

Alamitos Barrier Project

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Member Agencies:

Orange County Water District

Water Replenishment District of Southern California

Long Beach Water Department

Golden State Water Company

Los Angeles County Flood Control District

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Joint Management Committee

**Annual report on the control of seawater intrusion
2012 - 2013**

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INTRODUCTION

The Alamitos Barrier Project (ABP) was designed and constructed to protect the groundwater supplies of the Central Basin of the County of Los Angeles and the southwest portion of the Coastal Plain area in Orange County from the intrusion of seawater through the Alamitos Gap area. The project facilities are located near the Los Angeles-Orange County border about two miles inland from the terminus of the San Gabriel River. The original facilities included injection wells to form a freshwater pressure ridge and extraction wells to form a saltwater trough. The freshwater pressure ridge has proven to be historically effective, whereas the saltwater trough has not. As a result, the extraction wells are currently not in operation. A map showing the supply pipeline, injection wells, extraction wells, and observation wells is shown on page A-12.

The County of Los Angeles Department of Public Works (Public Works) operates and maintains the ABP and its associated facilities under the direction and approval of the Joint Management Committee (JMC), acting on behalf of the Los Angeles County Flood Control District (LACFCD) and the Orange County Water District (OCWD).

This report summarizes design and construction issues, operation and maintenance activities, hydrogeologic effects, groundwater and chloride concentrations, and project costs for Fiscal Year (FY) 2012-13 (i.e., July 1, 2012 through June 30, 2013).

SUMMARY

During FY 2012-13, a total of 5,490.4 AF of water was injected into the ABP (an average rate of 7.6 cubic feet per second). Of that total, OCWD purchased 1,721.5 acre-feet (31%) and the Water Replenishment District of Southern California (WRD) purchased 3,768.9 acre-feet (69%). This total injected amount was 27% more than in FY 2011-12, but was consistent with historical volumes and was 5% below the average of 5,787.5 AF for the previous five fiscal years. No major shutdowns have occurred since FY 2006-07. All minor shutdowns for FY 2012-13 are detailed in Appendix A-18.

The total costs associated with the ABP in FY 2012-13 were \$7,747,886 (\$7,677,478 for injection-related operations, maintenance, water, and approved LACFCD and OCWD project expenses and \$70,408 for operation and maintenance of idle extraction wells). Of the total injection-related expenses, the estimated cost of the injected water was \$5,199,913 (\$1,624,438 paid by OCWD and \$3,575,475 paid by WRD) and the total cost of services and supplies for injection was \$2,477,565 (\$602,456 paid by OCWD and \$1,945,517 paid by the LACFCD). The corresponding services and supplies cost to inject one acre-foot of water was \$451.25. This cost was considerably lower than recent years due to less capital improvement projects during this reporting period. However, this cost was relatively close to the average from the previous five fiscal years. The project costs are expected to vary from year to year depending on the need to repair or improve the barrier facilities. The observation well cleanout costs and injection well redevelopment costs vary each fiscal year because they are cyclical activities.

Overall, groundwater levels decreased slightly or showed little change from the previous year. There were also localized decreases that were related to operational activities. In all cases, the southeast portion of the barrier remained below protective elevations due to the limited injection capabilities (quantity of wells, pressure limitations, maintenance, etc). West of the San Gabriel River, chloride concentrations generally decreased with

the exception of various localized increases. East of the San Gabriel River, widespread high chloride concentrations were still present with some wells exhibiting decreased chloride concentrations. Detailed analyses of the reporting period's groundwater elevations and chloride concentrations are provided in the "Hydrogeologic Effects" and "Chlorides" sections below.

It is imperative that the barrier operate consistently and continuously to best prevent seawater intrusion. The JMC will continue to press forward to ensure that the ABP is operated and maintained efficiently, economically, and continuously protects the region's groundwater supplies.

PROJECTS AND STUDIES

Studies and capital improvement projects over this reporting period are briefly summarized below. The general location of each project is identified on the map in Appendix A-12 and further project details are included in Appendix A-17.

ABP, DGBP, and WCBBP Injection Well Condition Assessment

This project involved the evaluation of injection wells at all three seawater barriers. For the ABP, it includes all the injection wells not assessed during the ABP Condition Assessment. The project was advertised and awarded during FY 2009-10. The ABP portion of the field work was conducted during FY 2010-11. The project was completed and the final report was submitted in July 2012. The report prioritized well replacement based on the useful life of construction materials used and field data collected including visual inspection and various geophysical inspection techniques. Wells 34F(I), 34H(A), and 34H(I) were recommended for replacement first due to the overall poor condition of these mild steel wells.

New ABP Observation Wells in Los Angeles County (ABP Unit 13)

This project was jointly funded by LACFCD and WRD, but was managed by LACFCD. It

involved the design and construction of 8 new observation well sites, with 21 well casings, located in Los Angeles County. A construction contract was advertised and awarded during this reporting period. Once completed, these wells will provide valuable new data to serve as reference for operations near injection well 33G, fill data gaps on the western end of the ABP in each of the aquifer zones, confirm whether seawater intrusion is occurring through the B-zone merge area (as suggested by the INTERA model, scenario 3), and replace the recently destroyed observation well 34H'38(R). Construction began in June 2013 and is anticipated to finish in November of 2013.

New ABP Injection and Observation Wells in Orange and Los Angeles Counties (ABP Unit 14)

This project is jointly funded by OCWD and LACFCD and managed by OCWD. This project was in the design phase and identified 17 new clustered injection wells, four nested observation wells and two shallow piezometers along the east leg of ABP. Two injection well clusters and one nested observation well are proposed to be installed between points B and C. These new injection wells will provide additional capacity to maintain protective elevations along the east leg of the ABP. The observation wells will fill data gaps in each of the aquifer zones and help better guide injection operations. During this reporting period, OCWD prepared a Geologist's Report evaluating the barrier's effectiveness and providing recommendations to improve barrier performance. The findings of this report were approved by the JMC committee in May 2013. In addition, OCWD completed a Notice of Intent and Environmental Impact Report to identify the possible impacts and proposed mitigations for this project. Construction is anticipated to begin in Spring 2014.

INJECTION OPERATIONS

The total amount of water injected into the ABP during FY 2012-13 was 5,490.4 acre-feet. Of this total, 38 percent (2,104.6 acre-feet) was reclaimed water and 62 percent (3,385.8 acre-feet) was imported water. The maximum monthly injection during this reporting period was 555.3 acre-feet (324.1 acre-feet imported and 231.2 acre-feet reclaimed) which occurred in August 2012. The minimum monthly injection of 390.7 acre-feet (272.9 acre-feet imported and 117.8 acre-feet reclaimed) occurred in December 2012 and was due to relatively higher groundwater levels combined with a partial brief shutdown to replace the flow meters at points B and C . The details of this shutdown are outlined in Appendix A-18.

The percentage of reclaimed injection decreased from the previous year primarily because the reclamation plant did not operate continuously during this entire reporting period. There were a number of planned and unplanned interruptions in reclaimed water delivery, but most were brief and due to ongoing expansion of the Leo J. Vander Lans Advanced Water Treatment Facility (AWTF). A few interruptions took longer than one week due mainly to routine maintenance activities conducted simultaneously with these shutdowns to minimize down time.

According to the California Regional Water Quality Control Board (CRWQCB) permit, File No. 93-076 of Order No. R4-2005-0061, the 60-month running average of reclaimed water into the ABP cannot exceed 50 percent of the total water volume injected. Through this reporting period, WRD's calculated 60-month running percentage of reclaimed water into the ABP was 36.4 percent and was therefore in compliance with the CRWQCB permit. Public Works' calculation through this period (which is consistent with the volumes identified throughout this report) is 36.6 percent. The slight discrepancy is due to differences in the calculation methods of the monthly meter readings for both imported and recycled deliveries.

The injection volumes and costs for FY 2011-12 and FY 2012-13 are shown in Table 1. The representative unit costs included in Table 1 for imported and reclaimed water were calculated by WRD. Table 1 shows that the volume of water injected at the ABP during FY 2012-13 increased by 26.7% from the previous year. The amount of water injected at the ABP in FY 2012-13 is consistent with historical volumes and 5 percent below the average injection amount during the previous five fiscal years (5,787.5 AF).

All ABP shutdowns from FY 2012-13 are summarized in Appendix A-18. There were no major shutdowns during this reporting period.

TABLE 1. INJECTION OPERATIONS

	Imported Water Injections			Reclaimed Water Injections			Total Injections		
	FY11-12	FY12-13	Percent Change From Previous Year	FY11-12	FY12-13	Percent Change From Previous Year	FY11-12	FY12-13	Percent Change From Previous Year
VOLUME OF WATER INJECTED IN ACRE-FEET									
OCWD ¹	602.6	1,072.5	78.0	579.4	649.0	12.0	1,182.0	1,721.5	45.6
WRD ²	1,590.5	2,313.3	45.4	1,562.2	1,455.6	-6.8	3,152.7	3,768.9	19.5
TOTAL	2,193.1	3,385.8	54.4	2,141.6	2,104.6	-1.7	4,334.7	5,490.4	26.7
UNIT COST OF WATER PER ACRE-FEET³									
JULY - DEC	\$869.88	\$922.23	6.0	\$869.88	\$922.23	6.0			
JAN - JUN	\$923.72	\$975.23	5.6	\$923.72	\$975.23	5.6			
COST OF WATER PURCHASED									
OCWD ¹	\$542,630	\$1,012,730	86.6	\$524,103	\$611,708	16.7	\$1,066,733	\$1,624,438	52.3
WRD ²	\$1,418,299	\$2,194,986	54.8	\$1,398,792	\$1,380,489	-1.3	\$2,817,091	\$3,575,475	26.9
TOTAL	\$1,960,929	\$3,207,716	63.6	\$1,922,895	\$1,992,197	3.6	\$3,883,824	\$5,199,913	33.9
AVERAGE INJECTION RATE IN CFS									
OCWD ¹	0.8	1.5	78.0	0.8	0.9	12.0	1.6	2.4	45.6
WRD ²	2.2	3.2	45.4	2.2	2.0	-6.8	4.4	5.2	19.5
TOTAL	3.0	4.7	54.4	3.0	2.9	-1.7	6.0	7.6	26.7

¹ Orange County Water District (OWCD)

² Water Replenishment District (WRD)

³ The Unit Cost of **Imported Water** Per Acre-Foot is the sum of the Metropolitan Water District's wholesale rate at LB-07A (managed by Long Beach Water Department), the \$5 Administrative Surcharge, Readiness-To-Serve (RTS) costs, and Capacity costs (using total volume plus penalties). This amount is greater than what is shown on monthly invoices because Capacity costs are not typically known or accounted for at the time of those invoices. Based on the agreement between the OCWD and the WRD, the representative Unit Cost of **Reclaimed Water** Per Acre-Foot is equal to that of the imported water and is shown in the calculations by the WRD.

ADDITIONAL NOTES:

- The Unit Cost of Reclaimed Water for January through June 2013 was not yet available at the time of the Annual JMC Meeting. This value was estimated to be \$975.23 by adding the July through December 2012 RTS & CC charges to the January through June 2013 imported unit cost. Therefore, both the cost of reclaimed water and the overall total cost of injection water for FY12-13 are estimates only and should not be used for any other purposes.

Figure 1 presents the monthly amounts of water injected during FY 2012-13. Figure 2 illustrates the annual amounts of water injected over the last 20 years.

FIGURE 1 - MONTHLY AMOUNT OF WATER INJECTED

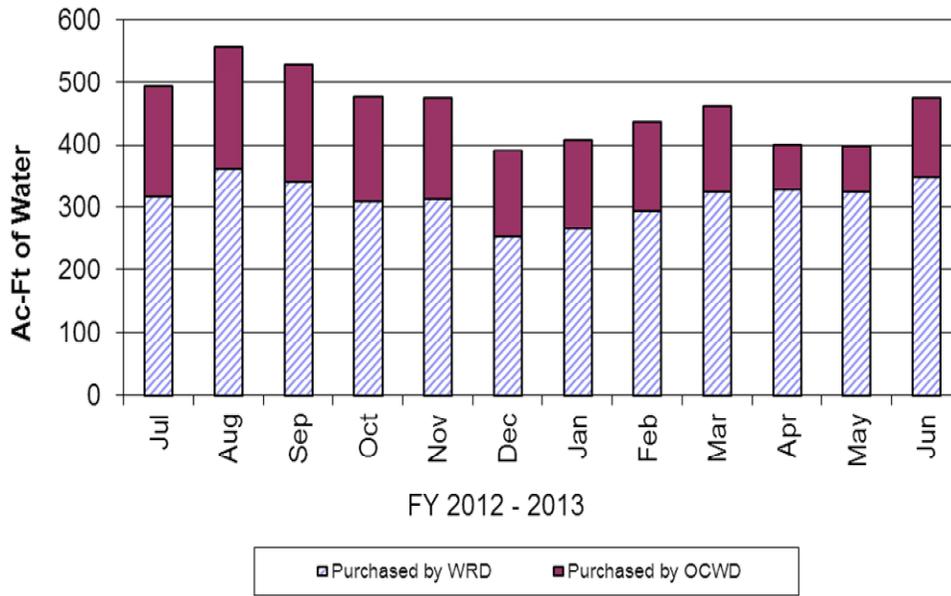
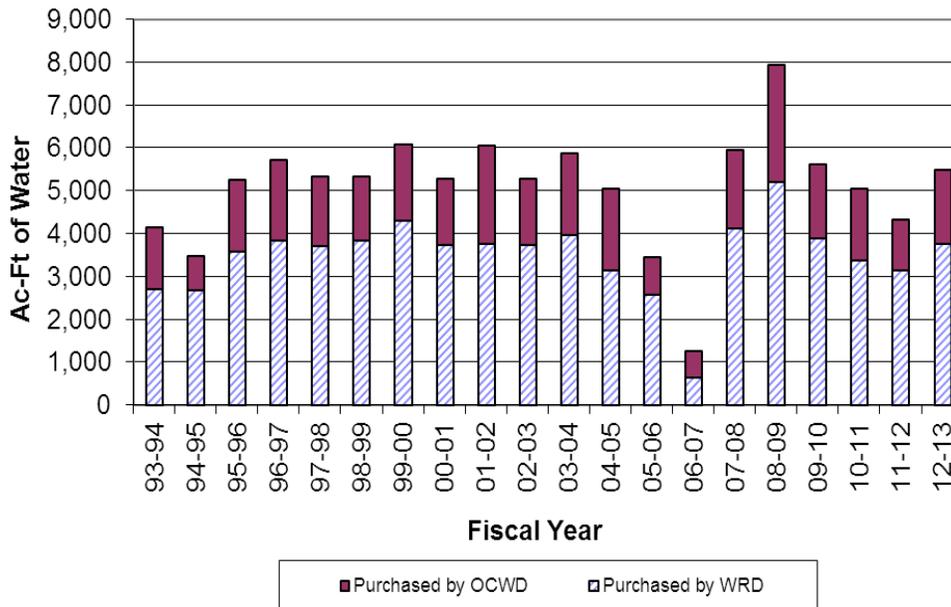


FIGURE 2 - ANNUAL AMOUNT OF WATER INJECTED



EXTRACTION OPERATIONS

There were no extraction activities during FY 2012-13. As recommended by the JMC, these wells were taken out of operation in FY 2002-03. This decision was based on the results of a one-year extraction well efficiency study, which demonstrated that the chloride levels in the area decreased when the extraction wells were turned off. The extraction wells will continue to receive minimal maintenance so that they can be converted to monitoring wells in the future.

MAINTENANCE

Typical well maintenance at the ABP includes observation well cleanouts and injection well redevelopments. The purpose of observation well cleanouts is to remove accumulated sediment at the bottom of the well casings. Removing the sediment ensures the full lengths of the well screens are in communication with the aquifer, and also allows chloride sampling to occur at all designated depths. All 220 active observation wells are typically analyzed for sediment accumulation every two years. Following the analysis, every observation well determined to have significant sediment accumulation (i.e., covering a portion of the well screen) then receives the necessary cleanout services. Once cleanout activities are completed, each casing is bottom sounded to determine whether or not sediments were removed successfully. Recommendations are developed for the casings where cleanouts are unsuccessful, such as sediment refilling the well due to a hole in the casing or the well is packed with foreign material. The results of unsuccessful cleanouts will be combined with the results of the ABP Condition Assessment to create a prioritized list of observation wells to be replaced. During FY 2012-13, 3 observation well casings were successfully cleaned out. A new cleanout cycle is anticipated to start in late 2013.

The purpose of injection well redevelopments is to remove accumulated sediments and microbiological build-up within the well casings to restore each well's ability to operate at its maximum injection capacity. Each of the 45 injection and extraction well casings

are routinely redeveloped once every two years. During FY 2012-13, Public Works completed redevelopment activities at the following 24 well casings¹: 33G(A,I), 33J(A,I), 33L(A,I), 33N(A,I), 33T(A,I), 33V'15P(R), 33W(C,B,A,I), 34E(C,B), 34E(I), 34F(I), 34H(A), 34H(I), 34H'17P(R), 34H'18P(I), 34S(C,B), 34S(I), 34S(A), 34S'22P(R), 34V(I), 34V(C,B), 34V(A), 35G(A,I), 35F(I), 34Z(I).

Figure 3 depicts the operating status of each injection and extraction well during FY 2012-13 and demonstrates that the barrier was predominantly in operation throughout the entire reporting period. There were two ABP shutdowns, one full barrier shutdown and one partial shutdown, as explained in Appendix A-18. In addition, a large part of the ABP's east leg was shut down from the beginning of April to mid-May 2013 to reduce groundwater levels in order to facilitate the redevelopment of injection wells 34S and 34V.

There were also a few instances of individual well shutdowns or limited injection due to actual or suspected surface leakage. Wells 33T and 33S1 had been operating with limited injection rates since FY 2011-12 due to known surface leakage issues. Public Works crews pressure grouted well 33T in August and September of 2012, and the well was returned to service in December 2012 after allowing the grout to cure and redevelopment of the well. In addition, surface leakage at well 35H2 was suspected to have caused a small sinkhole on the Boeing facility approximately 250' south and east of the well. OCWD and Public Works investigated the claim by shutting down the injection well, and constructing a small piezometer in the area to monitor shallow groundwater levels. The investigation determined that the high groundwater levels were unrelated to injection operations, and well 35H2 was returned to service.

¹ The capital letters in parenthesis represent the aquifer(s) associated with that particular injection well casing. For example, (A) = A Zone aquifer, (A,I) = A and I Zone aquifers, and so forth.

HYDROGEOLOGIC EFFECTS

Figures 4 through 8 (pp. 13-17) show the average monthly groundwater elevation relative to the average groundwater elevation of the 10 preceding years (FY 2002-03 to 2011-12) in the vicinity of the barrier alignment in the R, C, B, A, and I Zones, respectively. Two graphs were created for each aquifer to account for changes in groundwater elevation trends along two portions of the barrier alignment: wells west of the San Gabriel River and wells east of the San Gabriel River. It is important to note that the 10-year average does not represent a groundwater elevation goal nor does it specifically reflect barrier performance, but is simply included for comparison purposes. For example, the 10-year historical average included in the graphs for the FY 2012-13 report is generally higher than the one shown in the FY 2011-12 report because the FY 2011-12 data now included was generally higher than the FY 2001-02 data that it replaced. The graph includes all available semi-monthly, monthly, semi-annual, and annual data for wells within the barrier alignment and landward for approximately 2,000 feet from the barrier. As a result, semi-monthly values are “weighted” more heavily than the annuals in the calculation of the monthly average.

As shown in the graphs, groundwater elevations during FY 2012-13 were typically at or above historical averages. This was likely due to increased injection rates compared to those in FY 2011-12. East of the San Gabriel River, groundwater elevations were above 10-year historical averages for most of the reporting period with the exception of Spring 2013. West of the San Gabriel River, except for Spring 2013 in the Recent Zone, groundwater elevations were above the 10-year historical averages for the entire reporting period. In general, all the figures show the expected seasonal trends of higher groundwater elevations in the winter months (decreased pumping) and lower groundwater elevations in the summer months (increased pumping).

