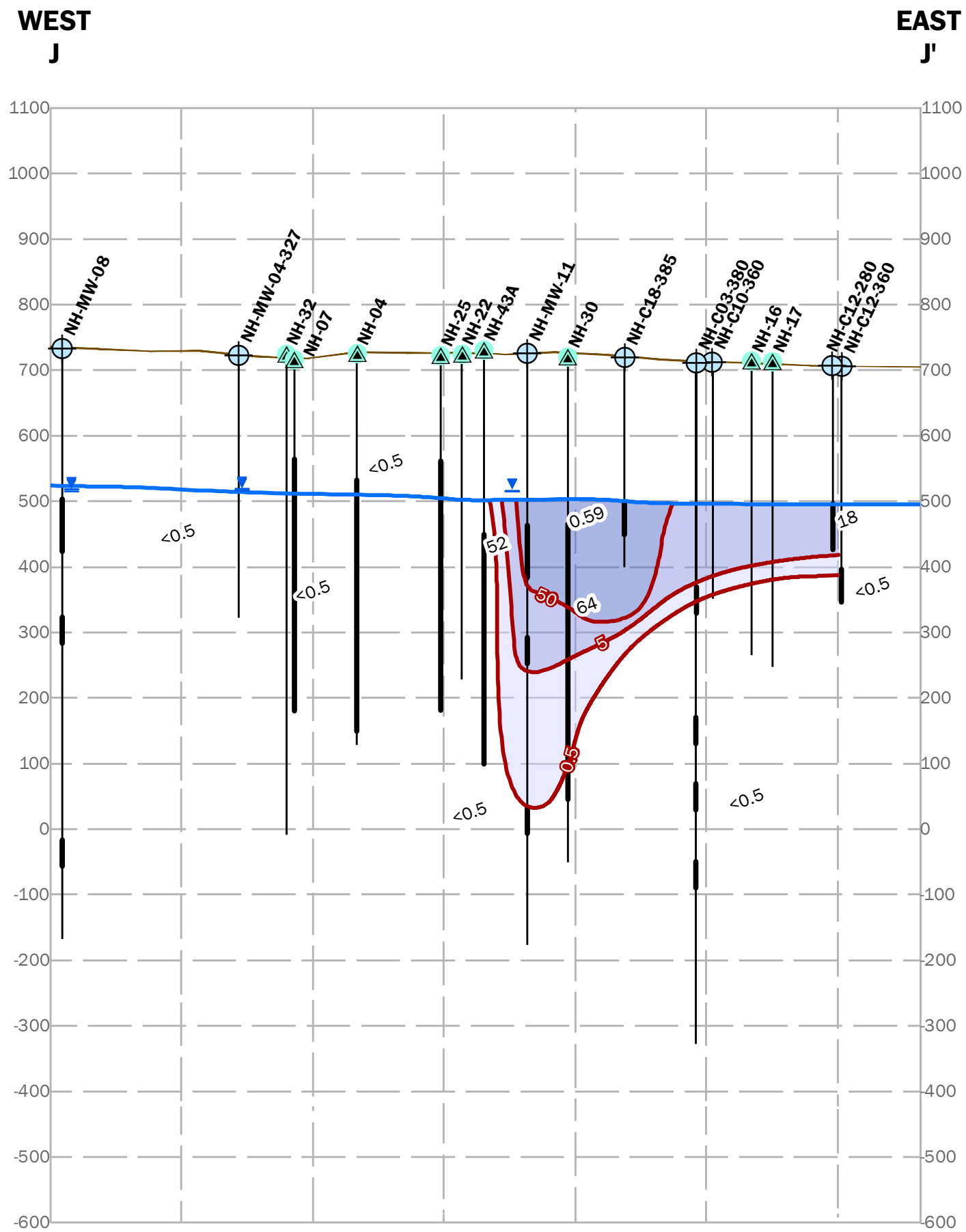
Elevation (ft) Mean Sea Level

**FIGURE 4-14d**  
**TRICHLOROETHYLENE (TCE) ISOCONCENTRATION**  
**CROSS SECTION - LINE E - E'**  
**San Fernando Groundwater Basin**  
**LADWP GSIS Project**  
**Los Angeles, California**

T. Crawford      Date: 3-6-2015      Project No. 146806



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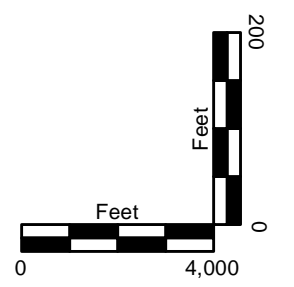


**Explanation**

- Trichloroethylene TCE concentration**
- 0.5 - 5 µg/L
- 5 - 50 µg/L
- 50 - 100 µg/L
- Trichloroethylene TCE contours
- + Monitoring Well
- ▲ North Hollywood Production Well
- Water Level Elevation
- Depth Groundwater Encountered
- Ground Surface
- Well Screens
- Boreholes

**FIGURE 4-14e**  
**TRICHLOROETHYLENE (TCE) ISOCONCENTRATION**  
**CROSS SECTION - LINE J - J'**  
**San Fernando Groundwater Basin**  
**LADWP GSIS Project**  
**Los Angeles, California**

T. Crawford      Date: 3-3-2015      Project No. 146806

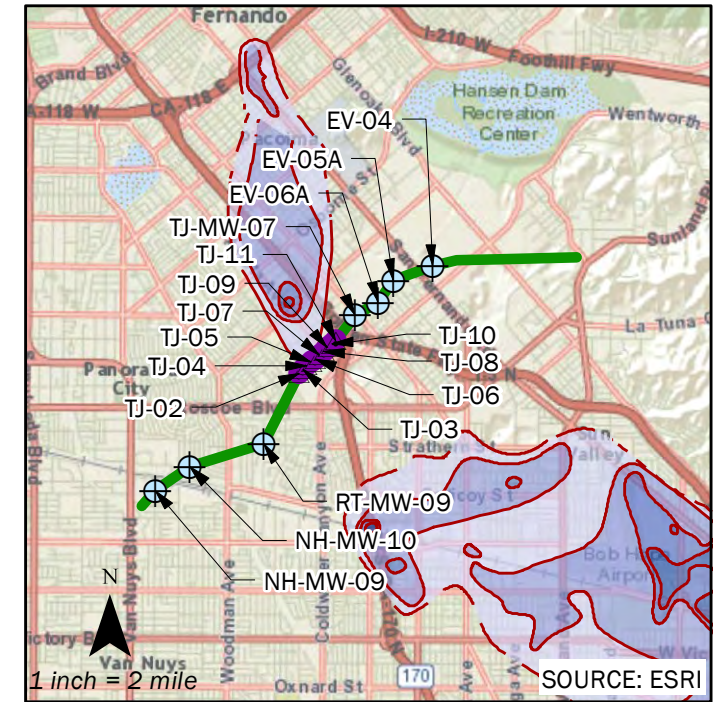
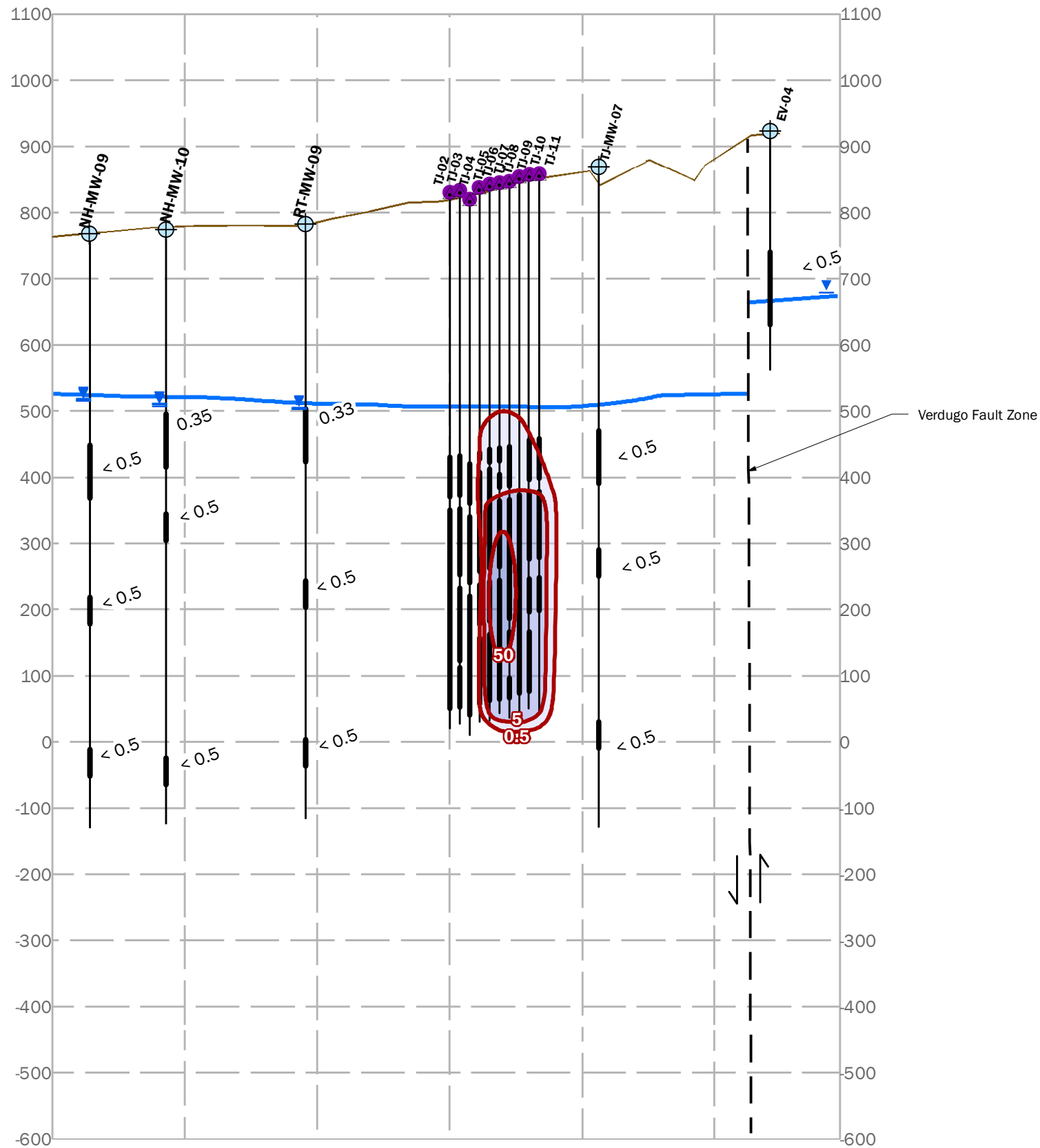


- Note:
1. The location map includes the shallow groundwater isoconcentration contours.
  2. Contours are based on plume maps (Appendix I) when well information or analytical data was unavailable for cross-section development.

Document Path: \\BCSAC01P\BC\_LAX\GIS\MAPDOCS\WORKING\CrossSections\FIG4-15a\_CrsSect\_LineA\_PCE\_11x17\_20150303.mxd

**SOUTHWEST  
A**

**NORTHEAST  
A'**

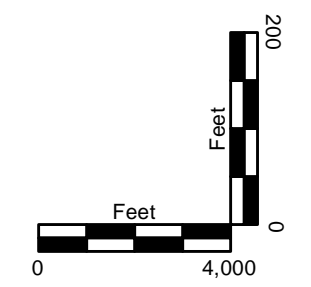


**Explanation**

- Tetrachloroethylene (PCE) concentration**
- 0.5 - 5 µg/L
- 5 - 50 µg/L
- 50 - 100 µg/L
- Tetrachloroethylene (PCE) contours
- Monitoring Well
- Tujunga Production Wells
- Water Level Elevation
- Depth Groundwater Encountered
- Ground Surface
- Well Screens
- Boreholes
- Fault

**FIGURE 4-15a  
TETRACHLOROETHYLENE (PCE) ISOCONCENTRATION  
CROSS SECTION - LINE A - A'  
San Fernando Groundwater Basin  
LADWP GIS Project  
Los Angeles, California**

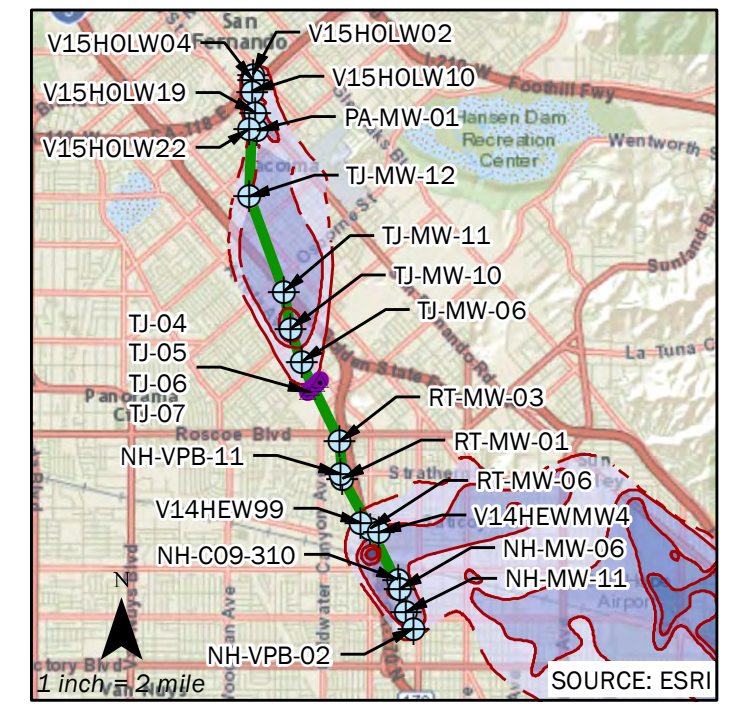
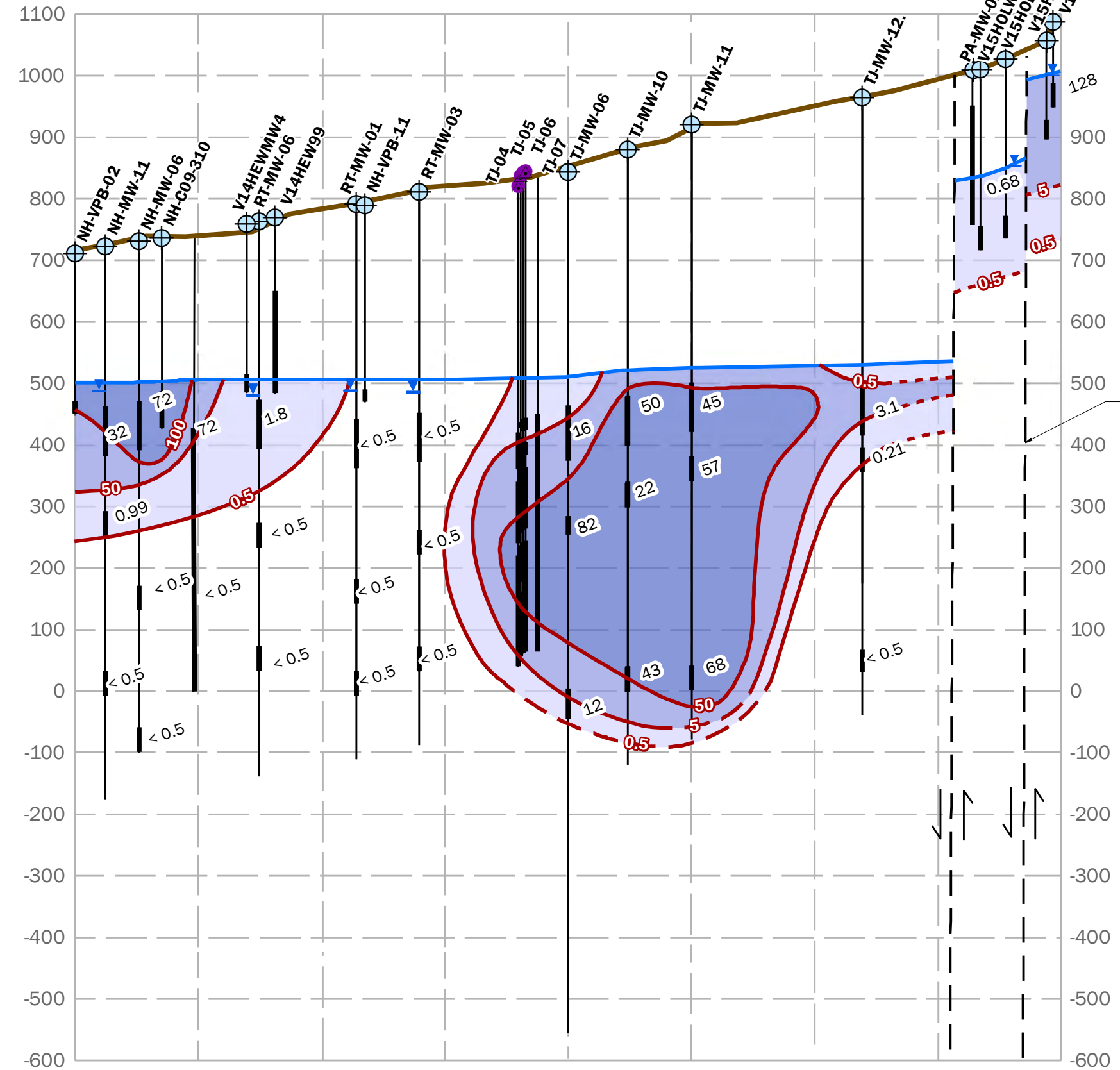
T. Crawford      Date: 3-4-2015      Project No. 146806



Note:  
1. The location map includes the shallow groundwater isoc concentration contours.  
2. Contours are based on plume maps (Appendix I) when well information or analytical data was unavailable for cross-section development.

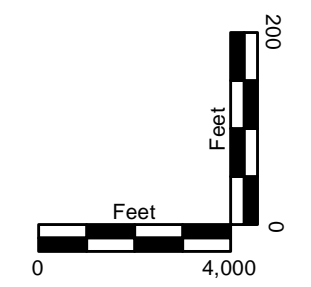
SOUTH  
B

NORTH  
B'



**Explanation**

- Tetrachloroethylene (PCE) Concentration**
- 0.5 - 5  $\mu\text{g/L}$
  - 5 - 50  $\mu\text{g/L}$
  - 50 - 100  $\mu\text{g/L}$
- Tetrachloroethylene (PCE) contours
  - Tetrachloroethylene (PCE) contours - Inferred
  - Tetrachloroethylene (PCE) contours - Inferred through Fault Zone
  - + Monitoring Wells
  - Tujunga Production Well
  - Water Level Elevation
  - Depth Groundwater Encountered
  - Well Screens
  - Boreholes
  - Faults



**FIGURE 4-15b**  
**TETRACHLOROETHYLENE (PCE) ISOCONCENTRATION**  
**CROSS SECTION - LINE B - B'**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

B. Tillotson & T. Crawford	Date: 3-4-2015	Project No. 146806
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**Brown and Caldwell**

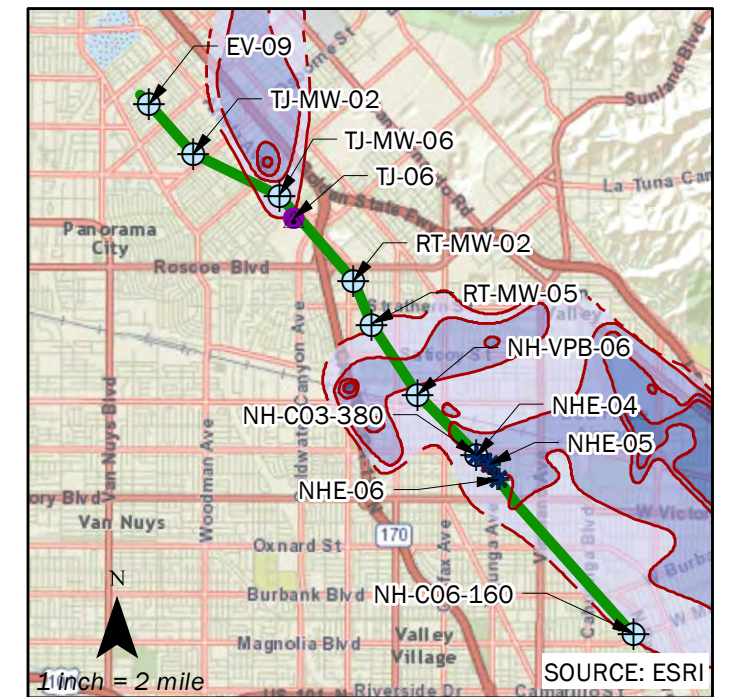
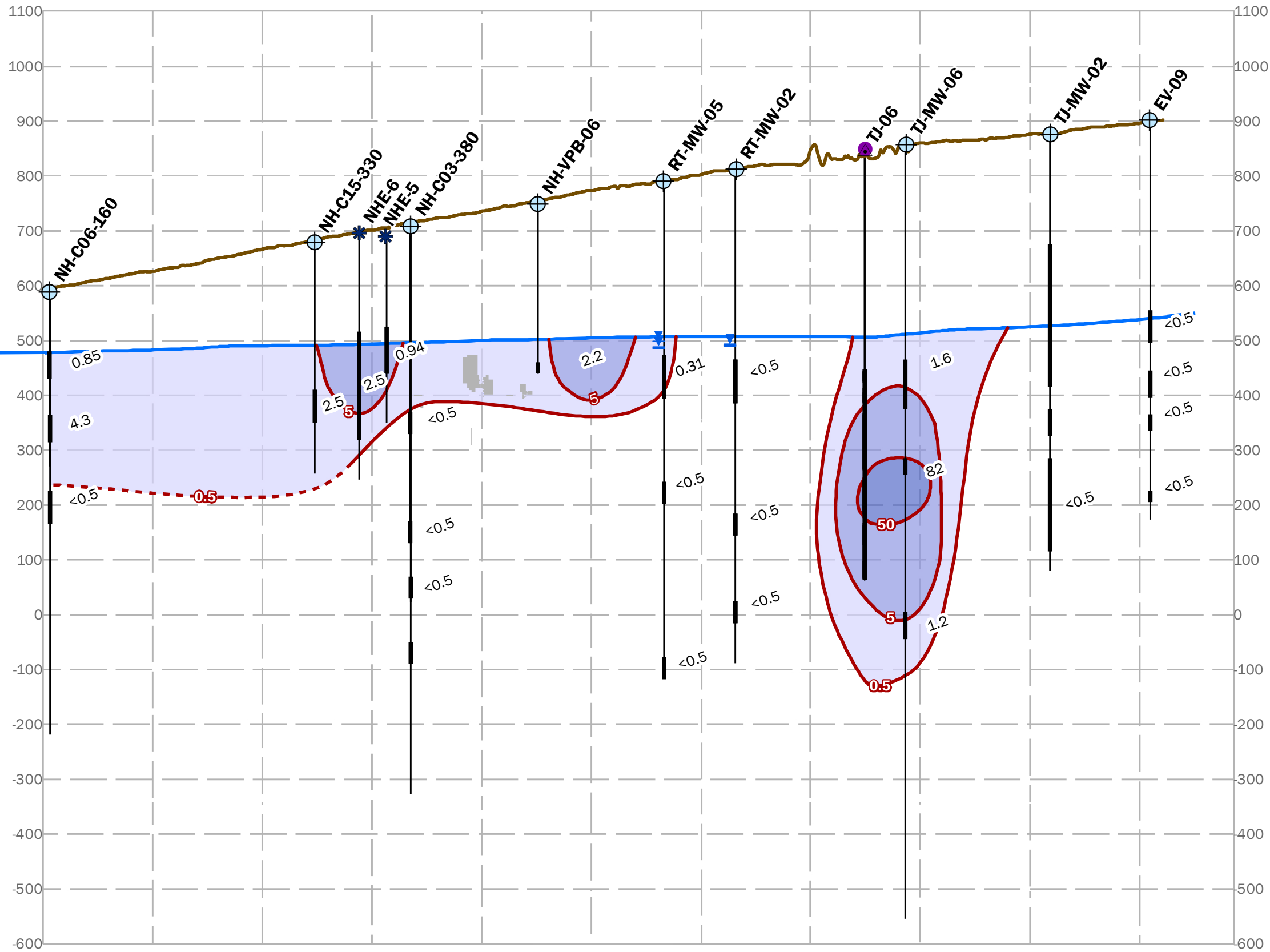
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Note:

1. The location map includes the shallow groundwater isoconcentration contours.
2. Contours are based on plume maps (Appendix I) when well information or analytical data was unavailable for cross-section development.