FIGURE 4a RECENT ZONE WEST OF THE SAN GABRIEL RIVER

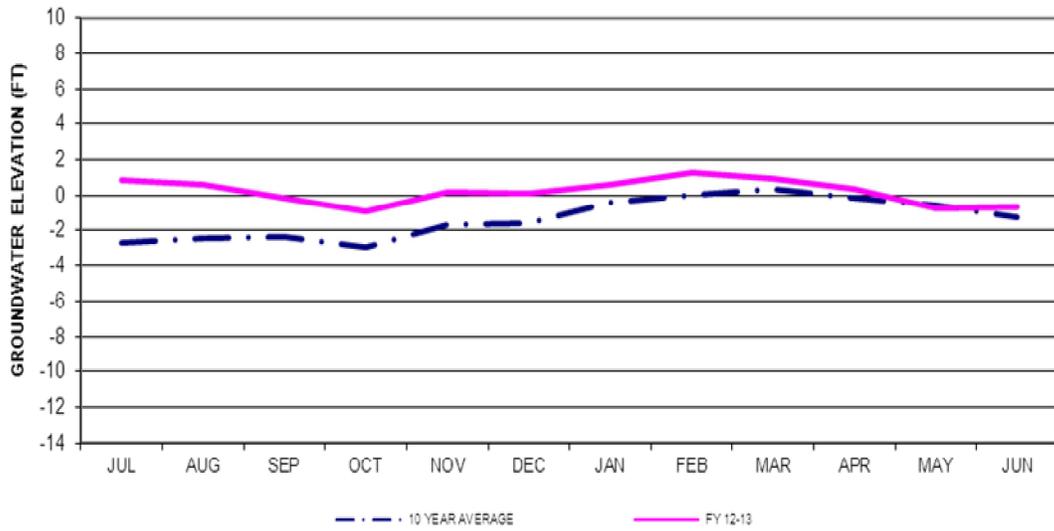


FIGURE 4b RECENT ZONE EAST OF THE SAN GABRIEL RIVER

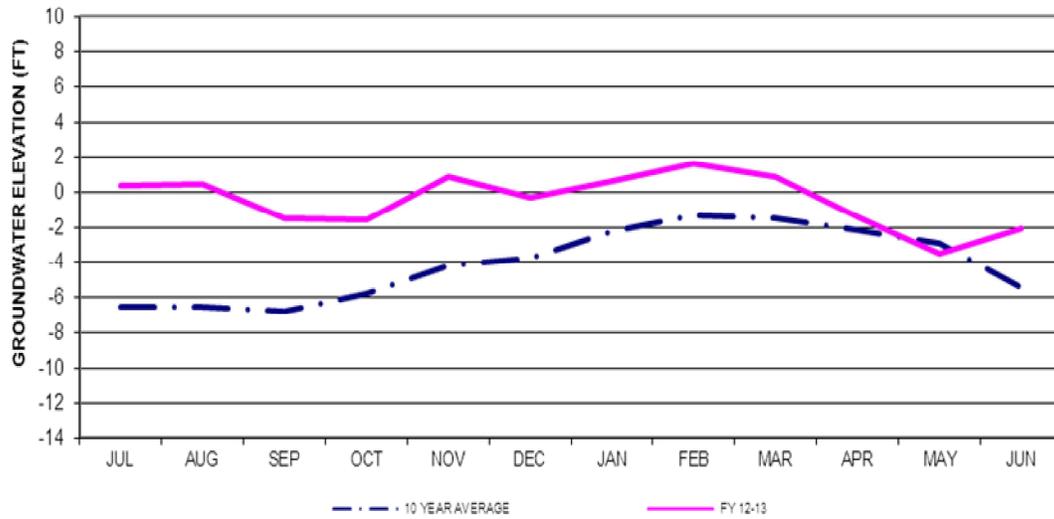


FIGURE 5a C-ZONE WEST OF THE SAN GABRIEL RIVER

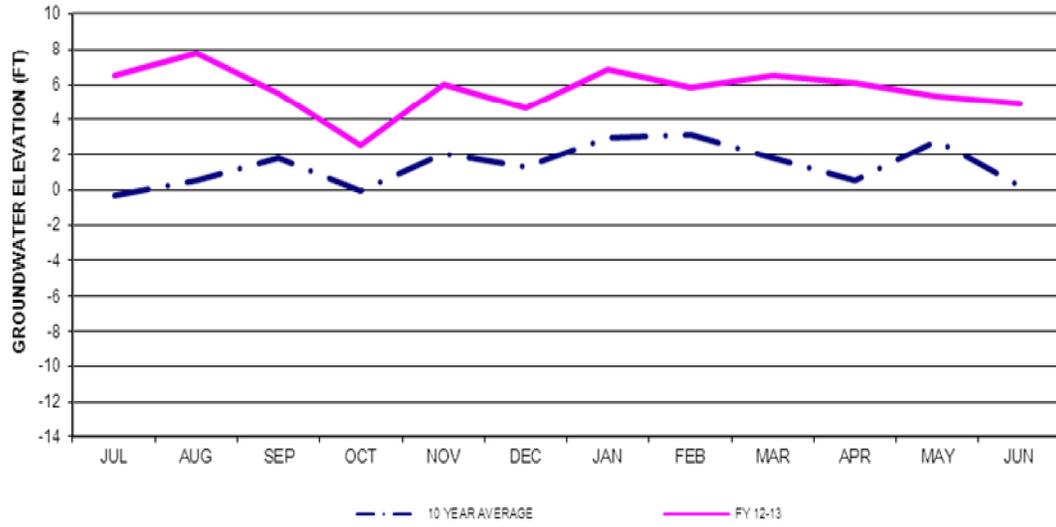


FIGURE 5b C-ZONE EAST OF THE SAN GABRIEL RIVER

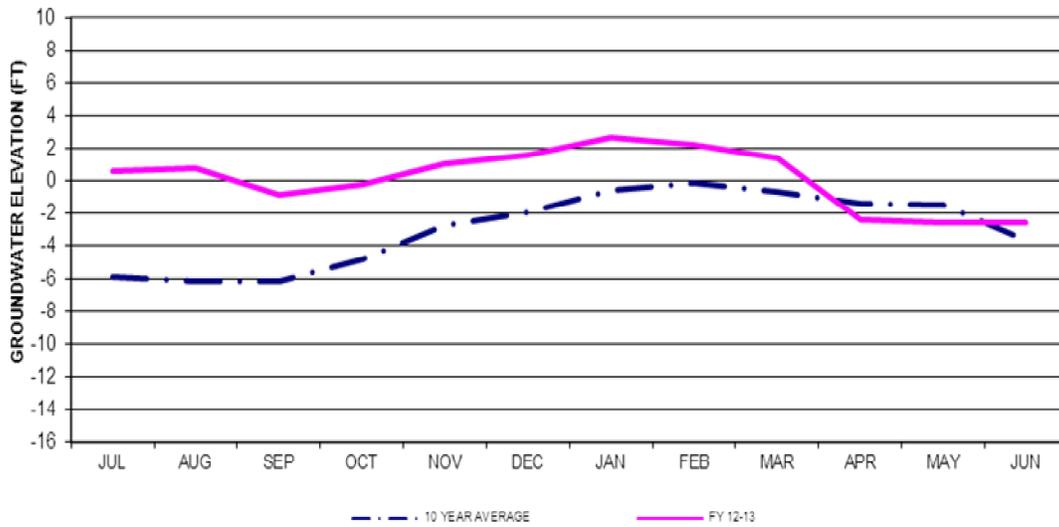


FIGURE 6a B-ZONE WEST OF THE SAN GABRIEL RIVER

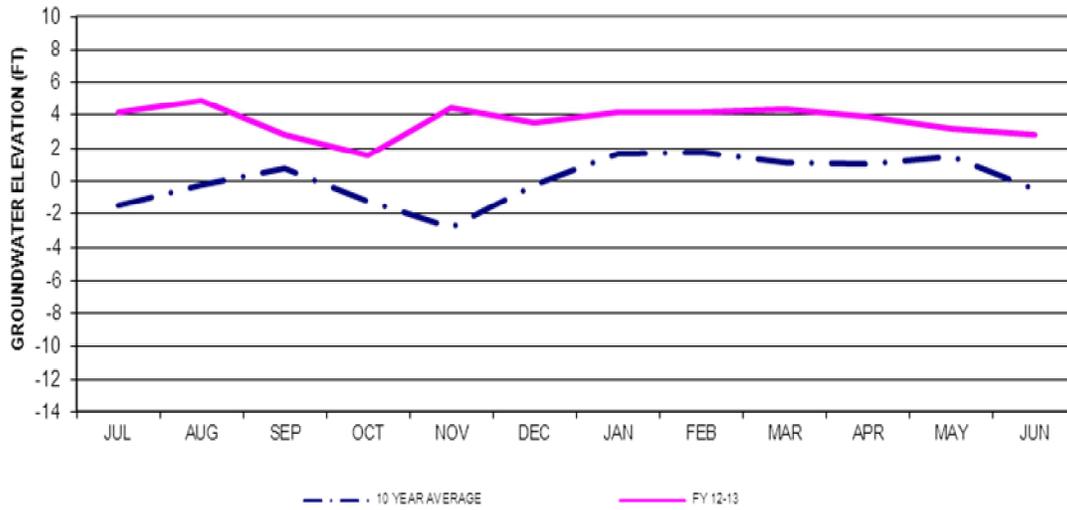


FIGURE 6b B-ZONE EAST OF THE SAN GABRIEL RIVER

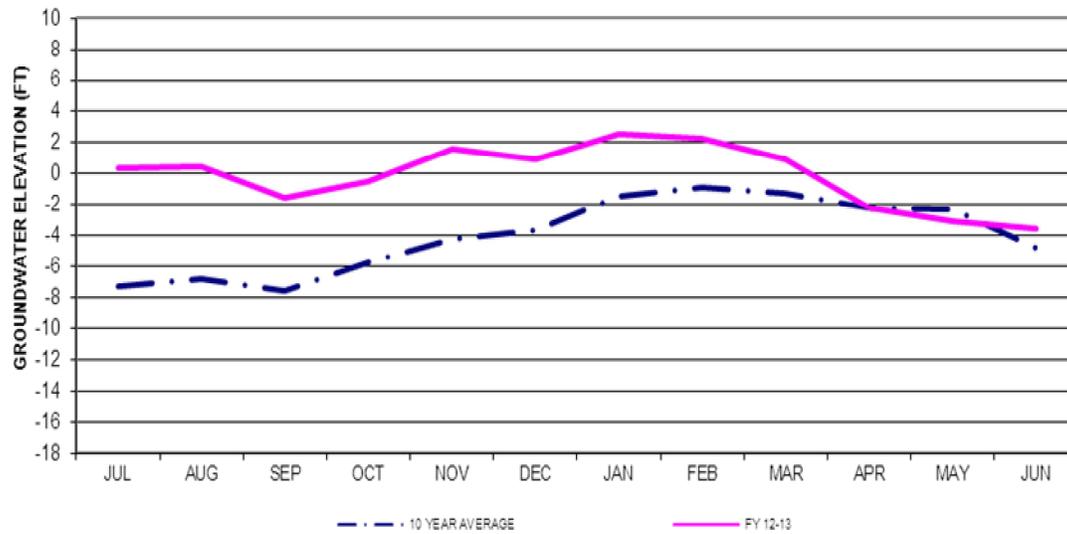


FIGURE 7a A-ZONE WEST OF THE SAN GABRIEL RIVER

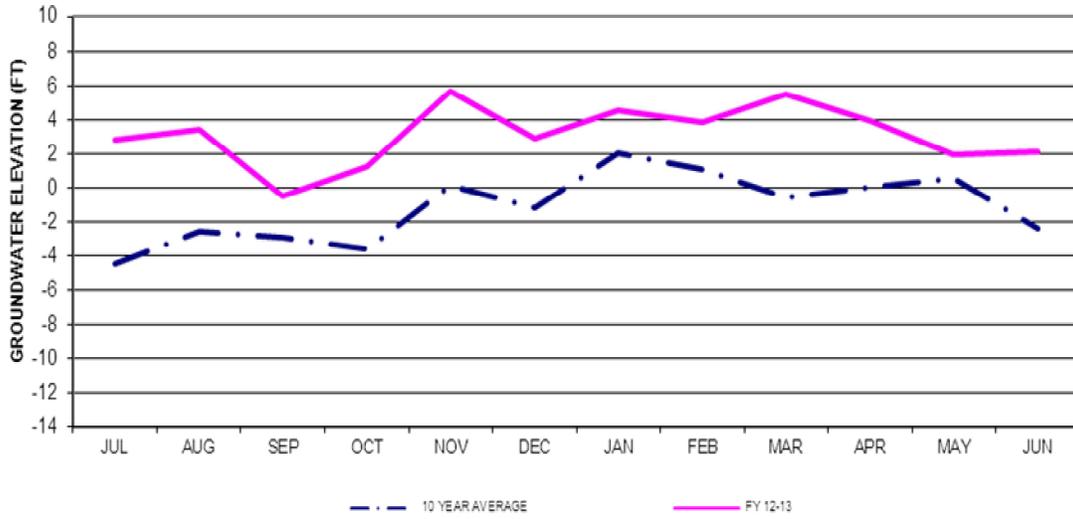


FIGURE 7b A-ZONE EAST OF THE SAN GABRIEL RIVER

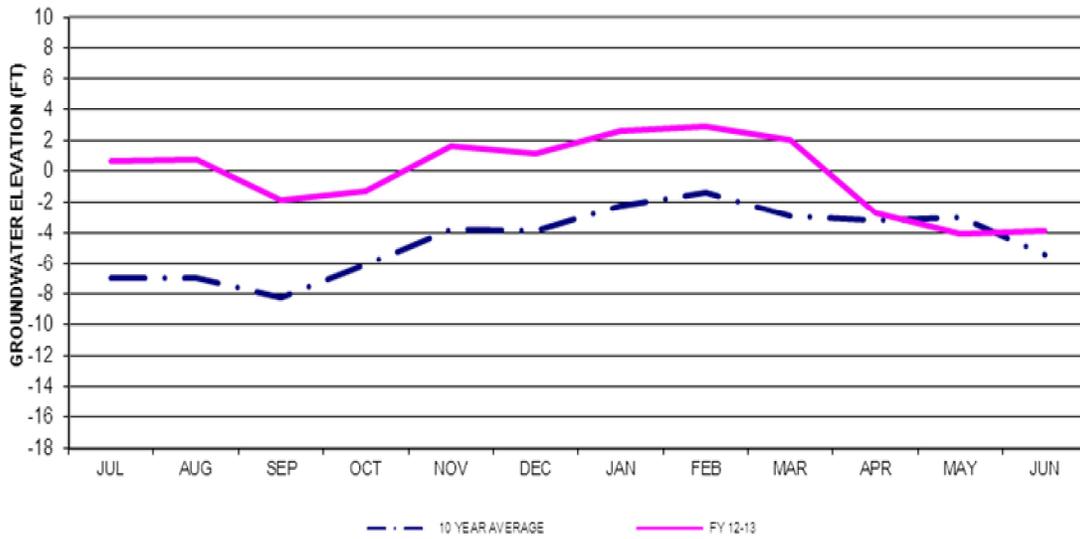


FIGURE 8a I-ZONE WEST OF THE SAN GABRIEL RIVER

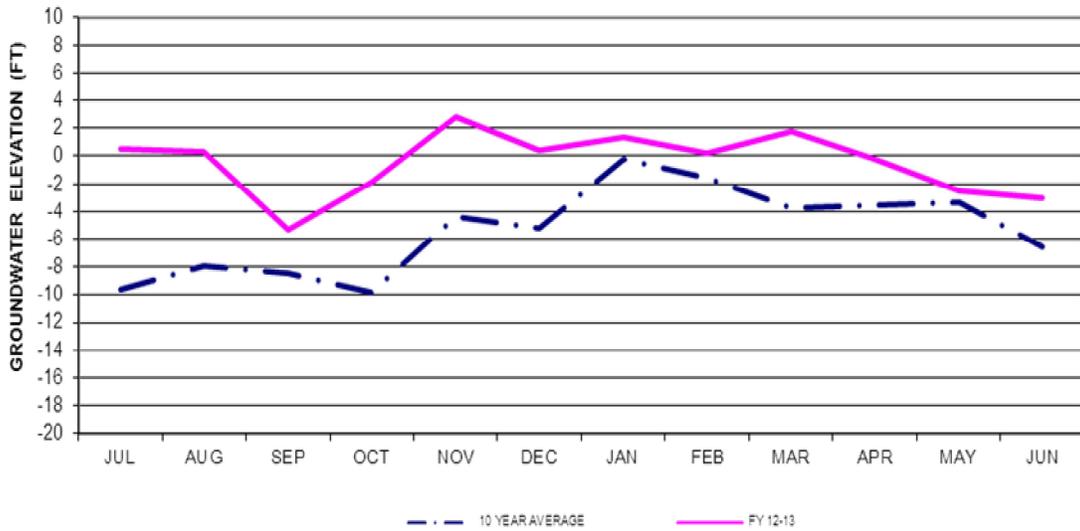
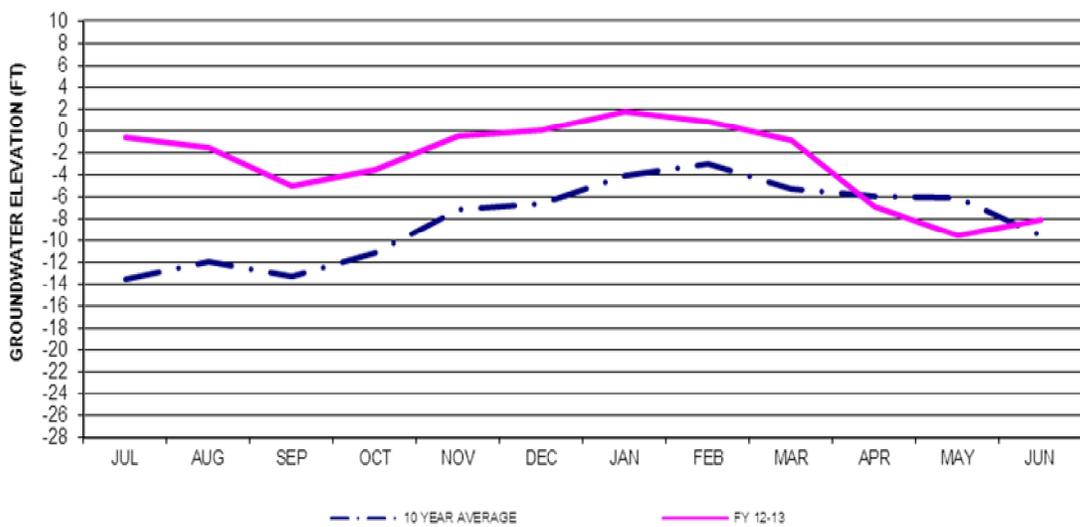


FIGURE 8b I-ZONE EAST OF THE SAN GABRIEL RIVER



Groundwater elevation contours for the R, C, B, A, and I Zones have been prepared from data collected in Spring 2013 and are included in Appendix A-1.1, 2.1, 3.1, 4.1, and 5.1. In general, the contours show that the groundwater levels were the highest near the barrier alignment, and typically decrease moving landward. The general shapes of each contour are similar to the previous year and some similar groundwater mounds are seen around certain injection wells. Also, it should be noted that areas historically having higher groundwater elevations in the C and B zones, especially near the bend at the San Gabriel River, continued to have higher groundwater elevations than their surroundings. Other areas of historically elevated groundwater levels (e.g., near 33XY and 33YZ), while higher than surrounding areas, were also much higher when compared to the same time last year. This is probably due to the February 2012 barrier shutdown in conjunction with redevelopment activities at nearby injection wells.

Contours of changes in groundwater elevations for the R, C, B, A, and I Zones between Spring 2012 and Spring 2013 are shown in A-1.2, 2.2, 3.2, 4.2, and 5.2. The data set is based on available data from Spring 2013, which was then subtracted from the corresponding and available data from Spring 2012 (shown in A-1.3, 2.3, 3.3, 4.3, and 5.3). These contours clearly identify increases and decreases in groundwater elevations from one reporting period to the next. In general, most areas saw very little changes in groundwater elevation. Below is a brief summary and discussion of each aquifer zone:

- R Zone:
 - Groundwater elevations remained fairly consistent in the vicinity of the ABP, with increases of about 1 foot along both the east and west legs of the barrier.
 - Groundwater elevations decreased about 2 feet along the barrier alignment between the San Gabriel River and the Los Alamitos Channel.
- C Zone:
 - Groundwater elevations remained relatively constant at the western and

eastern ends of the barrier.

- Groundwater elevations increased about 7 feet in the vicinity of wells 33XY and 33YZ. This increase was probably due to redevelopment activities at nearby injection wells in Spring 2012.
- B Zone:
 - Groundwater elevations decreased slightly at the western end of the barrier (e.g. 33JL and 33NQ)
 - Groundwater elevations increased up to 2 feet at the eastern end of the barrier and up to 7 feet in the middle of the barrier (e.g. 33XY and 33YZ).
- A Zone:
 - Groundwater elevations increased about 4 feet along the barrier alignment between Los Cerritos Channel and Los Alamitos Channel, with localized increases of about 7 feet in the vicinity of wells 33WX, 33XY, and 33YZ.
 - Groundwater elevations increased slightly along the west leg, and remained fairly constant along eastern end of the barrier.
- I Zone:
 - Groundwater elevations generally increased along the west leg, and remained constant or decreased slightly along the east leg.
 - Localized increases in groundwater elevations of up to 3 feet occurred along the barrier alignment between Los Cerritos Channel and San Gabriel River.

Graphs showing the average, maximum and minimum groundwater elevations at each internodal observation well throughout FY 2012-13 are included in Appendix A13 through A-16. As shown in the graphs, the average groundwater elevation was below the protective elevation at many wells along the barrier during FY 2012-13. However, areas of high chloride concentrations did not necessarily correlate with areas where the average elevations were below the protective elevation. A comparison of FY 2012-13 graphs with FY 2011-12 graphs indicates that overall elevations generally decreased, even though the barrier injected more water in FY 2012-13 than FY 2011-12. In all

cases, the southeastern portion of the barrier remained below protective elevations due to the limited injection capabilities in this area (quantity of wells, pressure limitations, maintenance, etc) It is important to note that the JMC is seeking to remediate the limited injection capabilities in the southeastern region through additional wells, modeling studies, grouting operations, and condition assessments to plan for and minimize shutdowns.

CHLORIDES

Figures 9 through 13 (pp. 23-27) show the historical chloride concentrations in each individual aquifer zone. The graphs plot the average of every maximum value measured at each observation well during each sampling event within the target area (i.e. east or west of the San Gabriel River) throughout FY 2012-13. The data includes all available information from the annual and semi-annual chloride sampling events for wells within the barrier alignment and landward for approximately 2,000 feet from the barrier. As a result, the semi-annual values are “weighted” more heavily than the annuals in the calculation of the annual average. Two sets of graphs were created for each aquifer to account for changes in chloride concentration trends in the areas to the west and east of the San Gabriel River, respectively. In each figure, the average of the annual maximum chloride concentrations for the last 10 fiscal years (including this year) is shown with respect to the freshwater condition (250 mg/L).

Figure 9a: R-Zone Chloride West of San Gabriel River

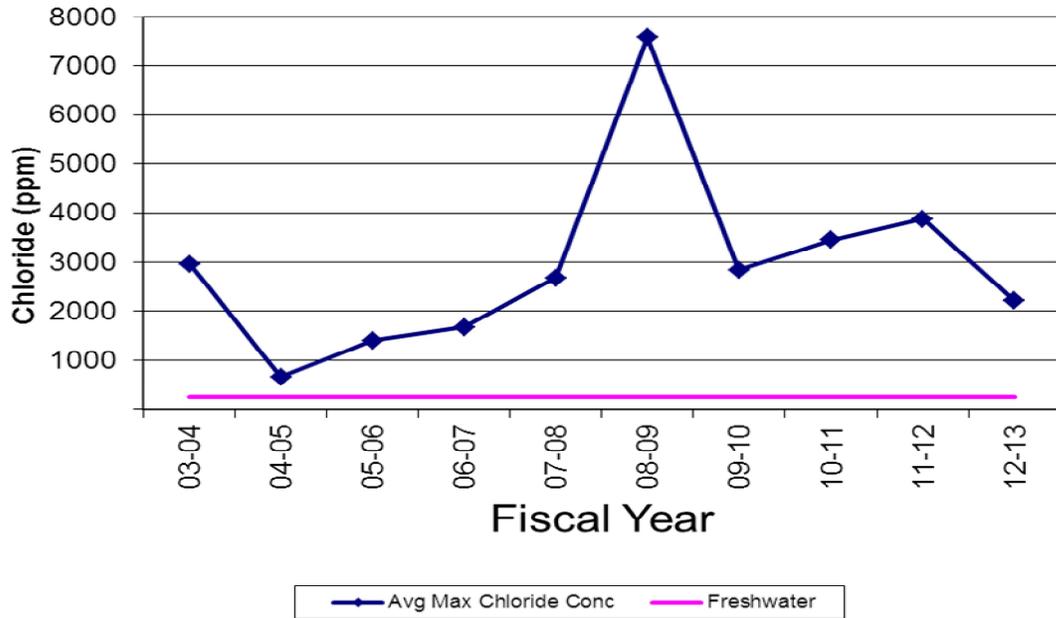


Figure 9b: R-Zone Chloride East of San Gabriel River

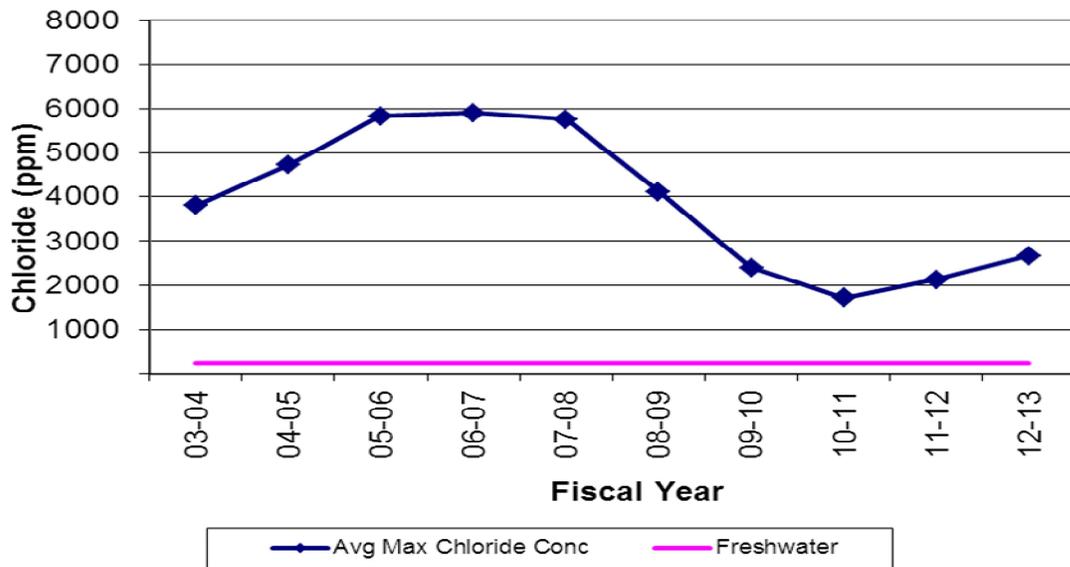


Figure 10a: C-Zone Chloride West of San Gabriel River

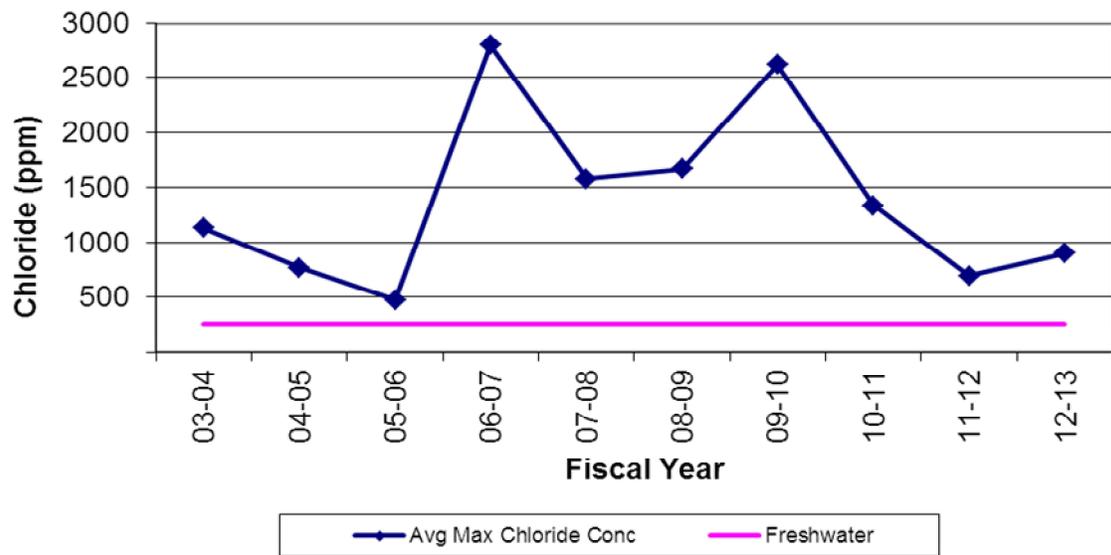
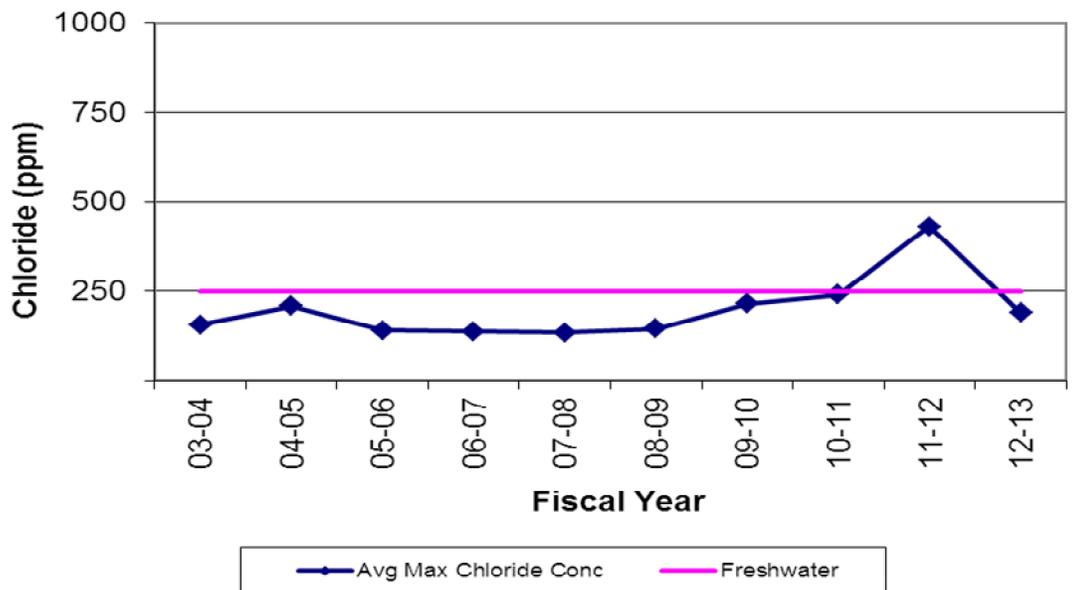


Figure 10b: C-Zone Chloride East of San Gabriel River



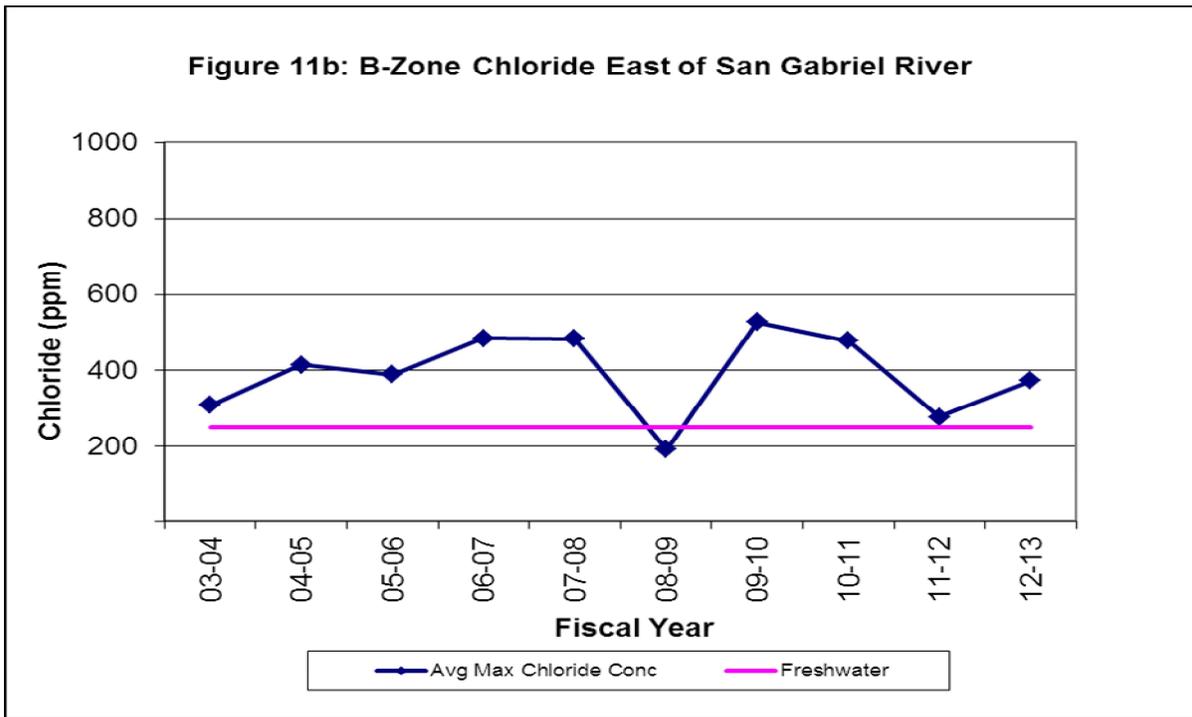
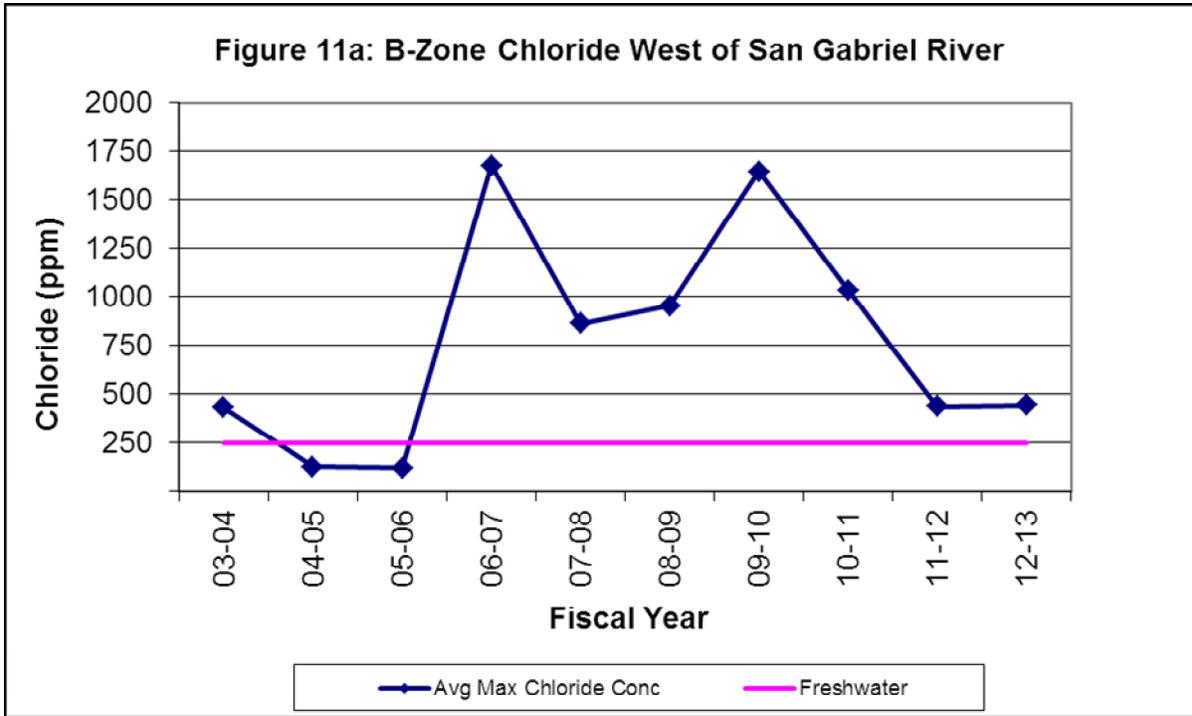


Figure 12a: A-Zone Chloride West of San Gabriel River

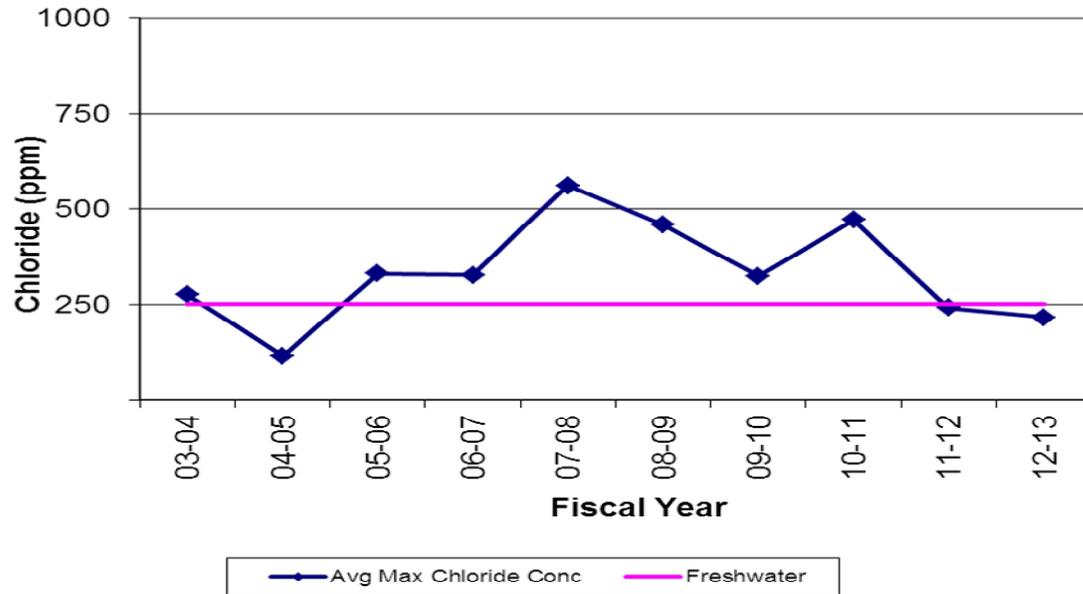


Figure 12b: A-Zone Chloride East of San Gabriel River

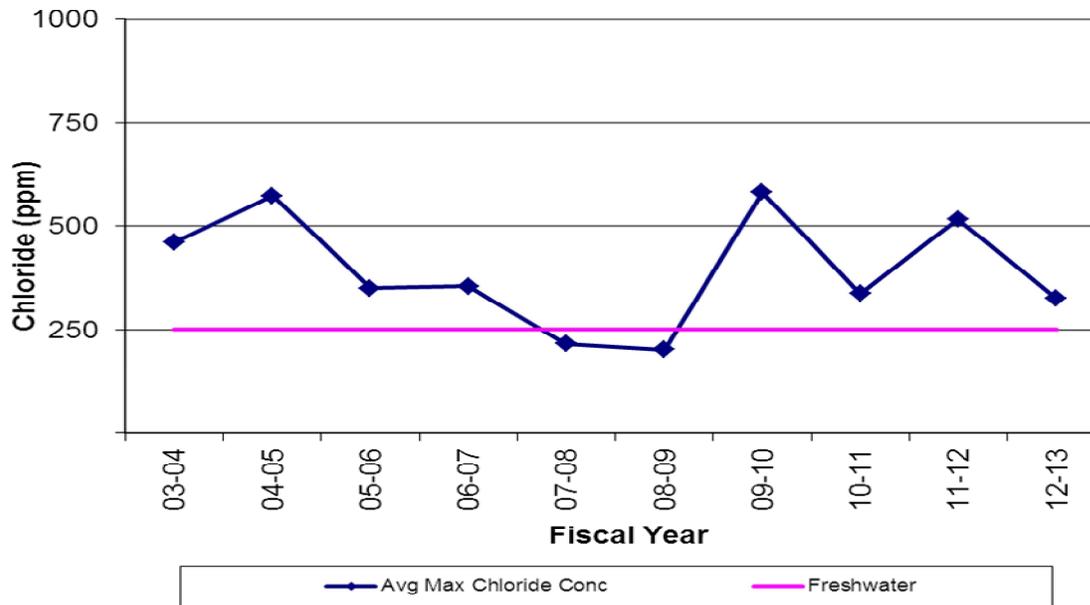


Figure 13a: I-Zone Chloride West of San Gabriel River

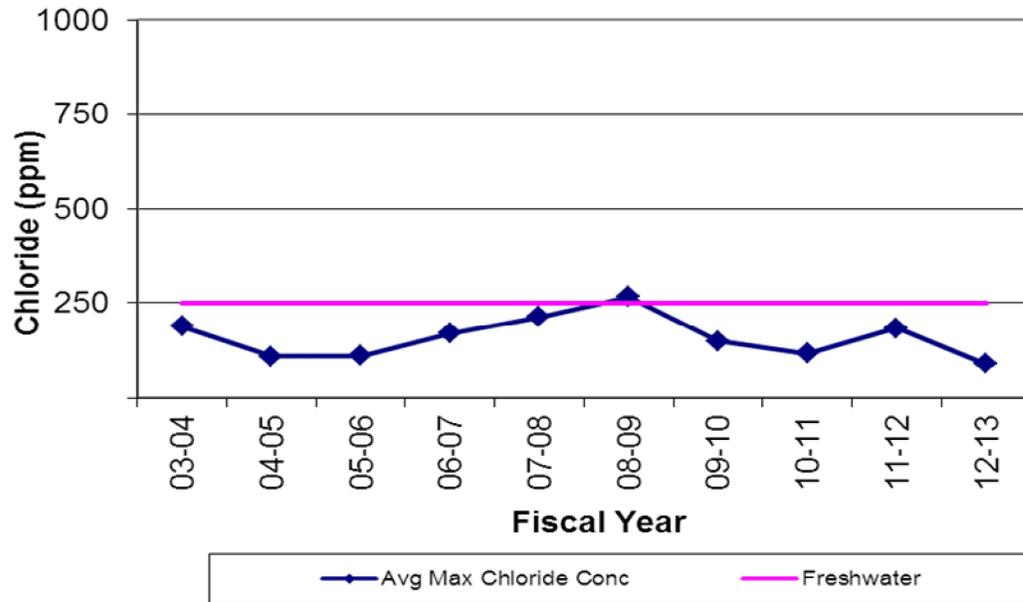
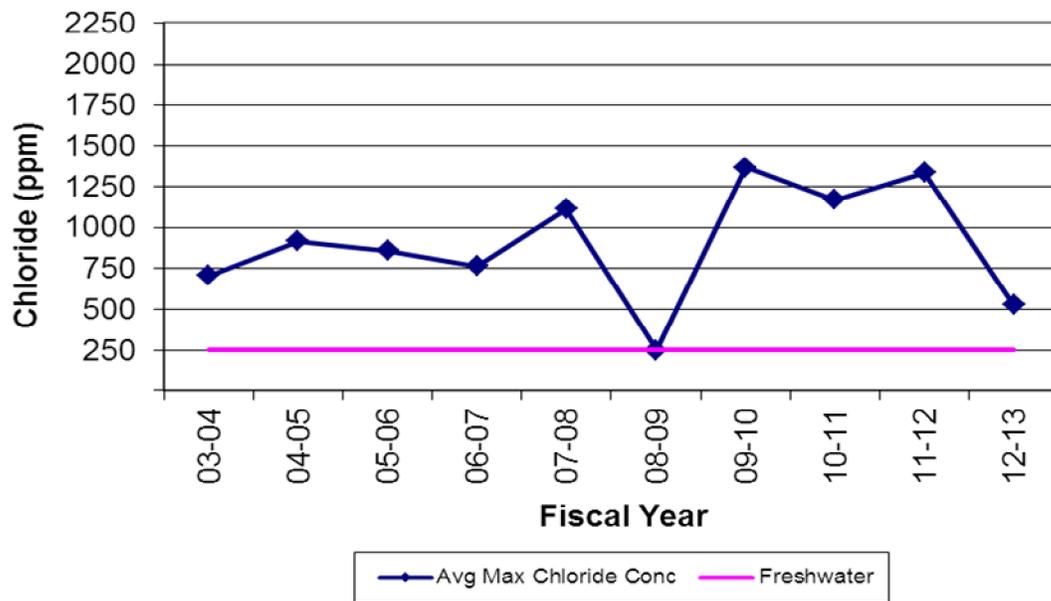


Figure 13b: I-Zone Chloride East of San Gabriel River



West of the San Gabriel River, FY 2012-13 average maximum chloride concentrations in the R, A, and I Zones decreased. The decrease was greater than 1500 mg/L in the R zone. Average maximum chloride concentration in the C and B Zones showed a slight increase.

East of the San Gabriel River, FY 2012-13 average maximum chloride concentrations decreased on the order of 200 mg/L in the C and A Zones. However, the decrease in the I zone was on the order of 1000 mg/L. Average maximum chloride concentrations increased substantially in the R zone, and the small increase in the B Zone is due primarily to increased chloride concentrations at significant wells in the area, such as 34U8 and 34JL.

Chloride concentration contour maps for the R, C, B, A, and I Zones have been prepared from data collected in the Spring of 2013 and are included in Appendix A-6.1, A-7.1, A-8.1, A-9.1, and A-10.1, respectively. The chloride contour maps are based on the maximum chloride ion concentration (mg/L) measured at each observation well. Chloride data was gathered from observation wells located within the immediate vicinity of the barrier and does not represent basin-wide conditions for the groundwater basin protected by the barrier. Wells with chloride concentrations of 250 mg/L or less were considered fresh. The chloride measurements used in this report were taken during the semi-annual sampling event in April, May and June 2013 and the annual event in March and April 2013.

Contours of **changes** in chloride concentration for the R, C, B, A, and I Zones between Spring 2012 and Spring 2013 are shown in Appendices A-6.2, A-7.2, A-8.2, A-9.2, and A-10.2. The data set is based on available data for Spring 2013, which was then subtracted from the corresponding data for Spring 2012. These contours very clearly identify areas where chloride concentrations increased and decreased between these two reporting periods.

The chloride concentration contours for FY 2012-13 are similar in shape and pattern to those of the previous year. The current contours and the corresponding chloride concentration cross-section (A-11) for this reporting period indicate that intrusion of seawater across the barrier continued to be controlled west of the San Gabriel River. East of the San Gabriel River, several areas recorded elevated chloride concentrations indicating seawater intrusion. Additional areas of high chloride concentrations and/or notable changes in concentration (since the FY 2011-12 report) are as follows:

- R Zone – High chloride concentrations remained present north of the west leg along Los Cerritos Channel and in the immediate vicinity of well 34L'1 on the east leg. Chloride concentrations decreased dramatically at well 33S18, while remaining above 5,000 mg/L.
- C Zone – High chloride concentrations observed during the FY 2009-10 and FY 2010-11 reporting periods along the west leg at the Los Cerritos Channel (33ST) reappeared during FY 2012-13 after decreasing dramatically over the previous year. While chloride concentrations decreased significantly along the east leg near observation well 34T0.1 during FY 2012-13, the elevated chloride concentration indicates that injection in that area is insufficient to control sea water intrusion.
- B Zone – West of the Los Cerritos Channel, the trend of decreasing chloride concentrations noted during the FY 2011-12 reporting period reversed course, with chloride concentrations at 33ST and 33T3 increasing dramatically. Chloride concentrations decreased significantly at well 33T13, and decreased slightly at well 33Q15 while remaining significantly elevated. Along the east leg of the barrier, chloride concentrations at well 34JL remained elevated and unchanged, even though northerly and southerly injection wells 34G2 and 34L, respectively, were operational during the entire reporting period. Monitoring well 34JL is approximately 1,600 feet between injection wells 34G2 and 34L. Continued high chloride concentrations at 34JL, while decreasing slightly during this reporting period, demonstrate that the distance between injection wells 34G2 and 34L is

too great to control seawater intrusion. The plume of high chloride surrounding well 34U8 identified in the FY 2010-11 reporting period has decreased significantly to below 250 mg/L, indicating that this plume may have migrated inland.

- A Zone – High chloride concentrations remain northwest of the ABP's west leg, although the lateral extent of high chloride concentration has decreased since FY 2011-12 as evidenced by notable decreases in chloride concentrations at wells 33T29 and 33S20. Chloride concentrations have also decreased or remained consistent along the west leg between the Los Cerritos Channel and San Gabriel River, particularly at 33UV, 33WX, 33YZ, and 33Z'1 while increasing at well 33XY. Similarly, well 34DG exhibited a significant increase in chloride concentration from the previous year. Chloride concentrations along and landward of the barrier's east leg showed minimal changes or decreases in chloride concentrations, especially around the southeast end of the ABP.
- I Zone – In general, chloride concentrations remained below 250 mg/L along the west leg and northward of the barrier, with notable decreases at wells 33XY and 33YZ. Along the east leg of the barrier, chloride concentrations decreased dramatically at 34LS and 35E0.1, and decreased slightly or remained relatively consistent at wells 34DG, 34GH, 34HL, 34JL, 34T0.1, and 34VZ. While chloride concentrations decreased at well 35H11 and 34X40, continuing high concentrations at 35F20 suggest that the barrier continues to be breached in this area.

There continue to be three possible causes of the high chloride concentrations in all zones north of, northwest of, and along portions of the ABP west leg (which was predominantly in steady operation during this reporting period). These include the remaining seawater from previous intrusions, migration of seawater inland by the Los Cerritos Channel, and suspected intrusion around the west end of the barrier.

North of the west leg, continued high chloride concentrations in the C zone (33S18, 33T13, 33U11) and B zone (33Q15) are likely the result of seawater intrusions from

2006 and 2007 that have not dissipated. In the A zone, elevated chloride concentrations at 33T29 thought to be resulting from limited operation of injection wells 33T and 33S1 in FY 2012-13 have decreased significantly.

OCWD is in the process of improving the north-south barrier alignment with the installation of 17 new clustered injection wells. OCWD is also planning the installation of four multi-depth observation wells along the ABP east leg to improve the monitoring well network in that area. In addition, LACFCD is in the process of constructing eight additional observation wells which will aid in further understanding the conditions within Los Angeles County, particularly north and west of the west leg. LACFCD plans to utilize the additional data to determine whether or not to construct new injection wells to further prevent seawater intrusion.

FINANCING AND COSTS

This section of the report is divided into four parts: Water Costs, Services and Supplies Costs (operation and maintenance), Fixed Assets Costs (capital outlay), and Budget. Under the terms of the 1964 Cooperative Agreement between LACFCD and OCWD, fixed assets are typically divided into facilities paid for by the LACFCD, facilities paid for by the OCWD, and joint facilities paid for by both agencies, depending on their location. Under the same agreement, water costs are divided between the LACFCD (whose portion is paid by the WRD per a separate agreement) and the OCWD. The total cost of the ABP in FY 2012-13 was \$7,747,886 (\$7,677,478 for injection-related operations, maintenance, water, and approved LACFCD and OCWD project expenses; \$70,408 for maintenance of extraction wells).

WATER COSTS

During FY 2012-13, 5,490.4 acre-feet of water were injected at an estimated total cost of \$5,199,913. The monthly water rates (dollars per AF) from July 2012 to June 2013 varied periodically as shown earlier in Table 1. The monthly quantity of water injected and total water costs paid by each agency are shown below in Table 2.

TABLE 2. QUANTITY OF WATER INJECTED AND COSTS

MONTH	WRD VOLUME (AF)	OCWD VOLUME (AF)	TOTAL VOLUME (AF)
Jul-12	316.8	175.3	492.1
Aug-12	360.0	195.3	555.3
Sep-12	339.3	187.5	526.8
Oct-12	307.9	168.3	476.2
Nov-12	311.4	162.4	473.8
Dec-12	252.7	138.0	390.7
Jan-13	266.2	141.1	407.3
Feb-13	293.4	141.9	435.3
Mar-13	323.4	137.9	461.3
Apr-13	326.2	73.7	399.9
May-13	323.5	74.2	397.7
Jun-13	348.1	125.9	474.0
TOTAL INJECTED	3,768.9	1,721.5	5,490.4
TOTAL COST (\$) [From Tbl. 1]	\$3,575,475.05	\$1,624,438.05	\$5,199,913

SERVICES AND SUPPLIES COSTS

As shown in Appendix A-19, a total of \$2,477,565 was spent on services and supplies and special programs during the 2012-13 fiscal year (excluding water costs). Pursuant to the 1964 Cooperative Agreement, the OCWD pays a percentage of the applicable services and supplies costs for injection operations proportional to the percentage of the total amount of injection water paid for by the District. The distribution of FY 2012-13 services and supplies costs is summarized in Table 3.

**TABLE 3. DISTRIBUTION OF SERVICES AND SUPPLIES COSTS FOR
INJECTION AND EXTRACTION ACTIVITIES**

ITEM	LOS ANGELES COUNTY	ORANGE COUNTY	TOTAL
Service & Supplies of Injection Facilities (including Observation Wells) ¹	\$1,386,232	\$602,456	\$1,988,688
Service & Supplies of Extraction Facilities ²	\$70,408	\$0	\$70,408
Special Programs ³	\$488,877	\$0	\$488,877
SUBTOTAL	\$1,945,517	\$602,456	\$2,547,973
Liability Insurance ⁴	\$0	\$0	\$0
TOTAL	\$1,945,517	\$602,456	\$2,547,973

The values in Table 3 come from the ABP FY 2012-13 Costs (see A-19) as follows:

¹ The sum of Items 1, 2, 3, 7, 8, 9, 10, 11, 12, 14, and 15. OCWD is responsible for 31.4% of all costs for these items except for Item 10 (flat \$375 per Agreement)

² The sum of Items 4, 5, and 6. OCWD is not responsible for any portion of the cost for these items.

³ Item 13. OCWD is not responsible for any portion of the cost for this item.

⁴ Item 16. OCWD and LACFCD are currently investigating joint insurance options as required by Supplement No. 2 to the Implementation Agreement.

The yearly cost of the services and supplies (including special programs but excluding water and extraction costs) for the last 20 years of ABP operations are shown in Table 4.

TABLE 4. COSTS OF SERVICES AND SUPPLIES FOR INJECTION

Fiscal Year	Volume of Water Injected (Ac-Ft)	Total Cost	Cost Per Ac-Ft Injected
1993-94	4,144.8	\$584,975	\$141.13
1994-95	3,495.7	\$651,845	\$186.47
1995-96	5,269.0	\$509,377	\$96.67
1996-97	5,739.4	\$408,064	\$71.10
1997-98	5,335.8	\$923,342	\$173.05
1998-99	5,330.4	\$795,044	\$149.15
1999-00	6,077.9	\$589,168	\$96.94
2000-01	5,398.8	\$961,649	\$178.12
2001-02	6,061.7	\$713,299	\$117.67
2002-03	5,012.3	\$1,555,921	\$310.42
2003-04	5,879.7	\$730,652	\$124.27
2004-05	5,066.1	\$918,020	\$181.21
2005-06	3,457.8	\$1,605,456	\$464.30
2006-07 ¹	1,265.1	\$2,309,300	\$1,825.39
2007-08	5,971.1	\$3,513,957	\$588.49
2008-09	7,936.2	\$1,875,902	\$236.37
2009-10	5,629.2	\$3,135,608	\$557.03
2010-11	5,066.1	\$2,830,801	\$558.77
2011-12	4,334.7	\$2,368,788	\$546.47
2012-13	5,490.4	\$2,477,565	\$451.25

¹ The higher costs per Ac-Ft injected since FY05-06 are typically because these years included costs for multiple repairs and/or capital improvement projects which were not included in previous years. The cost per Ac-ft is especially high in FY06-07 because of improvement projects, observation well cleanouts, costs related to the reclaimed water program, and various fixed costs that were incurred in a year of reduced injections due to the extended shutdowns for repairs.

The costs of the services and supplies for extraction operations for the last 20 years, including electrical costs, are shown in Table 5.

TABLE 5. COSTS OF SERVICES AND SUPPLIES FOR EXTRACTION

Fiscal Year	Volume of Water Extracted (Ac-Ft)	Total Cost	Cost Per Ac-Ft Extracted
1993-94	992.0	\$169,621	\$170.99
1994-95	940.7	\$148,122	\$157.46
1995-96	998.4	\$130,901	\$131.11
1996-97	1,200.9	\$51,077	\$42.53
1997-98	883.5	\$64,774	\$73.32
1998-99	775.6	\$52,043	\$67.10
1999-00	679.9	\$41,320	\$60.77
2000-01	404.8	\$49,769	\$122.95
2001-02	495.0	\$53,153	\$107.38
2002-03	262.7	\$63,165	\$240.45
2003-04	0.0	\$6,068	N/A
2004-05	0.0	\$3,043	N/A
2005-06	0.0	\$2,857	N/A
2006-07	0.0	\$3,224	N/A
2007-08	0.0	\$4,224	N/A
2008-09	0.0	\$14,742	N/A
2009-10	0.0	\$20,223	N/A
2010-11	0.0	\$4,552	N/A
2011-12	0.0	\$6,219	N/A
2012-13 ¹	0.0	\$70,408	N/A

¹ FY 2012-13 costs were higher than previous years due to extraction well redevelopment.

FIXED ASSETS

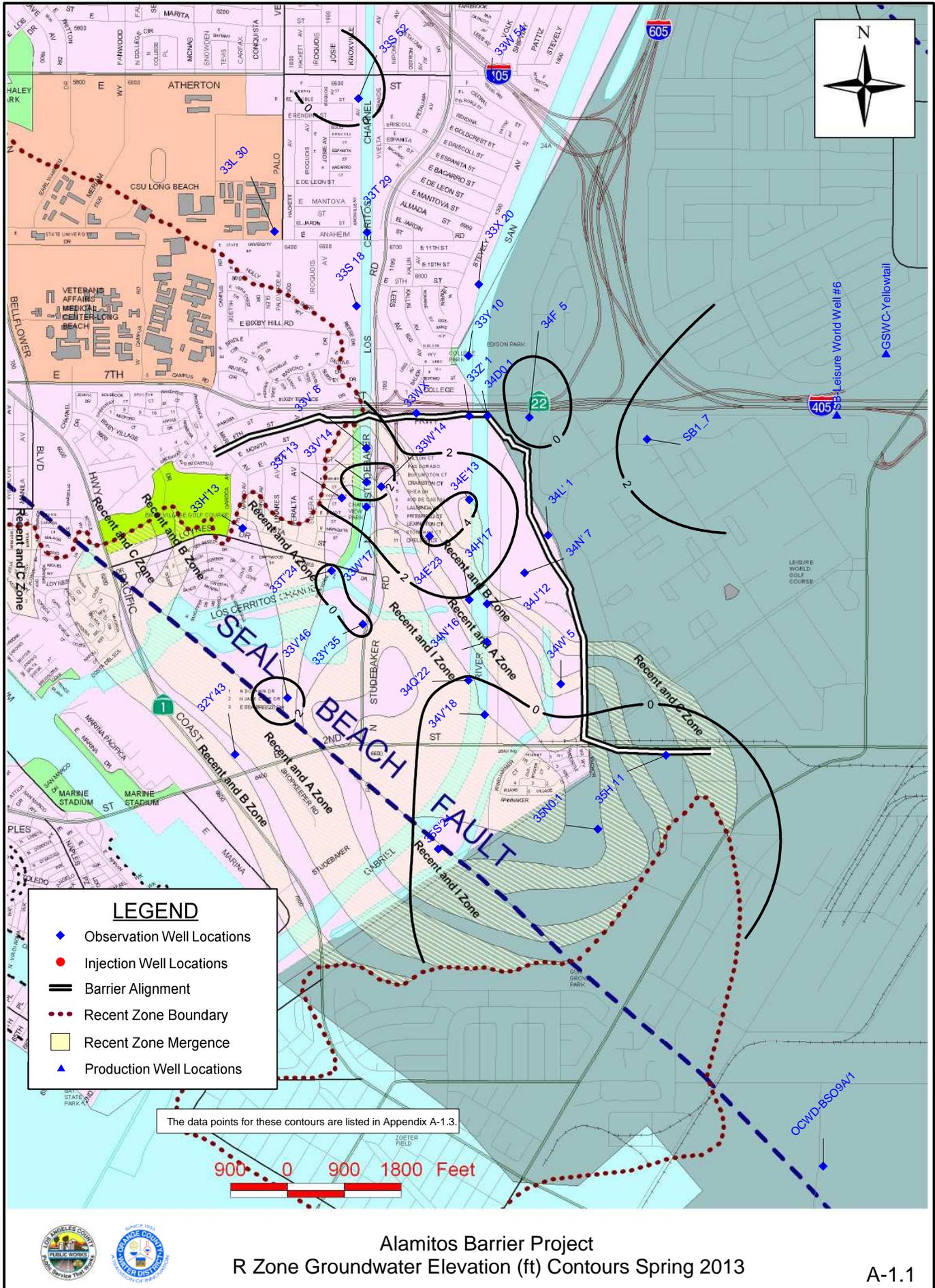
During Fiscal Year 2012-13, there were no new LACFCD facilities, OCWD facilities, or joint facilities added to the ABP. However, new OCWD facilities (Unit 14 injection and observation wells) and new LACFCD facilities (Unit 13 observation wells) are in the planning and construction phases, respectively.