SOUTH  
C

NORTH  
C'

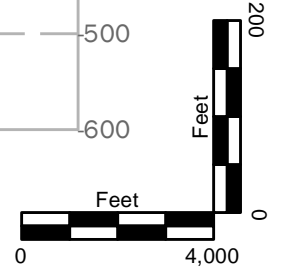


**Explanation**

- Tetrachloroethylene (PCE) concentration**
- 0.5 - 5 µg/L
- 5 - 50 µg/L
- ≥ 100 µg/L
- Tetrachloroethylene (PCE) contours
- Tetrachloroethylene (PCE) contours - Inferred
- ⊕ Monitoring Well
- Tujunga Production Wells
- ★ North Hollywood OU Extraction Well
- Ground Surface
- Water Level Elevation
- ▼ Depth Groundwater Encountered
- Well Screens
- Boreholes

**FIGURE 4-15c**  
**TETRACHLOROETHYLENE (PCE) ISOCONCENTRATION**  
**CROSS SECTION - LINE C - C'**  
**San Fernando Groundwater Basin**  
**LADWP GSIS Project**  
**Los Angeles, California**

B. Tillotson & T. Crawford | Date: 3-4-2015 | Project No. 146806

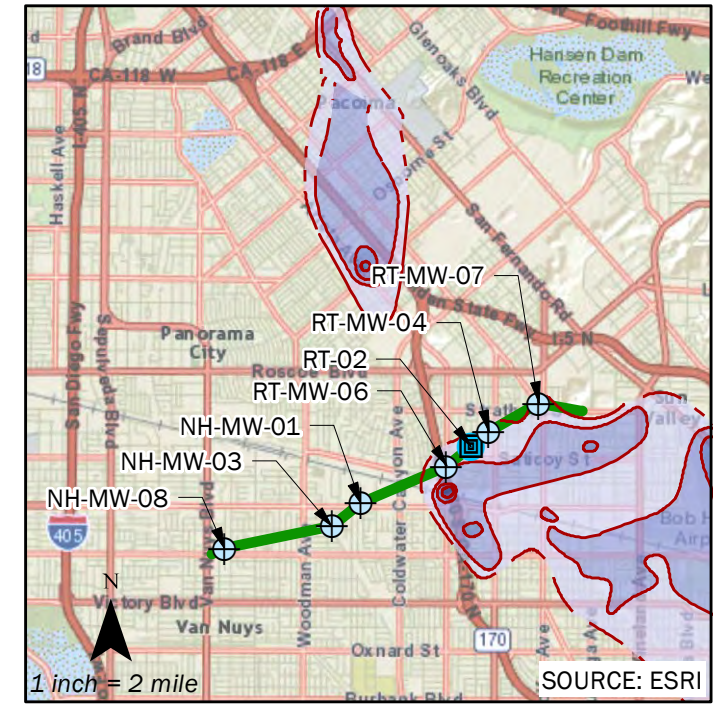
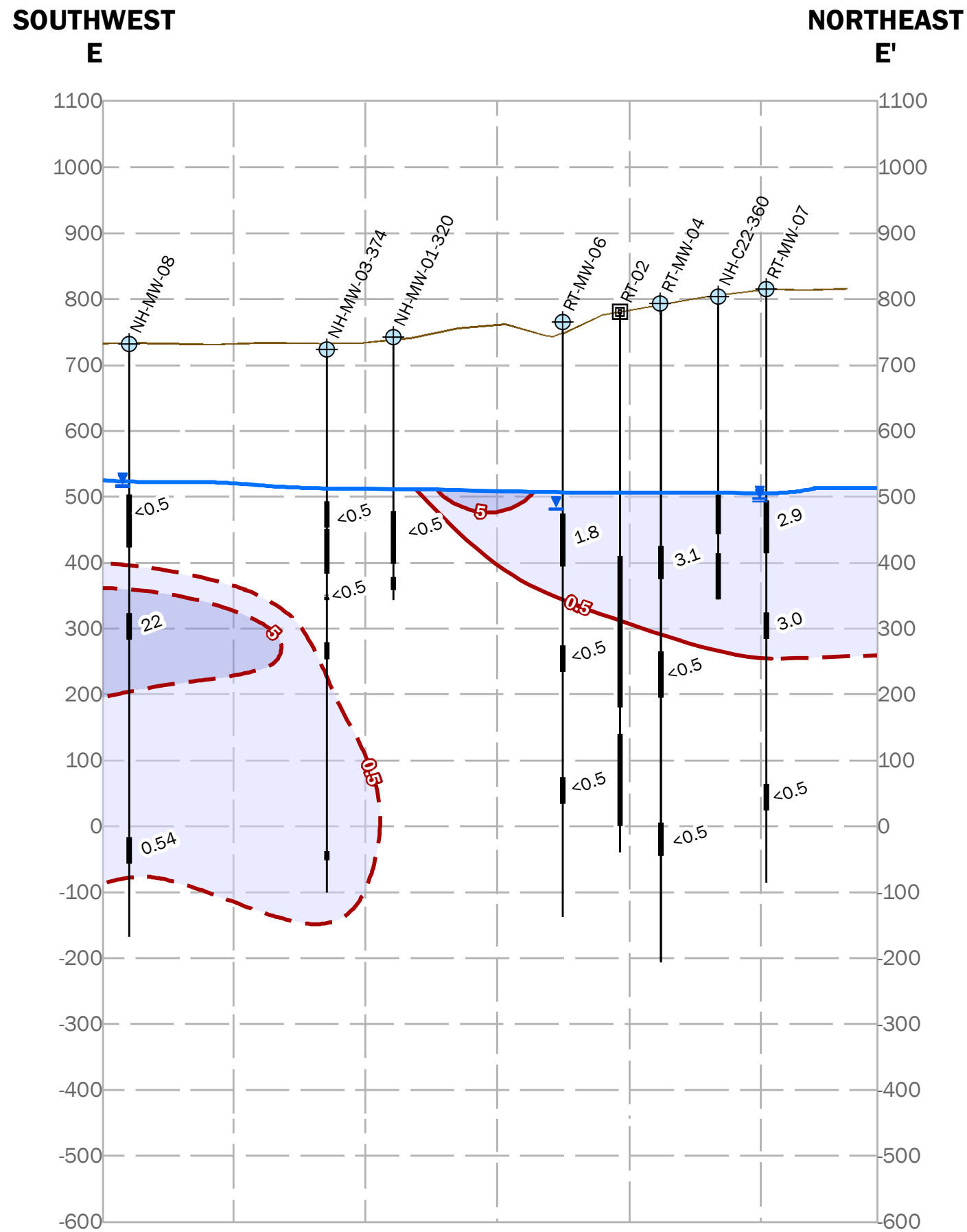


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Note:  
 1. The location map includes the shallow groundwater isoconcentration contours.  
 2. Contours are based on plume maps (Appendix I) when well information or analytical data was unavailable for cross-section development.



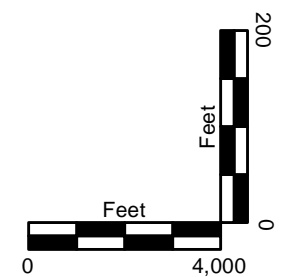
Document Path: \\BCSAC01P\BC\_LAX\GIS\MAPDOCS\WORKING\CrossSections\FIG4-15d\_CrsSect\_LineE\_PCE\_11x17\_20150303.mxd



**Explanation**

- Tetrachloroethylene (PCE) Concentration**
- 0.5 - 5 µg/L
  - 5 - 50 µg/L
  - Tetrachloroethylene (PCE) contours
  - Tetrachloroethylene (PCE) contours - Inferred
  - Water Level Elevation
  - Depth Groundwater Encountered
  - Ground Surface
  - Well Screens
  - Boreholes

- Note:
1. The location map includes the shallow groundwater isoconcentration contours.
  2. Contours are based on plume maps (Appendix I) when well information or analytical data was unavailable for cross-section development.

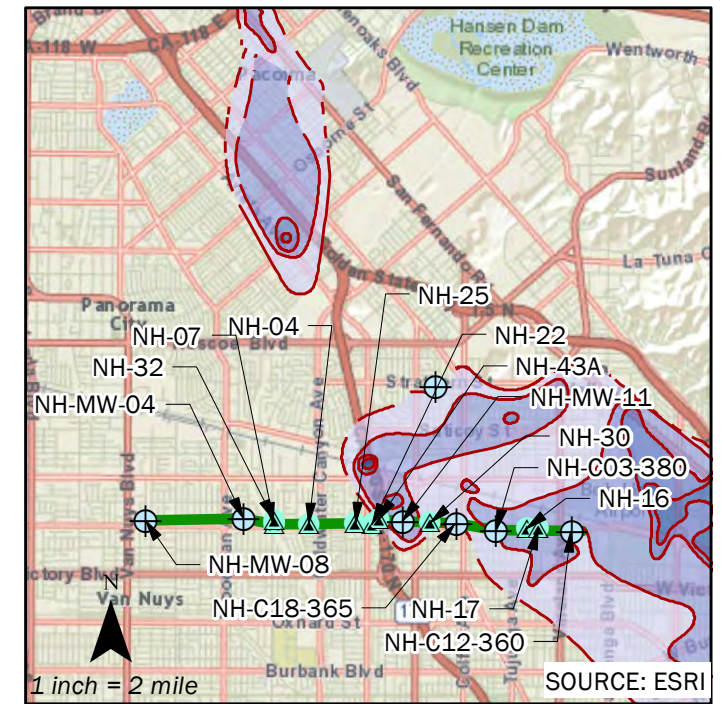
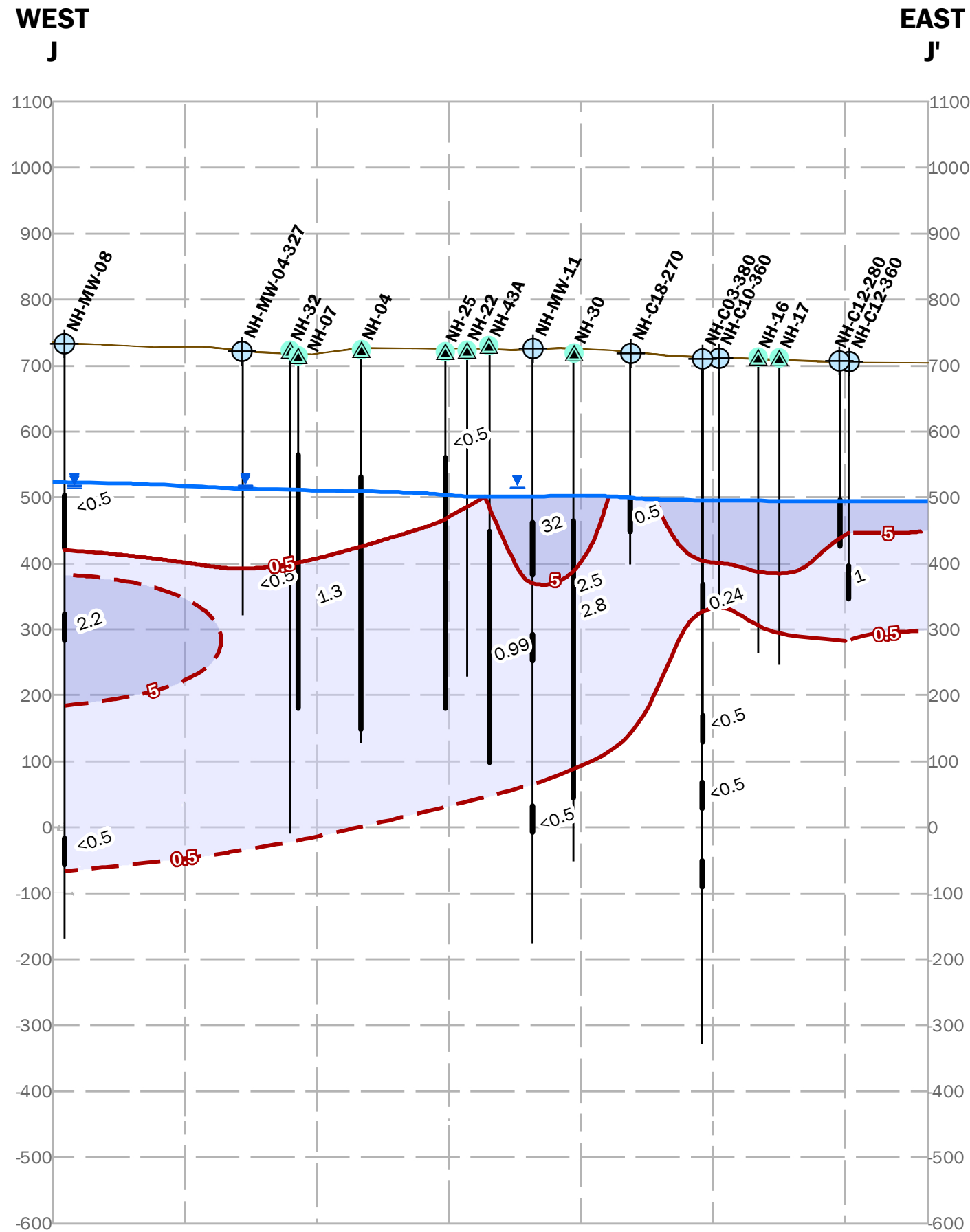


Elevation (ft) Mean Sea Level

**FIGURE 4-15d**  
**TETRACHLOROETHYLENE (PCE) ISOCONCENTRATION**  
**CROSS SECTION - LINE E - E'**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

T. Crawford      Date: 3-5-2015      Project No. 146806

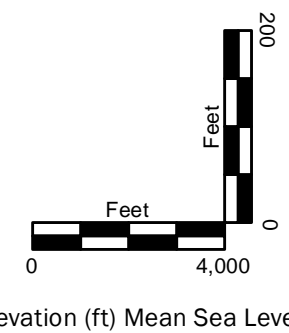




**Explanation**

- Tetrachloroethylene (PCE) concentration**
- 0.5 - 5  $\mu\text{g/L}$
  - 5 - 50  $\mu\text{g/L}$
  - Tetrachloroethylene (PCE) contours
  - Tetrachloroethylene (PCE) contours - Inferred
  - + Monitoring Well
  - ▲ North Hollywood Production Well
  - Water Level Elevation
  - ▼ Depth Groundwater Encountered
  - Ground Surface
  - Well Screens
  - Boreholes

- Note:
1. The location map includes the shallow groundwater isoconcentration contours.
  2. Contours are based on plume maps (Appendix I) when well information or analytical data was unavailable for cross-section development.

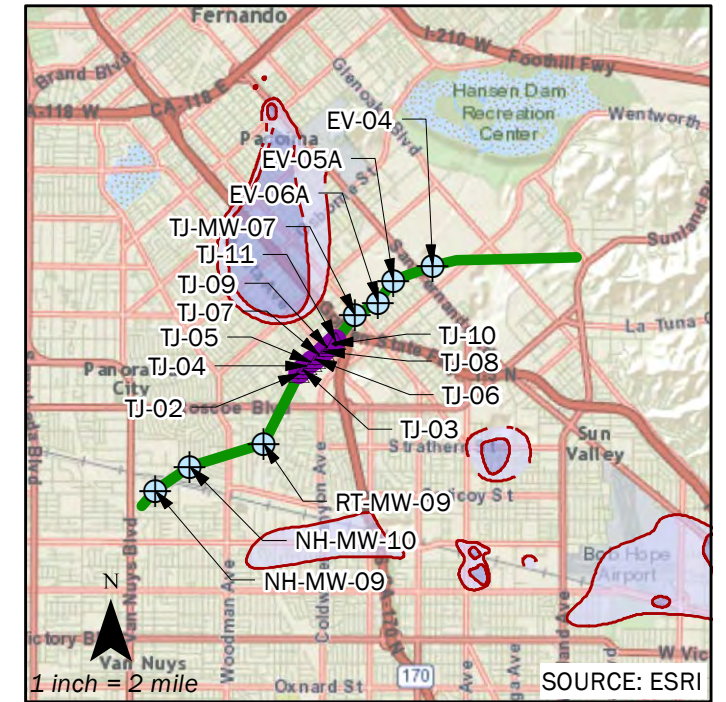
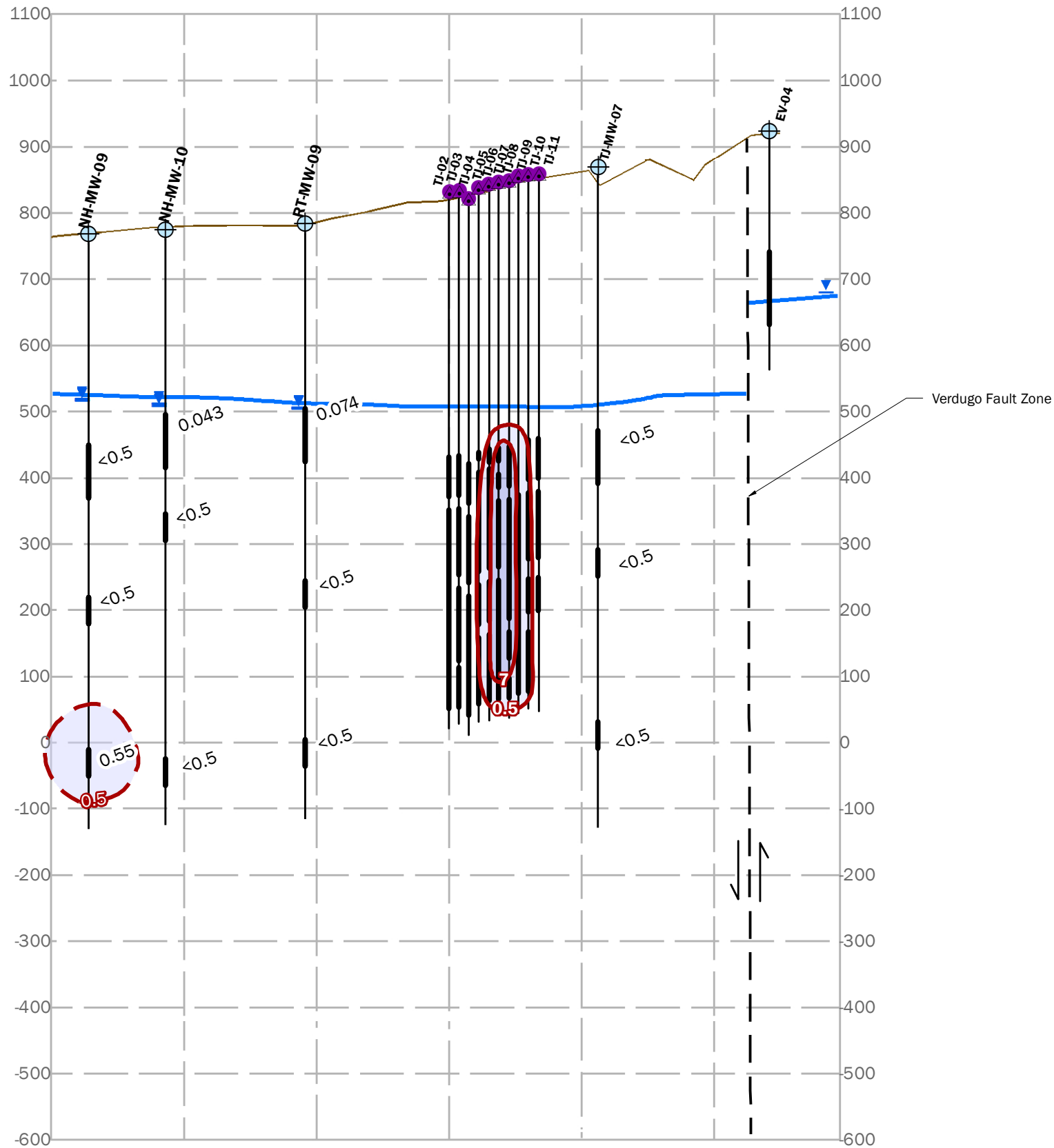


**FIGURE 4-15e**  
**TETRACHLOROETHYLENE (PCE) ISOCONCENTRATION**  
**CROSS SECTION - LINE J - J'**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

T. Crawford	Date: 3-5-2015	Project No. 146806

**SOUTHWEST  
A**

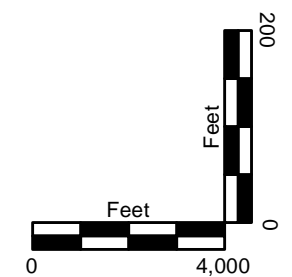
**NORTHEAST  
A'**



**Explanation**

- 1,1 Dichloroethylene concentration**
- 0.5 - 7 µg/L
- 7 - 10 µg/L
- 1,1 Dichloroethylene contours
- 1,1 Dichloroethylene contours - Inferred
- Monitoring Well
- Tujunga Production Wells
- Water Level Elevation
- Depth Groundwater Encountered
- Ground Surface
- Well Screens
- Boreholes
- Fault

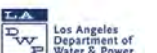
- Note:
1. The location map includes the shallow groundwater isoconcentration contours.
  2. Contours are based on plume maps (Appendix I) when well information or analytical data was unavailable for cross-section development.



Elevation (ft) Mean Sea Level

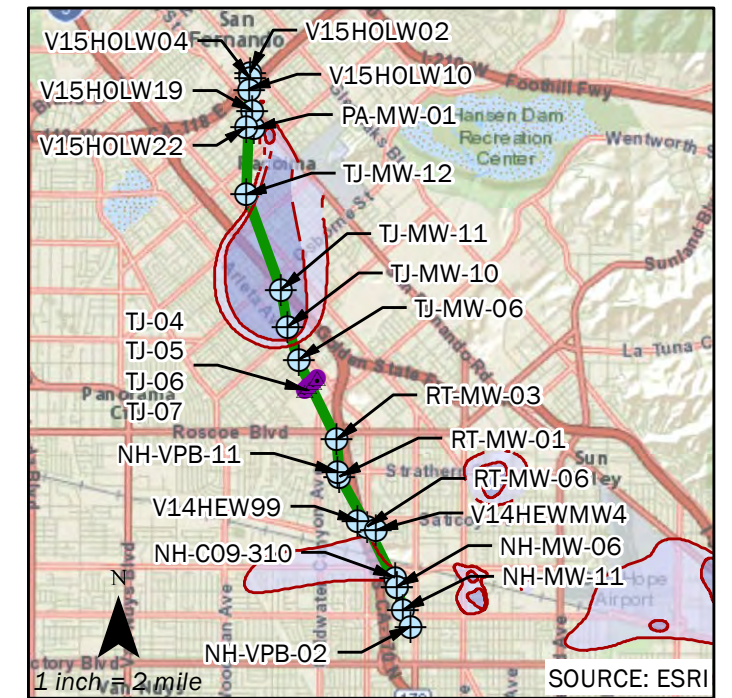
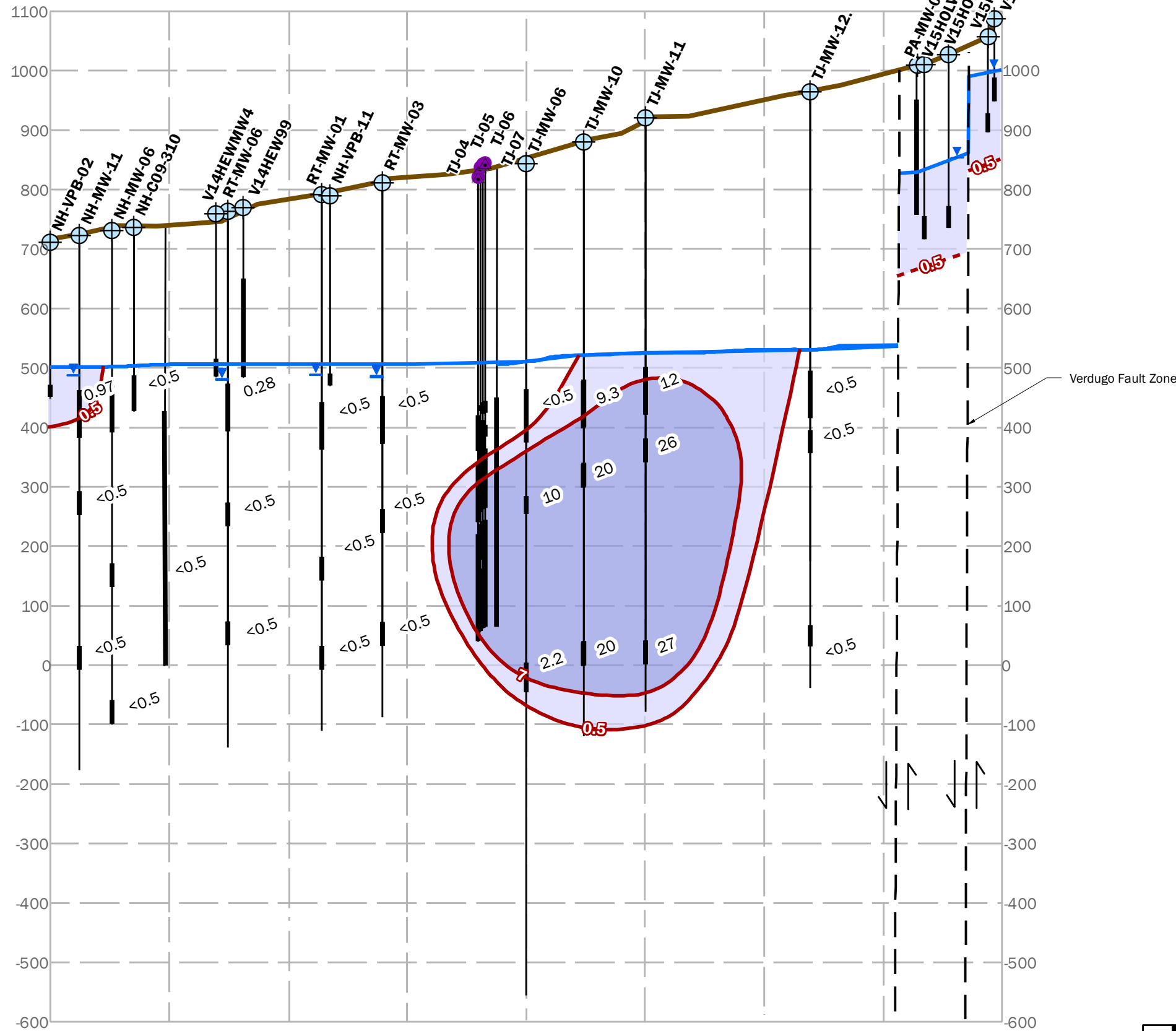
**FIGURE 4-16a**  
**1,1-DICHLOROETHYLENE ISOCONCENTRATION**  
**CROSS SECTION - LINE A - A'**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

T. Crawford Date: 3-3-2015 Project No. 146468.14



**SOUTH  
B**

**NORTH  
B'**

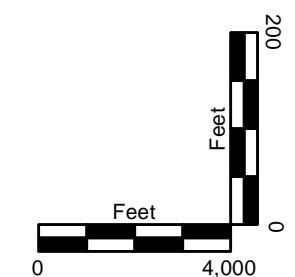


**Explanation**

- 1,1 Dichloroethylene concentration**
- 0.5 - 7  $\mu\text{g/L}$
- 7 - 10  $\mu\text{g/L}$
- 1,1 Dichloroethylene contours
- 1,1 Dichloroethylene contours - Inferred through Fault Zone
- + Monitoring Wells
- Tujungga Production Well
- Water Level Elevation
- Depth Groundwater Encountered
- Ground Surface
- Well Screens
- Boreholes
- Faults

**FIGURE 4-16b**  
**1,1-DICHLOROETHYLENE ISOCONCENTRATION**  
**CROSS SECTION - LINE B - B'**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