LACFCD spent \$688,420.52 on capital improvement projects (including contracts and labor), primarily ABP Unit 13 New Observation Wells. However, a small amount was also spent on labor related to the Injection Well Condition Assessment project . As agreed at the previous annual JMC meetings, the labor costs associated with the Injection Well Condition Assessment project were incorporated into the operation and maintenance costs (i.e., services and supplies) so that OCWD covered a portion of these costs in accordance with the distribution of water delivered (31%).

BUDGET

The FY 2014-15 budget for the ABP Supplies and Services and fixed Assets Costs is \$3,002,200. A breakdown of this amount, along with past expenditures per category, is shown in Appendix A-20. Note that amounts for WRD are shown in addition to those for LACFCD and OCWD.

APPENDIX



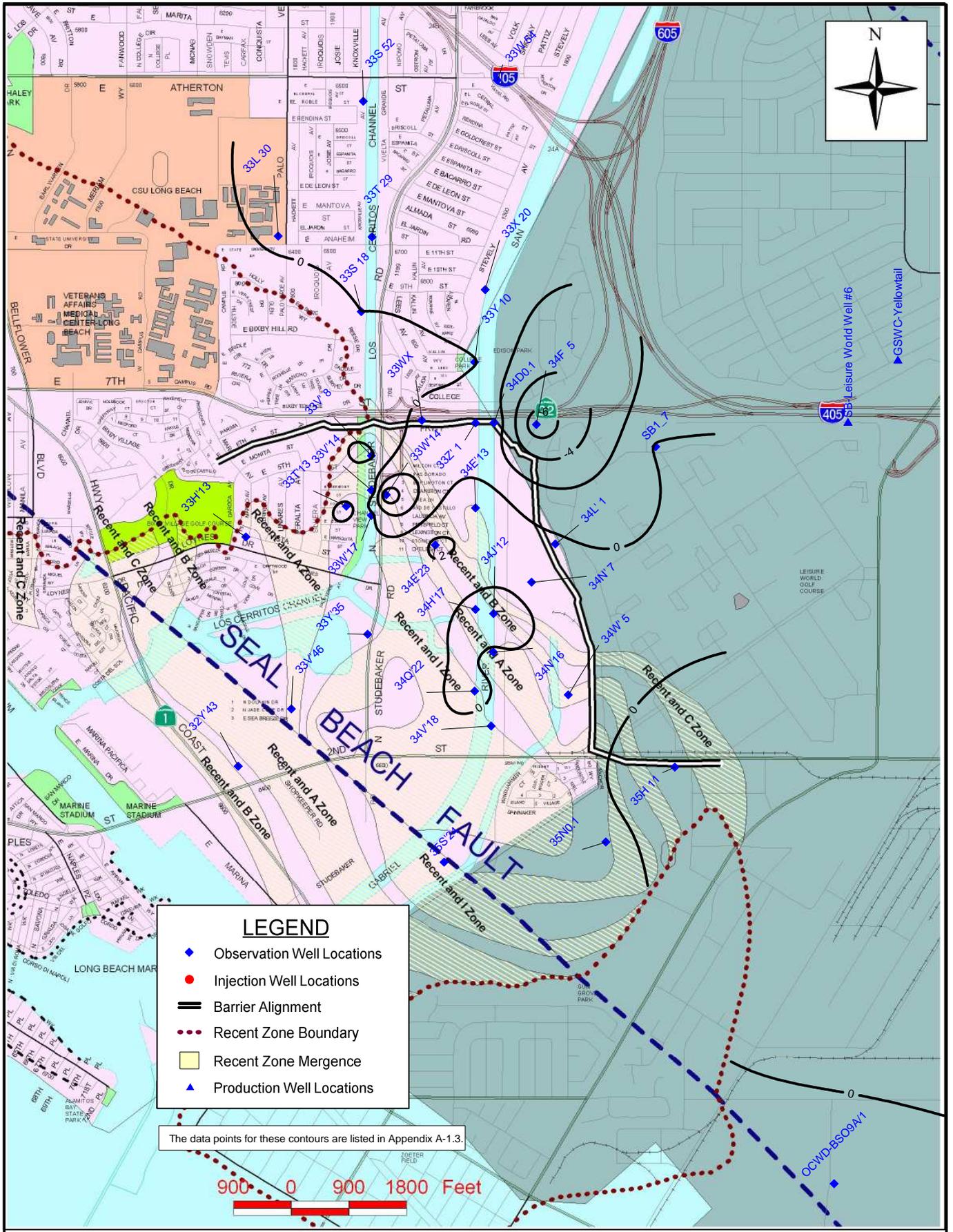
LEGEND

- ◆ Observation Well Locations
- Injection Well Locations
- Barrier Alignment
- ⋯ Recent Zone Boundary
- Recent Zone Mergence
- ▲ Production Well Locations

The data points for these contours are listed in Appendix A-1.3.



Alamos Barrier Project
R Zone Groundwater Elevation (ft) Contours Spring 2013



LEGEND

- ◆ Observation Well Locations
- Injection Well Locations
- == Barrier Alignment
- ⋯ Recent Zone Boundary
- Recent Zone Mergence
- ▲ Production Well Locations

The data points for these contours are listed in Appendix A-1.3.



Alamosa Barrier Project
R Zone: Change in Elevation(ft), Spring 2012 to Spring 2013

ALAMITOS BARRIER PROJECT
R-Zone
Groundwater Elevation Data for Contours and Tables

POINT	PROJ	FCD	AQUIFER	DATE	FY 12-13 ELEV	P.E. ¹	Δ^2	FY 11-12 ELEV2	CHANGE IN ELEV
1	32Y'43	493WW	R	20130326	1.3			1.3	0.0
2	33H'13	493YY	R,A	20130319	1.5			1.2	0.3
3	33L 30	491G	R	20130313	0.7			0.8	-0.1
4	33S 18	492AH	R	20130320	1.4			1.4	0.0
5	33S 52	491J	R	20130314	-0.2			-0.1	-0.1
6	33T 29	491D	R	20130321	0.8			1.0	-0.2
7	33T'13	492AU	R	20130327	2.4			2.8	-0.4
8	33T'24	493SS	R	20130325	-0.3				n/a
9	33V' 8	492BY	RA	20130326	3.3			1.1	2.2
10	33V'14	492JJ	R	20130326	0.4			-1.0	1.4
11	33V'46	493UU	R	20130403	2.5			2.1	0.4
12	33W 54	501C	R	20130327	0.8			1.2	-0.4
13	33W'14	492AT	R	20130404	1.5			7.3	-5.8
14	33W'17	493PP	R	20130326	2.5			2.1	0.4
15	33WX	502AZ	R	20130417	0.5	2.0	-1.5	1.0	-0.5
16	33X 20	502L	R	20130313	0.7			1.9	-1.2
17	33Y 10	502BA	R	20130328	0.6			0.5	0.1
18	33Y'35	493AB	R	20130328	-0.2			-0.9	0.7
19	33Z' 1	502AU	R	20130411	0.4			0.9	-0.5
20	34D0.1	502AX	R	20130418	1.3			2.0	-0.7
21	34E'13	503AU	R	20130319	4.4			2.7	1.7
22	34E'23	503X	R	20130402	4.4			1.9	2.5
23	34F 5	502BT	R	20130417	-1.6			5.9	-7.5
24	34H'17	503Y	R	20130319	1.9			2.6	-0.7
25	34J'12	503U	R	20130402	1.3			2.6	-1.3
26	34L' 1	503P	R	20130313	0.8			0.5	0.3
27	34N' 7	503AE	R	20130408	1.2			0.5	0.7
28	34N'16	503W	R	20130326	0.9			0.7	0.2
29	34Q'22	503T	R	20130319	-0.1			0.1	-0.2
30	34V'18	503V	R	20130403	-0.5			-0.7	0.2
31	34W' 5	503AH	R	20130325	0.7			0.3	0.4
32	35H 11	514F	R	20130328	-0.7	2.0	-2.7	-0.1	-0.6
33	35N0.1	504M	R	20130402	-1.7			-1.9	0.2
34	35S'24	504K	R	20130313	-0.2			-0.2	0.0
35	OCWD- BSO9A/1		R	20130307	1.9			1.8	0.1
36	SB1_7		R	20130315	3.2			3.1	0.1

AVG=

1.1

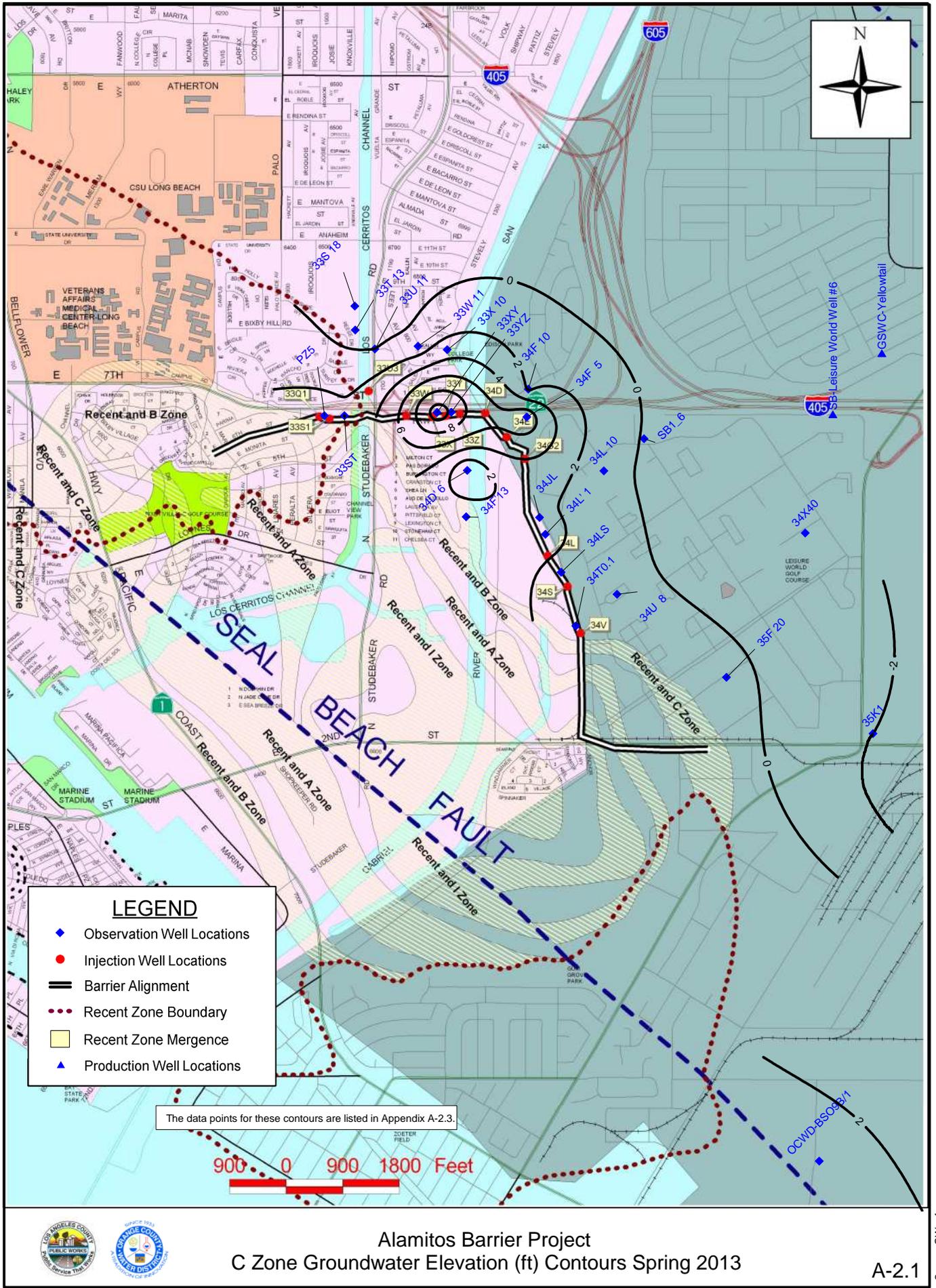
AVG=

1.3

¹ P.E. represents the protective elevations calculated for internodal wells.

² Δ (+/-) represents how much groundwater level is above/below respective P.E.

= A max. or min. elevation during that period.



LEGEND

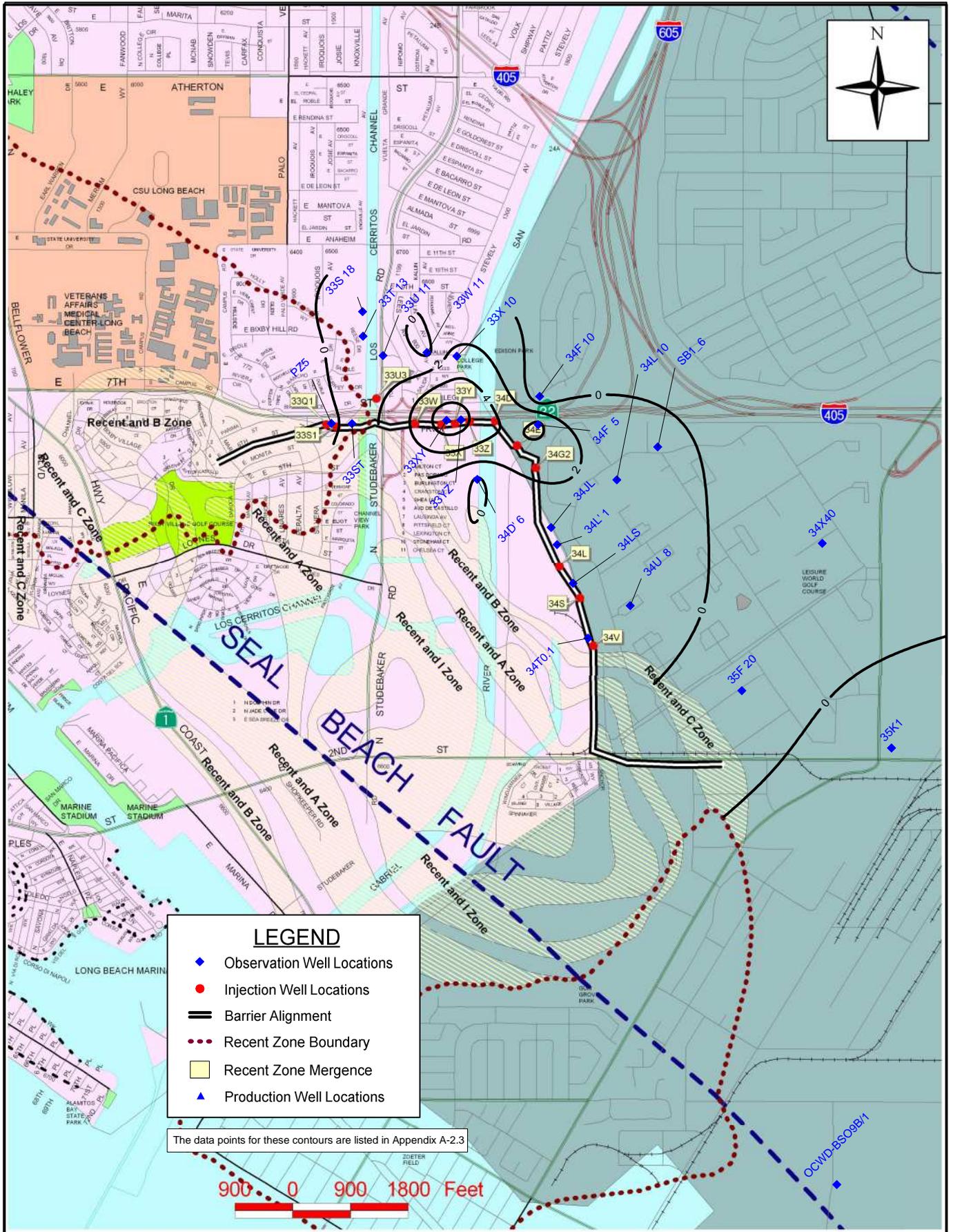
- ◆ Observation Well Locations
- Injection Well Locations
- Barrier Alignment
- ⋯ Recent Zone Boundary
- ▭ Recent Zone Mergence
- ▲ Production Well Locations

The data points for these contours are listed in Appendix A-2.3.

900 0 900 1800 Feet



**Alamos Barrier Project
C Zone Groundwater Elevation (ft) Contours Spring 2013**



LEGEND

- ◆ Observation Well Locations
- Injection Well Locations
- == Barrier Alignment
- ⋯ Recent Zone Boundary
- ▭ Recent Zone Mergence
- ▲ Production Well Locations

The data points for these contours are listed in Appendix A-2.3



Alamitos Barrier Project
 C Zone: Change in Elevation (ft), Spring 2012 to Spring 2013

ALAMITOS BARRIER PROJECT
C-Zone
Groundwater Elevation Data for Contours and Tables

POINT	PROJ	FCD	AQUIFER	DATE	FY 12-13 ELEV	P.E. ¹	Δ^2	FY 11-12 ELEV	CHANGE IN ELEV
1	33S 18	492AG	C	20130320	-0.4			-1.0	0.6
2	33ST	492BK	CB	20130314	2.0	0.9	1.1	1.3	0.7
3	33T 13	492AC	C	20130409	-0.8			-1.0	0.2
4	33U 11	492AL	C	20130410	0.0			-0.8	0.8
5	33W 11	502R	C	20130410	0.8			1.2	-0.4
6	33X 10	502BB	C	20130313	3.1			0.1	3.0
7	33XY	502BL	C	20130328	11.2	5.4	5.8	3.6	7.6
8	33YZ	502AB	C	20130314	9.7	5.4	4.4	2.9	6.8
9	34D' 6	502BF	C	20130319	0.0			0.3	-0.3
10	34F 5	502BU	C	20130319	7.4			2.8	4.6
11	34F 10	502AP	C	20130411	1.8				n/a
12	34F'13	503R	C	20130402	3.2			3.3	-0.1
13	34JL	503AR	C	20130313	2.0	4.2	-2.2	1.0	1.0
14	34L' 1	503N	C	20130313	3.1	4.8	-1.7	1.7	1.4
15	34L 10	502AK	C	20130403	0.5			-0.8	1.3
16	34LS	503BF	C	20130313	1.1	4.5	-3.4	0.8	0.3
17	34T0.1	503AB	C	20130312	1.5	3.6	-2.1	1.1	0.4
18	34U 8	513D	C	20130313	0.4			-1.1	1.5
19	34X40	513R	C	20130425	-1.6			0.3	-1.9
20	35F 20	513L	C	20130313	0.6			1.8	-1.2
21	35K1	523D	C	20130312	-2.0	4.3	-6.3	-3.7	1.7
22	PZ5	492CH	CB	20130327	3.4			3.8	-0.4
23	OCWD-BSO9B/1		C	20130306	2.6			2.4	0.2
24	SB1_6		C	20130315	-0.1			-0.7	0.6

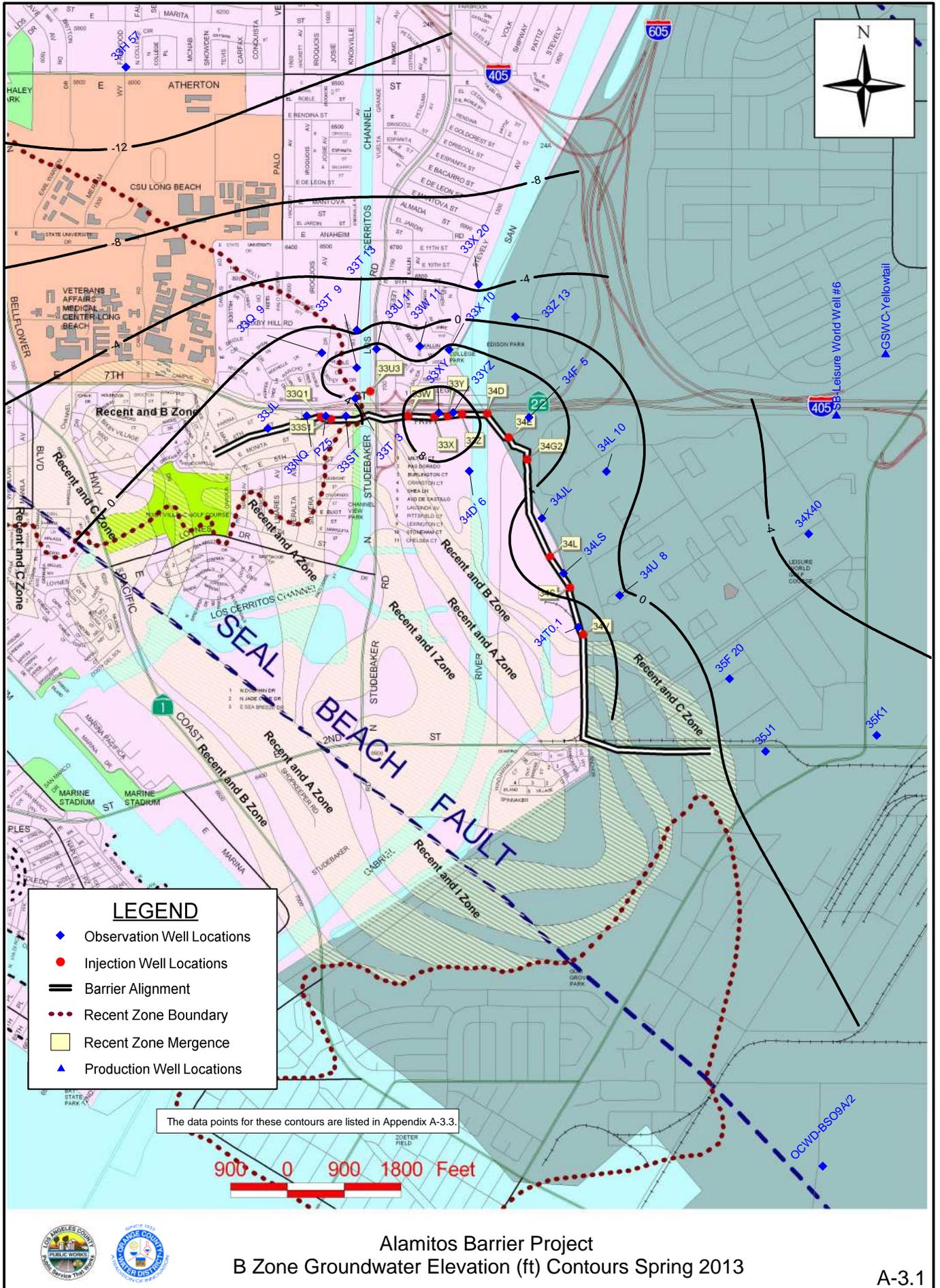
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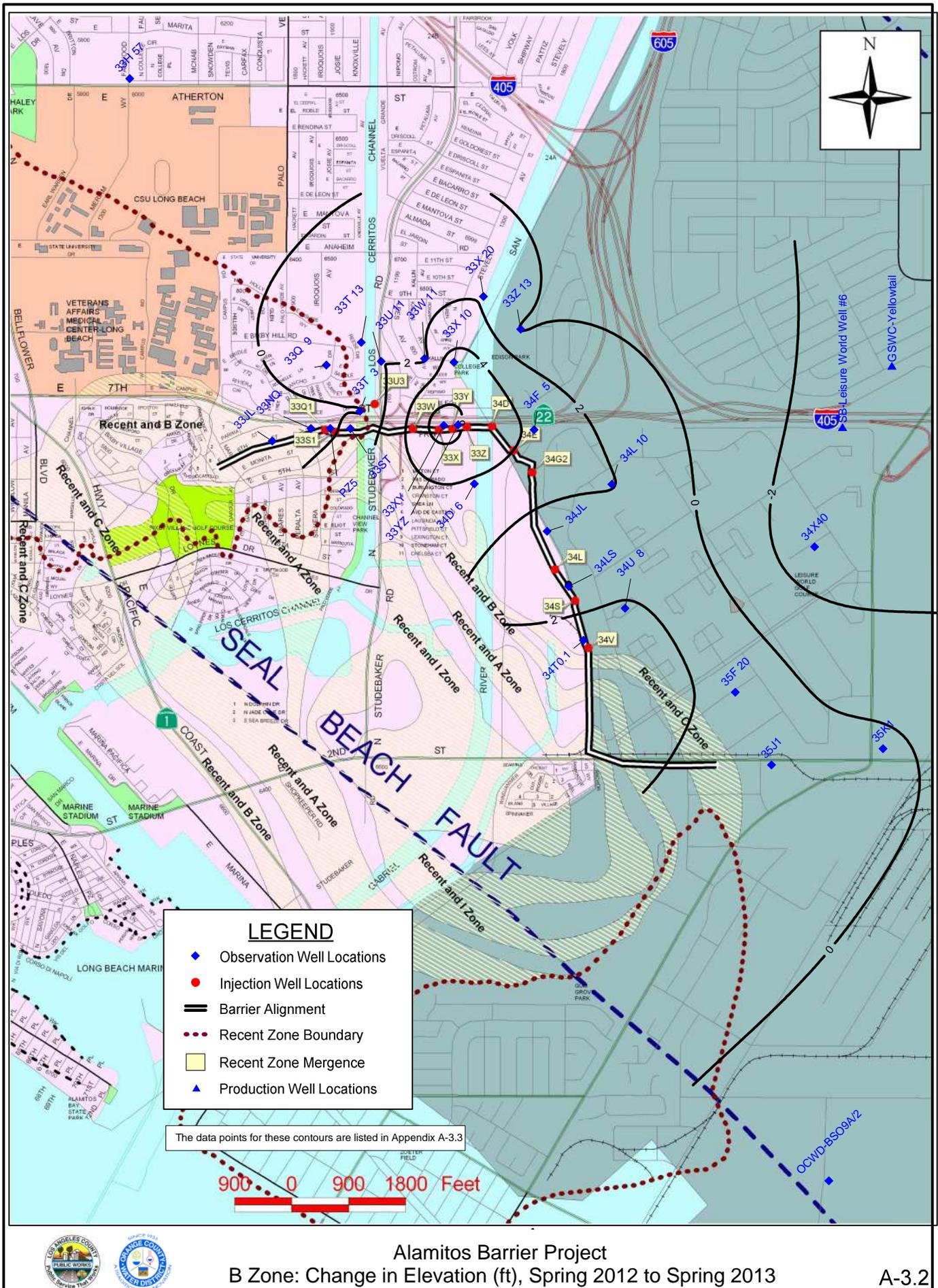
AVG= 0.8

¹ P.E. represents the protective elevations calculated for internodal wells.

² Δ (+/-) represents how much groundwater level is above/below respective P.E.

= A max. or min. elevation during that period.





ALAMITOS BARRIER PROJECT
B-Zone
Groundwater Elevation Data for Contours and Tables

POINT	PROJ	FCD	AQUIFER	DATE	FY 11-12 ELEV	P.E. ¹	Δ^2	FY 10-11 ELEV	CHANGE IN ELEV
1	33H 57	481	B	20130326	-15.4			-14.0	-1.4
2	33JL	492BQ	B	20130314	2.3	0.9	1.4	2.8	-0.5
3	33NQ	492BN	B	20130314	3.4	0.7	2.8	3.8	-0.4
4	33Q 9	492CM	B	20130313	3.2			2.0	1.2
5	33ST	492BK	CB	20130314	2.0	0.9	1.1	1.3	0.7
6	33T 3	492CL	B	20130318	4.5			4.6	-0.1
7	33T 9	492YY	B	20130409	7.3				n/a
8	33T 13	492AB	B	20130409	-0.9			-1.7	0.8
9	33U 11	492AK	B	20130410	5.5			3.5	2.0
10	33W 11	502S	B	20130410	0.9			-0.8	1.7
11	33X 10	502BC	B	20130313	5.0			-0.3	5.3
12	33X 20	502K	B	20130313	-4.8			-6.7	1.9
13	33XY	502BM	B	20130328	11.2	6.3	4.9	3.8	7.4
14	33YZ	502AC	B	20130314	8.8	7.1	1.7	2.7	6.1
15	33Z 13	502E	B	20130326	-0.9			-0.8	-0.1
16	34D' 6	502BG	B	20130319	7.0			3.3	3.7
17	34F 5	502BS	B	20130319	7.0			3.3	3.7
18	34JL	503AQ	B	20130313	2.3	5.3	-3.0	1.2	1.1
19	34L 10	502AL	B	20130313	1.6			-0.5	2.1
20	34LS	503BE	B	20130313	1.8	5.4	-3.6	1.9	-0.1
21	34T0.1	503AC	B	20130328	7.0			3.2	3.8
22	34U 8	513E	B	20130313	0.2			-2.1	2.3
23	34X40	513Q	B	20130425	-5.0			-1.6	-3.4
24	35F 20	513K	B	20130313	-0.7			-2.2	1.5
25	35J1	514M	B	20130313	-1.5	5.8	-7.3	-1.8	0.3
26	35K1	523A	B	20130312	-2.4	5.8	-8.2	-2.8	0.4
27	PZ5	492CH	CB	20130327	3.4			3.8	-0.4
28	OCWD-BSO9A/2		B	20130307	-3.9			-2.8	-1.1

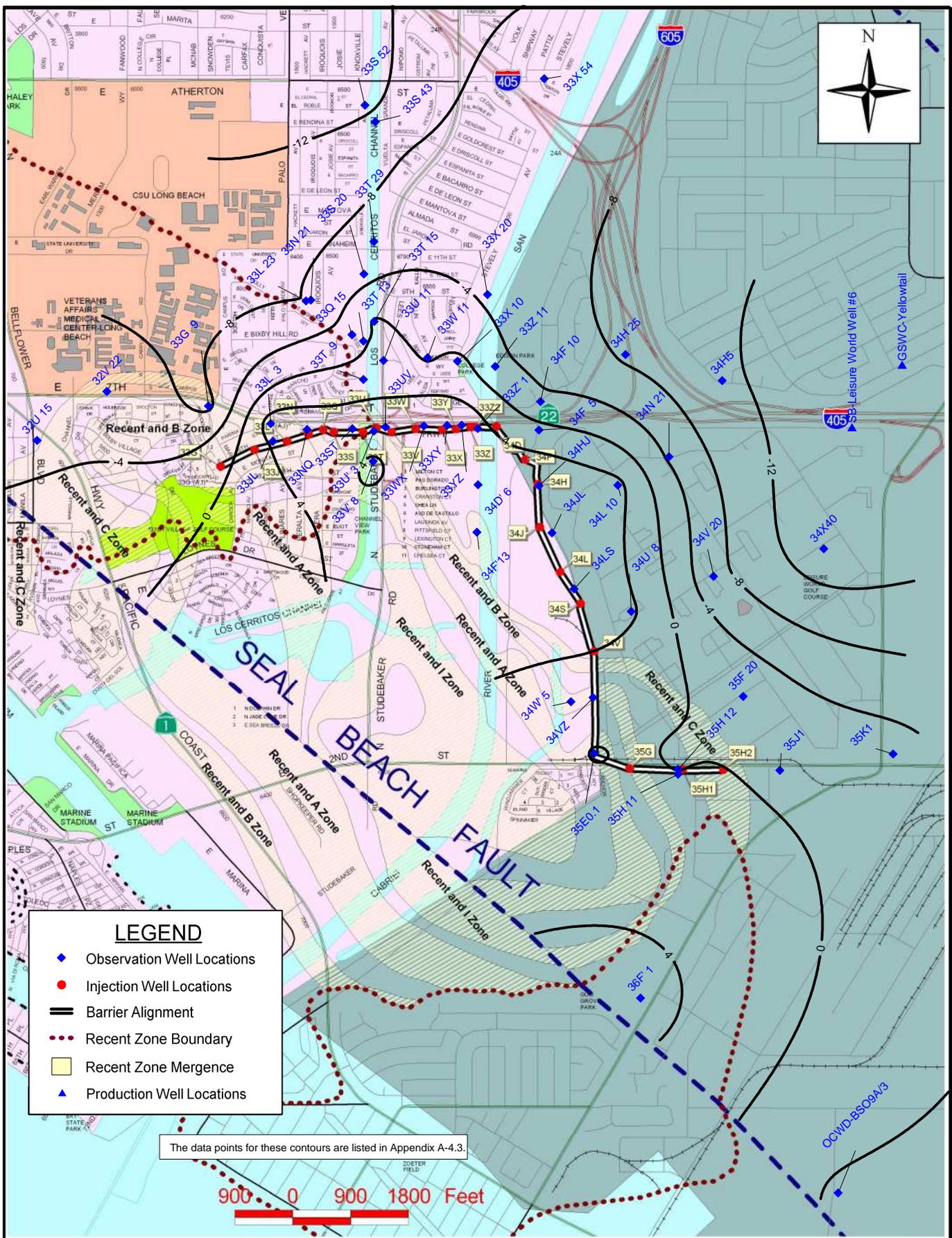
AVG= 1.7

AVG= 0.1

¹ P.E. represents the protective elevations calculated for internodal wells.

² Δ (+/-) represents how much groundwater level is above/below respective P.E.

= A max. or min. elevation during that period.



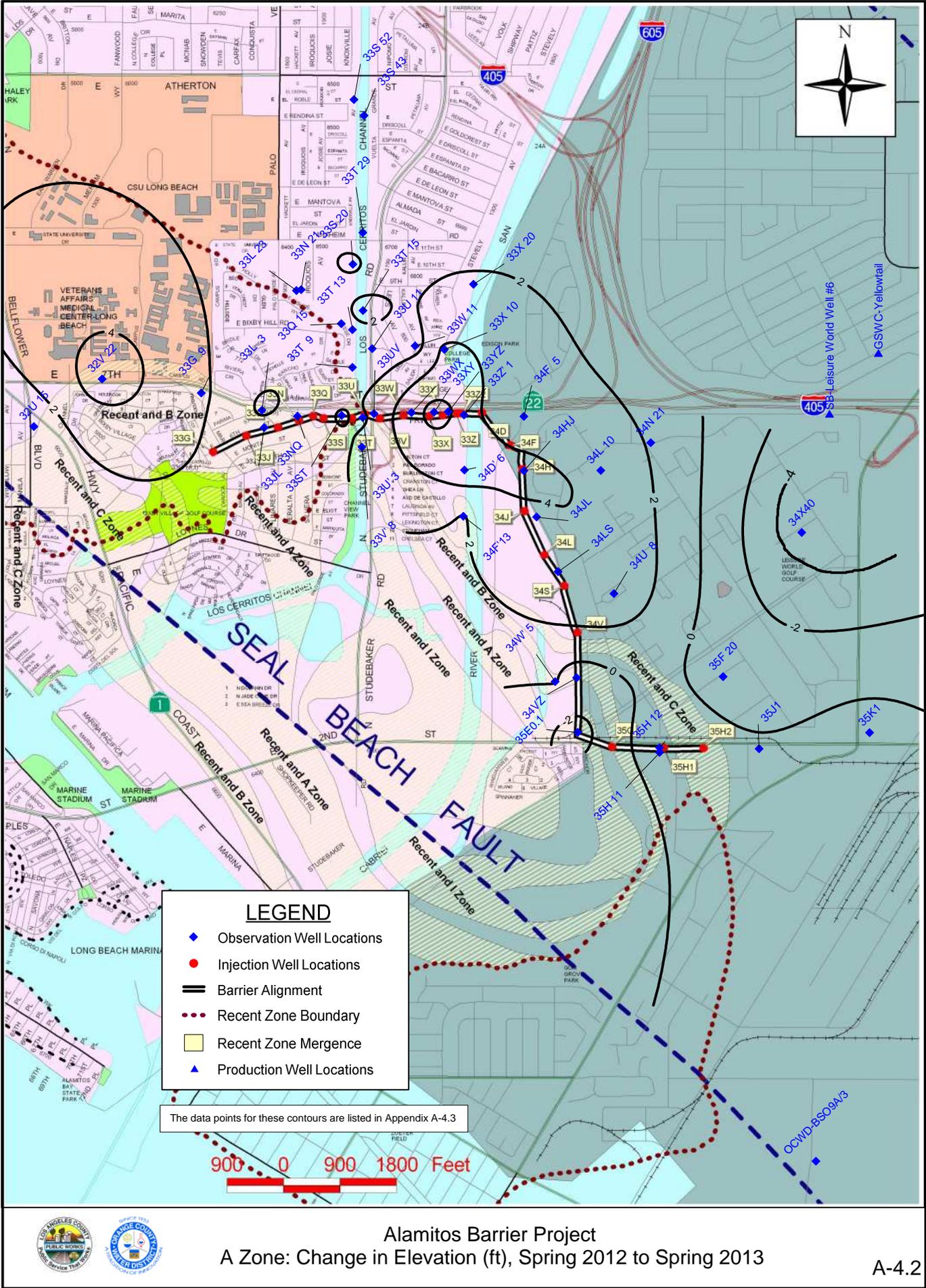
LEGEND

- ◆ Observation Well Locations
- Injection Well Locations
- Barrier Alignment
- ⋯ Recent Zone Boundary
- Recent Zone Mergence
- ▲ Production Well Locations

The data points for these contours are listed in Appendix A-4.3.



Alamos Barrier Project
A Zone Groundwater Elevation (ft) Contours Spring 2013



ALAMITOS BARRIER PROJECT
A-Zone
Groundwater Elevation Data for Contours and Tables

POINT	PROJ	FCD	AQUIFER	DATE	FY 12-13 ELEV	P.E. ¹	Δ^2	FY 11-12 ELEV2	CHANGE IN ELEV
1	32U 15	482M	A	20130313	-4.8			-5.3	0.5
2	32V 22	482P	A	20130328	-4.9			-10.1	5.2
3	33G 9	482F	A	20130328	-8.8			-11.2	2.4
4	33JL	492BW	AI	20130314	4.4	3.1	1.3	3.4	1.0
5	33L 3	492	A	20130313	5.8			6.2	-0.4
6	33L 23	492RR	A	20130314	-7.9			-8.4	0.5
7	33N 21	492BU	A	20130314	-6.6			-7.6	1.0
8	33NQ	492BP	AI	20130314	5.7	3.6	2.1	5.2	0.5
9	33Q 15	492AM	A	20130319	-3.0			-3.9	0.9
10	33S 20	492BR	A	20130320	-5.0			-4.4	-0.6
11	33S 43	491E	A	20130314	-9.5			-9.9	0.4
12	33S 52	491H	A	20130314	-14.0			-14.1	0.1
13	33ST	492BL	A	20130314	5.6	2.8	2.8	3.3	2.3
14	33T 9	492TT	A	20130409	1.8			1.1	0.7
15	33T 13	492ZZ	A	20130409	-0.4			-1.4	1.0
16	33T 15	492SS	A	20130325	0.4			-2.7	3.1
17	33T 29	491C	A	20130321	-6.4			-7.8	1.4
18	33U 11	492AJ	A	20130411	1.3			0.5	0.8
19	33U' 3	492WW	A	20130326	7.4			5.9	1.5
20	33UV	492BH	A	20130314	5.6	4.0	1.6	2.6	3.0
21	33V' 8	492BY	RA	20130326	3.3			1.1	2.2
22	33W 11	502T	A	20130410	-0.5			-1.7	1.2
23	33WX	502AF	A	20130314	6.5	7.6	-1.1	1.3	5.2
24	33X 10	502BD	A	20130313	1.0			-3.4	4.4
25	33X 20	502J	A	20130313	-4.5			-6.7	2.2
26	33X 54	501	AI	20130325	-5.1				n/a
27	33XY	502BN	A	20130314	6.6	8.0	-8.1	-0.1	6.7
28	33YZ	502AD	A	20130314	7.0	8.7	-1.7	0.6	6.4
29	33Z' 1	502G	A	20130319	5.2			0.8	4.4
30	33Z 11	502V	A	20130416	-2.9				n/a
31	34D' 6	502BH	A	20130319	5.1			0.1	5.0
32	34F 5	502BR	A	20130319	1.2			-1.3	2.5
33	34F 10	502AR	A	20130411	-3.2				n/a
34	34F'13	503Q	A	20130319	6.2			4.3	1.9
35	34H 25	502AH	A	20130416	-8.6				n/a
36	34H5	512E	A	20130425	-11.3				n/a
37	34HJ	502BX	A	20130312	7.6	8.6	-1.0	3.0	4.6
38	34JL	503AP	A	20130313	7.0	7.8	-0.8	3.3	3.7

ALAMITOS BARRIER PROJECT

A-Zone

Groundwater Elevation Data for Contours and Tables

POINT	PROJ	FCD	AQUIFER	DATE	FY 12-13 ELEV	P.E. ¹	Δ ²	FY 11-12 ELEV2	CHANGE IN ELEV
40	34L 10	502AM	A	20130313	5.0			1.3	3.7
41	34LS	503BD	A	20130328	6.6	7.6	-1.0	2.7	3.9
42	34N 21	512B	A	20130404	-4.5			-6.3	1.8
43	34U 8	513F	A	20130313	4.6			0.9	3.7
44	34V 20	513B	A	20130422	-6.9				n/a
45	34VZ	503BH	A	20130312	2.0	4.4	-2.4	3.1	-1.1
46	34W' 5	503AJ	A	20130325	1.6			1.5	0.1
47	34X40	513P	A	20130425	-14.8			-10.0	-4.8
48	35E0.1	503BK	A	20130312	-0.2	2.4		2.5	-2.7
49	35F 20	513J	A	20130313	-0.8			0.2	-1.0
50	35H 11	514G	A	20130312	0.7	3.8	-3.1	-0.1	0.8
51	35H 12	514D	A	20130312	-0.3	2.8	-3.1	-2.1	1.8
52	35J1	514L	A	20130313	-0.8	6.2	-7.0	-1.0	0.2
53	35K1	523B	A	20130312	-2.2	5.8	-8.0	-3.2	1.0
54	36F' 1	505D	A	20130404	5.5				n/a
55	OCWD-BSO9A/3		A	20130307	-4.6			-5.1	0.6

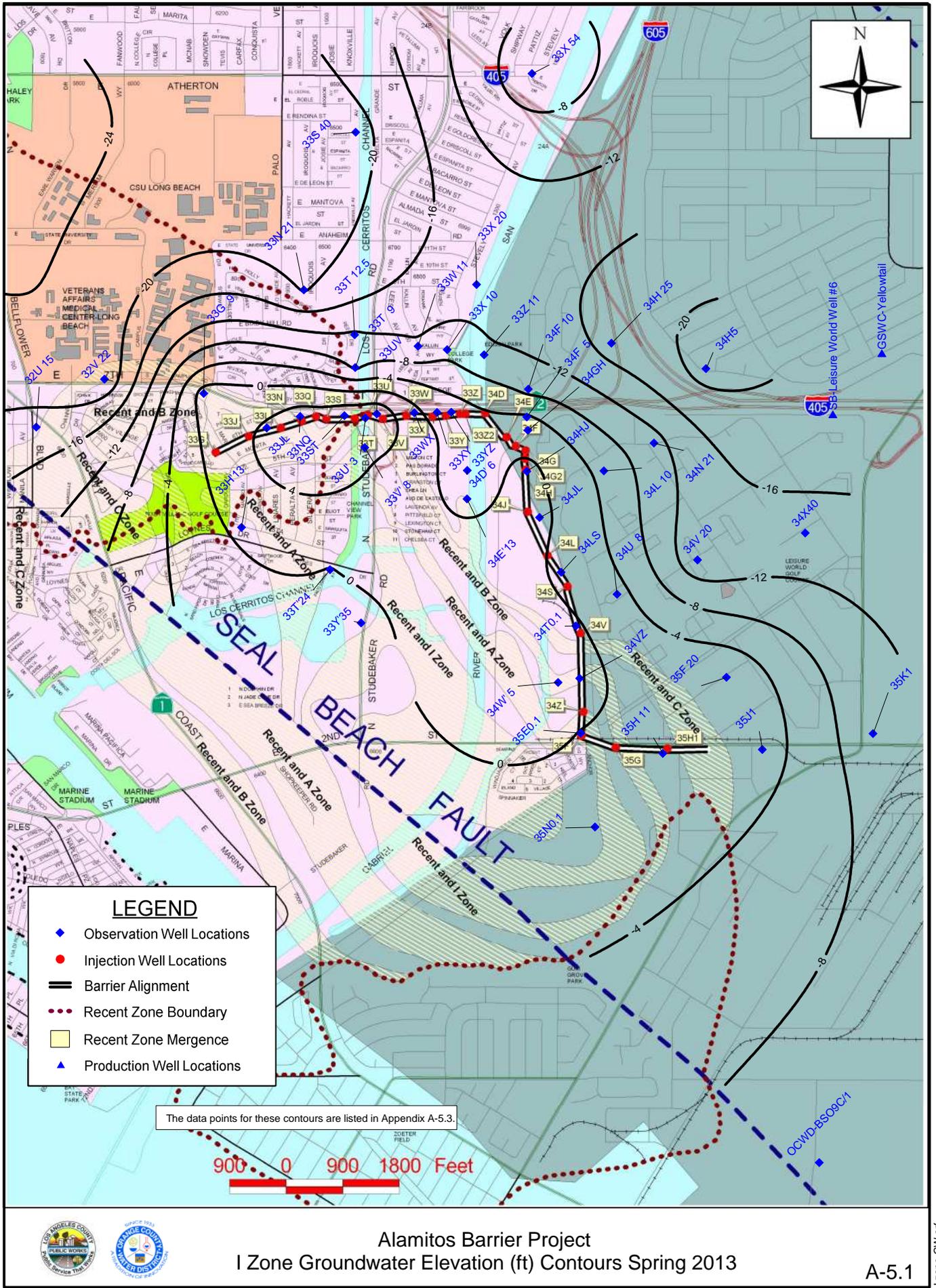
AVG= -0.4

AVG= -1.6

¹ P.E. represents the protective elevations calculated for internodal wells.

² Δ (+/-) represents how much groundwater level is above/below respective P.E.

= A max. or min. elevation during that period.



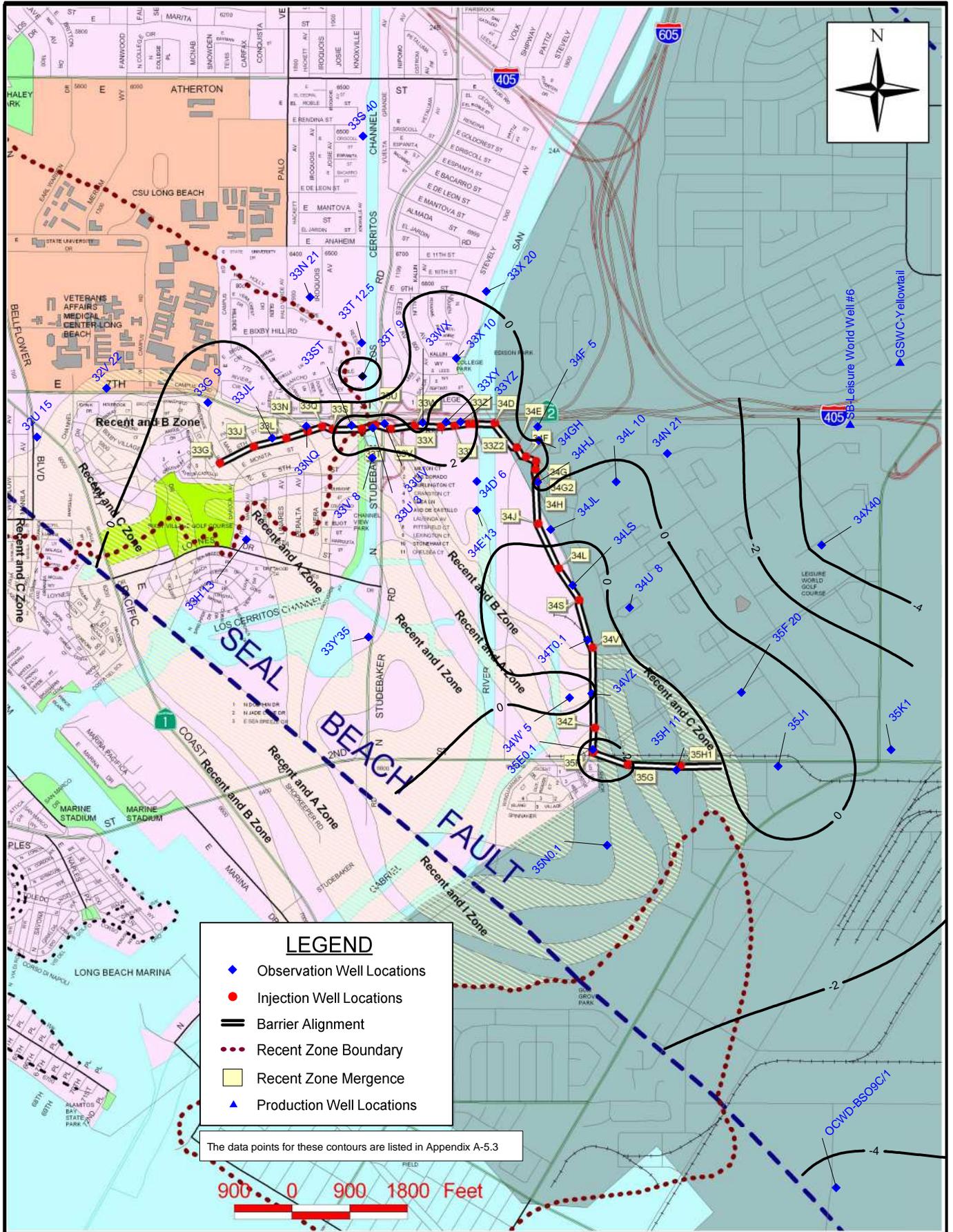
LEGEND

- ◆ Observation Well Locations
- Injection Well Locations
- Barrier Alignment
- ⋯ Recent Zone Boundary
- Recent Zone Mergence
- ▲ Production Well Locations

The data points for these contours are listed in Appendix A-5.3.