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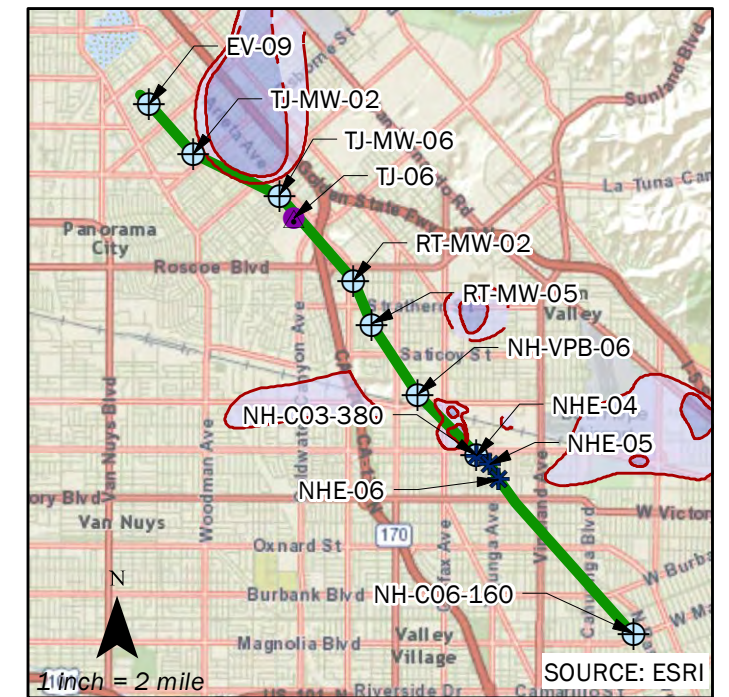
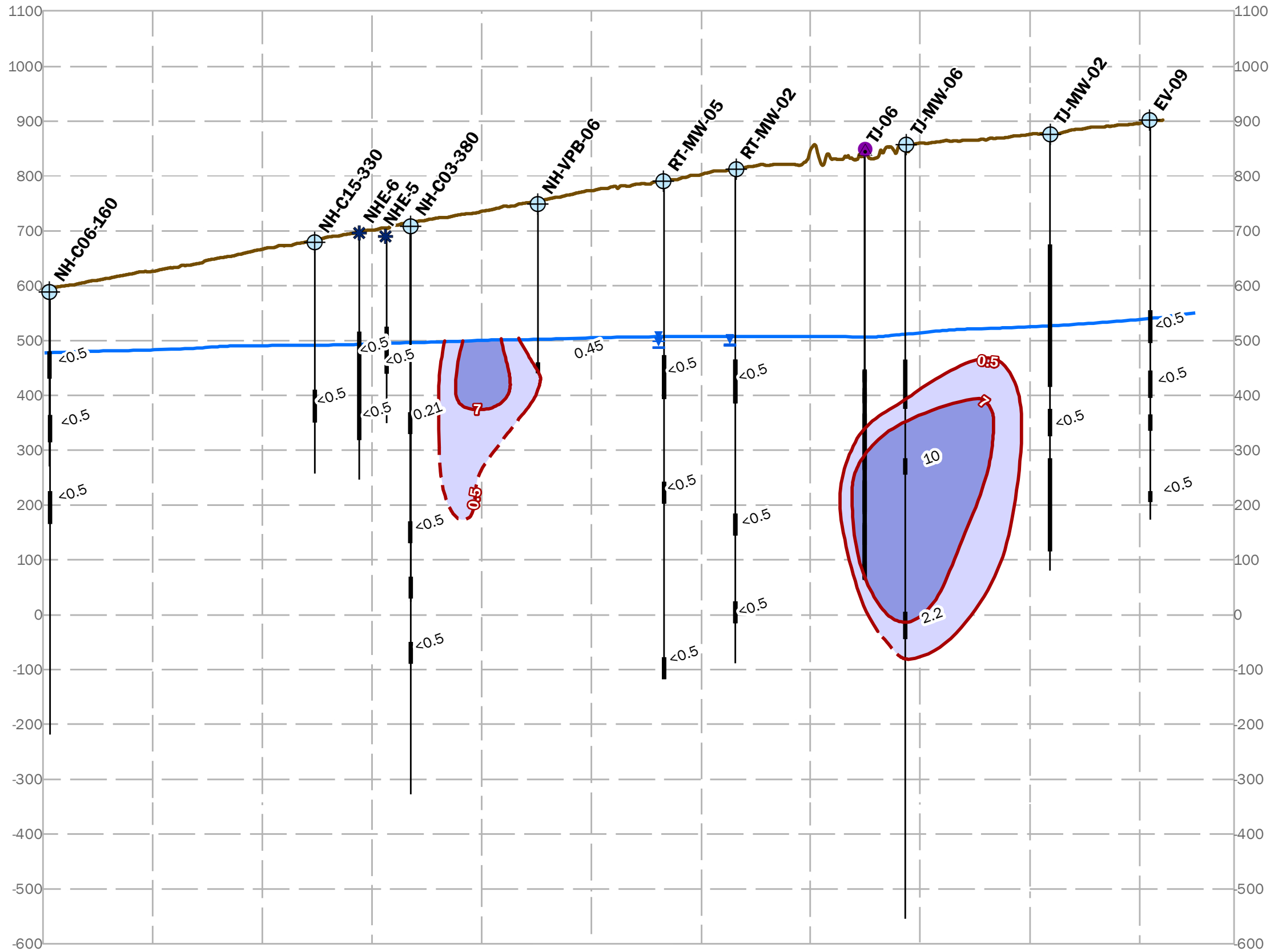


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Note:  
 1. The location map includes the shallow groundwater isoconcentration contours.  
 2. Contours are based on plume maps (Appendix I) when well information or analytical data was unavailable for cross-section development.

SOUTH  
C

NORTH  
C'

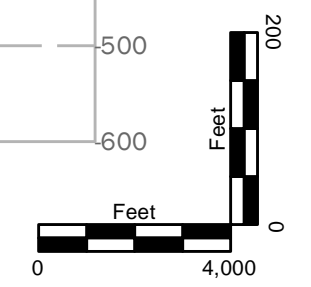


**Explanation**

- 1,1 Dichloroethylene concentration**
- 0.5 - 7  $\mu\text{g/L}$
- 7 - 50  $\mu\text{g/L}$
- 1,1 Dichloroethylene contours - Inferred
- 1,1 Dichloroethylene contours
- + Monitoring Well
- Tujunga Production Wells
- ★ North Hollywood OU Extraction Well
- Ground Surface
- Water Level Elevation
- Depth Groundwater Encountered
- Well Screens
- Boreholes

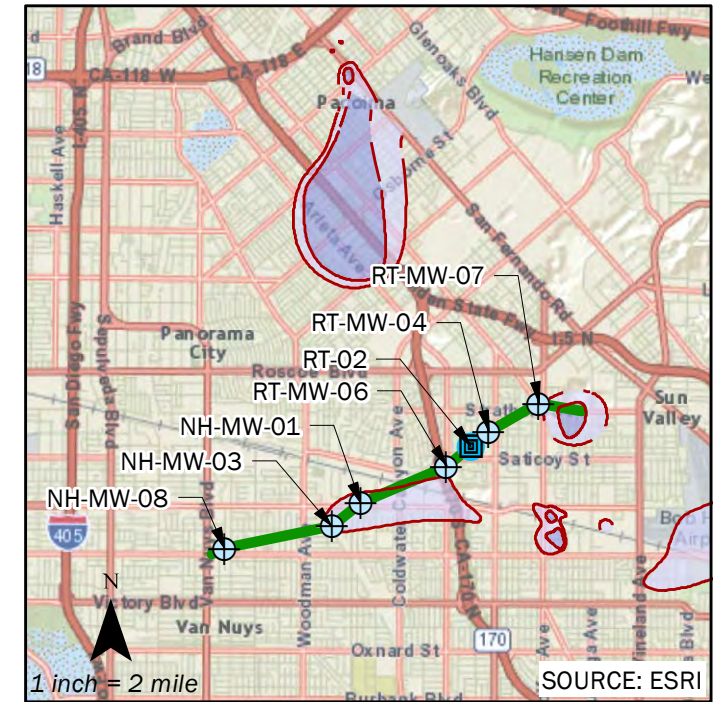
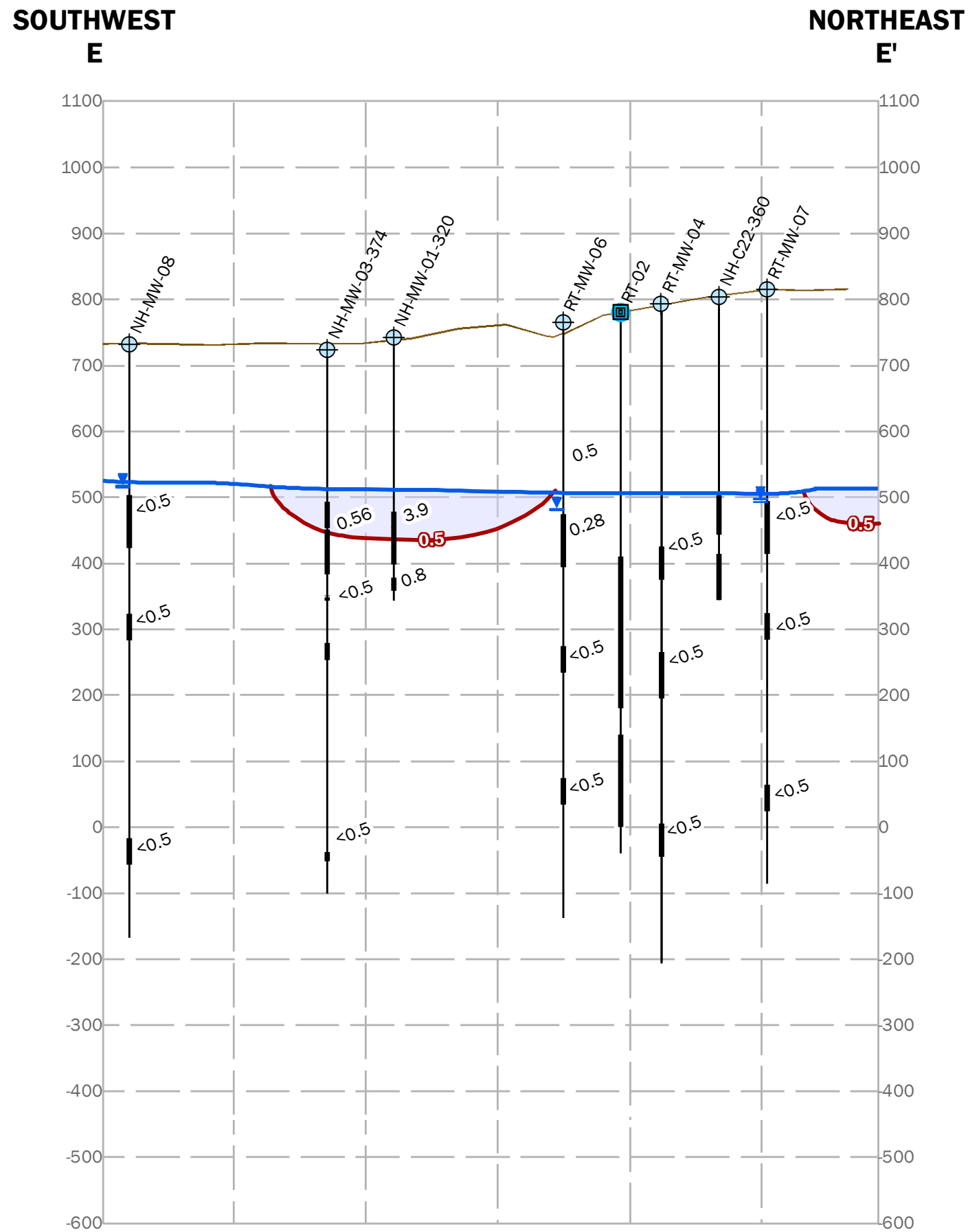
**FIGURE 4-16c**  
**1,1-DICHLOROETHYLENE ISOCONCENTRATION**  
**CROSS SECTION - LINE C - C'**  
**San Fernando Groundwater Basin**  
**LADWP GSIS Project**  
**Los Angeles, California**

B. Tillotson & T. Crawford | Date: 3-3-2015 | Project No. 146806



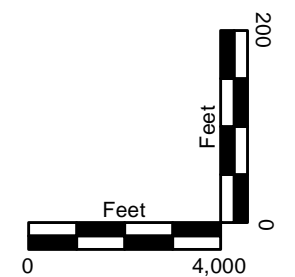
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Note:  
 1. The location map includes the shallow groundwater isoconcentration contours.  
 2. Contours are based on plume maps (Appendix I) when well information or analytical data was unavailable for cross-section development.



**Explanation**

- 1,1 Dichloroethylene concentration**
- 0.5 - 7 µg/L
- 1,1 Dichloroethylene contours
- ⊕ Monitoring Well
- ⊞ Rinaldi-Toluca Production Well
- Water Level Elevation
- ▼ Depth Groundwater Encountered
- Ground Surface
- Well Screens
- Boreholes

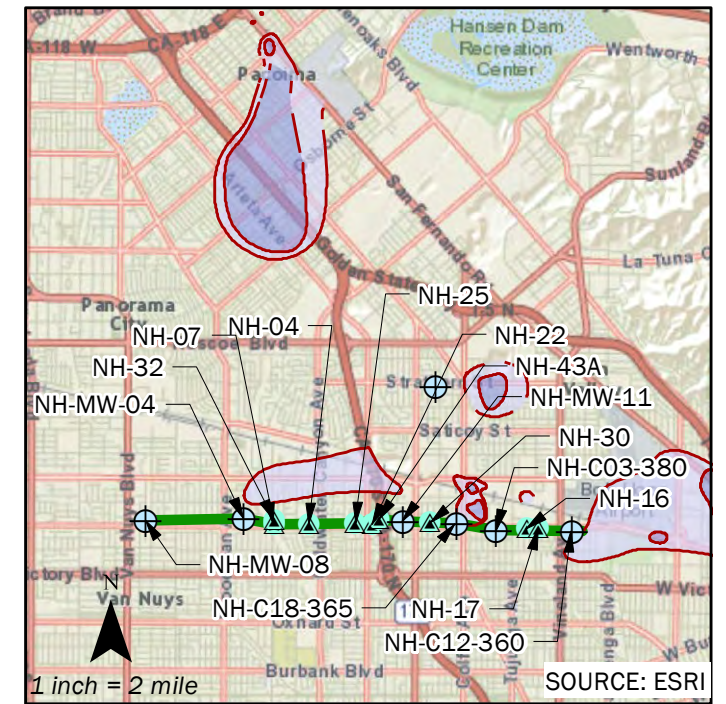
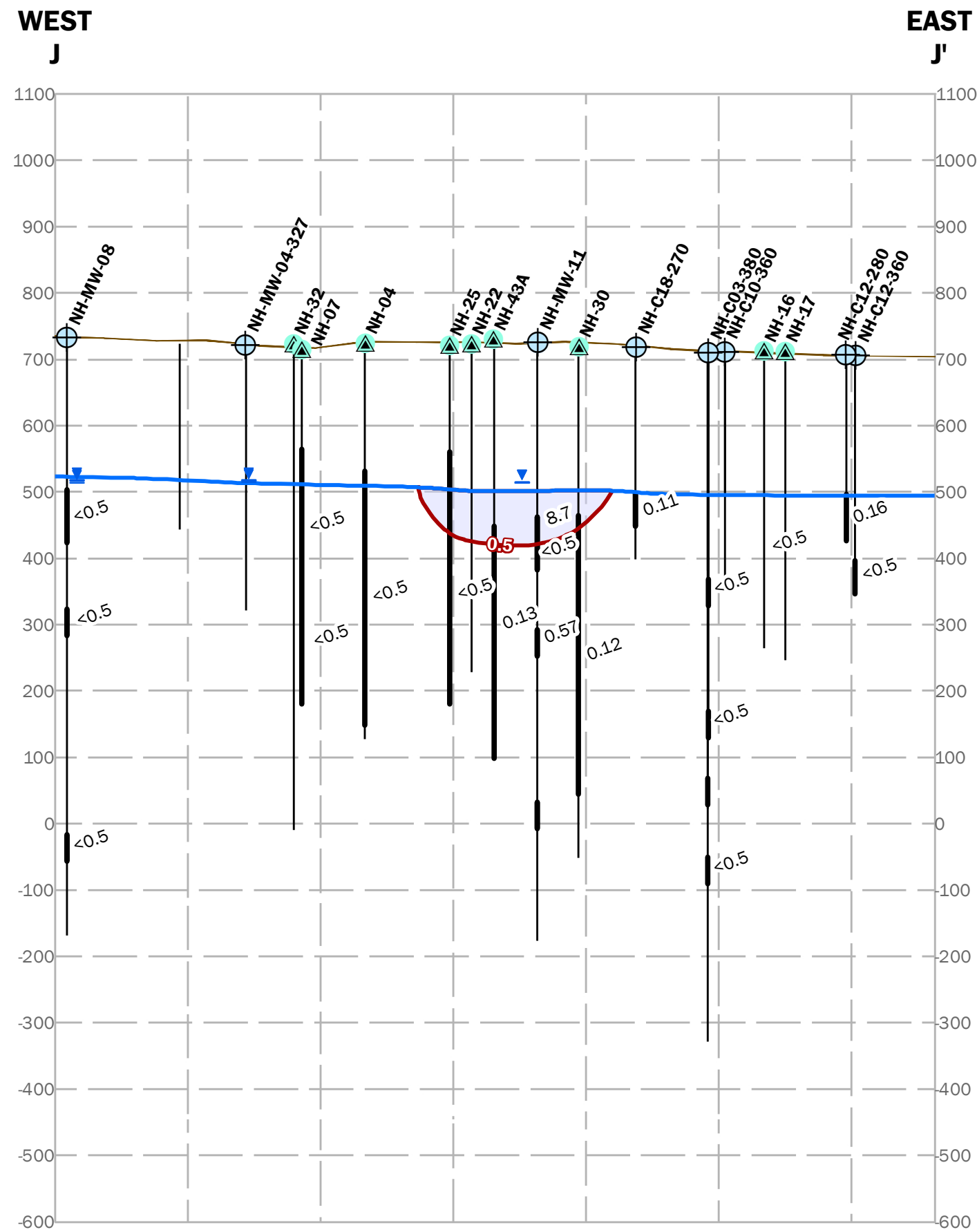


Elevation (ft) Mean Sea Level

**FIGURE 4-16d**  
**1,1-DICHLOROETHYLENE ISOCONCENTRATION**  
**CROSS SECTION - LINE E - E'**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

T. Crawford	Date: 3-3-2015	Project No. 146806
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Document Path: \\BCSAC01P\BC\_LAX\GIS\MAPDOCS\WORKING\CrossSections\FIG4-16e\_CrsSect\_LineJ\_DCE11\_11x17\_20150224.mxd

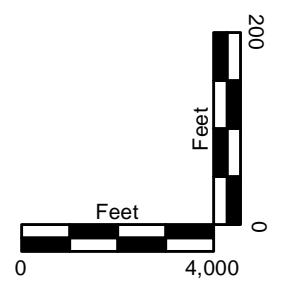


**Explanation**

- 1,1 Dichloroethylene concentration**
- 0.5 - 7 µg/L
- 1,1 Dichloroethylene contours
- ⊕ Monitoring Well
- ▲ North Hollywood Production Well
- Water Level Elevation
- ▼ Depth Groundwater Encountered
- Ground Surface
- Well Screens
- Boreholes

**FIGURE 4-16e**  
**1,1-DICHLOROETHYLENE ISOCONCENTRATION**  
**CROSS SECTION - LINE J - J'**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

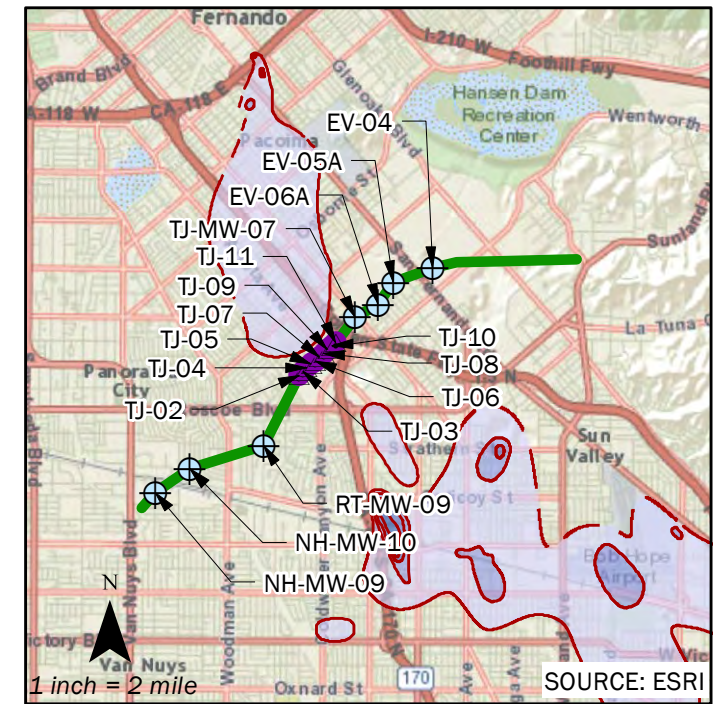
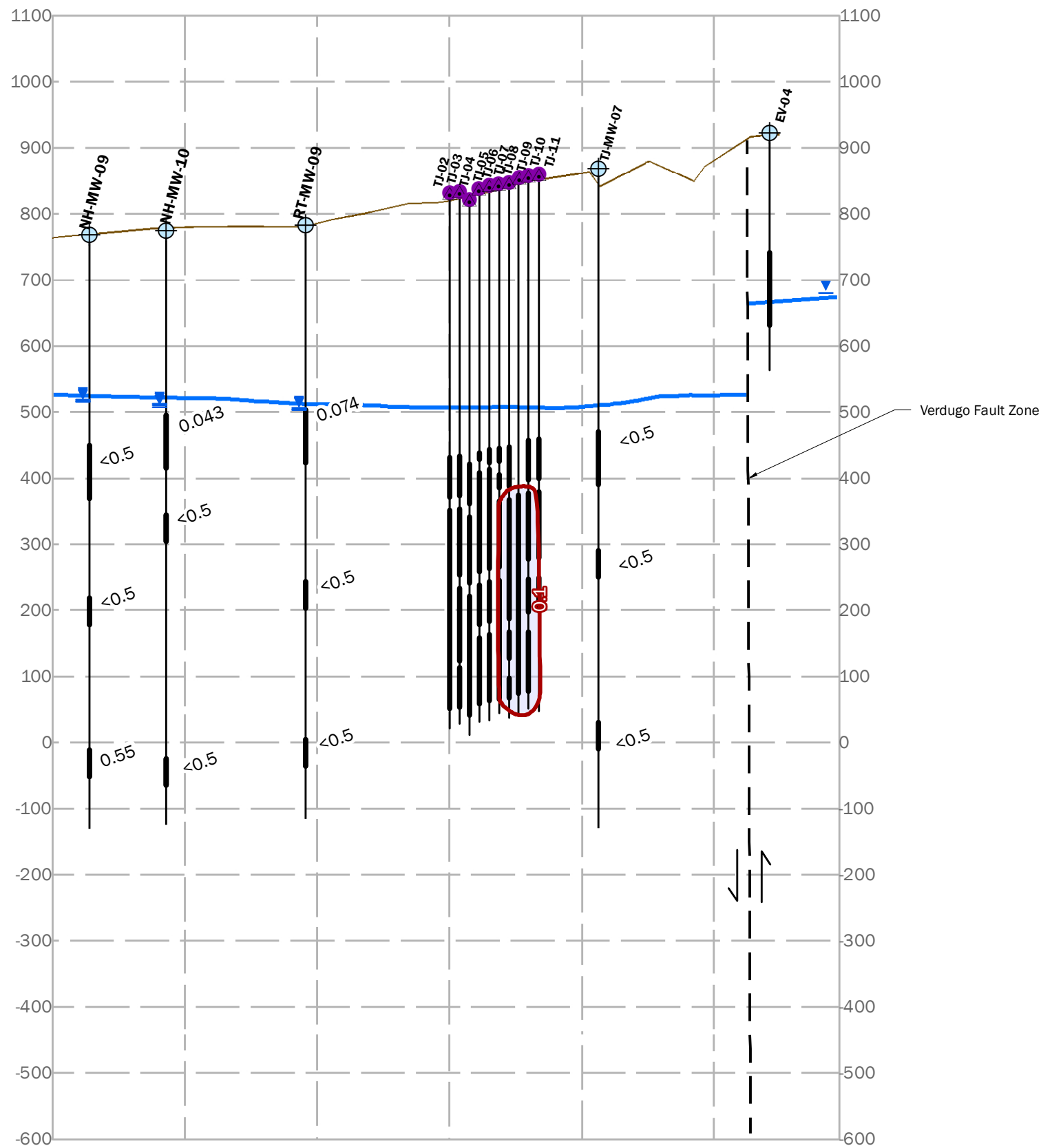
T. Crawford      Date: 3-3-2015      Project No. 146806



Note:  
 1. The location map includes the shallow groundwater isoconcentration contours.  
 2. Contours are based on plume maps (Appendix I) when well information or analytical data was unavailable for cross-section development.

**SOUTHWEST**  
**A**

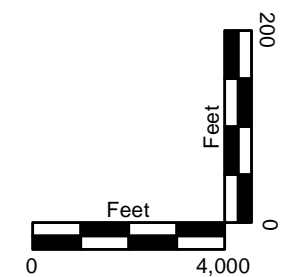
**NORTHEAST**  
**A'**



**Explanation**

- 1,4-Dioxane concentration**
- 0.1 - 3 µg/L
- 1,4-Dioxane contours
- ⊕ Monitoring Well
- Tujunga Production Wells
- Water Level Elevation
- Depth Groundwater Encountered
- Ground Surface
- Well Screens
- Boreholes
- Fault

- Note:
1. The location map includes the shallow groundwater isoconcentration contours.
  2. Contours are based on plume maps (Appendix I) when well information or analytical data was unavailable for cross-section development.