Alamosa Barrier Project
I Zone Groundwater Elevation (ft) Contours Spring 2013



LEGEND

- ◆ Observation Well Locations
- Injection Well Locations
- == Barrier Alignment
- ⋯ Recent Zone Boundary
- Recent Zone Mergence
- ▲ Production Well Locations

The data points for these contours are listed in Appendix A-5.3



Alamitos Barrier Project
I Zone: Change in Elevation (ft), Spring 2012 to Spring 2013

ALAMITOS BARRIER PROJECT
I-Zone
Groundwater Elevation Data for Contours and Tables

POINT	PROJ	FCD	AQUIFER	DATE	FY 12-13 ELEV	P.E. ¹	Δ^2	FY 11-12 ELEV	CHANGE IN ELEV
1	32U 15	482L	I	20130313	-18.3			-17.2	-1.1
2	32V 22	482N	I	20130313	-23.1			-21.8	-1.3
3	33G 9	482G	I	20130318	1.6			0.5	1.1
4	33H'13	493XX	I	20130319	0.8			-0.4	1.2
5	33JL	492BW	AI	20130314	4.4	3.1	1.3	3.4	1.0
6	33N 21	492BV	I	20130319	-20.3			-20.0	-0.3
7	33NQ	492BP	AI	20130314	5.7	3.6	2.1	5.2	0.5
8	33S 40	491F	I	20130314	-21.4			-20.1	-1.3
9	33ST	492BM	I	20130314	6.4	4.2	2.2	3.1	3.3
10	33T 9	492XX	I	20130409	-8.5			-4.2	-4.3
11	33T 12.5	492BT	I	20130318	-11.5			-11.3	-0.2
12	33T'24	493RR	I	20130325	-0.1				n/a
13	33U' 3	492QQ	I	20130326	6.2			3.4	2.8
14	33UV	492BJ	I	20130328	7.1	6.1	1.0	4.2	2.9
15	33V' 8	492BX	I	20130326	4.5			3.2	1.3
16	33W 11	502U	I	20130410	-11.4				n/a
17	33WX	502AG	I	20130314	1.1	10.4	-9.3	-0.6	1.7
18	33X 10	502BE	I	20130313	-8.8			-10.2	1.4
19	33X 20	502H	I	20130313	-12.9			-12.7	-0.2
20	33X 54	501	AI	20130325	-5.1				n/a
21	33XY	502BP	I	20130314	-1.7	11.0	-12.7	-4.9	3.2
22	33Y'35	493ZZ	I	20130328	-0.6			-1.7	1.1
23	33YZ	502AE	I	20130314	-1.8	11.1	-12.9	-4.5	2.7
24	33Z 11	502W	I	20130416	-11.2				n/a
25	34D' 6	502BI	I	20130319	-2.3			-3.8	1.5
26	34E'13	503AT	I	20130319	-0.8			-1.0	0.2
27	34F 5	502BQ	I	20130319	-3.6			-2.4	-1.2
28	34F 10	502AS	I	20130411	-9.0				n/a
29	34GH	502BV	I	20130312	-1.7	11.3	-13.0	-1.8	0.1
30	34H 25	502AJ	I	20130416	-17.7				n/a
31	34H5	512D	I	20130425	-21.6				n/a
32	34HJ	502BW	I	20130328	0.9	11.0	-10.1	1.0	-0.1
33	34JL	503AN	I	20130328	0.7	10.5	-9.8	0.3	0.4
34	34L 10	502AN	I	20130313	-5.1			-5.4	0.3
35	34LS	503BC	I	20130328	-0.6	9.5	-10.1	0.6	-1.2
36	34N 21	512C	I	20130404	-10.5			-10.2	-0.3
37	34T0.1	503AD	I	20130328	0.3	8.4	-8.1	1.7	-1.4
38	34U 8	513G	I	20130313	-2.7			-3.8	1.1
39	34V 20	513C	I	20130422	-14.8				n/a
40	34VZ	503BG	I	20130312	0.9	5.9	-5.0	0.8	0.1
41	34W' 5	503AK	I	20130325	1.8			1.0	0.8
42	34X40	513N	I	20130506	-14.1			-9.6	-4.5
43	35E0.1	503BJ	I	20130328	-0.1	3.0	-3.1	2.5	-2.6
44	35F 20	513H	I	20130313	-0.3			-1.5	1.2
45	35H 11	514H	I	20130312	-2.0	5.5	-7.5	-0.1	-1.9
46	35J1	513M	I	20130328	-2.2			-3.7	1.5
47	35K1	523C	I	20130328	-10.7			-10.0	-0.7
48	35N0.1	504N	I	20130404	-1.7			-1.2	-0.5
49	OCWD-BSO9C/1		I	20130307	-10.7			-6.3	-4.4

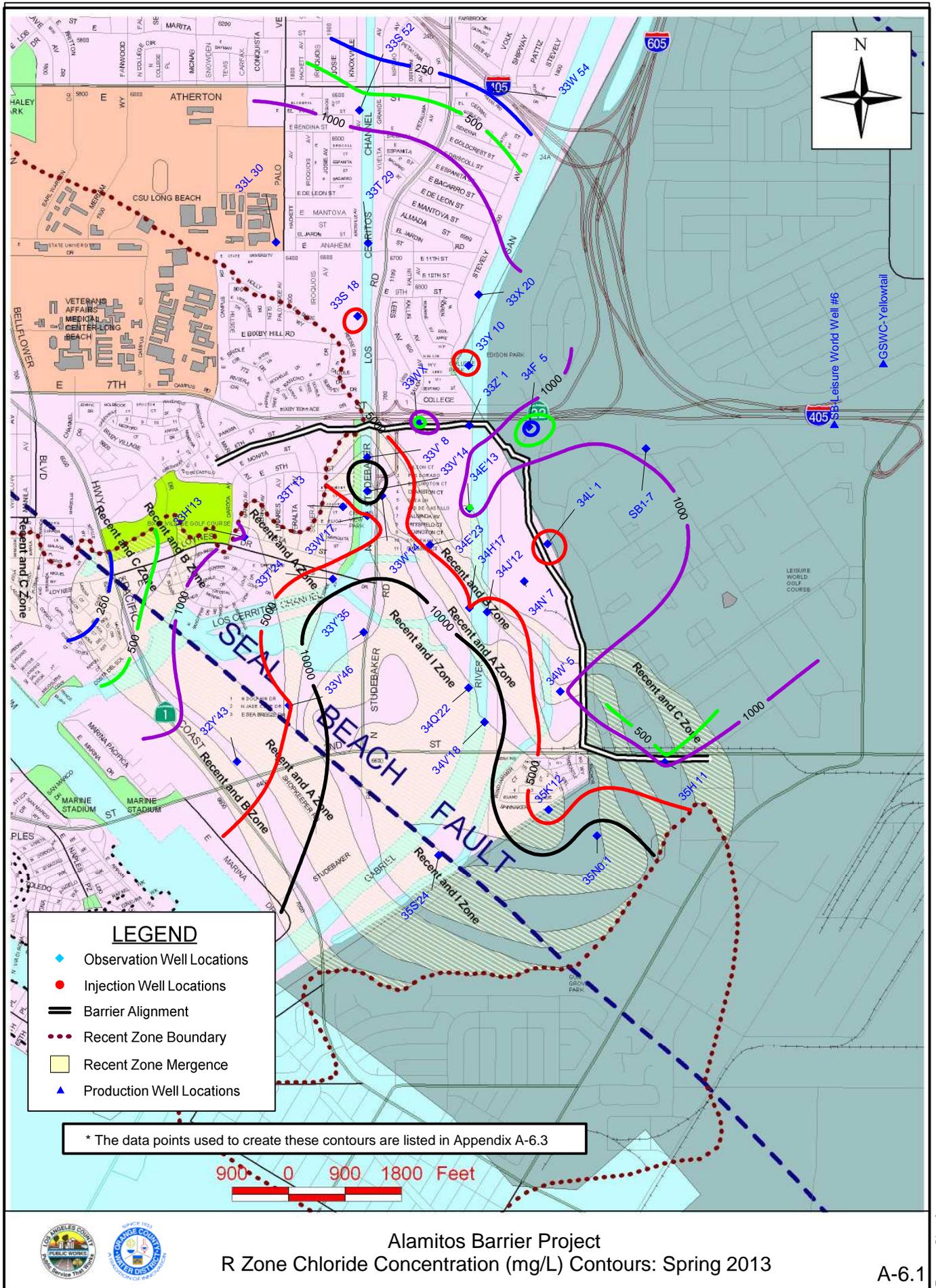
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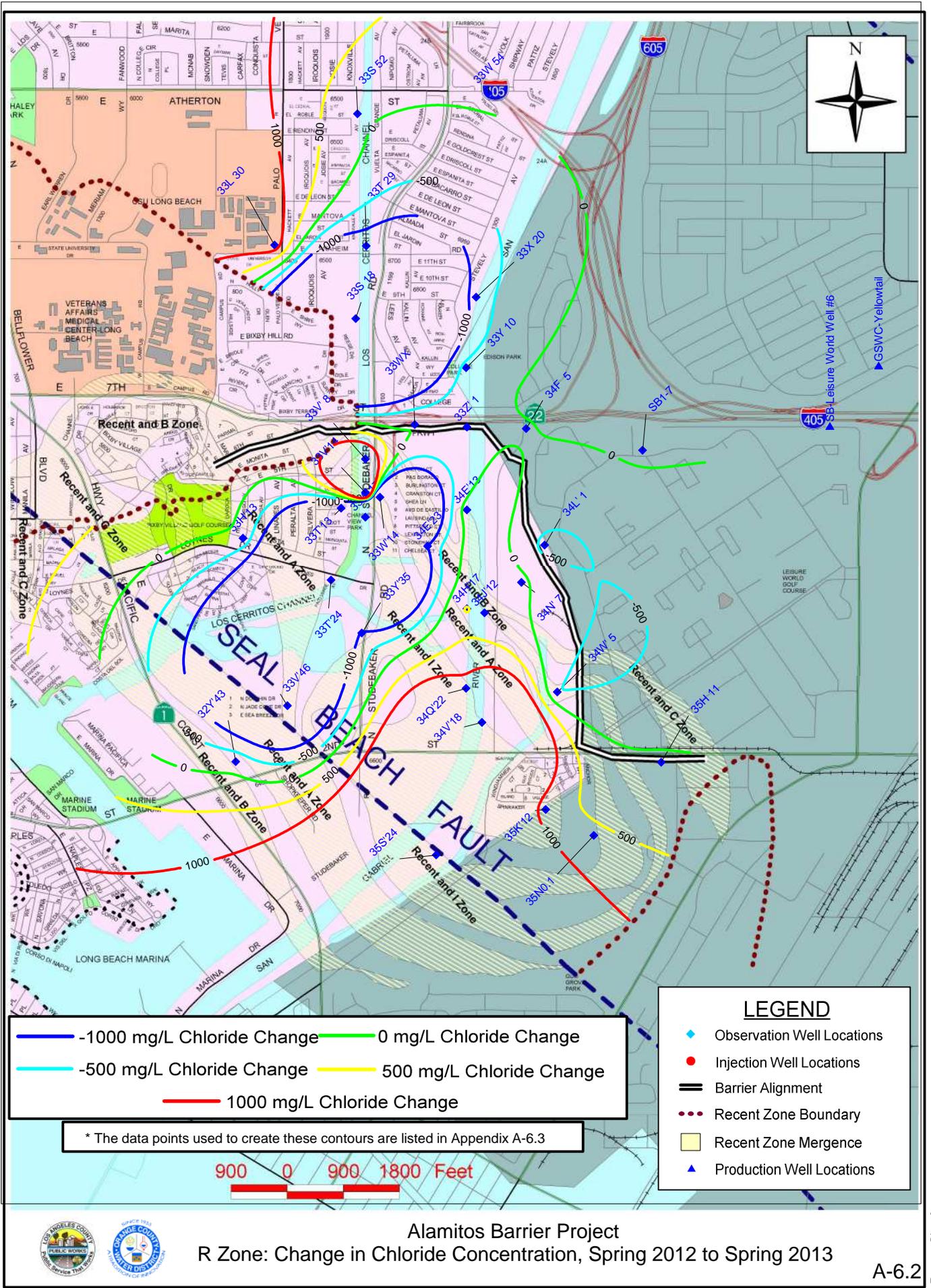
AVG= -3.9

¹ P.E. represents the protective elevations calculated for intertidal wells.

² Δ (+/-) represents how much groundwater level is above/below respective P.E.

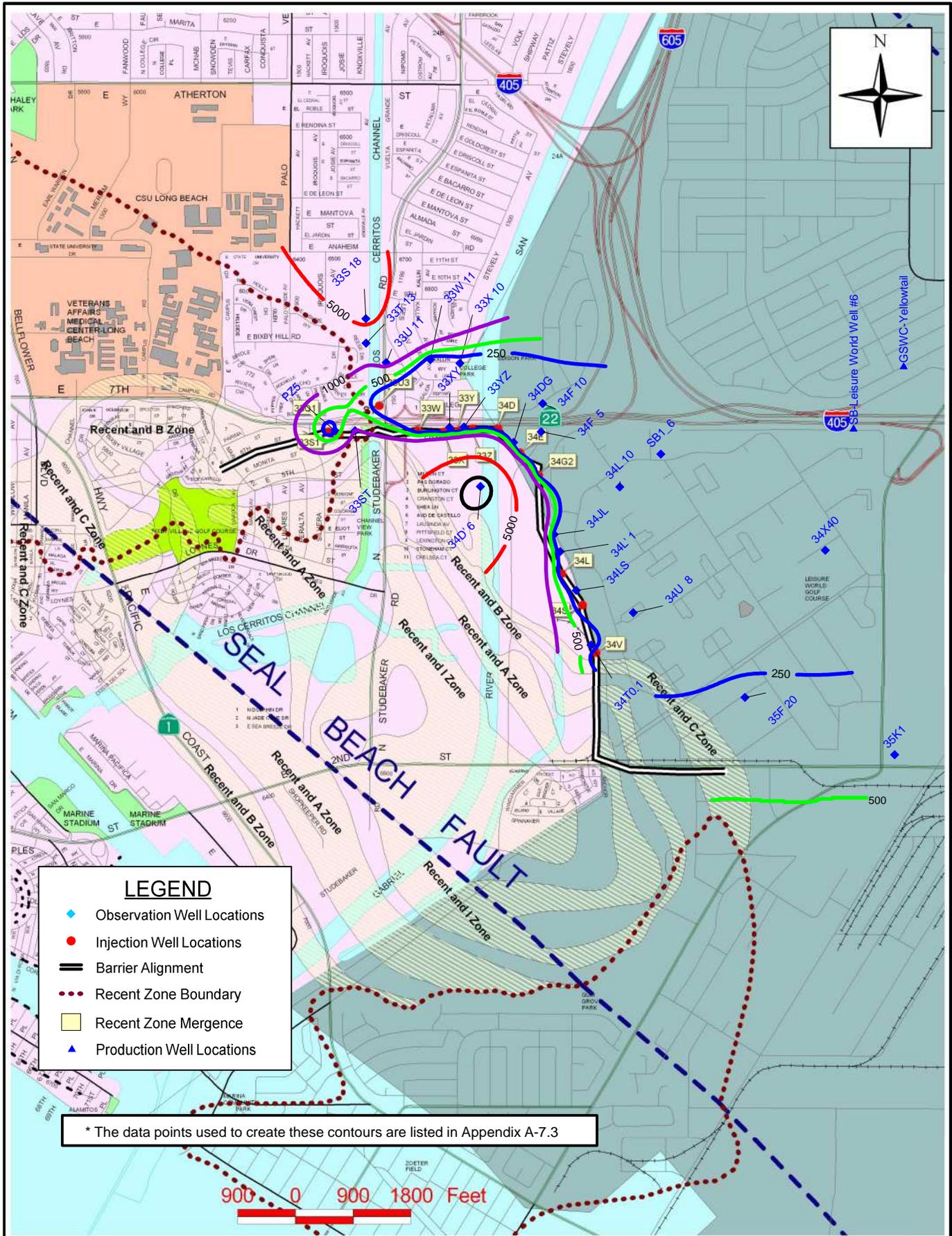
= A max. or min. elevation during that period.





ALAMITOS BARRIER PROJECT
R-ZONE CHLORIDE CONCENTRATIONS
 Chloride Data Used for Contours and Cross-Section

No.	PROJ	FCD	DATE	AQUIFER	For Cross-Section (Internodal Wells in Bold)						For Contours	MAX CHLORIDE	Change in Chloride
					ELEV 1 (ft)	CHL 1 (mg/L)	ELEV 2 (ft)	CHL 2 (mg/L)	ELEV 3 (ft)	CHL 3 (mg/L)	MAX CHL. 12-13	11-12	(FY12-13 - FY11-12)
1	32Y43	493WW	20130326	R	-43	1,710					1,710	1,900	-190
2	33H13	493YY	20130319	R,A	-18	394	-38	682	-58	993	993	1,160	-167
3	33L 30	491G	20130313	R	-50	3,170					3,170	1,880	1,290
4	33S 18	492AH	20130320	R	-67	5,160					5,160	13,000	-7,840
5	33S 52	491J	20130314	R	-54	638					638	559	79
6	33T 29	491D	20130321	R	-56	3,620					3,620	5,090	-1,470
7	33T13	492AU	20130327	R	-41	844	-51	1,210			1,210	3,750	-2,540
8	33T24	493SS	20130325	R	-17	6,960					6,960	12,300	-5,340
9	33V 8	492BY	20130326	RA	-24	9,280	-48	7,200			9,280	7,560	1,720
10	33V14	492JJ	20130326	R	-67	18,000					18,000	13,300	4,700
11	33V46	493UU	20130403	R	-61	4,670					4,670	7,570	-2,900
12	33W 54	501C	20130327	R	-33	216	-53	177			216	127	89
13	33W14	492AT	20130404	R	-46	7,080	-66	8,880			8,880	14,100	-5,220
14	33W17	493PP	20130326	R	-41	2,670	-51	4,520			4,520	14,600	-10,080
15	33WX	502AZ	20130417	R	-45	70					70	73	-3
16	33X 20	502L	20130411	R	-68	1,390					1,390	2,150	-760
17	33Y 10	502BA	20130328	R	-58	1,540	-83	5,900			5,900	6,230	-330
18	33Y35	493AB	20130328	R	-36	22,600					22,600	23,500	-900
19	33Z 1	502AU	20130429	R	-46	1,540	-56	1,520			1,540	1,700	-160
20	34E13	503AU	20130401	R	-19	185	-52	436			436	207	229
21	34E23	503X	20130402	R	-43	4,560					4,560	5,530	-970
22	34F 5	502BT	20130502	R	-136	63	-146	62	-156	61	63	80	-17
23	34H17	503Y	20130401	R	-46	4,960					4,960	4,410	550
24	34J12	503U	20130402	R	-28	6,220	-36	5,510			6,220	6,070	150
25	34L 1	503P	20130422	R	-57	6,100					6,100	6,750	-650
26	34N 7	503AE	20130408	R	-51	2,670	-61	3,270	-70	3,980	3,980	3,850	130
27	34Q22	503T	20130402	R	-42	11,800	-57	14,000			14,000	12,700	1,300
28	34V18	503V	20130403	R	-48	13,300					13,300	8,250	5,050
29	34W 5	503AH	20130325	R	-51	1,150					1,150	1,630	-480
30	35H 11	514F	20130424	R	-42	294	-65	641			641	550	91
31	35K12	504R	20130408	R	-44	637	-54	1,880			1,880	1,200	680
32	35N0.1	504M	20130402	R	-38	12,000	-62	13,300			13,300	12,700	600
33	35S24	504K	20130403	R	-14	17,700					17,700	14,450	3,250
34	SB1-7	SB1-7	20130430	R		780					780	690	90



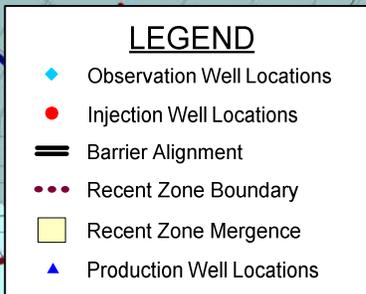
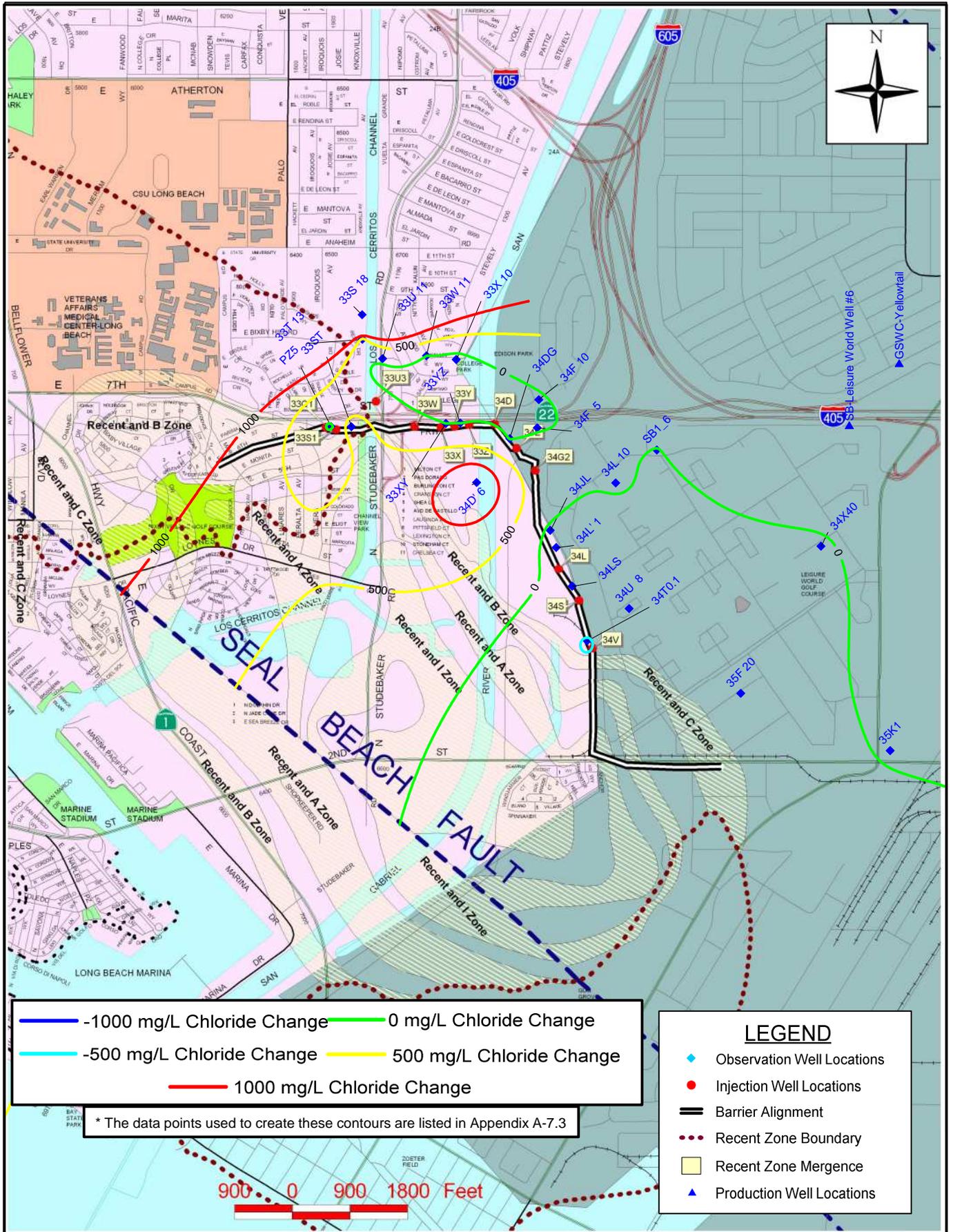
LEGEND

- ◆ Observation Well Locations
- Injection Well Locations
- Barrier Alignment
- Recent Zone Boundary
- Recent Zone Mergence
- ▲ Production Well Locations

* The data points used to create these contours are listed in Appendix A-7.3



Alamitos Barrier Project
C Zone Chloride Concentration (mg/L) Contours: Spring 2013



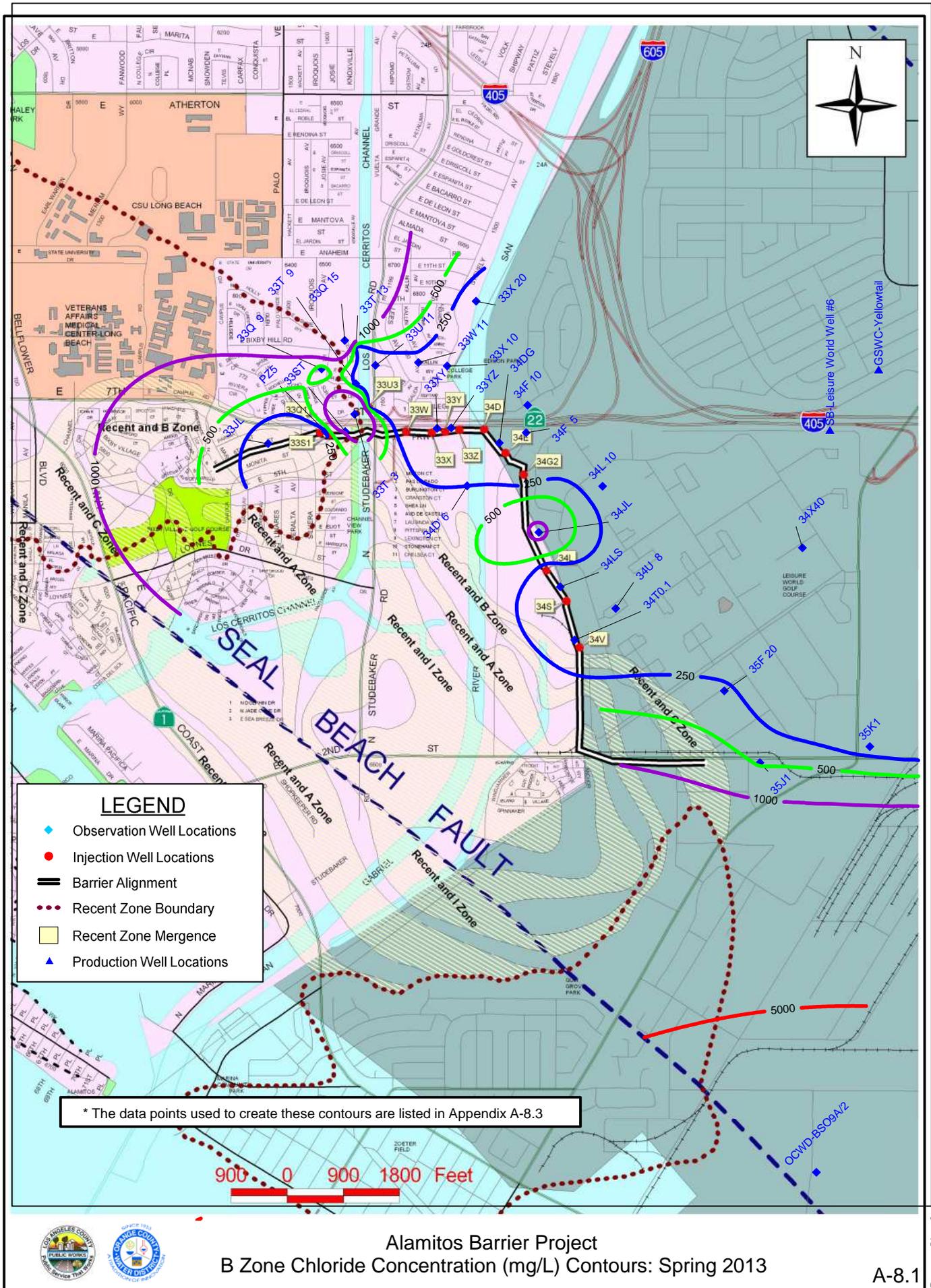
* The data points used to create these contours are listed in Appendix A-7.3