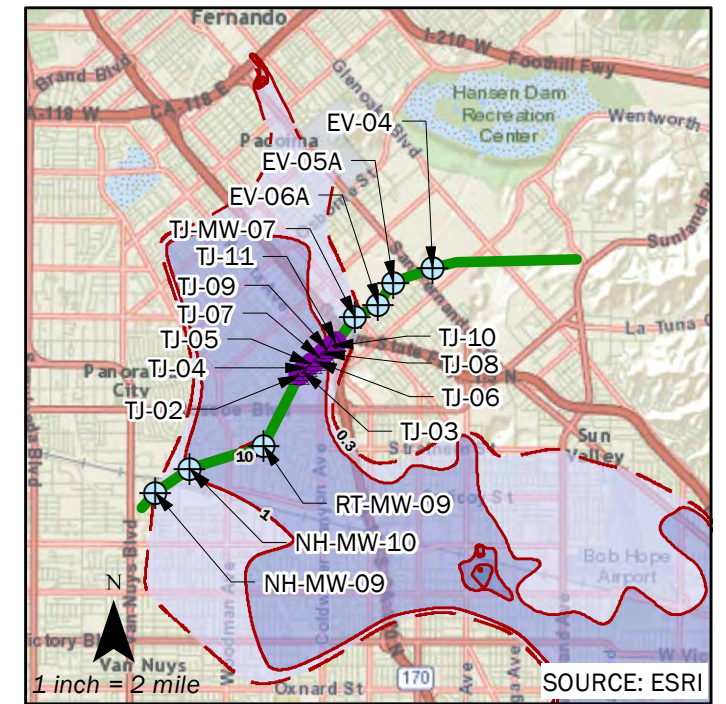
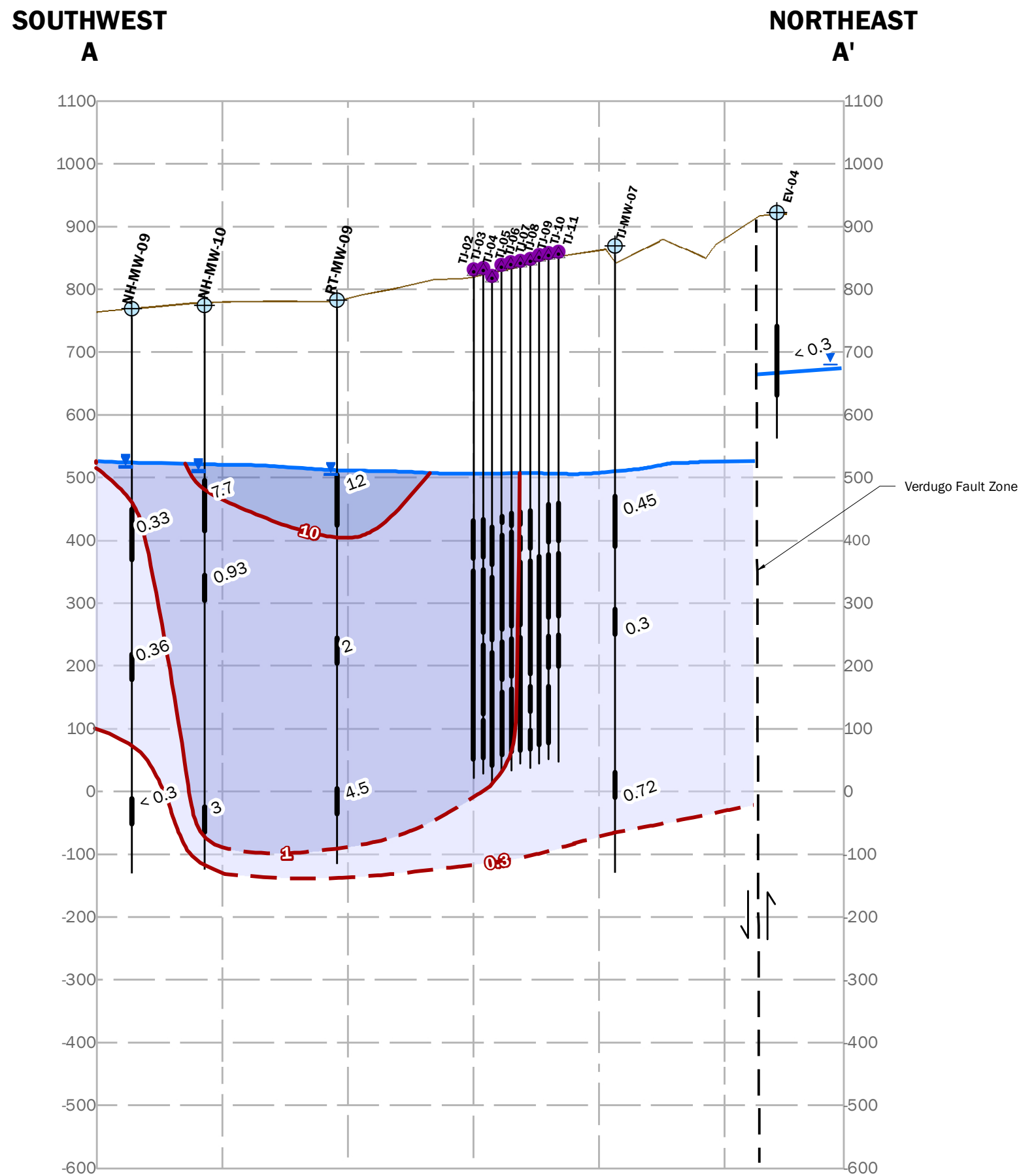
Elevation (ft) Mean Sea Level

**FIGURE 4-17a**  
**1,4-DIOXANE ISOCONCENTRATION**  
**CROSS SECTION - LINE A - A'**  
**San Fernando Groundwater Basin**  
**LADWP GSIS Project**  
**Los Angeles, California**

T. Crawford      Date: 2-23-2015      Project No. 146806

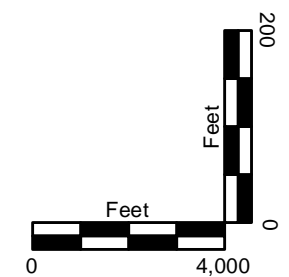






**Explanation**

- Chromium, Hexavalent concentration**
- 0.3 - 1 µg/L
  - 1 - 10 µg/L
  - 10 - 100 µg/L
  - Chromium, Hexavalent contours
  - Chromium, Hexavalent contours - Inferred
  - ⊕ Monitoring Well
  - Tujunga Production Wells
  - Water Level Elevation
  - Depth Groundwater Encountered
  - Ground Surface
  - Well Screens
  - Boreholes
  - Fault



**FIGURE 4-18a**  
**CHROMIUM, HEXAVALENT ISOCONCENTRATION**  
**CROSS SECTION - LINE A - A'**  
**San Fernando Groundwater Basin**  
**LADWP GSIS Project**  
**Los Angeles, California**

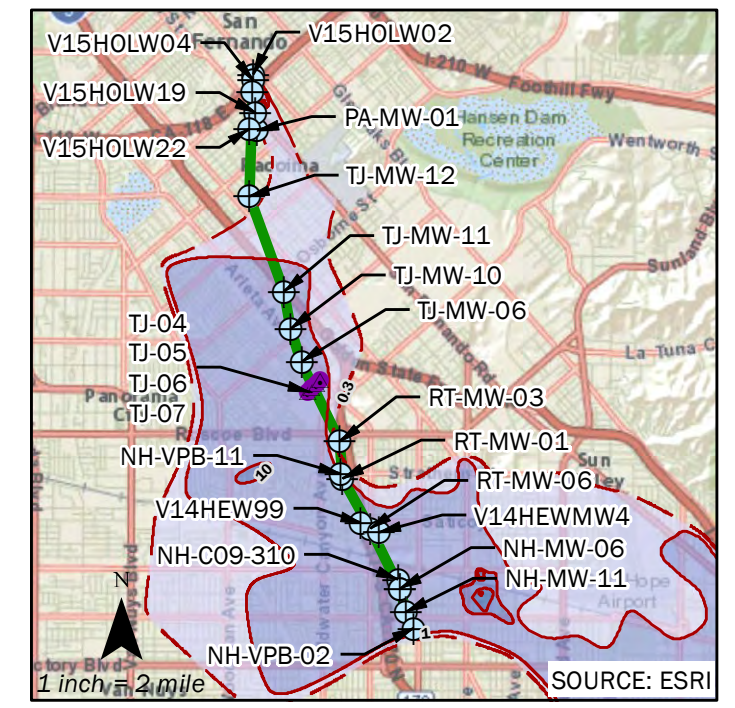
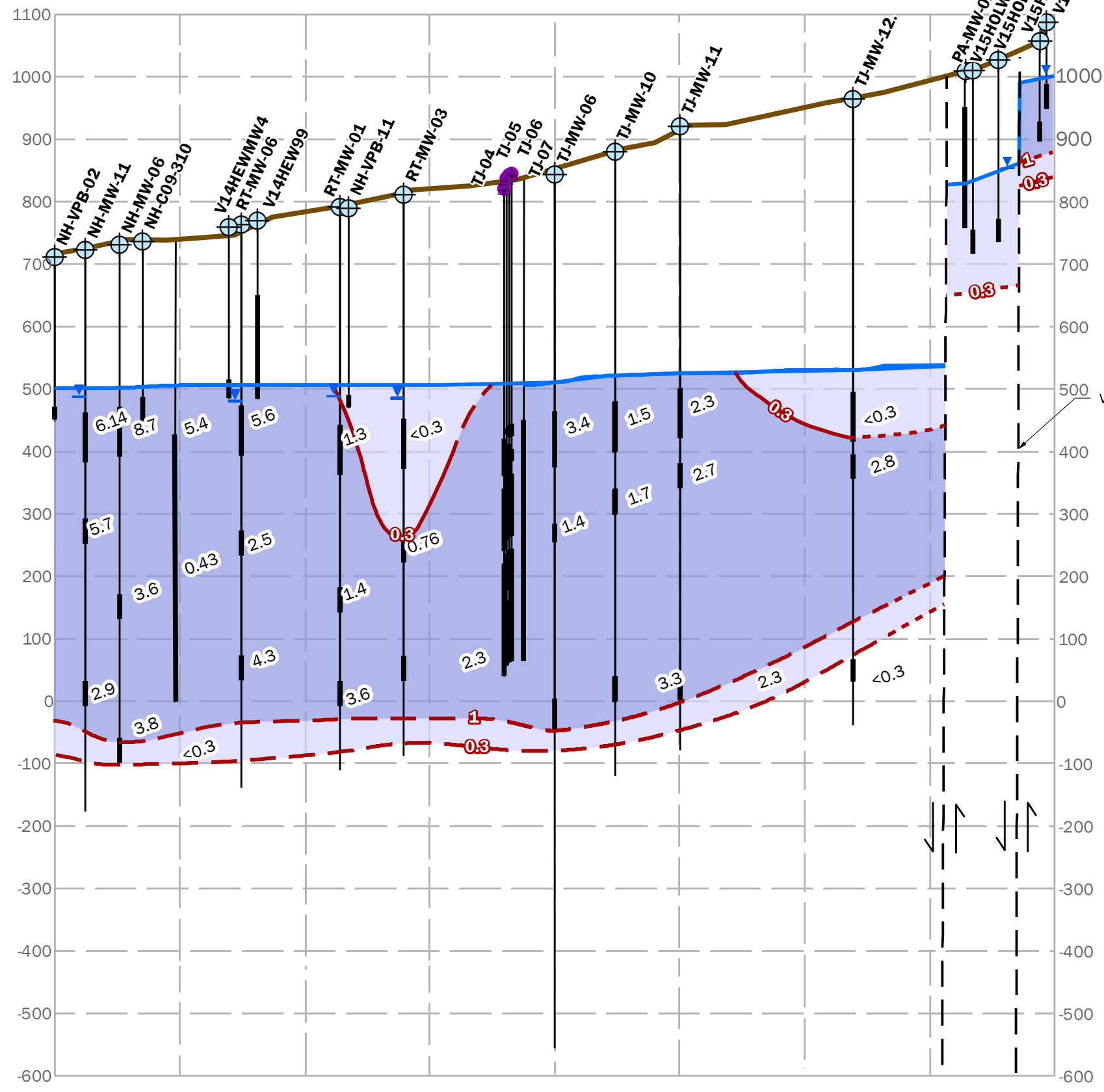
T. Crawford      Date: 3-3-2015      Project No. 146806



Note:  
 1. The location map includes the shallow groundwater isoconcentration contours.  
 2. Contours are based on plume maps (Appendix I) when well information or analytical data was unavailable for cross-section development.

SOUTH  
B

NORTH  
B'



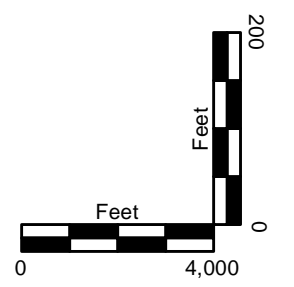
**Explanation**

- Chromium, Hexavalent concentration**
- 0.3 - 1 µg/L
- 1 - 10 µg/L
- Chromium, Hexavalent contours
- Chromium, Hexavalent contours - Inferred
- Chromium, Hexavalent contours - Inferred through Fault Zone
- Monitoring Wells
- Water Level Elevation
- Depth Groundwater Encountered
- Well Screens
- Boreholes
- Faults

Verdugo Fault Zone

**FIGURE 4-18b**  
**CHROMIUM, HEXAVALENT ISOCONCENTRATION**  
**CROSS SECTION - LINE B - B'**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

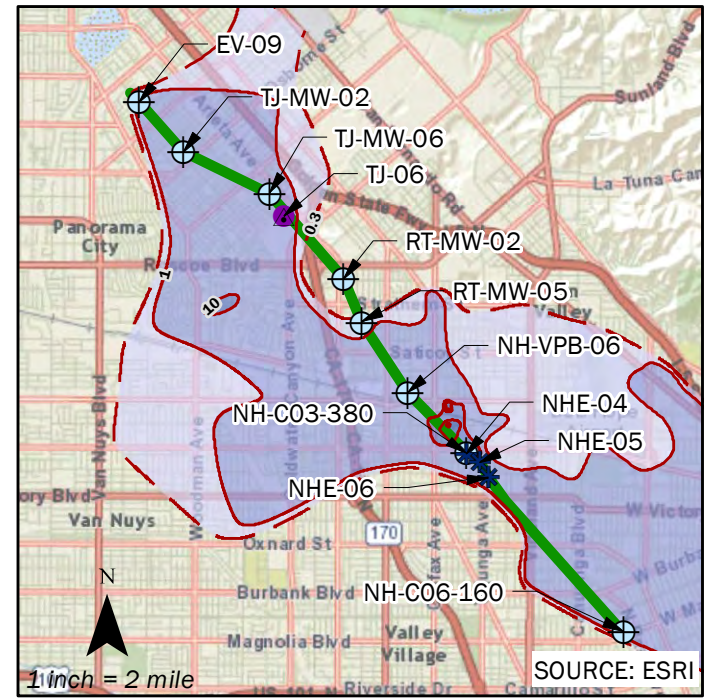
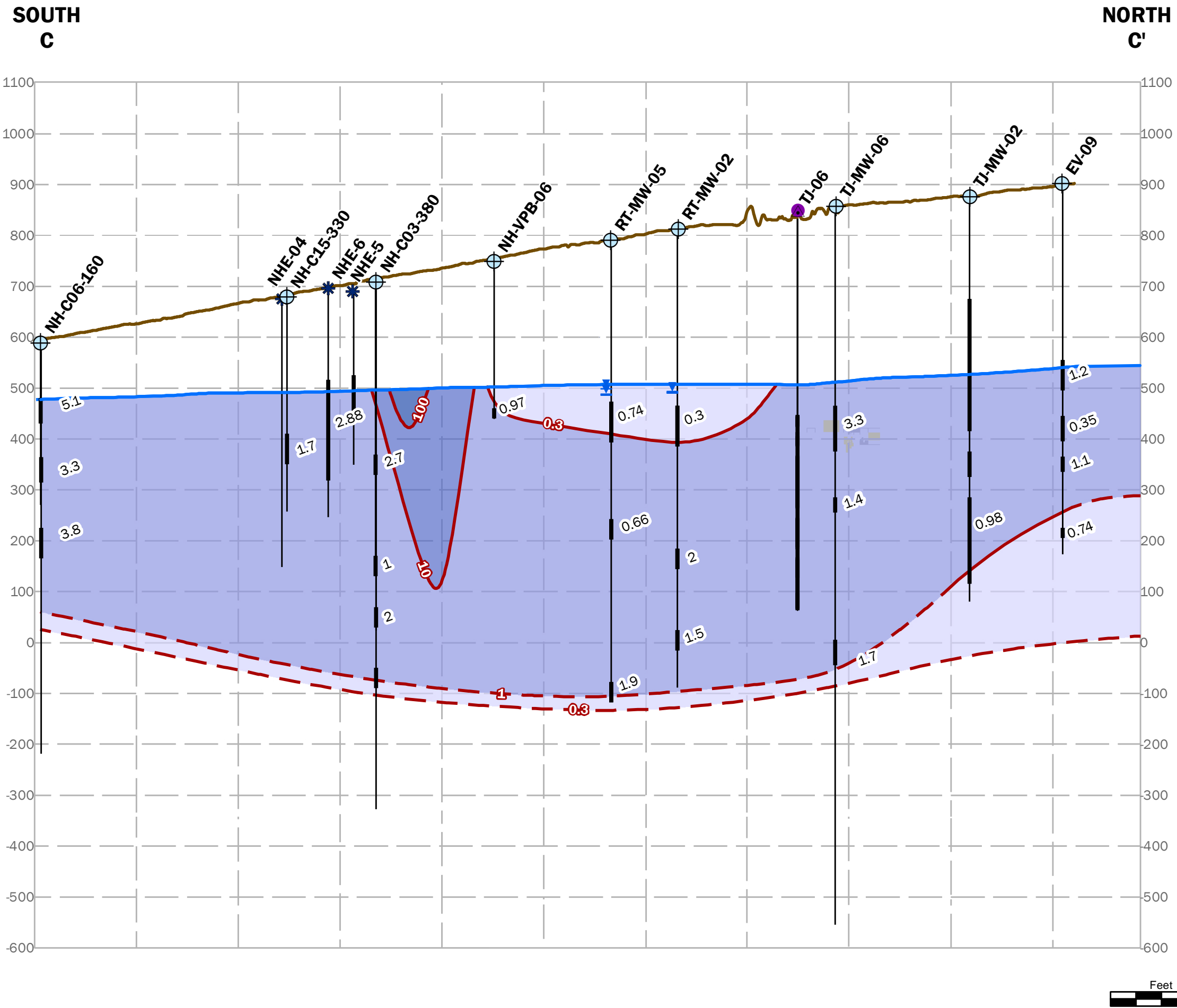
B. Tillotson & T. Crawford | Date: 3-3-2015 | Project No. 146806



Document Path: \\BCSAC01P\BC\_LAX\GIS\MAPDOCS\WORKING\CrossSections\FIG4-18b\_CrsSect\_LineB\_HexChrome\_11x17\_20150303.mxd

Note:  
 1. The location map includes the shallow groundwater isoconcentration contours.  
 2. Contours are based on plume maps (Appendix I) when well information or analytical data was unavailable for cross-section development.

Document Path: \\BCSAC01P\BC\_LAX\GIS\MAPDOCS\WORKING\CrossSections\FIG4-18c\_CrsSect\_LineC\_HexChrome\_11x17\_20150303.mxd



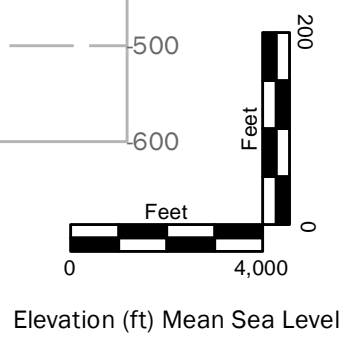
- Explanation**
- Chromium, Hexavalent concentration**
    - 0.3 - 1 µg/L
    - 1 - 10 µg/L
    - 10 - 100 µg/L
    - 100 - 1000 µg/L
  - Chromium, Hexavalent contours
  - Chromium, Hexavalent contours - Inferred
  - Monitoring Well
  - Tujunga Production Wells
  - North Hollywood OU Extraction Well
  - Water Level Elevation
  - Depth Groundwater Encountered
  - Ground Surface
  - Well Screens
  - Boreholes

**FIGURE 4-18c**  
**CHROMIUM, HEXAVALENT ISOCONCENTRATION**  
**CROSS SECTION - LINE C - C'**  
**San Fernando Groundwater Basin**  
**LADWP GSIS Project**  
**Los Angeles, California**

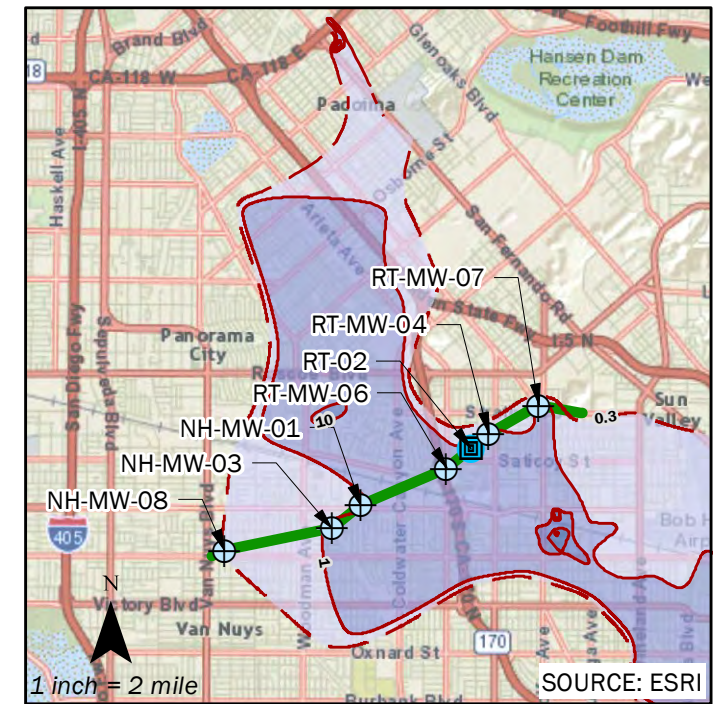
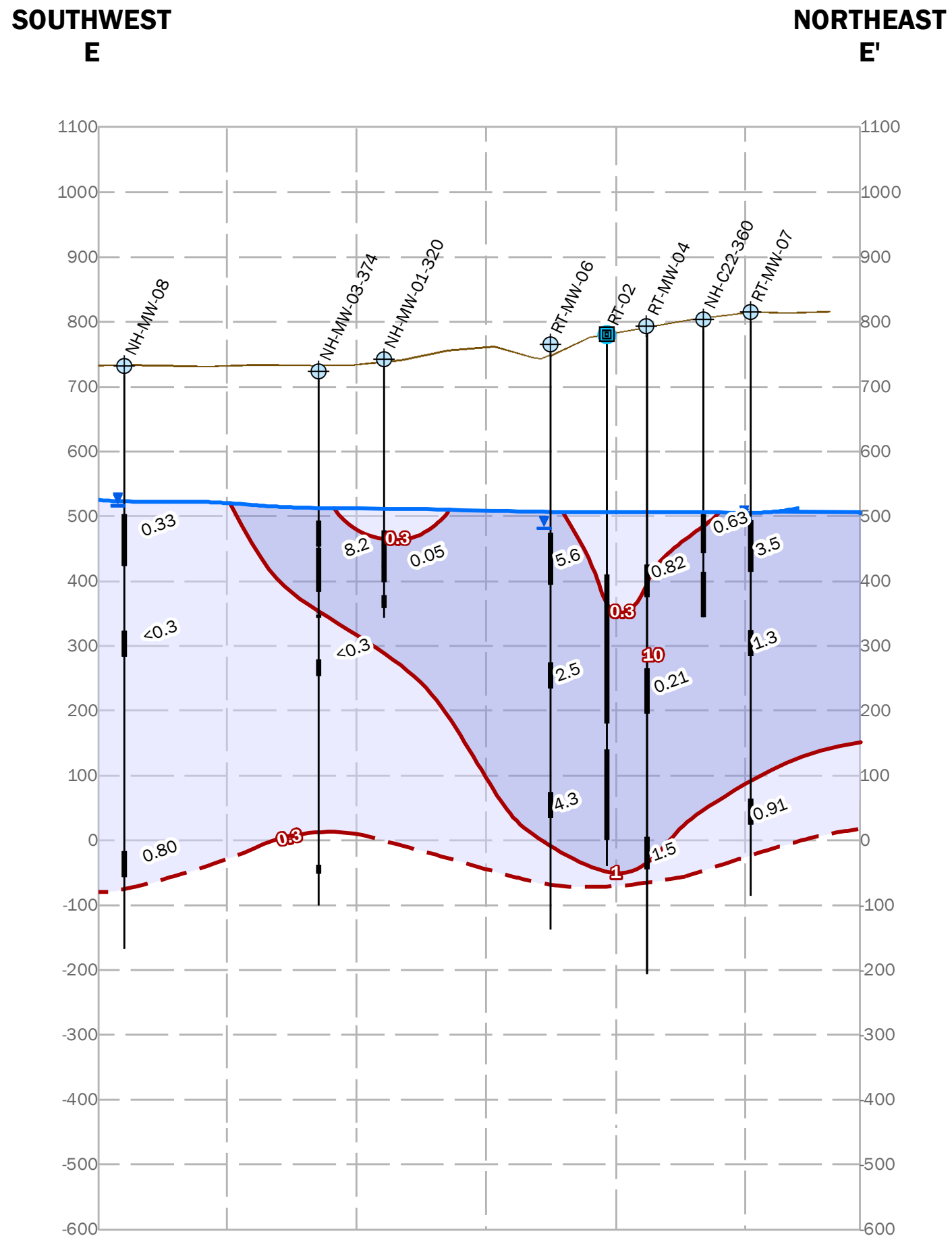
B. Tillotson & T. Crawford | Date: 3-3-2015 | Project No. 146806



Note:  
 1. The location map includes the shallow groundwater isoconcentration contours.  
 2. Contours are based on plume maps (Appendix I) when well information or analytical data was unavailable for cross-section development.



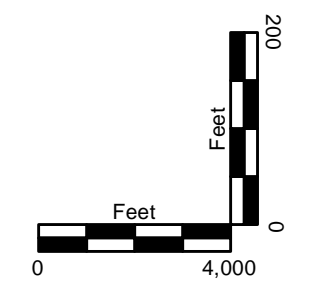
Document Path: \\BCSAC01P\BC\_LAX\GIS\MAPDOCS\WORKING\CrossSections\FIG4-18d\_CrsSect\_LineE\_HexChrome\_11x17\_20150303.mxd



**Explanation**

- Chromium, Hexavalent concentration**
- 0.3 - 1 µg/L
  - 1 - 10 µg/L
  - 10 - 100 µg/L
- Chromium, Hexavalent contours
  - Chromium, Hexavalent contours - Inferred
  - ⊕ Monitoring Wells
  - Rinaldi-Toluca Production Well
  - Water Level Elevation
  - Depth Groundwater Encountered
  - Ground Surface
  - Well Screens
  - Boreholes

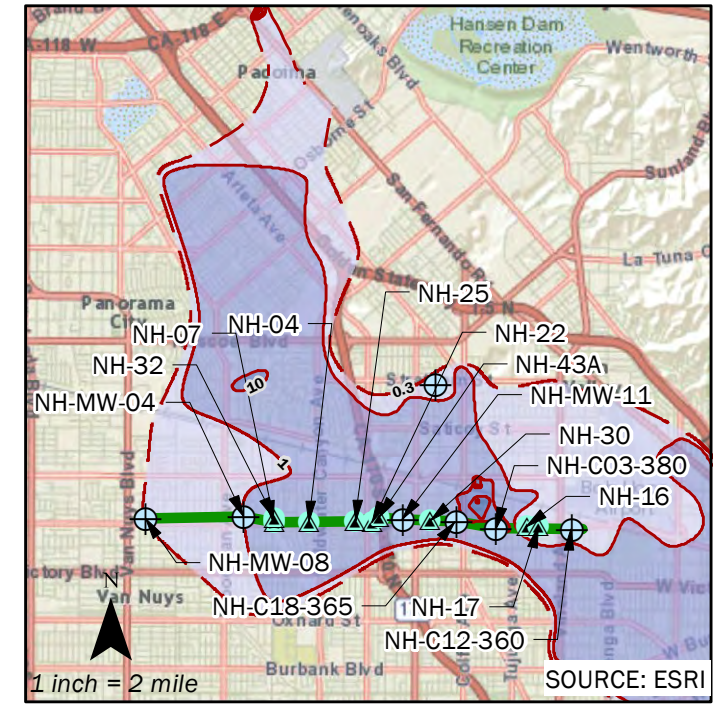
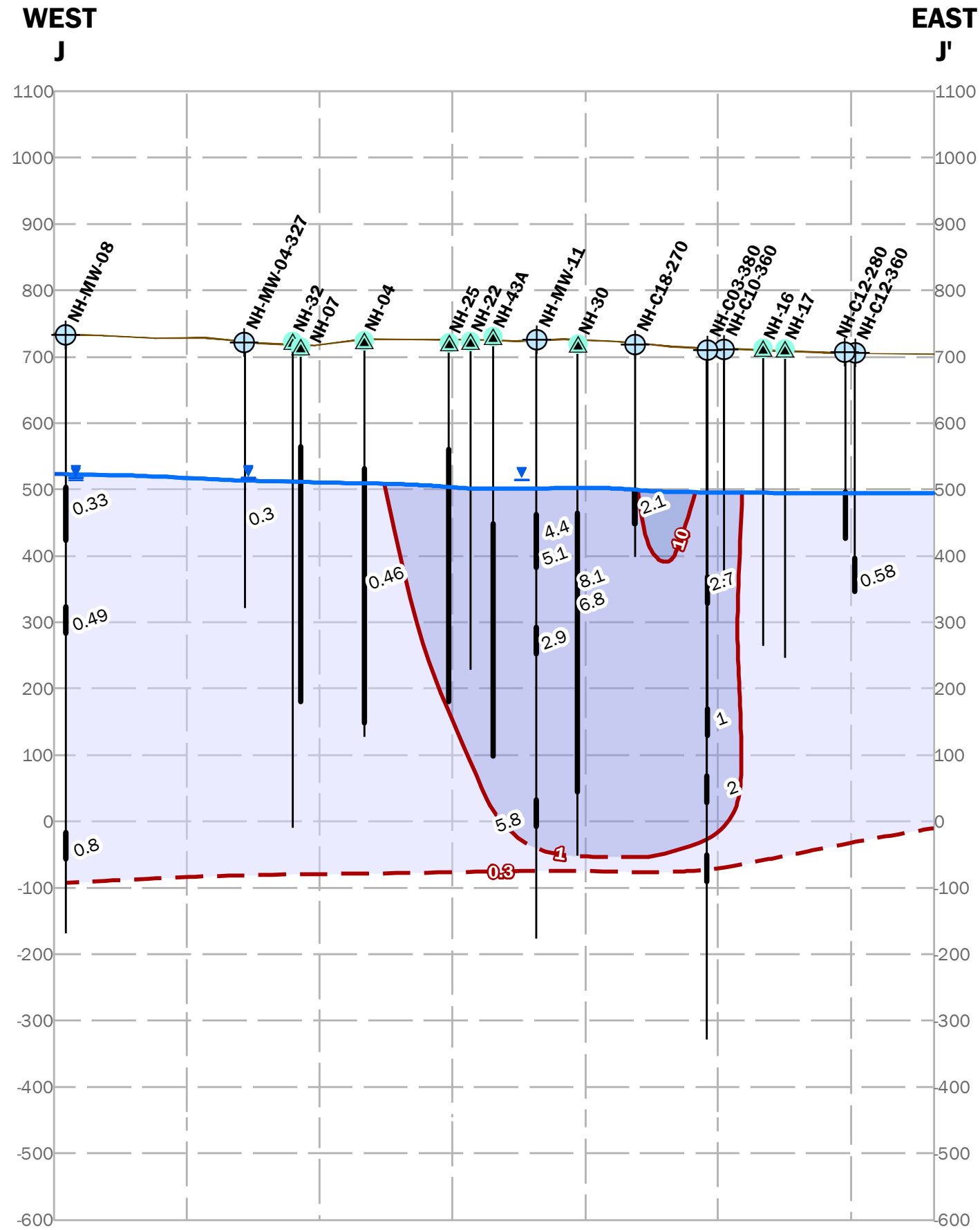
Note:  
 1. The location map includes the shallow groundwater isoconcentration contours.  
 2. Contours are based on plume maps (Appendix I) when well information or analytical data was unavailable for cross-section development.



**FIGURE 4-18d**  
**CHROMIUM, HEXAVALENT ISOCONCENTRATION**  
**CROSS SECTION - LINE E - E'**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

T. Crawford	Date: 3-3-2015	Project No. 146806

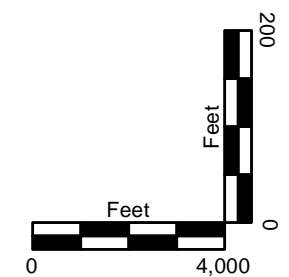
Elevation (ft) Mean Sea Level



**Explanation**

- Chromium, Hexavalent concentration**
- 0.3 - 1 µg/L
  - 1 - 10 µg/L
  - ≥ 10 µg/L
  - Chromium, Hexavalent contours
  - Chromium, Hexavalent contours - Inferred
  - ⊕ Monitoring Well
  - ▲ North Hollywood Production Well
  - Water Level Elevation
  - Depth Groundwater Encountered
  - Ground Surface
  - Well Screens
  - Boreholes

Note:  
 1. The location map includes the shallow groundwater isoconcentration contours.  
 2. Contours are based on plume maps (Appendix I) when well information or analytical data was unavailable for cross-section development.



Elevation (ft) Mean Sea Level

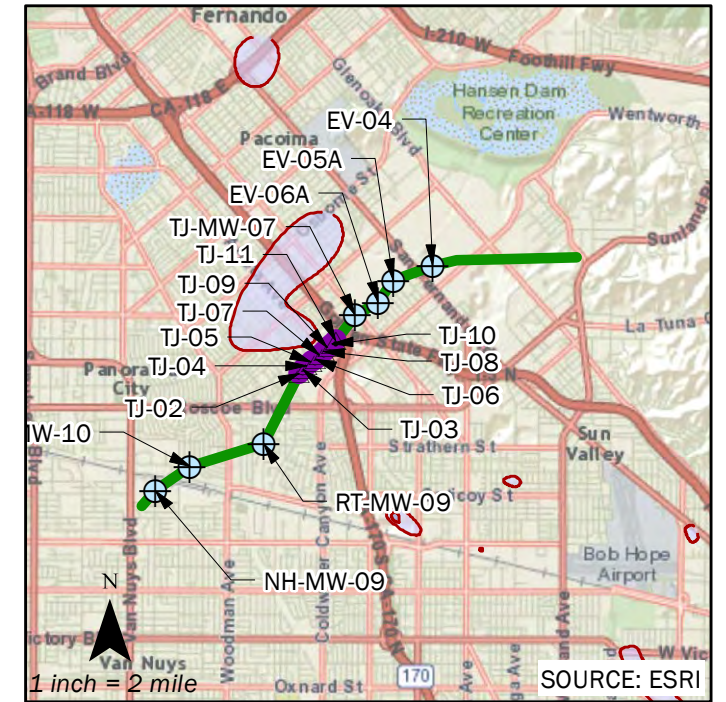
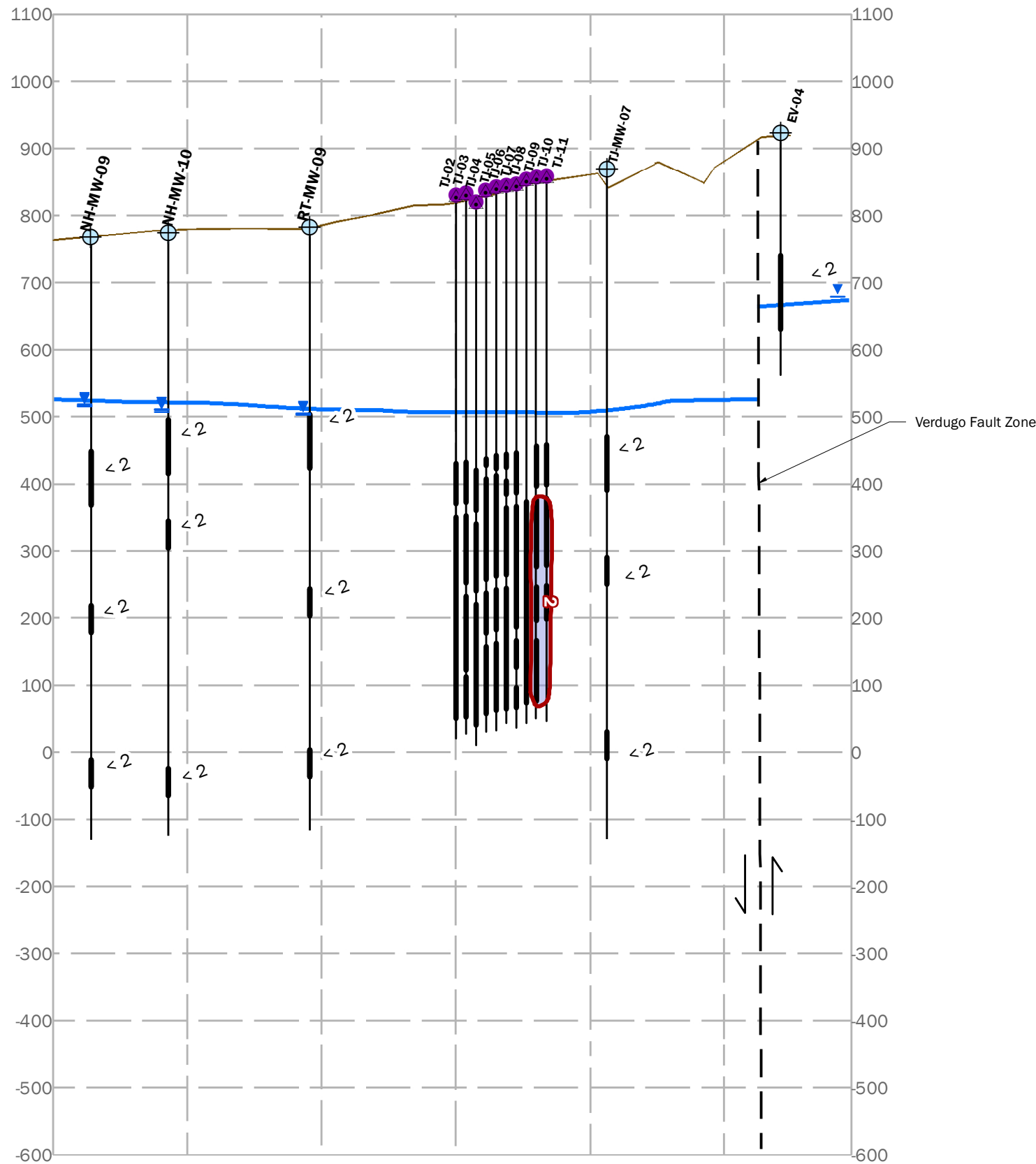
**FIGURE 4-18e**  
**CHROMIUM, HEXAVALENT ISOCONCENTRATION**  
**CROSS SECTION - LINE J - J'**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

T. Crawford	Date: 3-3-2015	Project No. 146806

Document Path: \\BCSAC01P\BC\_LAX\GIS\MAPDOCS\WORKING\CrossSections\FIG4-19a\_CrsSect\_LineA\_Perchlorate\_11x17\_20150303.mxd

**SOUTHWEST  
A**

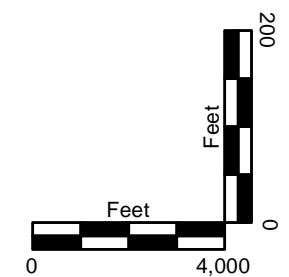
**NORTHEAST  
A'**



**Explanation**

- Perchlorate concentration**
- 2 - 6 µg/L
- Perchlorate contours
- + Monitoring Well
- Tujunga Production Wells
- Water Level Elevation
- Depth Groundwater Encountered
- Ground Surface
- Well Screens
- Boreholes
- Fault

- Note:
1. The location map includes the shallow groundwater isoconcentration contours.
  2. Contours are based on plume maps (Appendix I) when well information or analytical data was unavailable for cross-section development.



Elevation (ft) Mean Sea Level

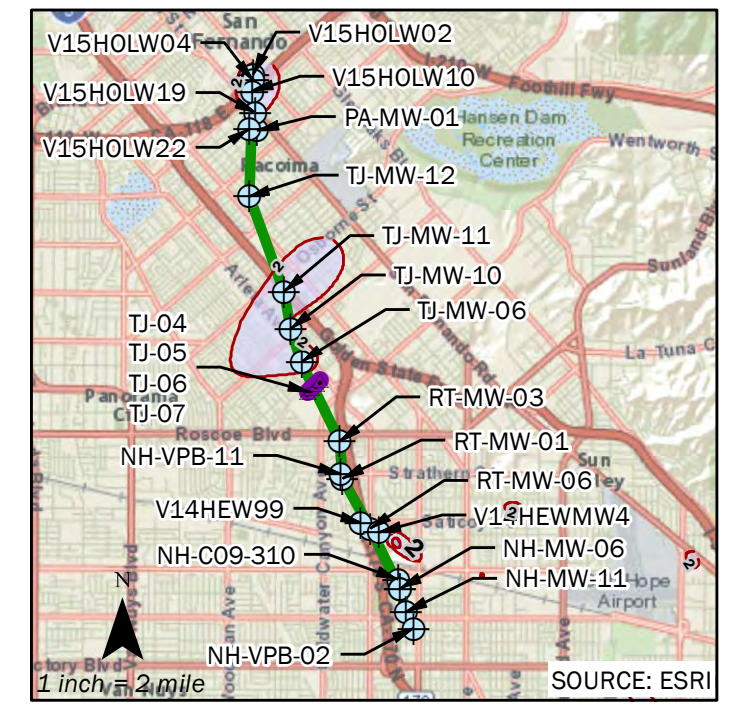
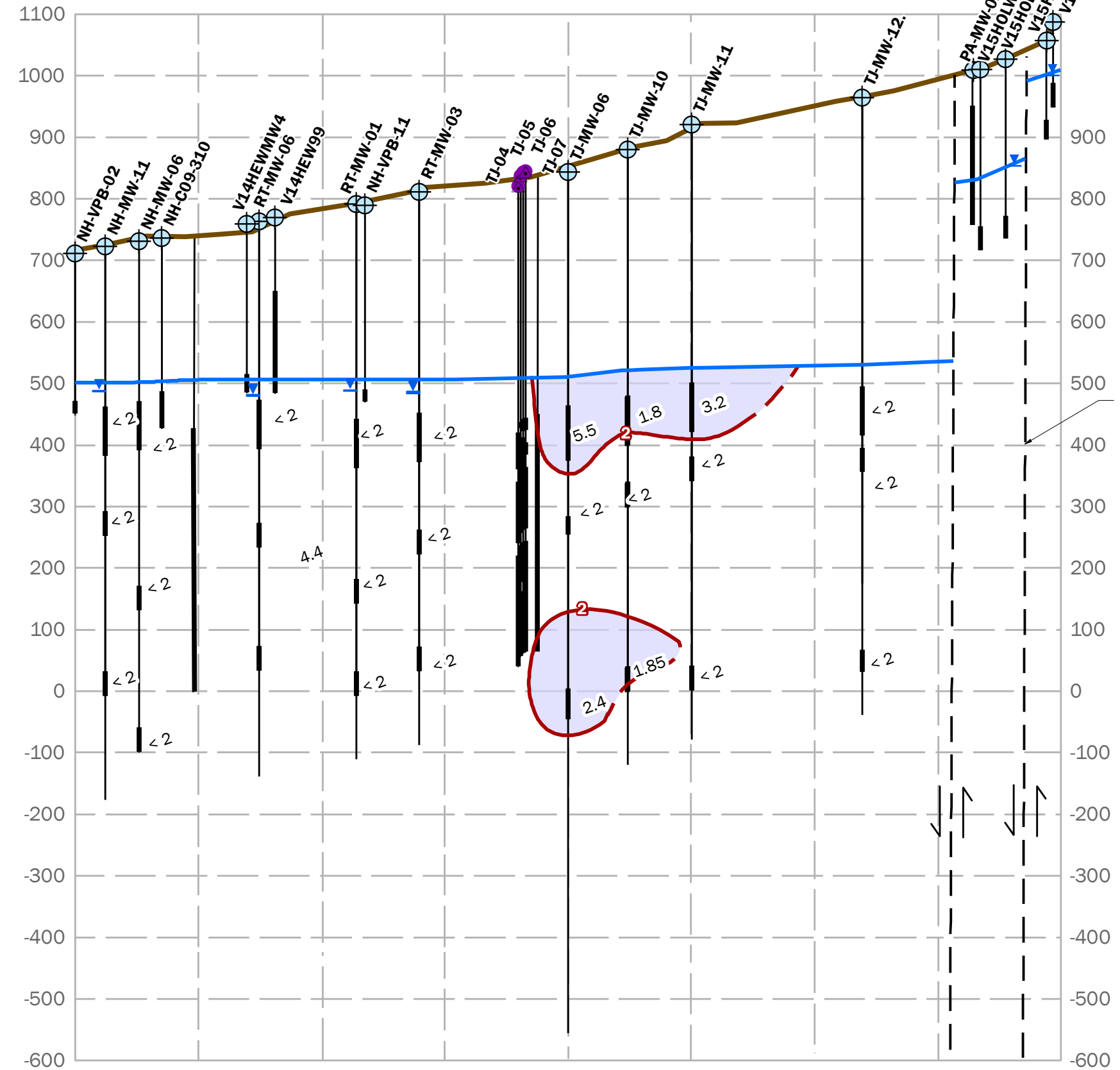
**FIGURE 4-19a  
PERCHLORATE ISOCONCENTRATION  
CROSS SECTION - LINE A - A'  
San Fernando Groundwater Basin  
LADWP GIS Project  
Los Angeles, California**

T. Crawford      Date: 3-6-2015      Project No. 146806



SOUTH  
B

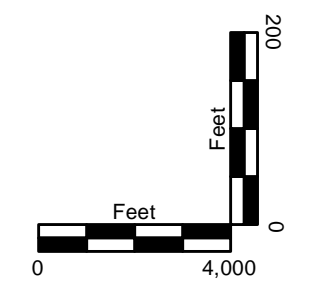
NORTH  
B'



**Explanation**

- Perchlorate concentration**
- 2 - 6 µg/L
- Perchlorate contours
- Perchlorate contours - Inferred
- Tujunga Production Well
- Monitoring Wells
- Water Level Elevation
- Depth Groundwater Encountered
- Ground Surface
- Well Screens
- Boreholes
- Faults

Verdugo Fault Zone



**FIGURE 4-19b**  
**PERCHLORATE ISOCONCENTRATION**  
**CROSS SECTION - LINE B - B'**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

B. Tillotson & T. Crawford	Date: 3-6-2015	Project No. 146806
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**Brown and Caldwell**

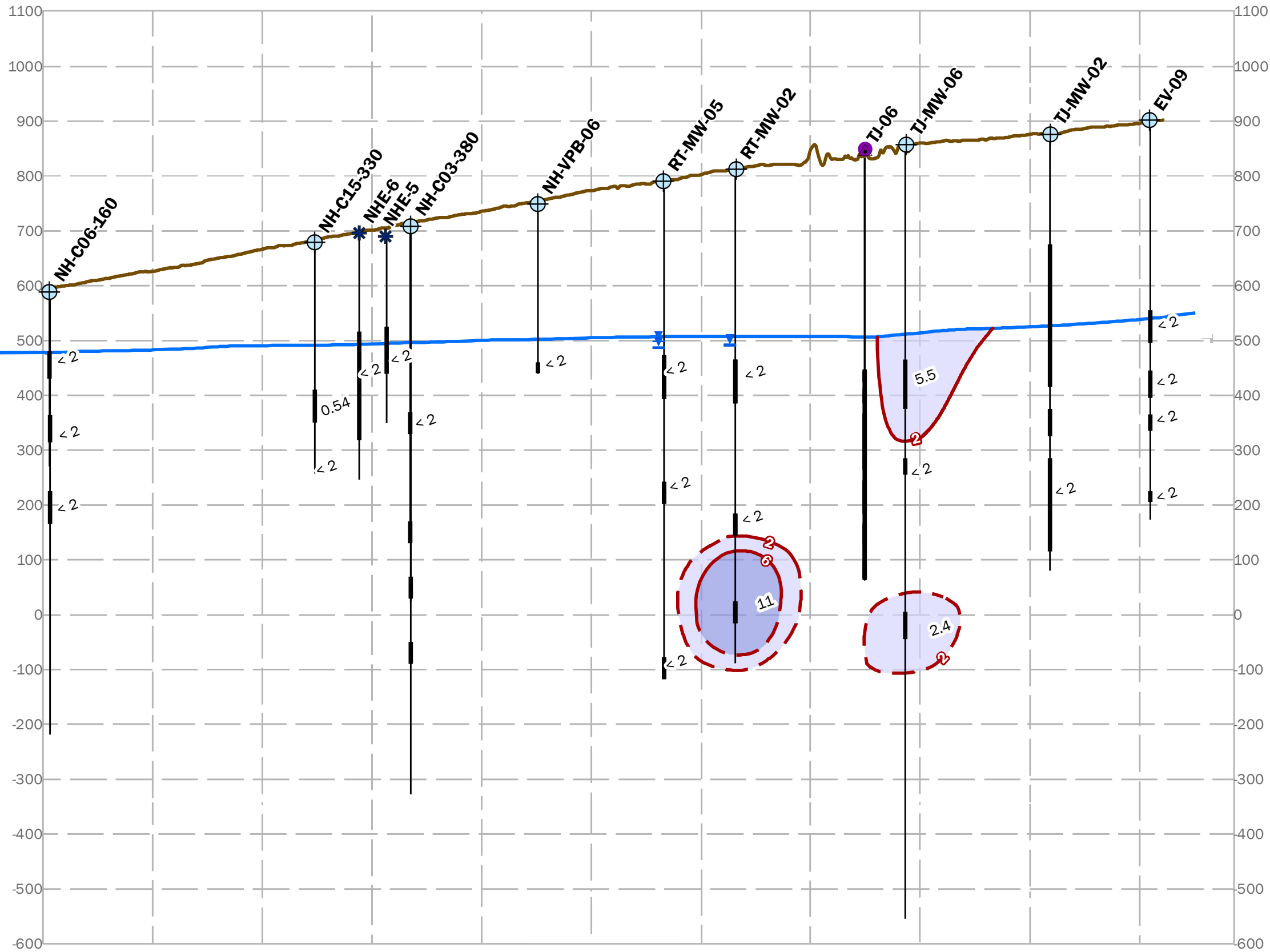
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Note:

1. The location map includes the shallow groundwater isoconcentration contours.
2. Contours are based on plume maps (Appendix I) when well information or analytical data was unavailable for cross-section development.