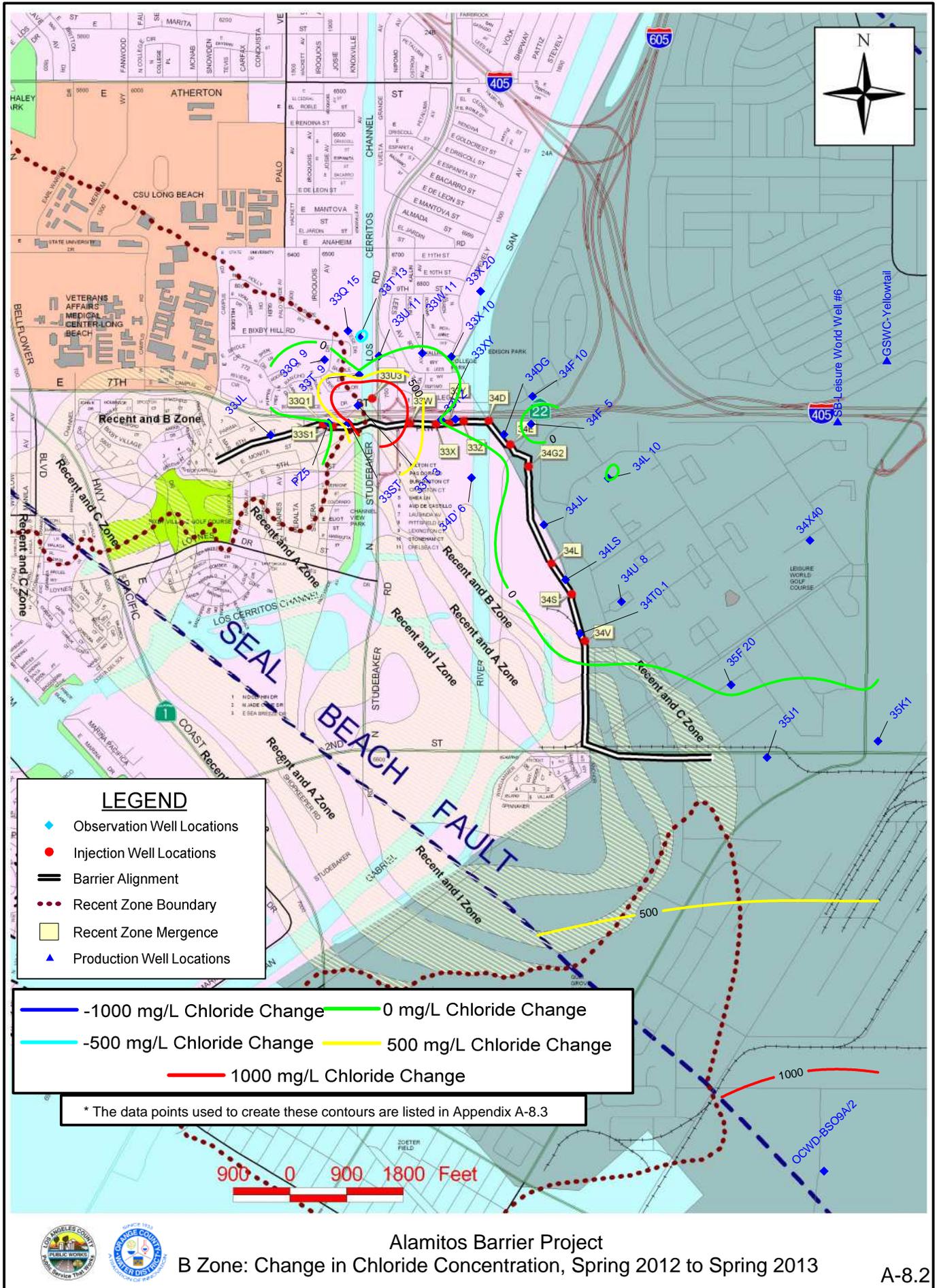
ALAMITOS BARRIER PROJECT
C-ZONE CHLORIDE CONCENTRATIONS
 Chloride Data Used for Contours and Cross-Section

No.	PROJ	FCD	DATE	AQUIFER	For Cross-Section (Internodal Wells in Bold)						For Contours	MAX CHLORIDE	Change in Chloride
					ELEV 1 (ft)	CHL 1 (mg/L)	ELEV 2 (ft)	CHL 2 (mg/L)	ELEV 3 (ft)	CHL 3 (mg/L)	MAX CHL. 12-13	11-12	(FY12-13 - FY11-12)
1	33S 18	492AG	20130320	C	-225	6,150					6,150	1,270	4,880
2	33ST	492BK	20130409	CB	-25	1,050					1,050	299	751
3	33T 13	492AC	20130409	C	-199	1,550					1,550	1,230	320
4	33U 11	492AL	20130410	C	-169	1,200					1,200	1,130	70
5	33W 11	502R	20130410	C	-183	79	-216	87			87	90	-3
6	33X 10	502BB	20130328	C	-190	80	-215	80			80	231	-151
7	33XY	502BL	20130429	C	-195	68	-210	58			68	70	-2
8	33YZ	502AB	20130429	C	-195	61	-210	64			64	70	-6
9	34D 6	502BF	20130401	C	-125	12,600					12,600	11,000	1,600
10	34DG	502X	20130418	C	-190	73	-205	75			75	90	-16
11	34F 5	502BU	20130502	C	-191	57	-201	56	-211	65	65	80	-15
12	34F 10	502AP	20130411	C	-211	75					75	110	-35
13	34JL	503AR	20130422	C	-161	80					80	155	-75
14	34L 1	503N	20130422	C	-162	108					108	300	-192
15	34L 10	502AK	20130403	C	-166	108					108	83	25
16	34LS	503BF	20130501	C	-133	97	-151	78	-163	87	97	120	-23
17	34T0.1	503AB	20130501	C	-134	457					457	999	-542
18	34U 8	513D	20130502	C	-150	78	-165	80			80	82	-1
19	34X40	513R	20130425	C	-85	30	-101	37			37	60	-23
20	35F 20	513L	20130423	C	-70	184	-78	231	-85	353	353	392	-39
21	35K1	523D	20130425	C	-88	199	-98	419			419	402	17
22	PZ5	492CH	20130327	CB	-24	239					239	309	-70
23	SB1.6		20130430	C		80					80	86	-6
24	33Q1						DP1				50	50	n/a
25	33U3						DP2				50	50	n/a
26	33W						DP3				50	50	n/a
27	33X						DP4				50	50	n/a
28	33Y						DP5				50	50	n/a
29	33Z						DP6				50	50	n/a
30	34D						DP7				50	50	n/a
31	34E						DP8				50	50	n/a
32	34G2						DP9				50	50	n/a
33	34L						DP10				50	50	n/a
34	34S						DP11				50	50	n/a
35	34V						DP12				50	50	n/a

DP = Dummy Point with an assumed chloride concentration of 50 mg/L. Placed at wells that were injecting into this zone during this reporting period.



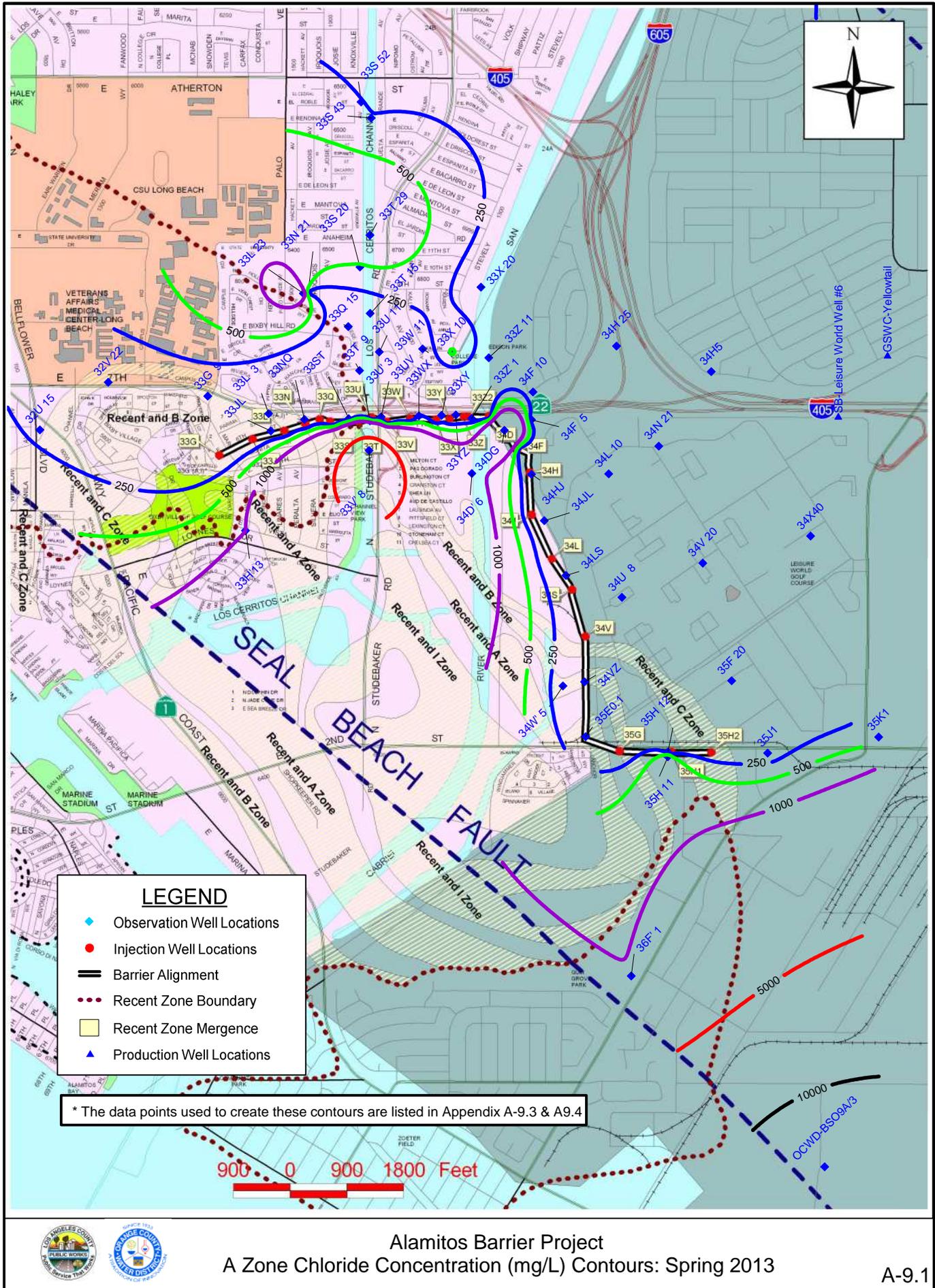
Alamitos Barrier Project
 B Zone Chloride Concentration (mg/L) Contours: Spring 2013



ALAMITOS BARRIER PROJECT
B-ZONE CHLORIDE CONCENTRATIONS
Chloride Data Used for Contours and Cross-Section

No.	PROJ	FCD	DATE	AQUIFER	For Cross-Section (Internodal Wells in Bold)						For Contours	MAX CHLORIDE	Change in Chloride
					ELEV 1 (ft)	CHL 1 (mg/L)	ELEV 2 (ft)	CHL 2 (mg/L)	ELEV 3 (ft)	CHL 3 (mg/L)	MAX CHL. 12-13	11-12	(FY12-13 - FY11-12)
1	33JL	492BQ	20130425	B	3	80	-7	74			80	89	-9
2	33Q 9	492CM	20130319	B	-85	61	-95	86	-105	321	321	105	216
3	33Q 15	492AN	20130319	B	-263	2,930					2,930	3,150	-220
4	33ST	492BK	20130409	CB	-25	1,050					1,050	299	751
5	33T 3	492CL	20130318	B	-40	113	-57	79	-75	4,010	4,010	42	3,968
6	33T 9	492YY	20130409	B	-163	168					168	87	81
7	33T 13	492AB	20130409	B	-254	171					171	754	-583
8	33U 11	492AK	20130410	B	-260	187					187	221	-34
9	33W 11	502S	20130410	B	-241	160	-261	202			202	130	72
10	33X 10	502BC	20130328	B	-275	71					71	95	-24
11	33X 20	502K	20130411	B	-266	66					66	130	-64
12	33XY	502BM	20130429	B	-245	58					58	85	-27
13	33YZ	502AC	20130429	B	-214	65	-263	63			65	100	-35
14	34D' 6	502BG	20130401	B	-180	249	-194	98			249	110	139
15	34DG	502Y	20130418	B	-232	61	-257	81			81	120	-39
16	34F 5	502BS	20130502	B	-231	60	-260	88			88	60	28
17	34F 10	502AQ	20130411	B	-269	77					77	90	-13
18	34JL	503AQ	20130422	B	-196	1,070	-211	1,210			1,210	1,370	-160
19	34L 10	502AL	20130403	B	-224	79	-249	79			79	77	2
20	34LS	503BE	20130501	B	-188	84					84	90	-6
21	34T0.1	503AC	20130501	B	-174	68	-207	61	-239	67	68	110	-42
22	34U 8	513E	20130506	B	-221	77					77	95	-18
23	34X40	513Q	20130425	B	-137	20					20	24	-4
24	35F 20	513K	20130423	B	-115	299					299	323	-24
25	35J1	514M	20130424	B	-128	399	-143	453	-148	456	456	277	179
26	35K1	523A	20130425	B	-127	99	-142	122	-157	114	122	106	16
27	PZ5	492CH	20130327	CB	-24	239					239	309	-70
28	OCWD-BSO9A/2	N/A	20130320	B	-	8,480					8,480	7,170	1,310
29	33Q1										50	50	n/a
30	33U3										50	50	n/a
31	33W										50	50	n/a
32	33X										50	50	n/a
33	33Y										50	50	n/a
34	33Z										50	50	n/a
35	34D										50	50	n/a
36	34E										50	50	n/a
37	34G2										50	50	n/a
38	34L										50	50	n/a
39	34S										50	50	n/a
40	34V										50	50	n/a

DP = Dummy Point with an assumed chloride concentration of 50 mg/L. Placed at wells that were injecting into this zone during this reporting period.



LEGEND

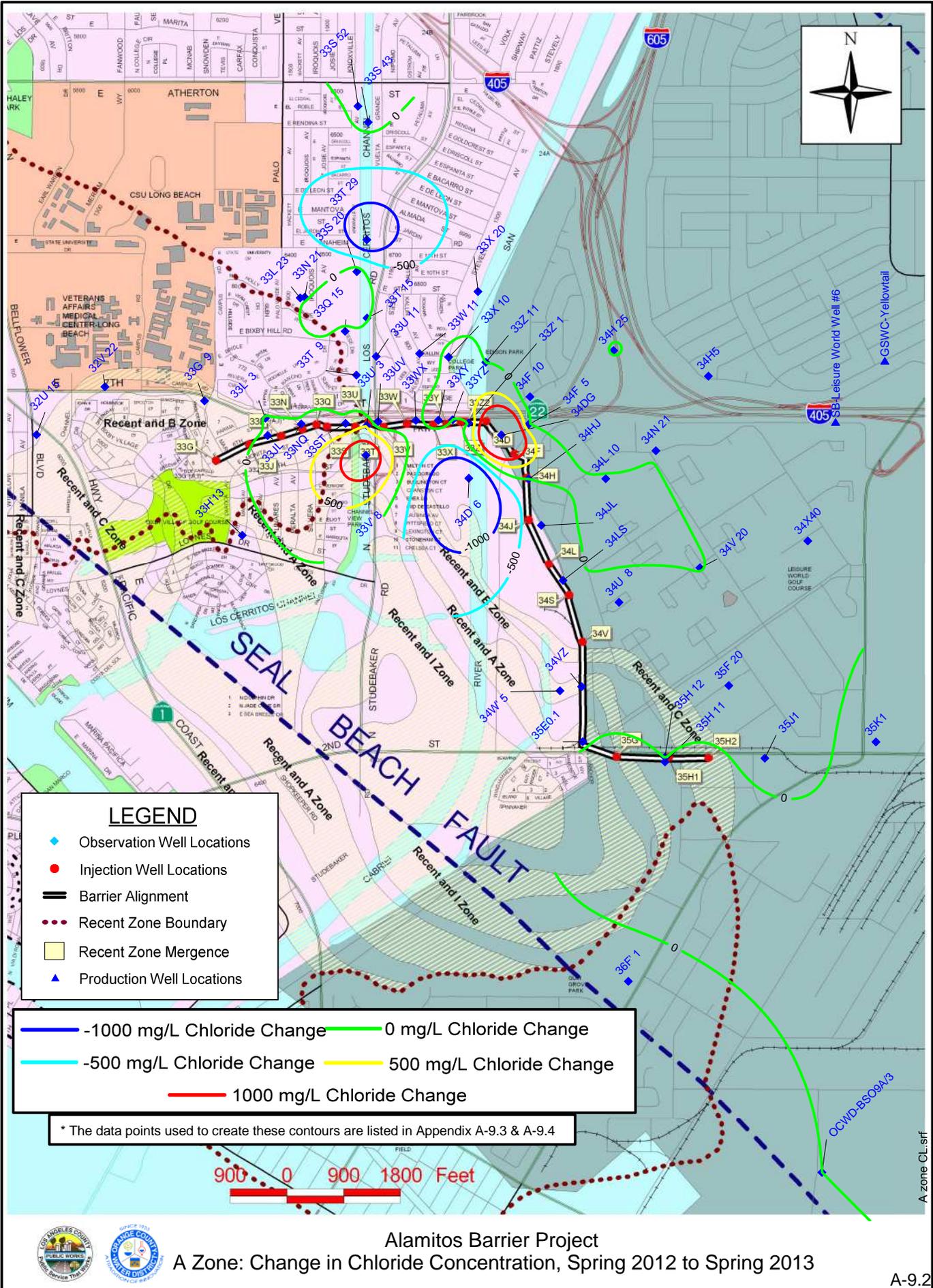
- ◆ Observation Well Locations
- Injection Well Locations
- Barrier Alignment
- ⋯ Recent Zone Boundary
- Recent Zone Mergence
- ▲ Production Well Locations

* The data points used to create these contours are listed in Appendix A-9.3 & A9.4

900 0 900 1800 Feet



Alamitos Barrier Project
 A Zone Chloride Concentration (mg/L) Contours: Spring 2013



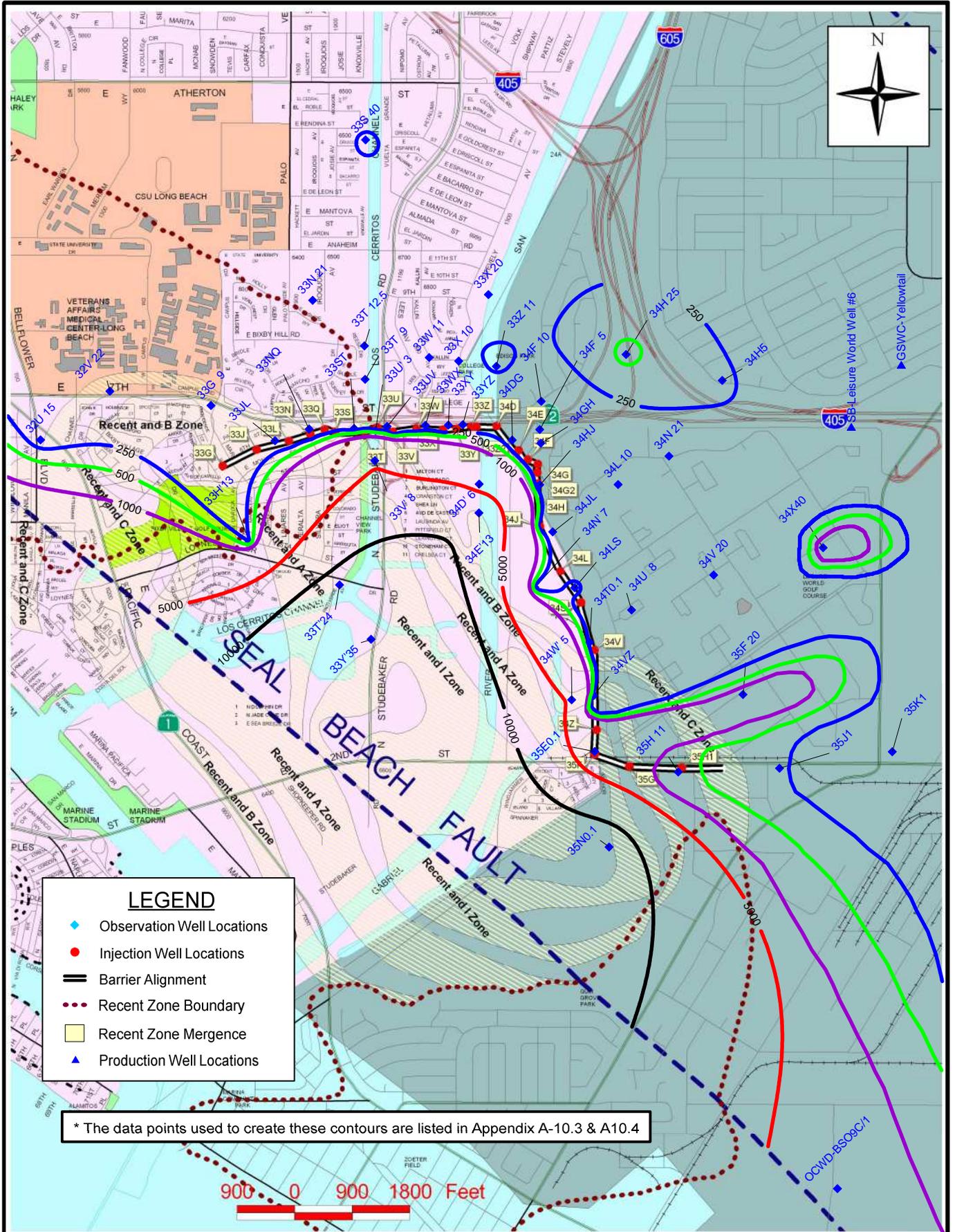
ALAMITOS BARRIER PROJECT
A-ZONE CHLORIDE CONCENTRATIONS
 Chloride Data Used for Contours and Cross-Section

No.	PROJ	FCD	DATE	AQUIFER	For Cross-Section (Internodal Wells in Bold)						For Contours	MAX CHLORIDE	Change in Chloride
					ELEV 1 (ft)	CHL 1 (mg/L)	ELEV 2 (ft)	CHL 2 (mg/L)	ELEV 3 (ft)	CHL 3 (mg/L)	MAX CHL. 12-13	11-12	(FY12-13 - FY11-12)
1	32U 15	482M	20130313	A	-17	213					213	605	-392
2	32V 22	482P	20130328	A	-11	133					133	280	-147
3	33G 9	482F	20130328	A	-3		-23	110			110	187	-77
4	33H13	493YY	20130319	R,A	-18	394	-38	682	-58	993	993	1,160	-167
5	33JL	492BW	20130408	AI	-41	56	-79	77	-116	72	77	67	10
6	33L 3	492	20130313	A	-60	76					76	70	5
7	33L 23	492RR	20130314	A	-344	1,380					1,380	1,390	-10
8	33N 21	492BU	20130314	A	-305	164	-330	191	-346	195	195	206	-11
9	33NQ	492BP	20130409	AI	-48	72	-92	82	-136	79	82	60	22
10	33Q 15	492AM	20130319	A	-337	129					129	153	-24
11	33S 20	492BR	20130320	A	-317	113	-336	290	-355	449	449	229	220
12	33S 43	491E	20130314	A	-333	174	-344	259			259	122	137
13	33S 52	491H	20130314	A	-284	237	-289	256			256	218	38
14	33ST	492BL	20130409	A	-65	88	-86	98	-100	112	112	50	62
15	33T 9	492TT	20130409	A	-262	71					71	75	-4
16	33T 15	492SS	20130325	A	-334	126					126	117	9
17	33T 29	491C	20130321	A	-350	1,000					1,000	2,560	-1,560
18	33U 11	492AJ	20130411	A	-348	149					149	166	-17
19	33U 3	492WW	20130326	A	-89	734					734	255	479
20	33UV	492BH	20130417	A	-106	76	-131	65	-155	69	76	470	-394
21	33V 8	492BY	20130326	RA	-24	9,280	-48	7,200			9,280	7,560	1,720
22	33W 11	502T	20130410	A	-321	52	-349	54	-366	84	84	500	-416
23	33WX	502AF	20130417	A	-258	287	-281	289	-297	291	291	367	-76
24	33X 10	502BD	20130328	A	-320	73	-340	92	-356	544	544	403	141
25	33X 20	502J	20130411	A	-353	99					99	100	-1
26	33XY	502BN	20130429	A	-279	76	-296	85	-311	312	312	80	232
27	33YZ	502AD	20130429	A	-296	69	-319	67			69	75	-6
28	33Z 1	502G	20130429	A	-320	47					47	40	7
29	33Z 11	502V	20130416	A	-321	57	-334	85			85	90	-5
30	34D 6	502BH	20130401	A	-270	1,050	-303	1,020	-335	1,140	1,140	3,710	-2,570
31	34DG	502Z	20130418	A	-292	111	-324	3,830			3,830	140	3,690
32	34F 5	502BR	20130502	A	-297	80	-322	63	-347	114	114	70	44
33	34F 10	502AR	20130411	A	-311	98	-326				98	500	-403
34	34H 25	502AH	20130416	A	-297	74	-312	96	-328	101	101	75	26
35	34H5	512E	20130425	A	-298	75	-313	71	-328	74	75	400	-325
36	34HJ	502BX	20130417	A	-310	65	-321	66	-331	72	72	80	-8
37	34JL	503AP	20130422	A	-263	56	-288	56	-303	57	57	185	-128
38	34L 10	502AM	20130403	A	-310	60	-330	56	-354	75	75	66	9
39	34LS	503BD	20130501	A	-238	60	-283	68			68	90	-22
40	34N 21	512B	20130404	A	-328	78	-354	87			87	92	-5

**ALAMITOS BARRIER PROJECT
A-ZONE CHLORIDE CONCENTRATIONS**
Chloride Data Used for Contours and Cross-Section

No.	PROJ	FCD	DATE	AQUIFER	For Cross-Section (Internodal Wells in Bold)						For Contours	MAX CHLORIDE	Change in Chloride
					ELEV 1 (ft)	CHL 1 (mg/L)	ELEV 2 (ft)	CHL 2 (mg/L)	ELEV 3 (ft)	CHL 3 (mg/L)	MAX CHL. 12-13	11-12	(FY12-13 - FY11-12)
41	34U 8	513F	20130506	A	-280	74	-310	75			75	130	-55
42	34V 20	513B	20130422	A	-234	112	-265	85	-284	88	112	110	2
43	34VZ	503BH	20130423	A	-146	52	-156	57			57	100	-43
44	34W' 5	503AJ	20130325	A	-81	77	-101	137	-119	83	137	167	-30
45	34X40	513P	20130425	A	-202	34	-232	39			39	65	-26
46	35E0.1	503BK	20130423	A	-74	89					89	105	-16
47	35F 20	513J	20130423	A	-129	88	-158	85			88	148	-61
48	35H 11	514G	20130424	A	-123	249	-146	836			836	443	393
49	35H 12	514D	20130424	A	-137	93					93	150	-57
50	35J1	514L	20130424	A	-193	87	-208	113	-228	67	113	203	-90
51	35K1	523B	20130425	A	-197	32	-212	68	-227	410	410	354	56
52	36F' 1	505D	20130404	A	-99	1,070					1,070	1,160	-90
53	OCWD-BSO9A/3	N/A	20130320	A	-	13,600					13,600	13,600	0
54	33G						DP1				50	50	n/a
55	33J						DP 2				50	50	n/a
56	33L						DP3				50	50	n/a
57	33N						DP4				50	50	n/a
58	33Q						DP5				50	50	n/a
59	33S						DP6				50	50	n/a
60	33T						DP7				50	50	n/a
61	33U						DP8				50	50	n/a
62	33V						DP9				50	50	n/a
63	33W						DP10				50	50	n/a
64	33X						DP11				50	50	n/a
65	33Y						DP12				50	50	n/a
66	33Z						DP13				50	50	n/a
67	33Z2						DP14				50	50	n/a
68	34D						DP15				50	50	n/a
69	34F						DP16				50	50	n/a
70	34H						DP17				50	50	n/a
71	34J						DP18				50	50	n/a
72	34L						DP19				50	50	n/a
73	34S						DP20				50	50	n/a
74	34V						DP21				50	50	n/a
75	35G						DP22				50	50	n/a
76	35H1						DP23				50	50	n/a
77	35H2						DP24				50	50	n/a

DP = Dummy Point with an assumed chloride concentration of 50 mg/L. Placed at wells that were injecting into this zone during this reporting period.