SOUTH  
C

NORTH  
C'



**Explanation**

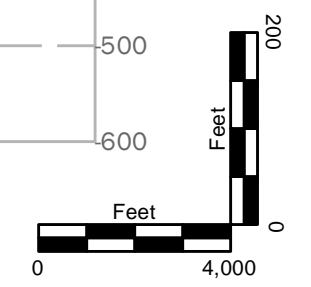
- Perchlorate concentration**
- 2 - 6 µg/L
- ≥ 6 µg/L
- Perchlorate contours
- Perchlorate contours - Inferred
- + Monitoring Well
- Tujunga Production Wells
- \* North Hollywood OU Extraction Well
- Water Level Elevation
- Depth Groundwater Encountered
- Ground Surface
- Well Screens
- Boreholes

**FIGURE 4-19c**  
**PERCHLORATE ISOCONCENTRATION**  
**CROSS SECTION - LINE C - C'**  
**San Fernando Groundwater Basin**  
**LADWP GSIS Project**  
**Los Angeles, California**

B. Tillotson & T. Crawford	Date: 3-6-2015	Project No. 146806
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**Brown and Caldwell**

Los Angeles Department of Water & Power



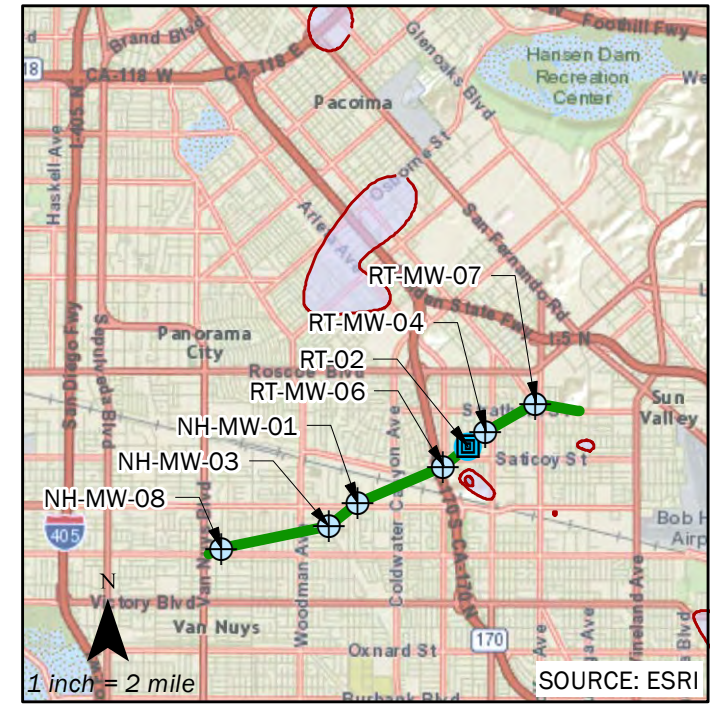
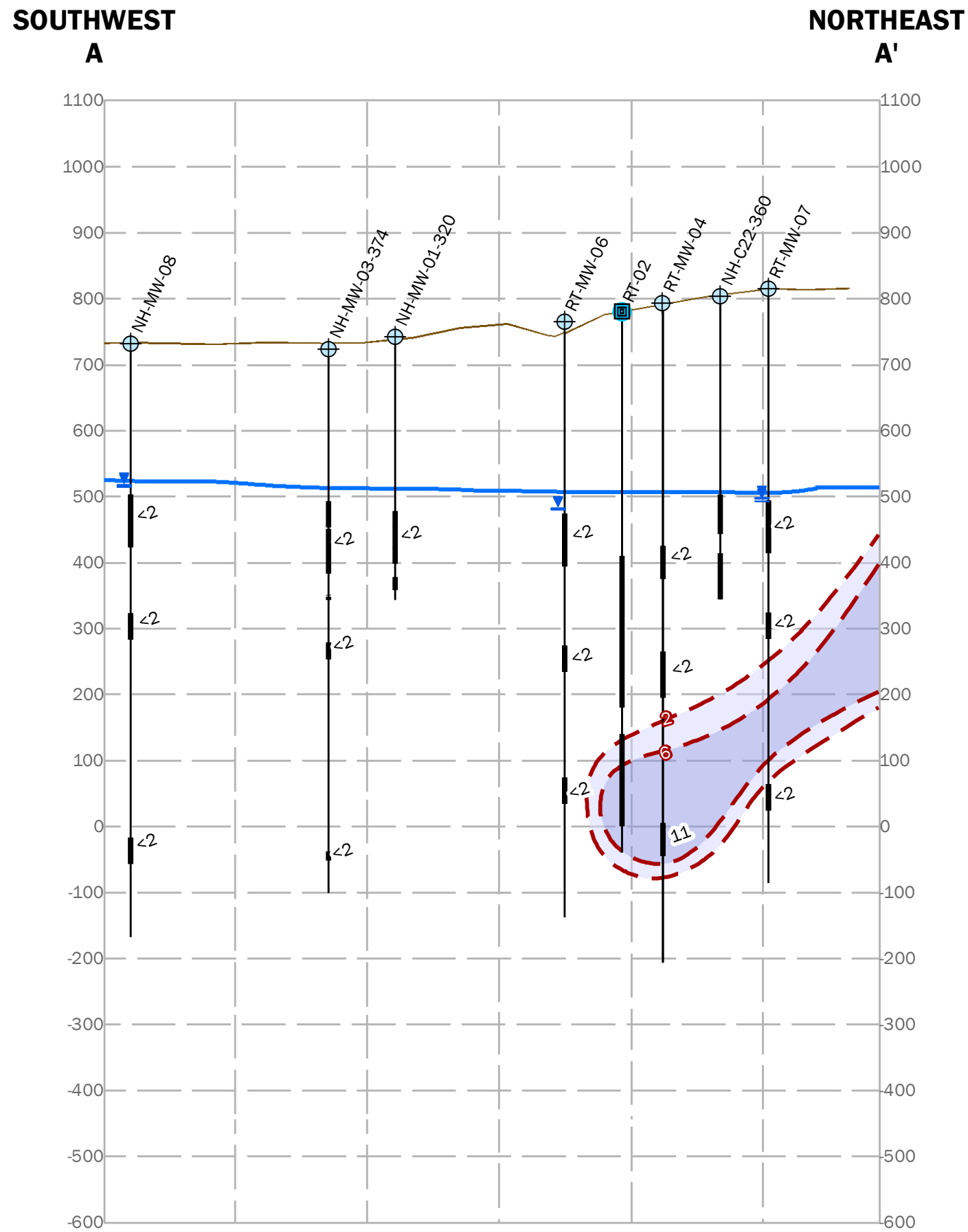
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Note:

1. The location map includes the shallow groundwater isoconcentration contours.
2. Contours are based on plume maps (Appendix I) when well information or analytical data was unavailable for cross-section development.



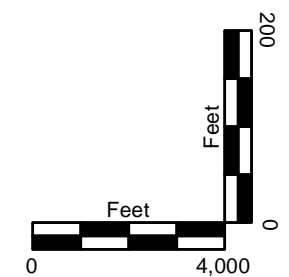
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**Explanation**

- Perchlorate concentration**
- 2 - 6 µg/L
- ≥ 6 µg/L
- Perchlorate contours - Inferred
- ⊕ Monitoring Wells
- ⊞ Rinaldi-Toluca Production Well
- Water Level Elevation
- Depth Groundwater Encountered
- Ground Surface
- Well Screens
- Boreholes

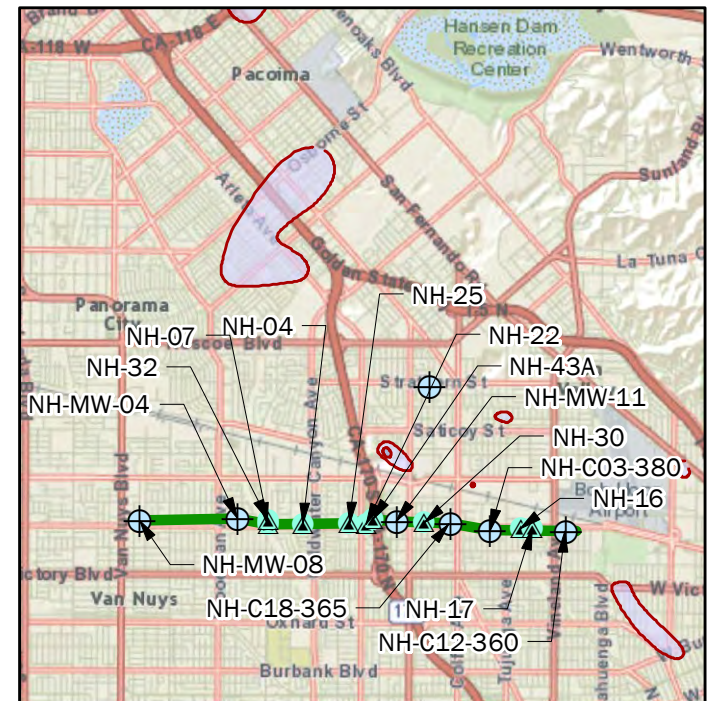
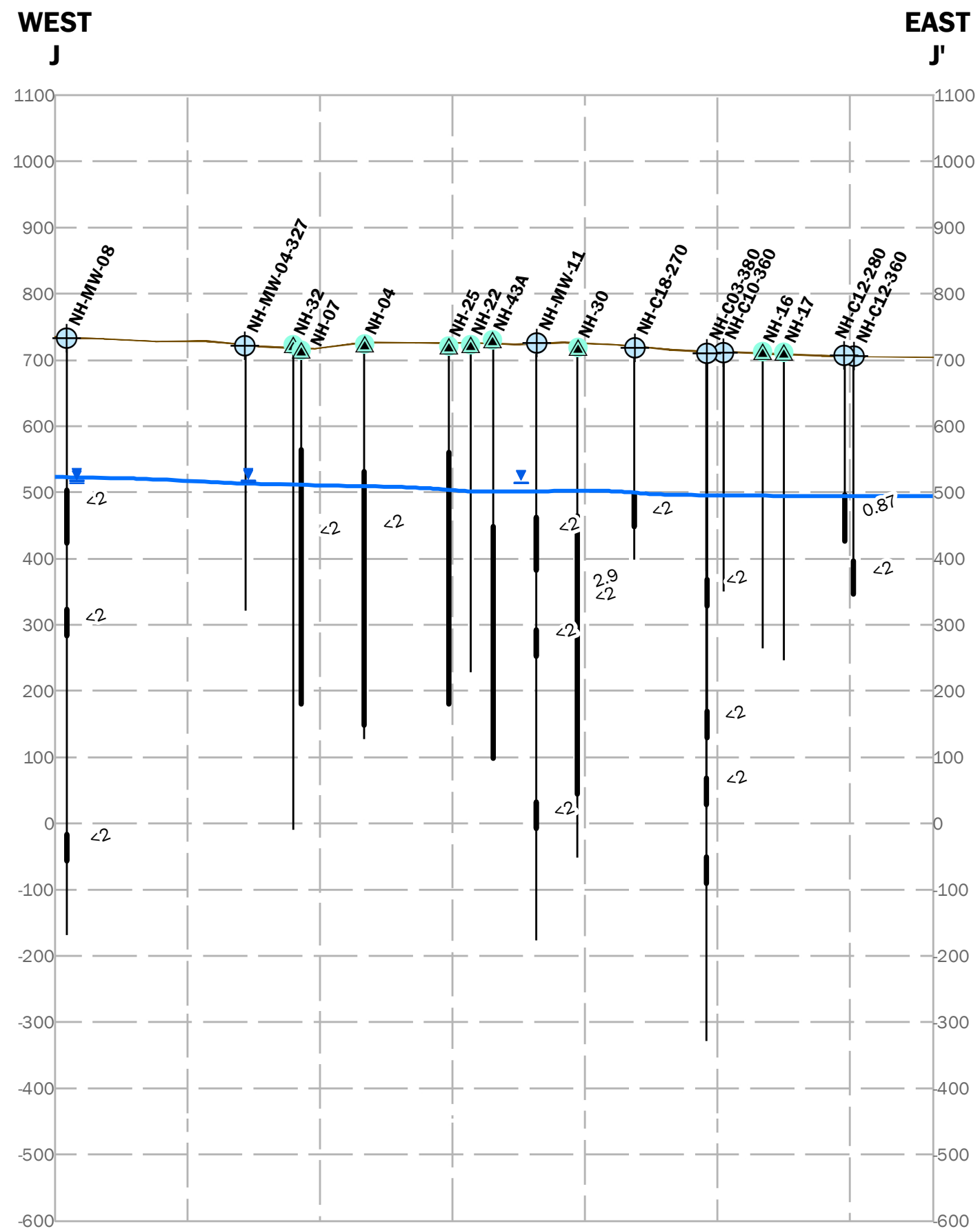
- Note:
1. The location map includes the shallow groundwater isoconcentration contours.
  2. Contours are based on plume maps (Appendix I) when well information or analytical data was unavailable for cross-section development.



Elevation (ft) Mean Sea Level

**FIGURE 4-19d**  
**PERCHLORATE ISOCONCENTRATION**  
**CROSS SECTION - LINE E - E'**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

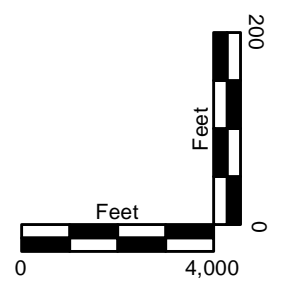
T. Crawford	Date: 3-3-2015	Project No. 146806
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**Explanation**

- Monitoring Well
- North Hollywood Production Well
- Water Level Elevation
- Depth Groundwater Encountered
- Ground Surface
- Well Screens
- Boreholes

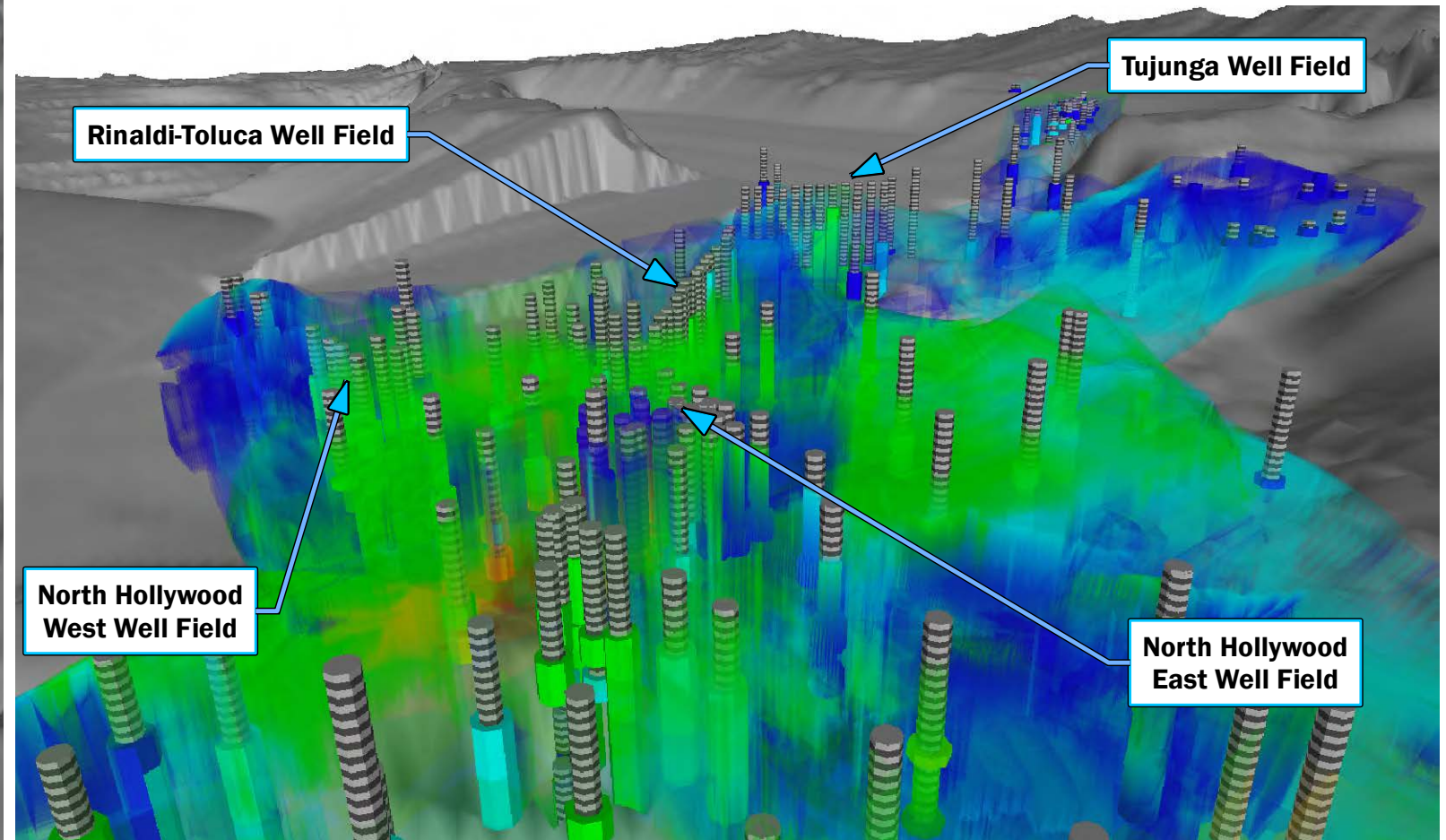
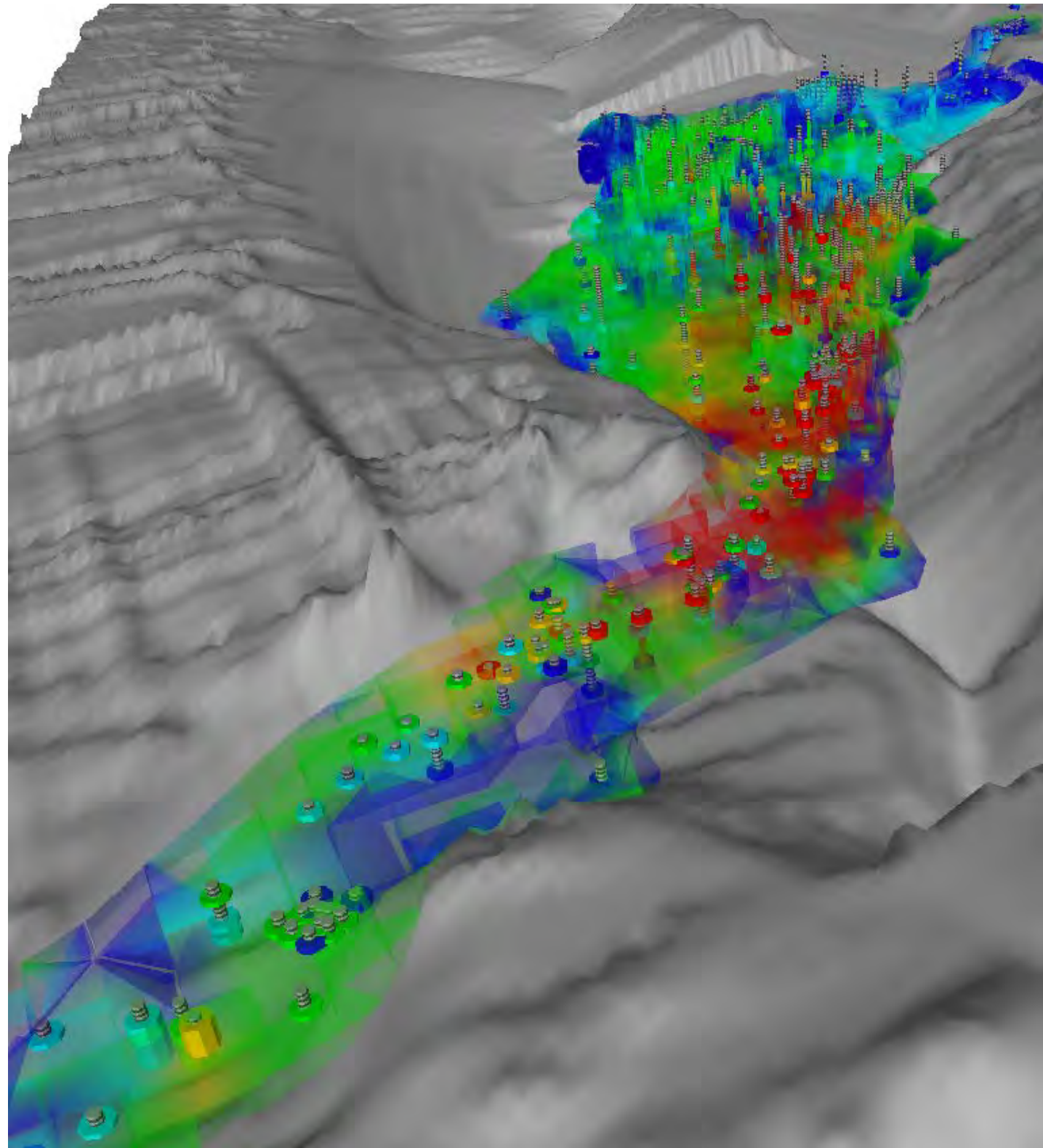
- Note:
1. The location map includes the shallow groundwater isoconcentration contours.
  2. Contours are based on plume maps (Appendix I) when well information or analytical data was unavailable for cross-section development.



Elevation (ft) Mean Sea Level


**FIGURE 4-19e**  
**PERCHLORATE ISOCONCENTRATION**  
**CROSS SECTION - LINE J - J'**  
**San Fernando Groundwater Basin**  
**LADWP GSIS Project**  
**Los Angeles, California**

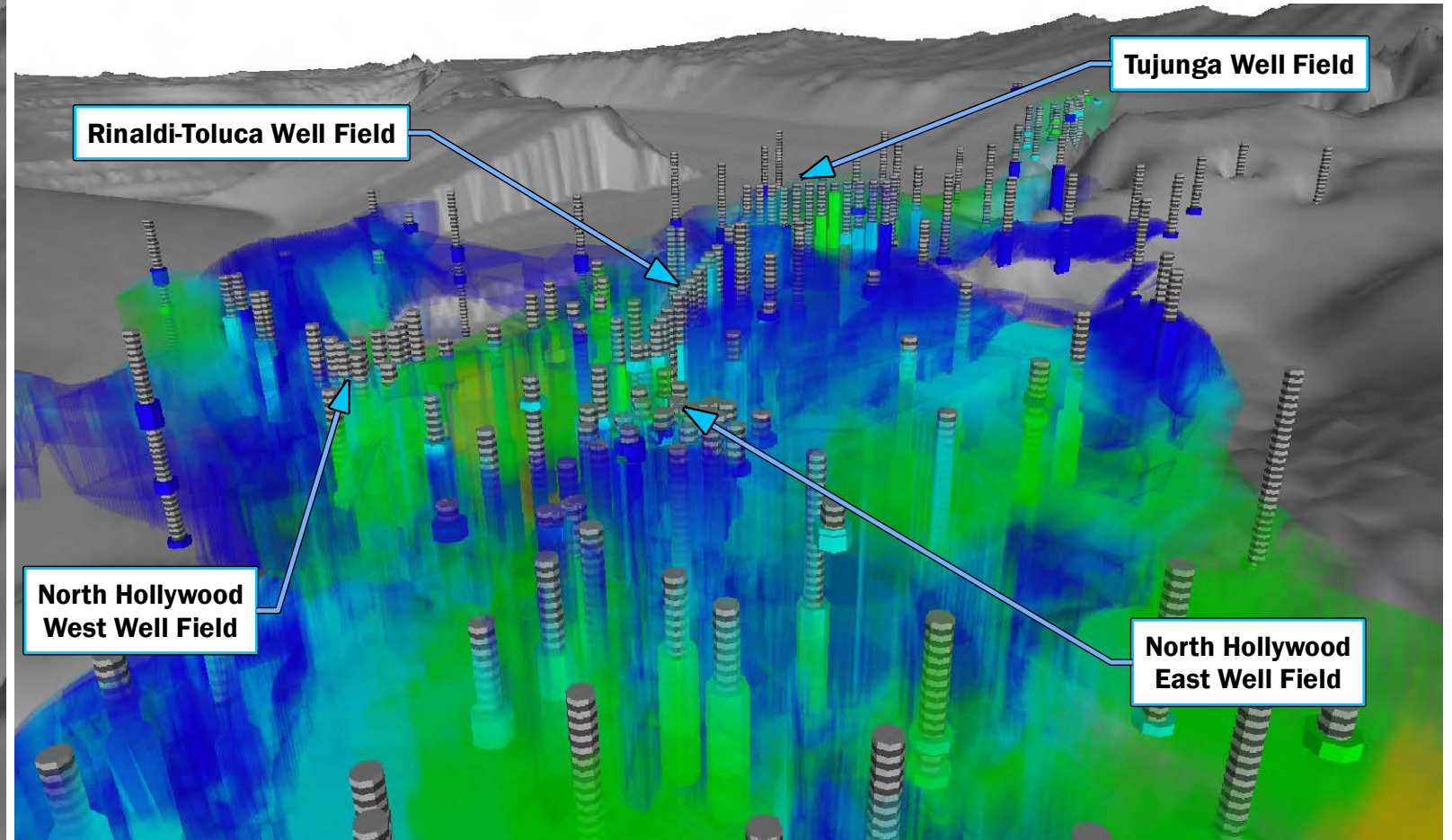
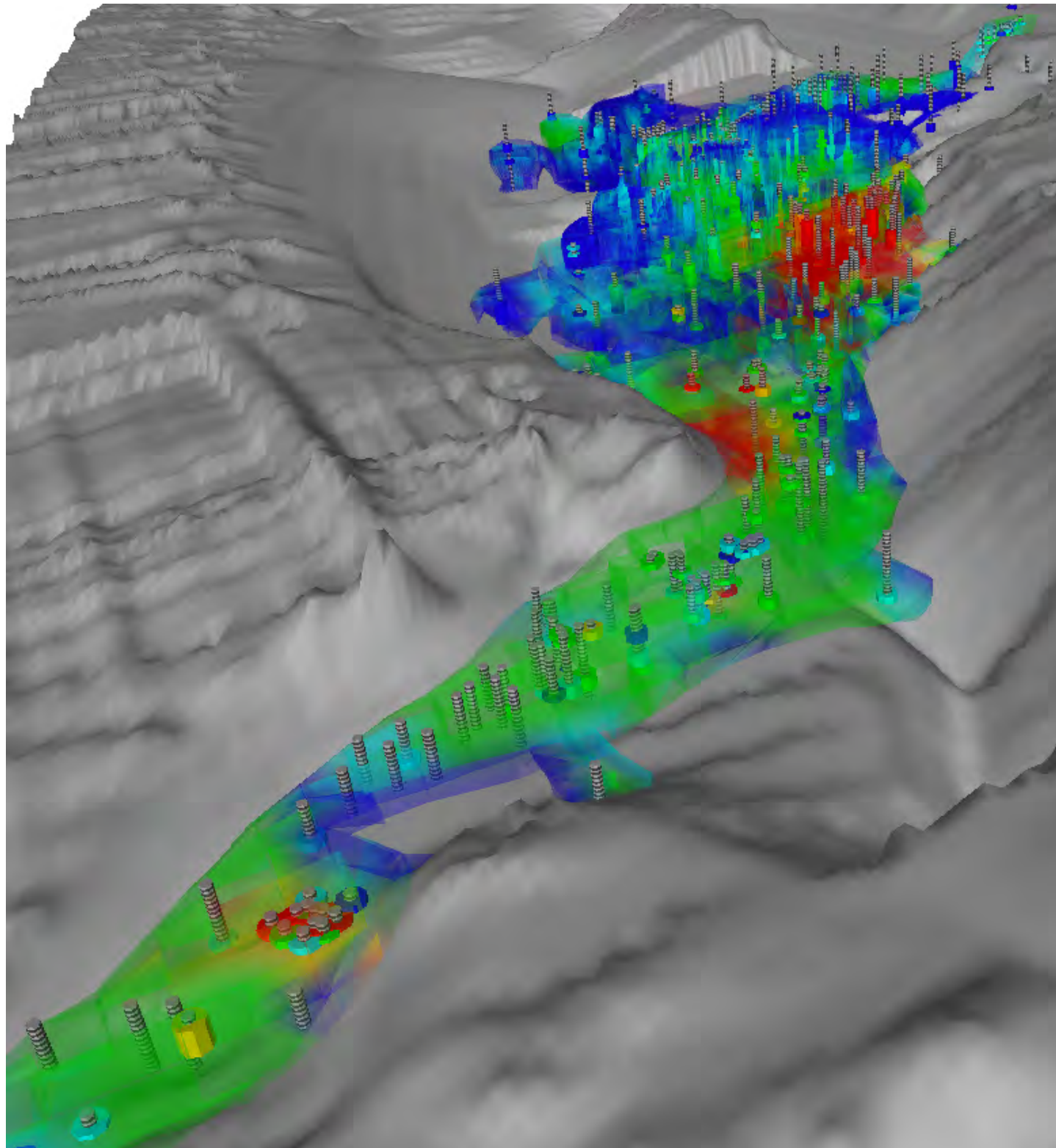
T. Crawford	Date: 3-3-2015	Project No. 146806



**FIGURE 4-20**  
**3D PLUME MODEL FOR TCE**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**


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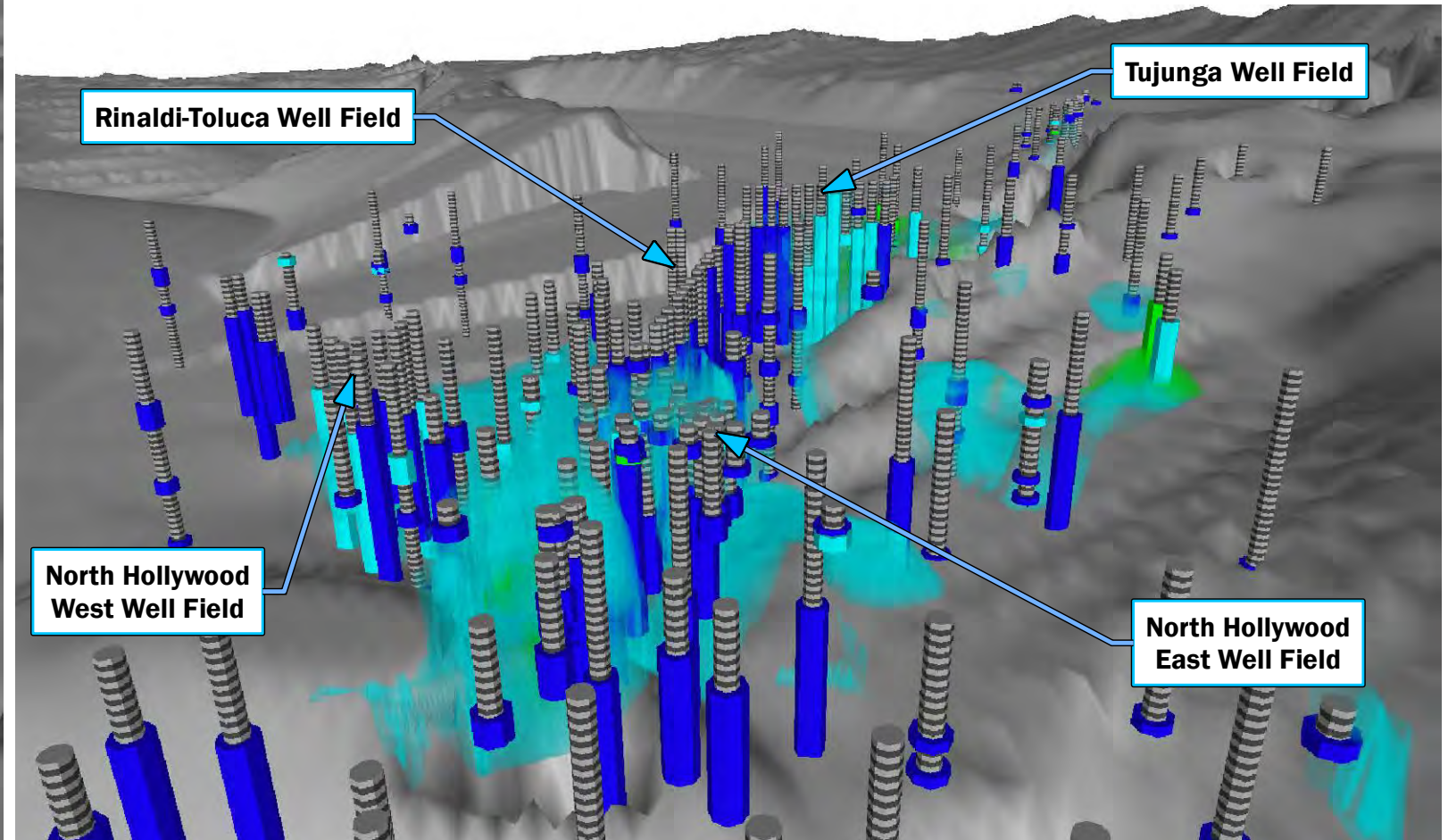
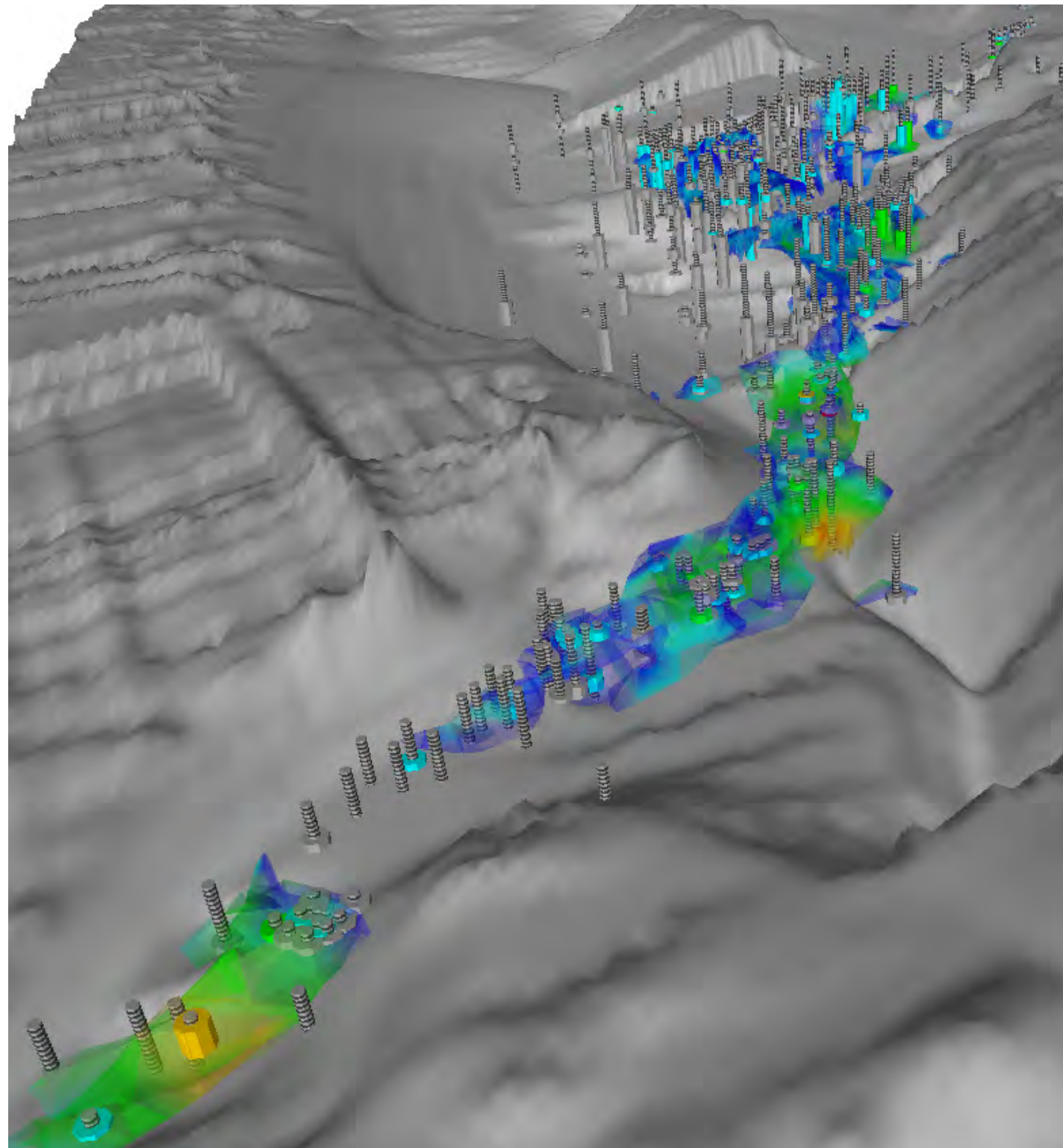
**Brown and Caldwell** 



**FIGURE 4-21**  
**3D PLUME MODEL FOR PCE**  
**San Fernando Groundwater Basin**  
**LADWP GSIS Project**  
**Los Angeles, California**

By: D. Hart	Date: 1/25/2015	Project No. 146806
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**Brown and Caldwell**  Los Angeles Department of Water & Power

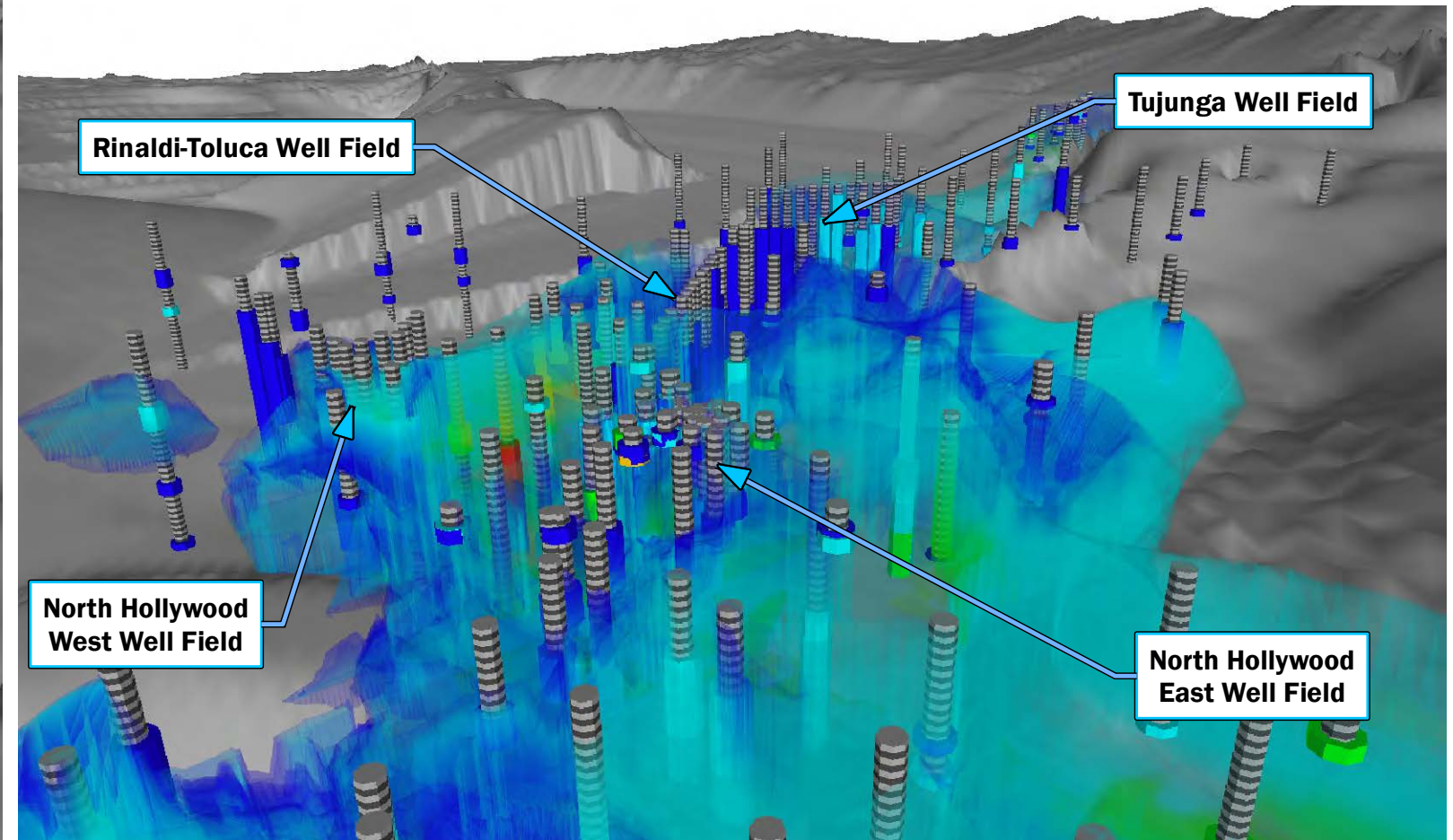
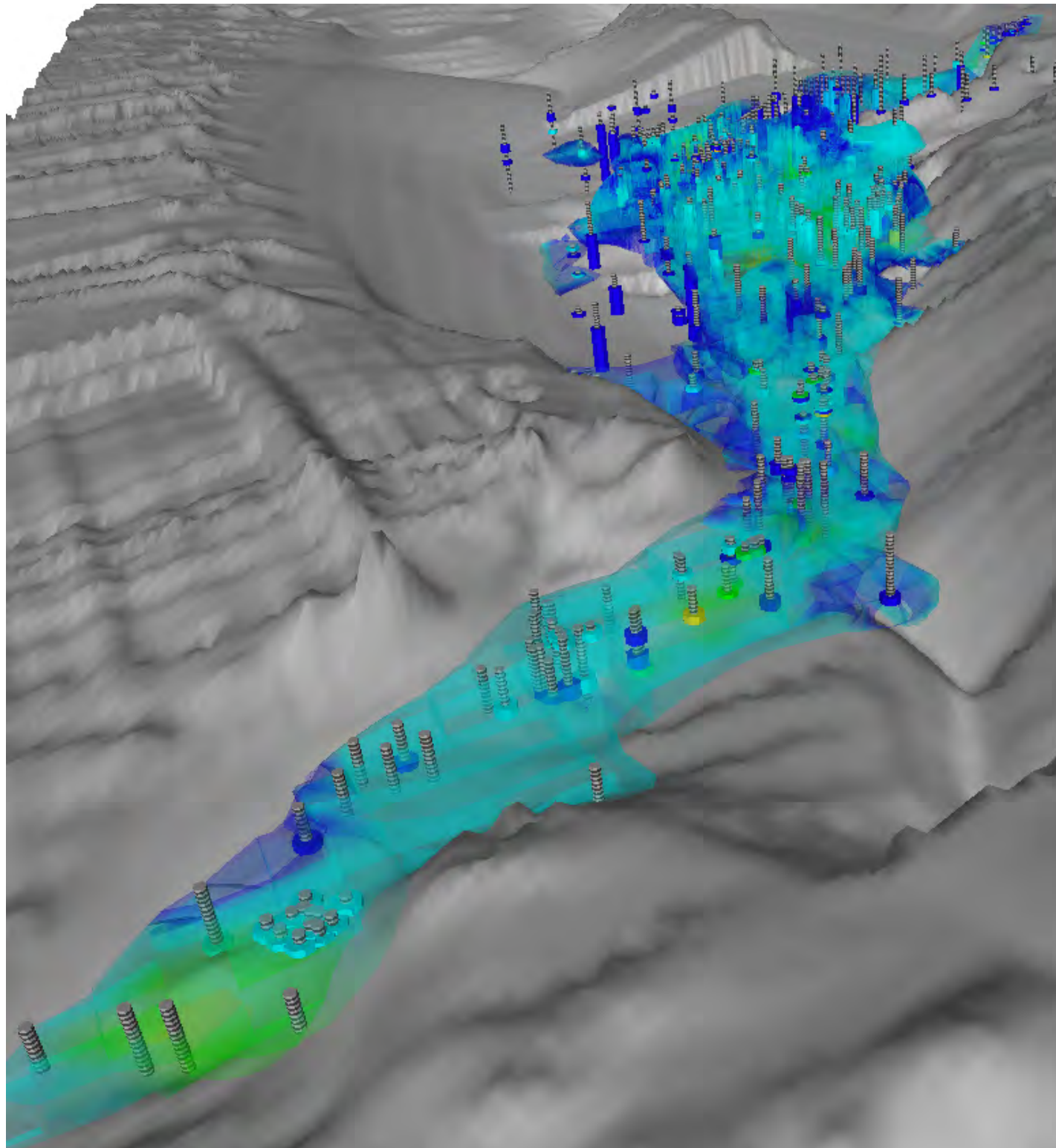


**FIGURE 4-22**  
**3D PLUME MODEL FOR 1,1-DCE**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

By: D. Hart


Date: 1/25/2015

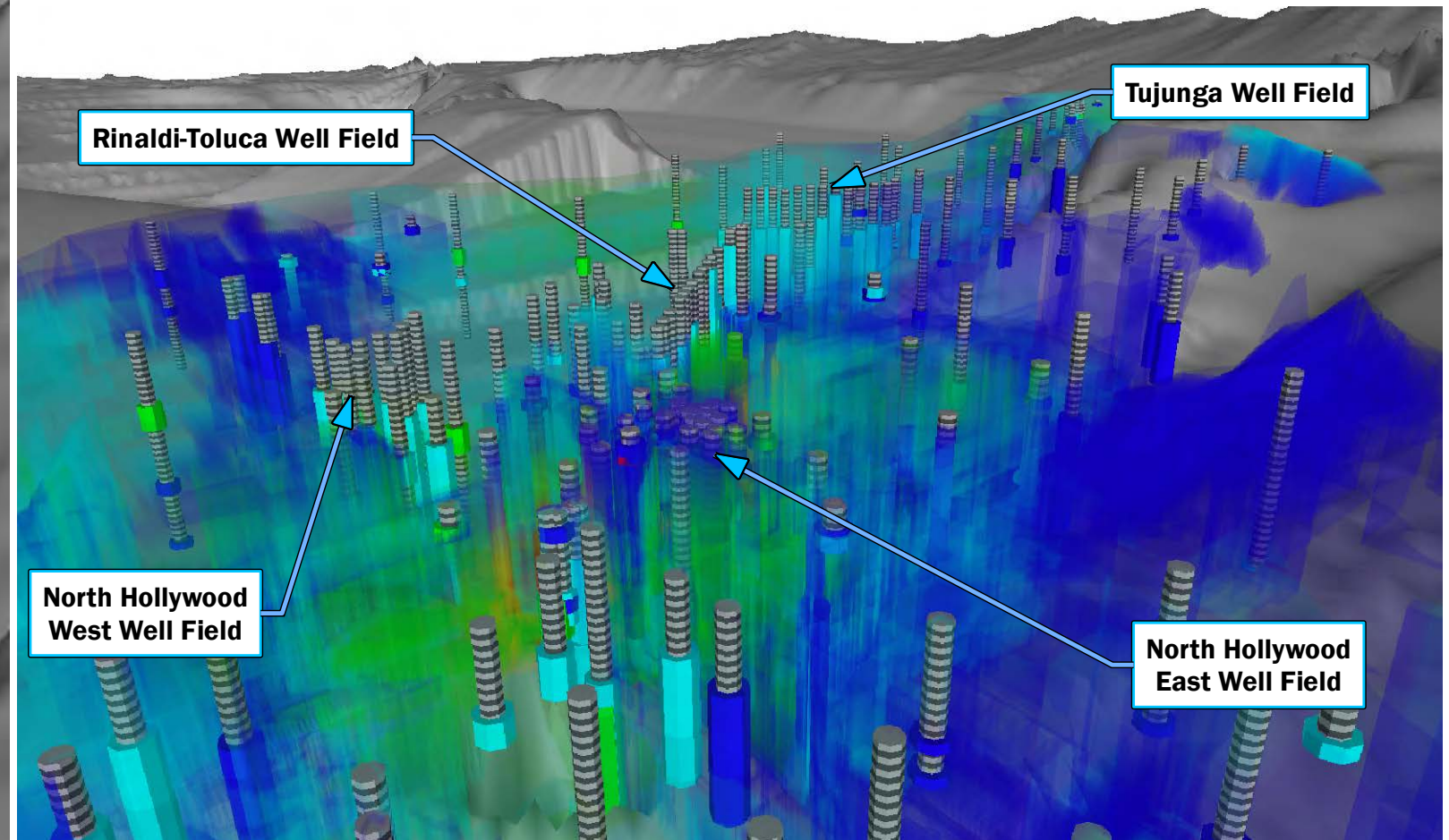
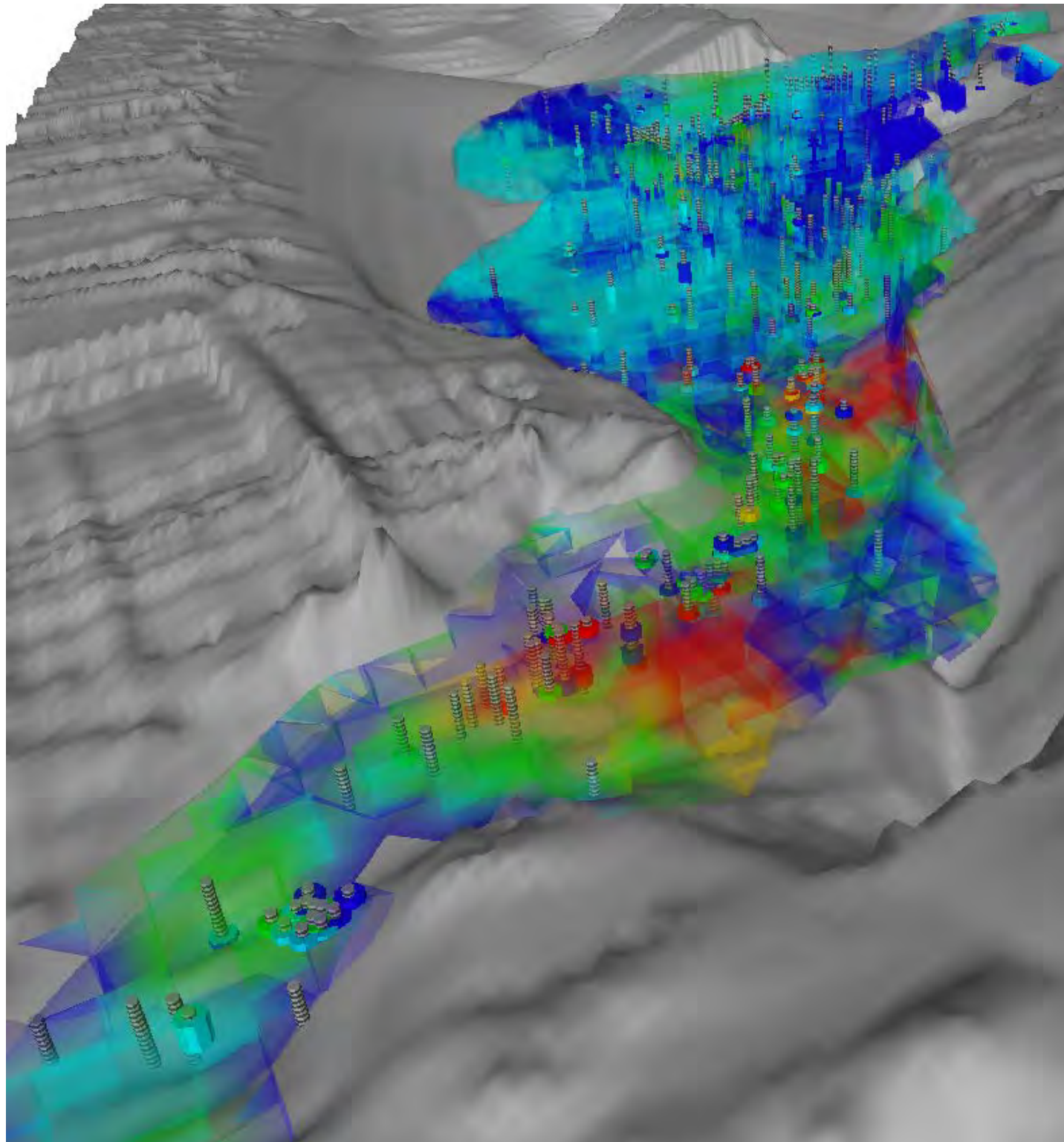
Project No. 146806



**FIGURE 4-23**  
**3D PLUME MODEL FOR 1,4-DIOXANE**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**


By: D. Hart	Date: 1/25/2015	Project No. 146806
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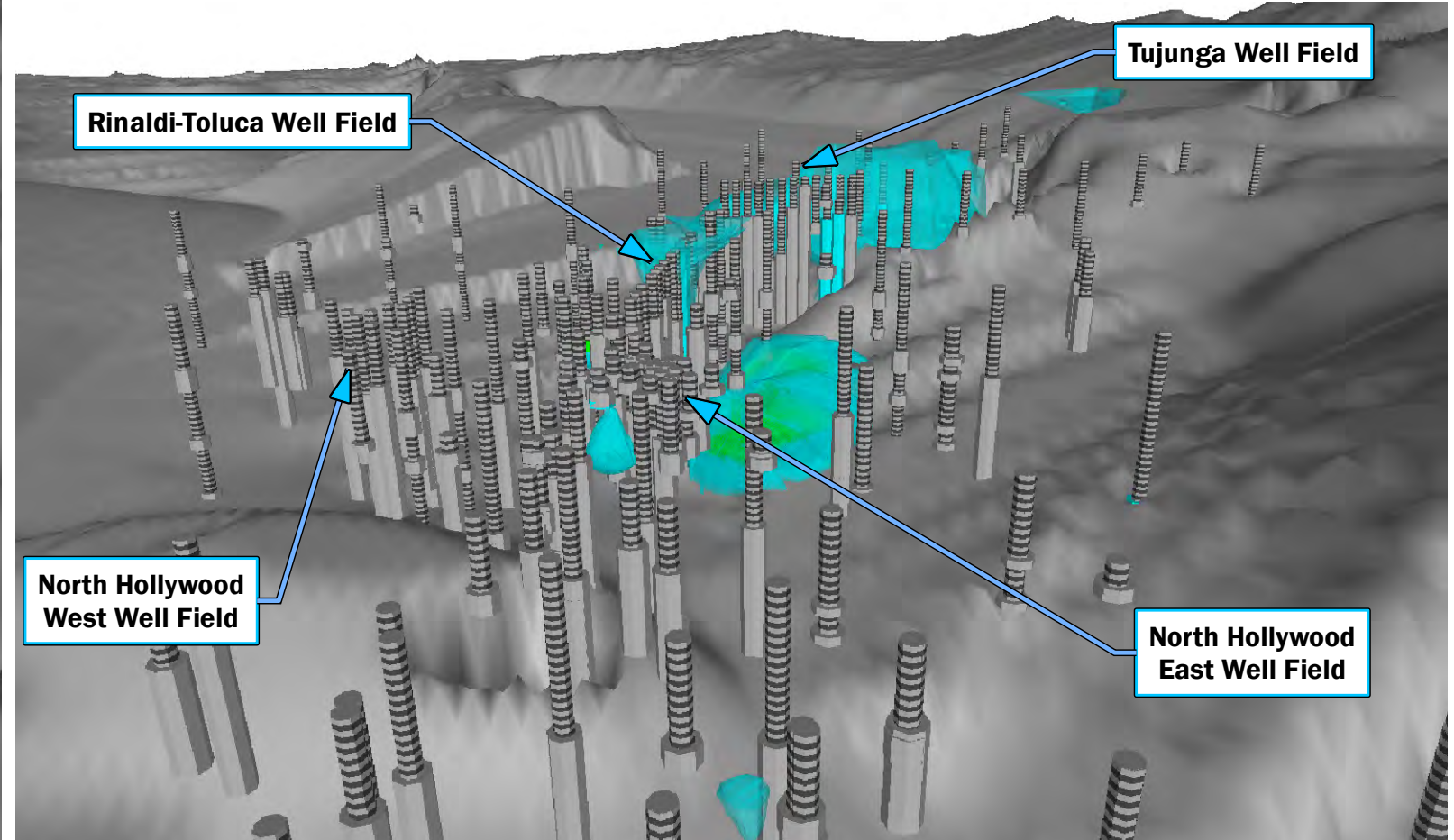
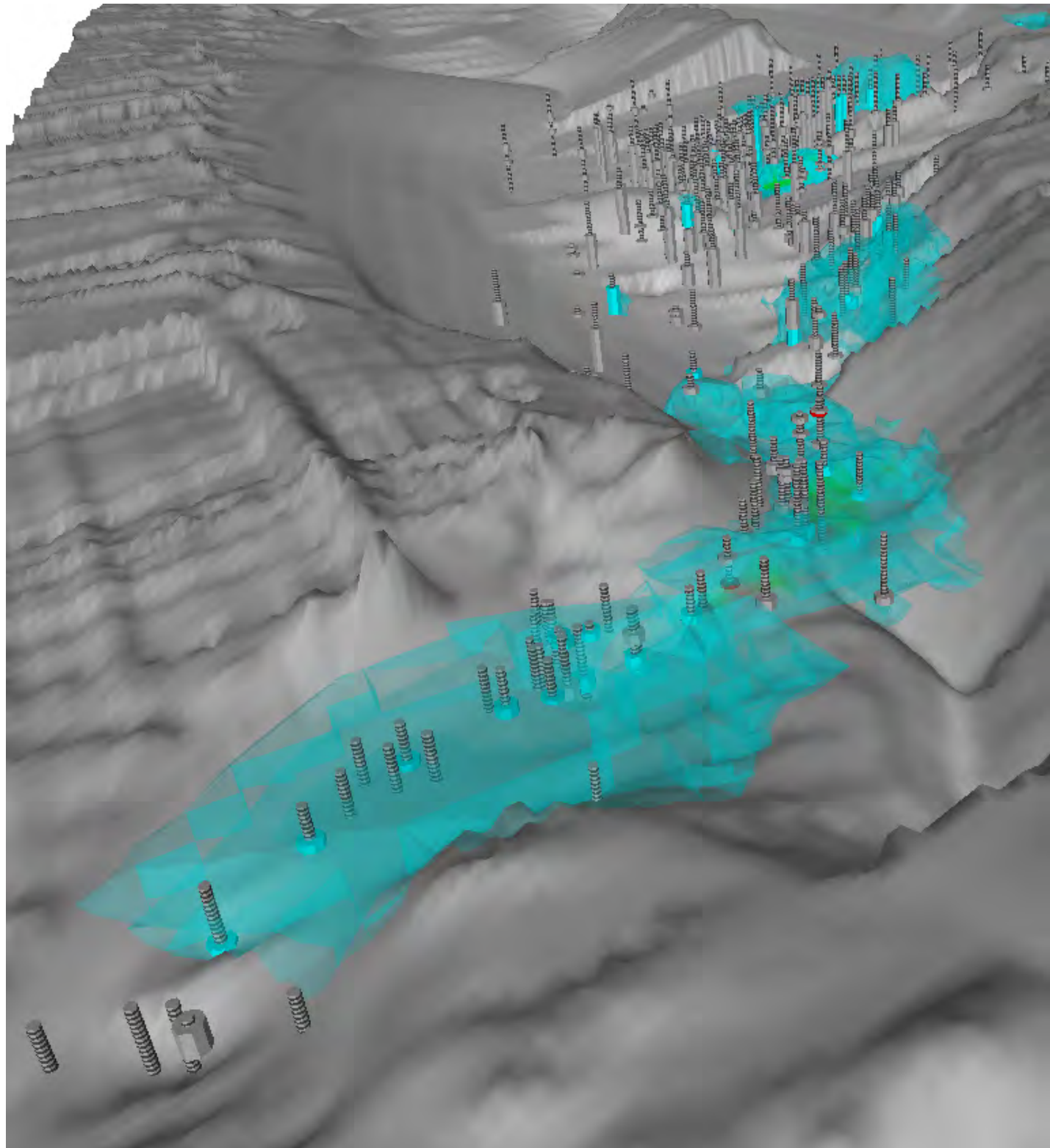
**Brown AND Caldwell** 



**FIGURE 4-24**  
**3D PLUME MODEL FOR**  
**HEXAVALENT CHROMIUM**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

By: D. Hart	Date: 1/25/2015	Project No. 146806
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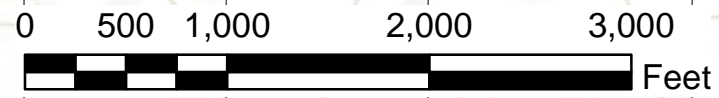
**Brown and Caldwell** 



**FIGURE 4-25**  
**3D PLUME MODEL FOR PERCHLORATE**  
**San Fernando Groundwater Basin**  
**LADWP GSIS Project**  
**Los Angeles, California**

By: D. Hart      Date: 1/25/2015      Project No. 146806



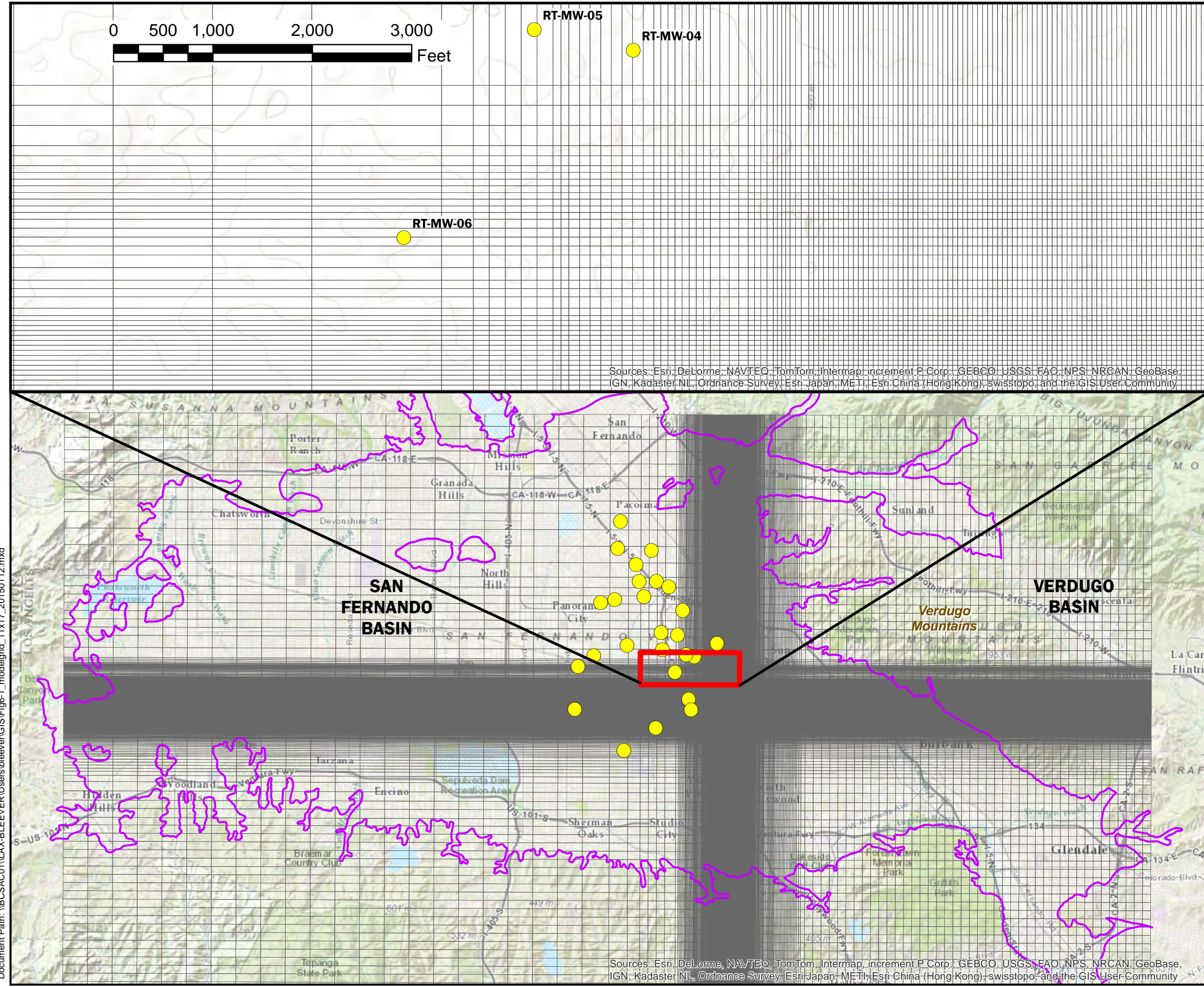


RT-MW-05  
RT-MW-04

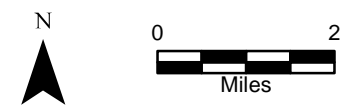
RT-MW-06

Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community

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- GSIS Monitoring Wells**
- GSIS Monitoring Wells
- BASIN\_NAME**
- SAN FERNANDO
  - grid

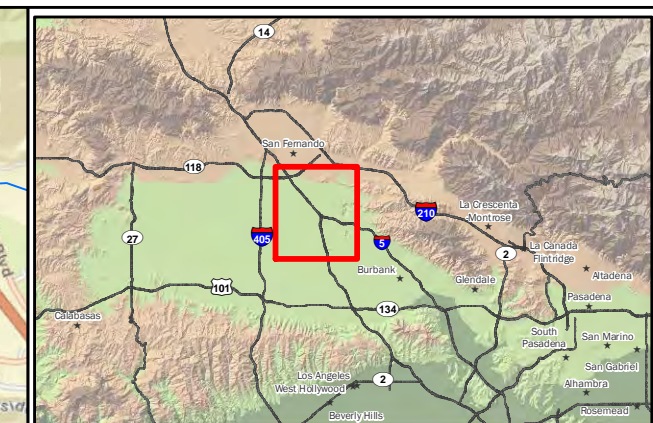
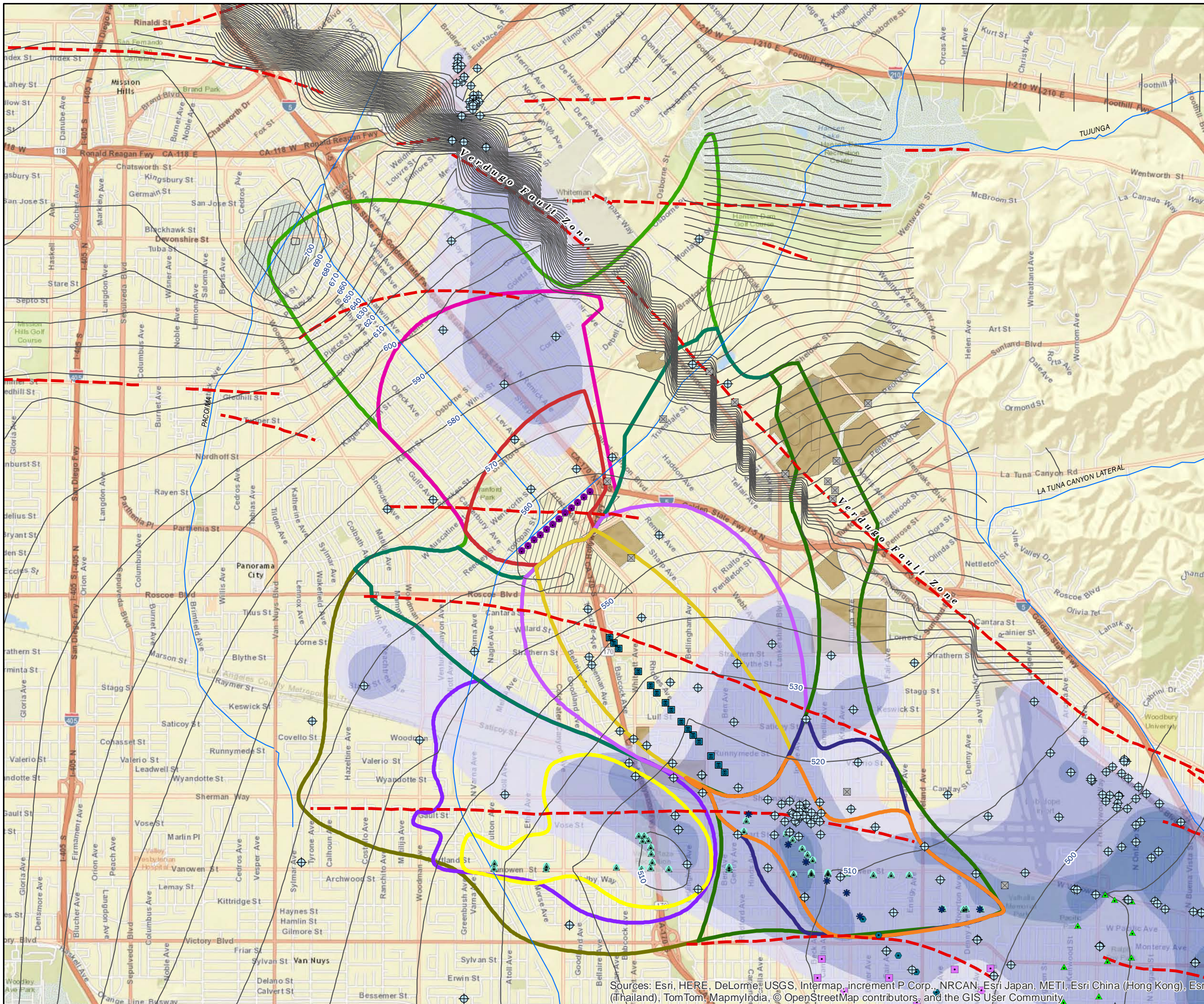


**FIGURE 6-1**  
**MODEL GRID - USEPA 2009 FFS**  
**San Fernando Groundwater Basin**  
**LADWP GSIS Project**  
**Los Angeles, California**

By: T. Crawford      Date: 2/11/2015      Project No. 146145.56

Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community





**Explanation**

**Trichloroethylene (TCE) concentration**

- 0.5 - 5 µg/L
- 5 - 50 µg/L
- 50 - 100 µg/L
- 100 - 1000 µg/L
- ≥ 1000 µg/L

**Tujunga Capture Zones**

- 2-Year
- 5-Year
- 10-Year

**Rinaldi Toluca Capture Zones**

- 2-Year
- 5-Year
- 10-Year

**North Hollywood West Capture Zones**

- 2-Year
- 5-Year
- 10-Year

**North Hollywood East Capture Zones**

- 2-Year
- 5-Year
- 10-Year

**Groundwater Level Contour at Year 10**

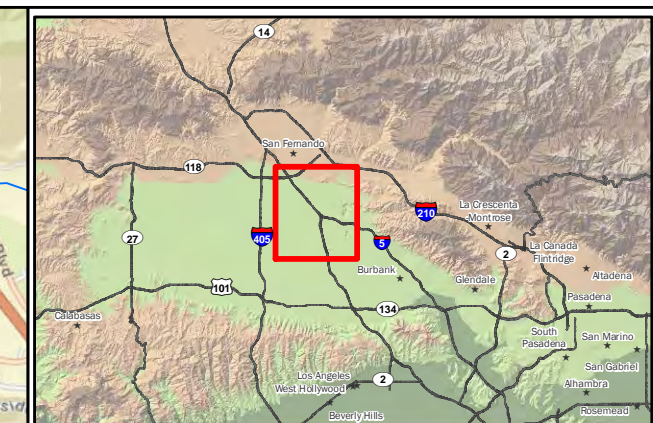
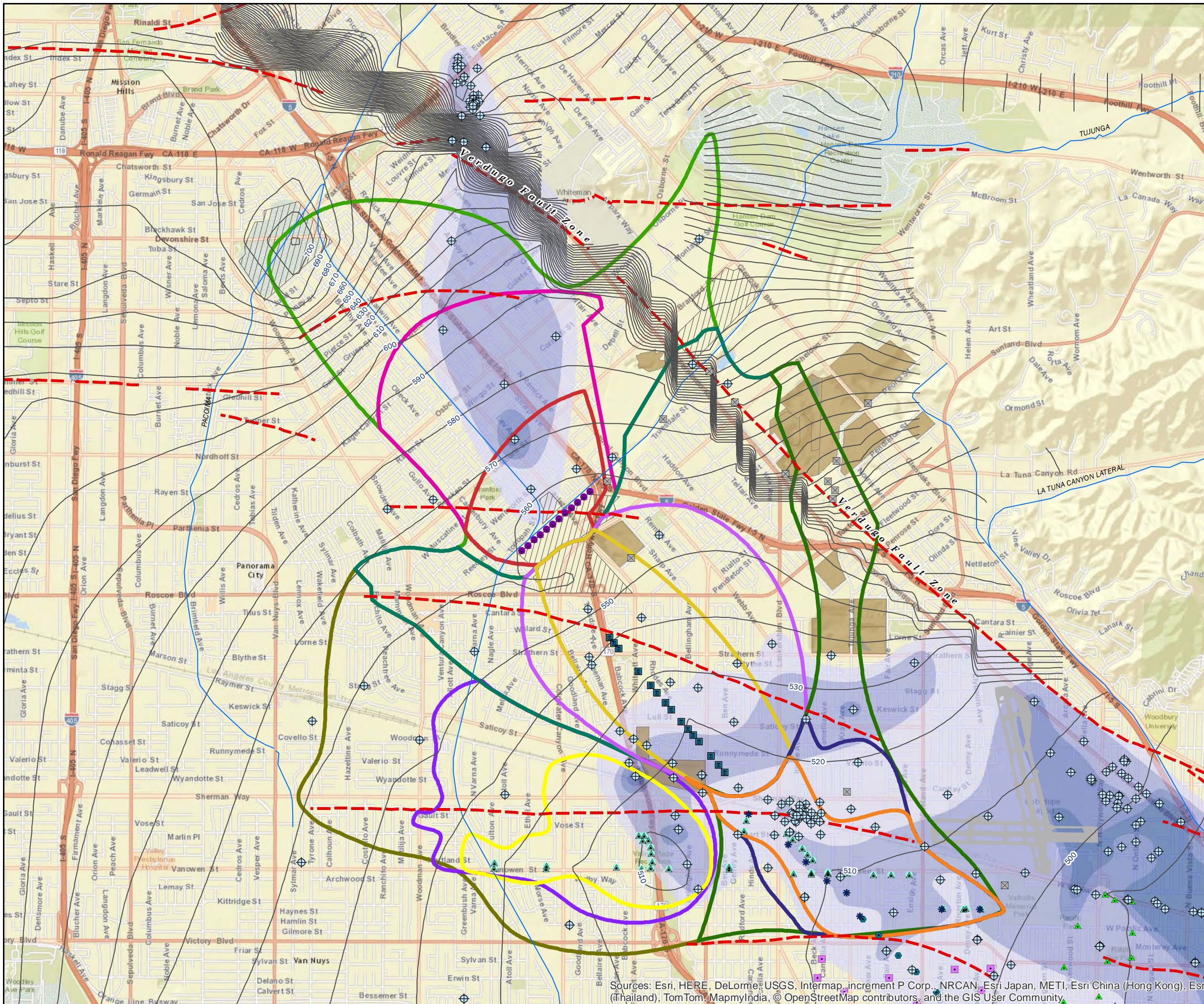
- Alternative 1 Simulated

**Other Feature**

- Faults



**FIGURE 6-3  
CAPTURE ZONES AND SHALLOW TCE  
San Fernando Groundwater Basin  
LADWP GIS Project  
Los Angeles, California**



**Explanation**

**Tetrachloroethylene (PCE) concentration**

- 0.5 - 5 µg/L
- 5 - 50 µg/L
- 50 - 100 µg/L
- ≥ 100 µg/L

**Tujunga Capture Zones**

- 2-Year
- 5-Year
- 10-Year

**Rinaldi Toluca Capture Zones**

- 2-Year
- 5-Year
- 10-Year

**North Hollywood West Capture Zones**

- 2-Year
- 5-Year
- 10-Year

**North Hollywood East Capture Zones**

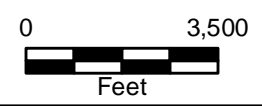
- 2-Year
- 5-Year
- 10-Year

**Groundwater Level Contour at Year 10**

- Alternative 1 Simulated

**Other Feature**

- Faults



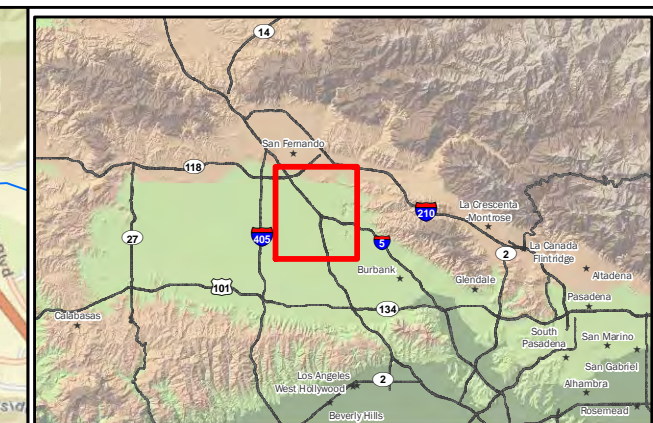
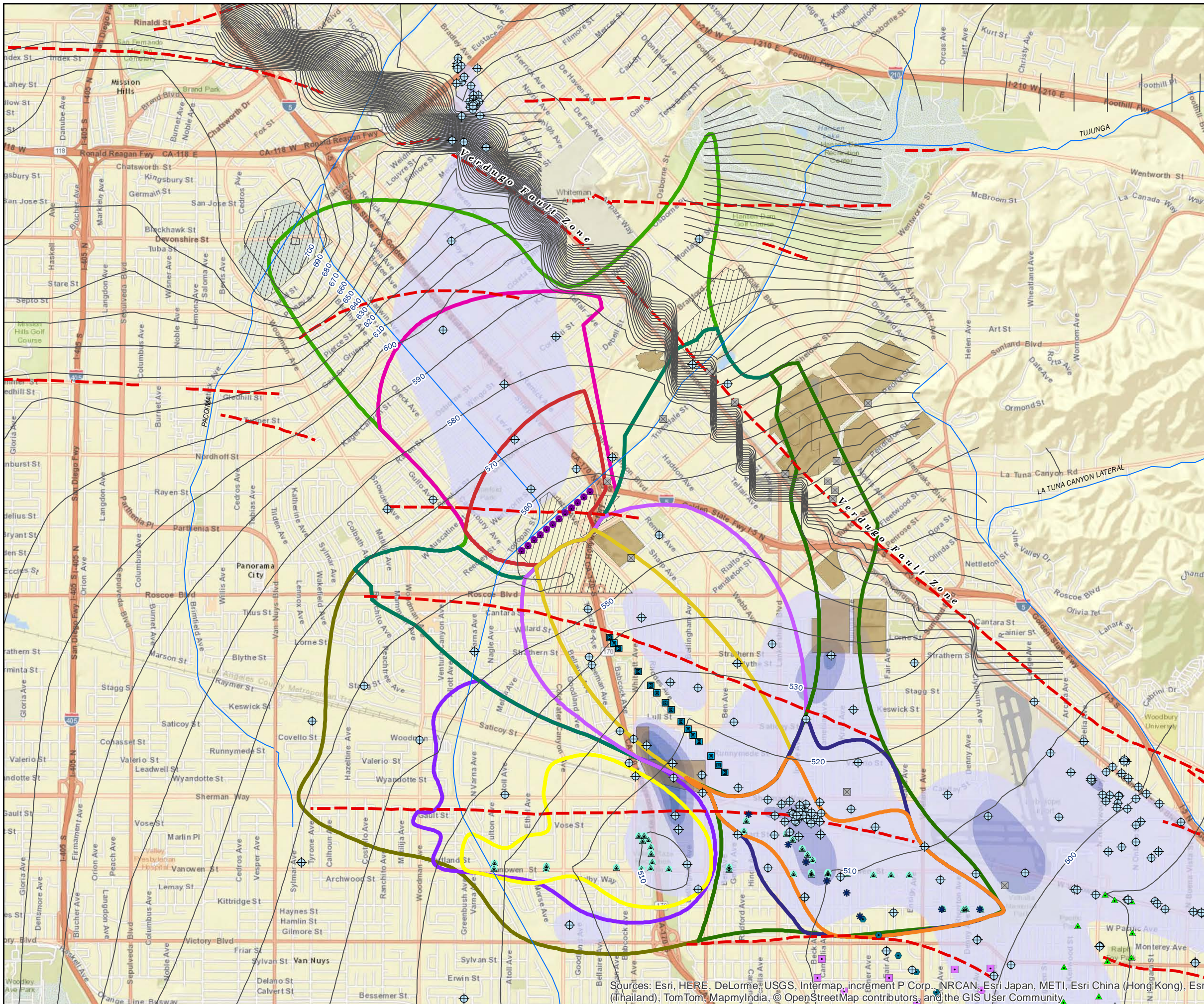
**FIGURE 6-4**  
**CAPTURE ZONES AND SHALLOW PCE**  
**San Fernando Groundwater Basin**  
**LADWP GIS Project**  
**Los Angeles, California**

By: Zeiler/Crawford    Date: 2-26-2015    Project No. 146806



Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

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**Explanation**

**1,4-Dioxane concentration**

- 0.1 - 3 µg/L
- 3 - 10 µg/L
- 10 - 100 µg/L
- ≥ 100 µg/L

**Tujunga Capture Zones**

- 2-Year
- 5-Year
- 10-Year

**Rinaldi Toluca Capture Zones**

- 2-Year
- 5-Year
- 10-Year

**North Hollywood West Capture Zones**

- 2-Year
- 5-Year
- 10-Year

**North Hollywood East Capture Zones**

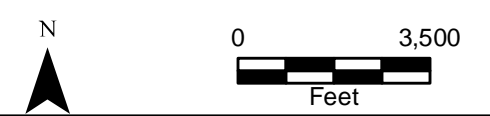
- 2-Year
- 5-Year
- 10-Year

**Groundwater Level Contour at Year 10**

- Alternative 1 Simulated

**Other Feature**

- Faults



**FIGURE 6-5  
CAPTURE ZONES AND SHALLOW 1,4-DIOXANE  
San Fernando Groundwater Basin  
LADWP GIS Project  
Los Angeles, California**

By: Zeiler/Crawford    Date: 2-26-2015    Project No. 146806



Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community