LEGEND

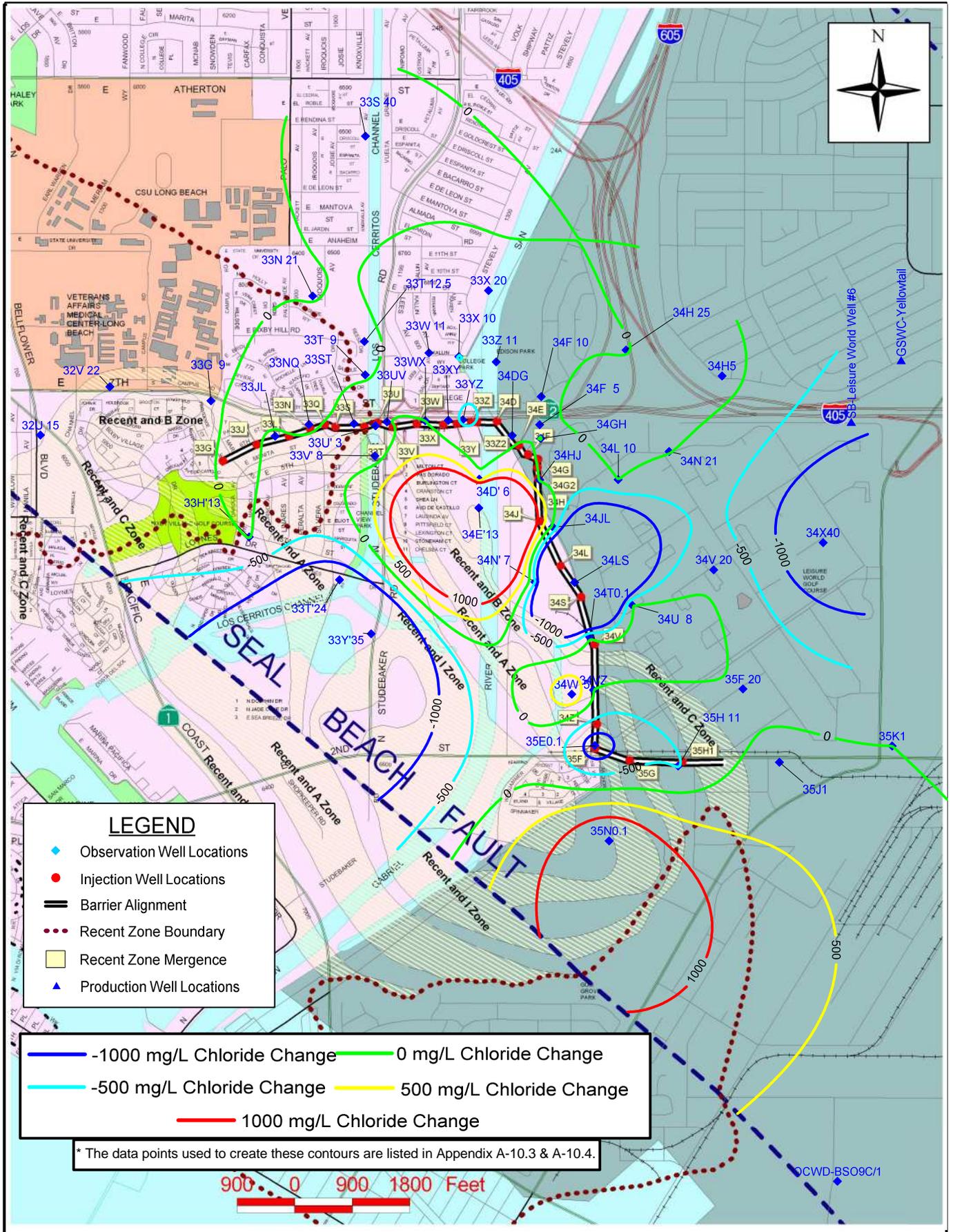
- ◆ Observation Well Locations
- Injection Well Locations
- Barrier Alignment
- Recent Zone Boundary
- Recent Zone Mergence
- ▲ Production Well Locations

* The data points used to create these contours are listed in Appendix A-10.3 & A10.4



Alamitos Barrier Project
I Zone Chloride Concentration (mg/L) Contours: Spring 2013

I zone CL.srf



LEGEND

- ◆ Observation Well Locations
- Injection Well Locations
- Barrier Alignment
- Recent Zone Boundary
- Recent Zone Mergence
- ▲ Production Well Locations

— -1000 mg/L Chloride Change — 0 mg/L Chloride Change
— -500 mg/L Chloride Change — 500 mg/L Chloride Change
— 1000 mg/L Chloride Change

* The data points used to create these contours are listed in Appendix A-10.3 & A-10.4.



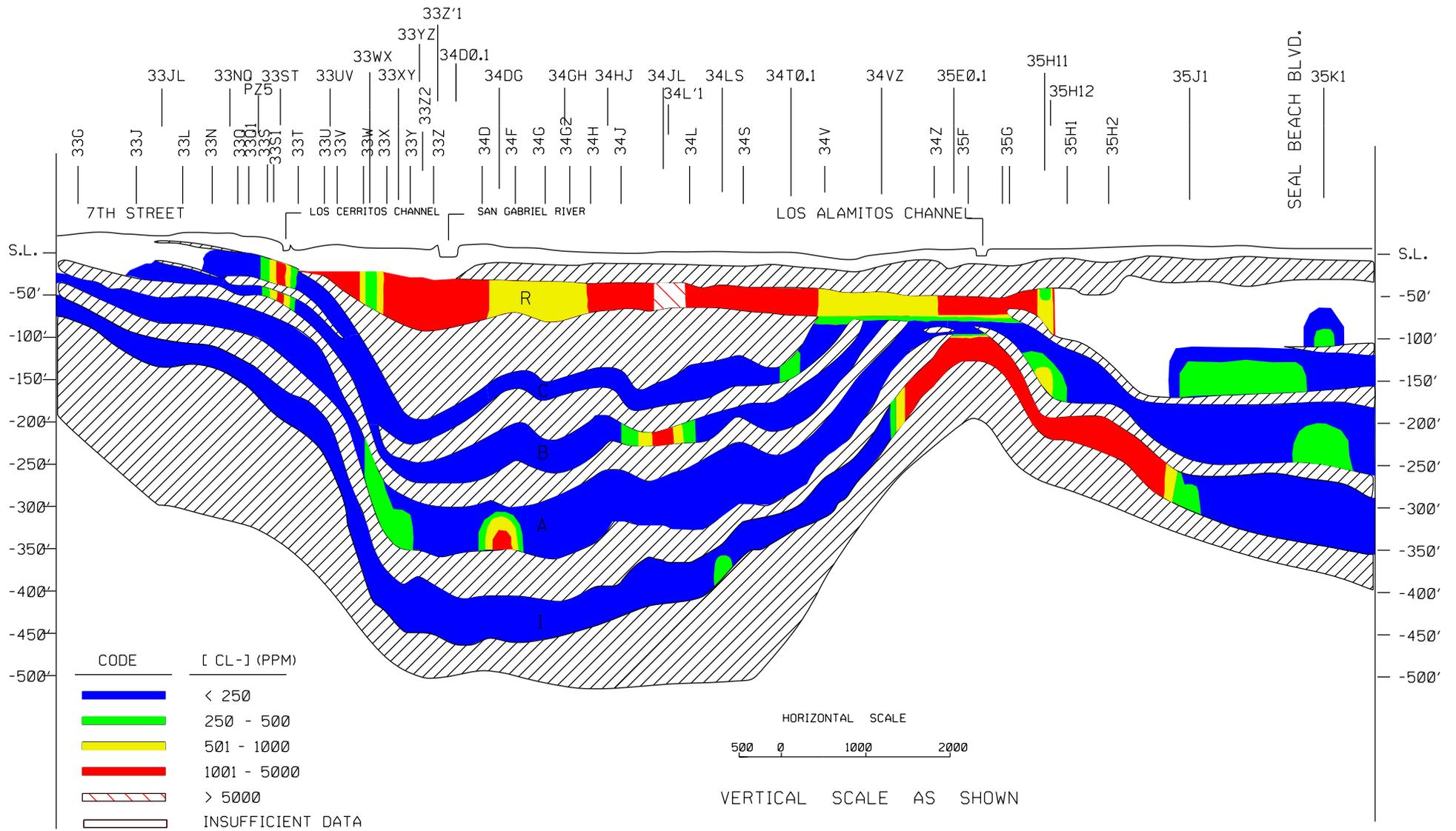
ALAMITOS BARRIER PROJECT
I-ZONE CHLORIDE CONCENTRATIONS
 Chloride Data Used for Contours and Cross-Section

No.	PROJ	FCD	DATE	AQUIFER	For Cross-Section (Internodal Wells in Bold)						For Contours	MAX CHLORIDE	Change in Chloride
					ELEV 1 (ft)	CHL 1 (mg/L)	ELEV 2 (ft)	CHL 2 (mg/L)	ELEV 3 (ft)	CHL 3 (mg/L)	MAX CHL. 12-13	11-12	(FY12-13 - FY11-12)
1	32U 15	482L	20130313	I	-74	104					104	196	-92
2	32V 22	482N	20130313	I	-51	112					112	280	-168
3	33G 9	482G	20130318	I	-34	79	-68	78	-78	77	79	88	-9
4	33H13	493XX	20130319	I	-89	249					249	233	16
5	33JL	492BW	20130408	AI	-41	56	-79	77	-116	72	77	85	-8
6	33N 21	492BV	20130319	I	-457	68	-468				68	70	-2
7	33NQ	492BP	20130409	AI	-48	72	-92	82	-136	79	82	60	22
8	33S 40	491F	20130314	I	-470	287					287	275	12
9	33ST	492BM	20130409	I	-130	70	-148	86	-163	86	86	124	-39
10	33T 9	492XX	20130409	I	-364	85					85	70	14
11	33T 12.5	492BT	20130318	I	-423	103	-438	103	-443		103	97	6
12	33T24	493RR	20130325	I	-52	12,000	-75				12,000	13,500	-1,500
13	33U 3	492QQ	20130326	I	-147	317					317	663	-346
14	33UV	492BJ	20130417	I	-209	62	-228	62	-246	62	62	71	-9
15	33V 8	492BX	20130326	I	-109	4,320	-130	4,650			4,650	4,820	-170
16	33W 11	502U	20130410	I	-423	60	-446	63	-456	63	63	110	-47
17	33WX	502AG	20130417	I	-374	51	-391	49	-395	51	51	50	1
18	33X 10	502BE	20130328	I	-420	186	-440		-460		186	709	-523
19	33X 20	502H	20130411	I	-442	80					80	110	-30
20	33XY	502BP	20130429	I	-404	89	-417	90	-431	92	92	330	-239
21	33Y35	493ZZ	20130328	I	-67	22,400					22,400	25,400	-3,000
22	33YZ	502AE	20130429	I	-402	62	-433	63			63	650	-587
23	33Z 11	502W	20130416	I	-417	82	-437	113	-454	319	319	480	-161
24	34D 6	502BI	20130401	I	-400	3,470	-410	3,560	-418		3,560	3,380	180
25	34DG	502AA	20130418	I	-402	58	-432	58			58	90	-32
26	34E13	503AT	20130401	I	-289	903	-308	9,380			9,380	2,290	7,090
27	34F 5	502BQ	20130502	I	-411	64	-426	63	-433	63	64	80	-16
28	34F 10	502AS	20130411	I	-416	51	-442	50			51	90	-39
29	34GH	502BV	20130418	I	-412	83	-427	82	-437	82	83	80	3
30	34H 25	502AJ	20130416	I	-407	501	-427	573	-446		573	585	-12
31	34H5	512D	20130425	I	-408	279	-423	274	-443	245	279	110	169
32	34HJ	502BW	20130417	I	-407	59	-417	59	-427	61	61	105	-45
33	34JL	503AN	20130422	I	-383	47	-398	47			47	125	-78
34	34L 10	502AN	20130403	I	-404	33	-426	34			34	29	4
35	34LS	503BC	20130501	I	-338	102	-368	448			448	9,810	-9,362
36	34N 21	512C	20130404	I	-423	85	-448	82			85	71	14
37	34N 7	503AG	20130408	I	-221	75	-254	155	-274	154	155	610	-455

**ALAMITOS BARRIER PROJECT
I-ZONE CHLORIDE CONCENTRATIONS
Chloride Data Used for Contours and Cross-Section**

No.	PROJ	FCD	DATE	AQUIFER	For Cross-Section (Internodal Wells in Bold)						For Contours	MAX CHLORIDE	Change in Chloride
					ELEV 1 (ft)	CHL 1 (mg/L)	ELEV 2 (ft)	CHL 2 (mg/L)	ELEV 3 (ft)	CHL 3 (mg/L)	MAX CHL. 11-12	10-11	(FY11-12 - FY10-11)
38	34T0.1	503AD	20130501	I	-289	192	-312	120	-334	98	192	260	-68
39	34U 8	513G	20130506	I	-360	134	-375	139			139	180	-41
40	34V 20	513C	20130422	I	-386	30					30	110	-80
41	34VZ	503BG	20130423	I	-214	71	-224	72			72	80	-8
42	34W 5	503AK	20130325	I	-156	4,580					4,580	3,650	930
43	34X40	513N	20130506	I	-331	976	-337	1,000			1,000	2,800	-1,800
44	35E0.1	503BJ	20130423	I	-114	2,220					2,220	3,640	-1,420
45	35F 20	513H	20130423	I	-235	2,290	-245	3,560	-255		3,560	3,580	-20
46	35H 11	514H	20130424	I	-203	511					511	1,030	-519
47	35J1	513M	20130424	I	-261	79	-271	283	-281	274	283	124	159
48	35K1	523C	20130425	I	-363	26	-373				26	26	0
49	35N0.1	504N	20130404	I	-71	13,100					13,100	11,200	1,900
51	OCWD-BSO9C/1	N/A	20130320	I	-	2,980					2,980	2,900	80
52	33G					DP1					50	50	n/a
53	33J					DP2					50	50	n/a
54	33L					DP3					50	50	n/a
55	33N					DP4					50	50	n/a
56	33Q					DP5					50	50	n/a
57	33S					DP6					50	50	n/a
58	33U					DP7					50	50	n/a
59	33V					DP8					50	50	n/a
60	33W					DP9					50	50	n/a
61	33X					DP10					50	50	n/a
62	33Y					DP11					50	50	n/a
63	33Z					DP12					50	50	n/a
64	33Z2					DP13					50	50	n/a
65	34D					DP14					50	50	n/a
66	34E					DP15					50	50	n/a
67	34F					DP16					50	50	n/a
68	34G2					DP17					50	50	n/a
69	34H					DP18					50	50	n/a
70	34J					DP19					50	50	n/a
71	34L					DP20					50	50	n/a
72	34S					DP21					50	50	n/a
73	34V					DP22					50	50	n/a

DP = Dummy Point with an assumed chloride concentration of 50 mg/L. Placed at wells that were injecting into this zone during this reporting period.

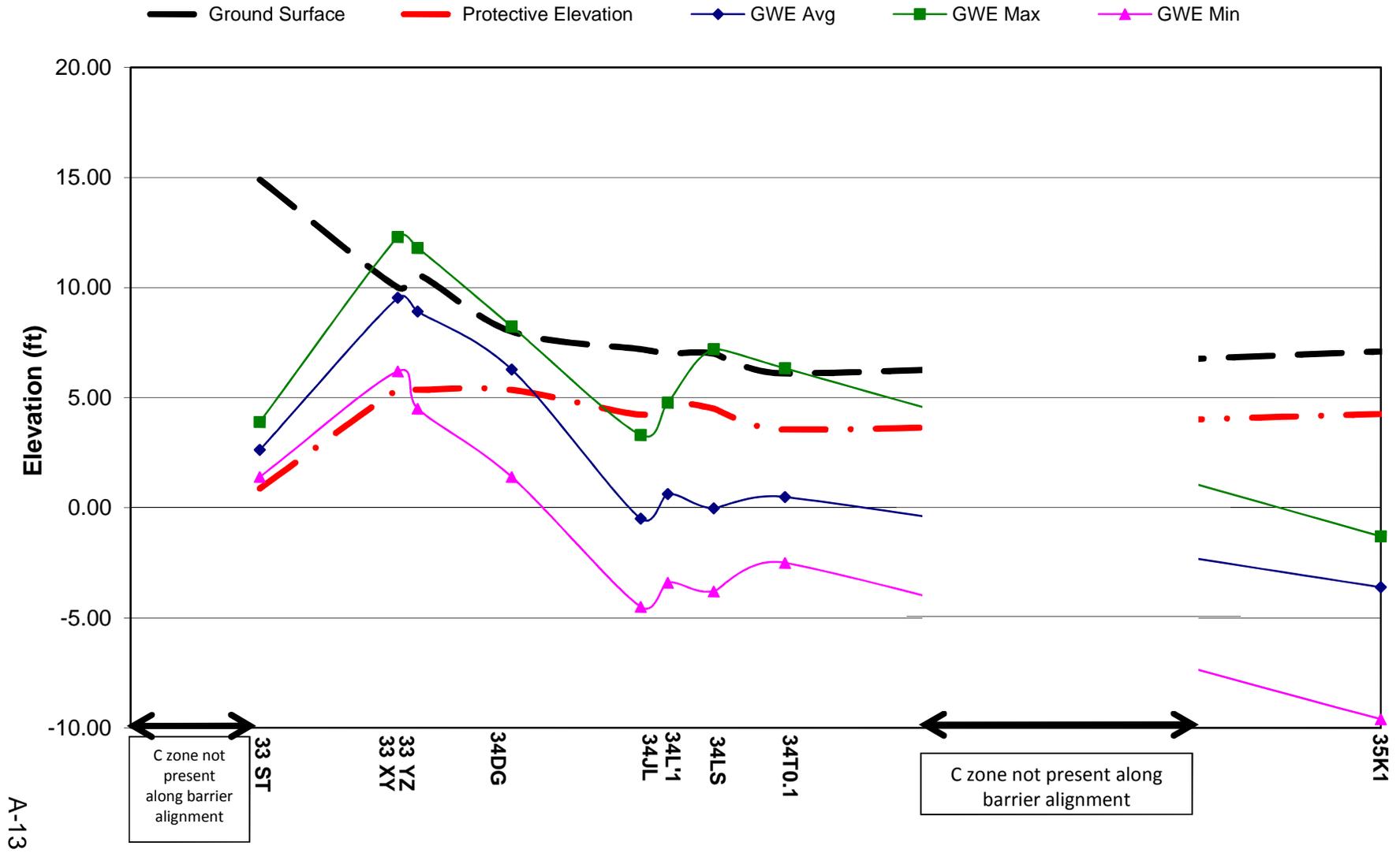


CHLORIDE SECTION ALONG THE BARRIER

Spring 2013

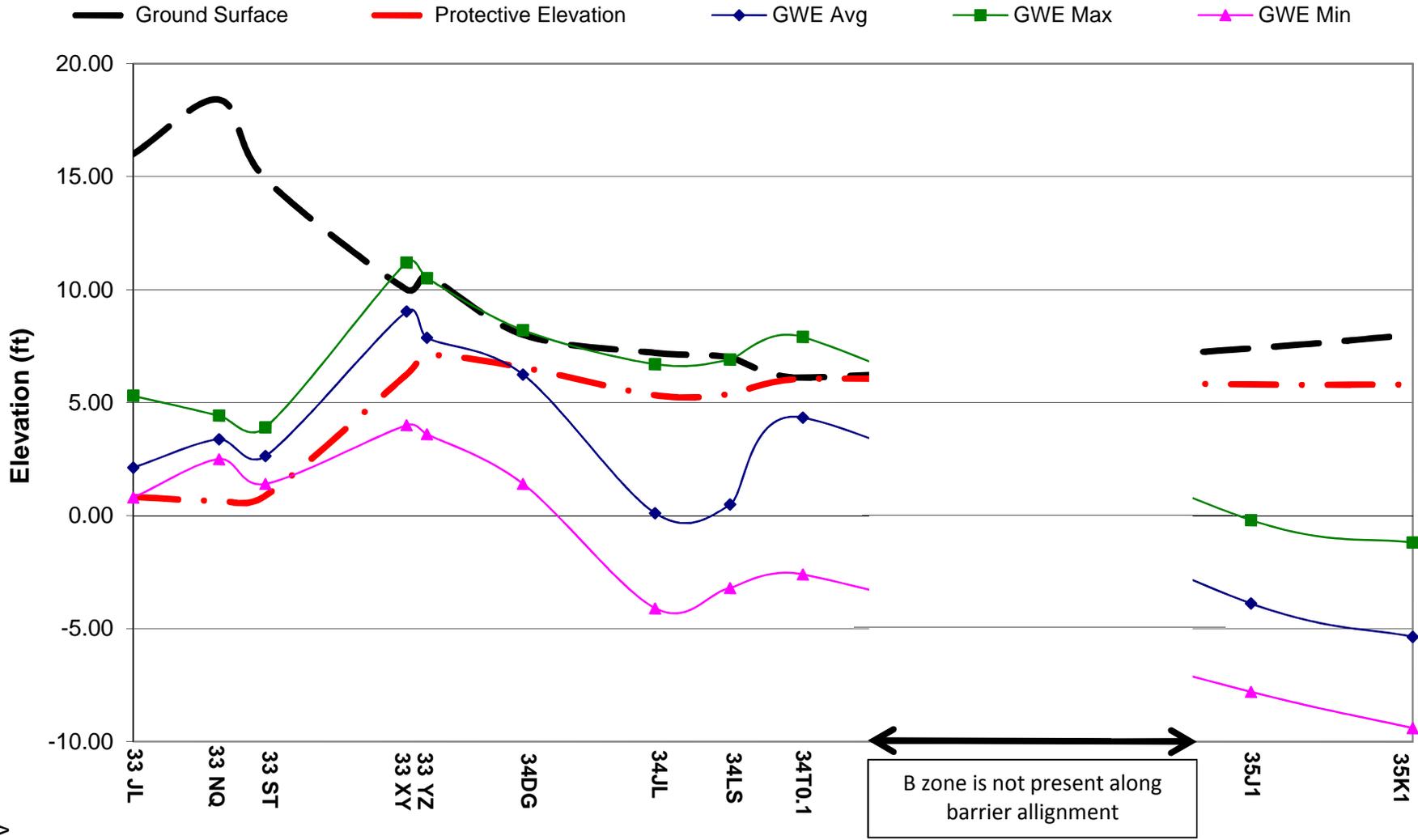
Note: The data points used to create this cross section are listed in the Appendix A-6.3, 7.3, 8.3, 9.3, 9.4, 10.3, & 10.4

C Zone - Groundwater Elevation (GWE) Along the ABP FY 2012-13

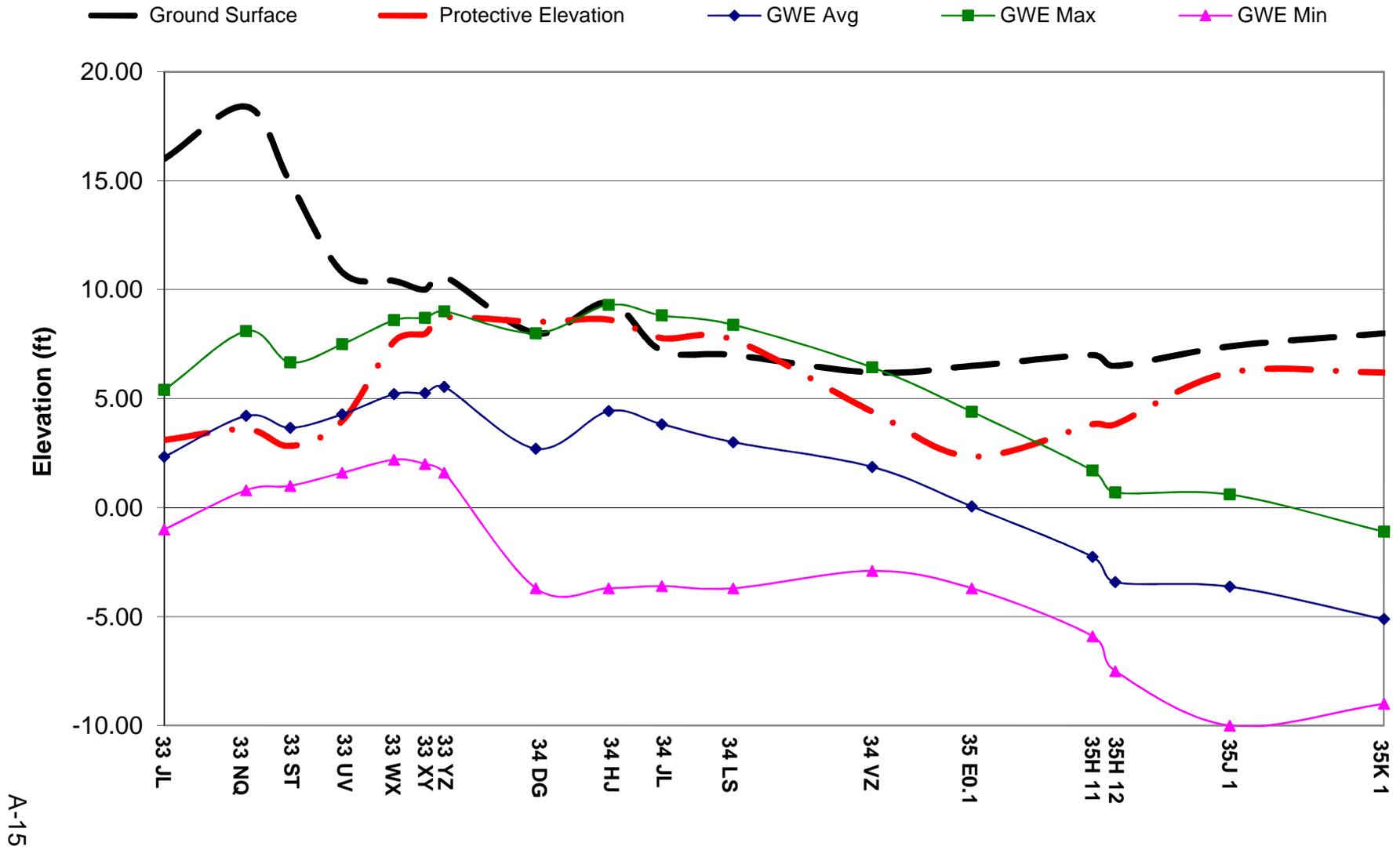


A-13

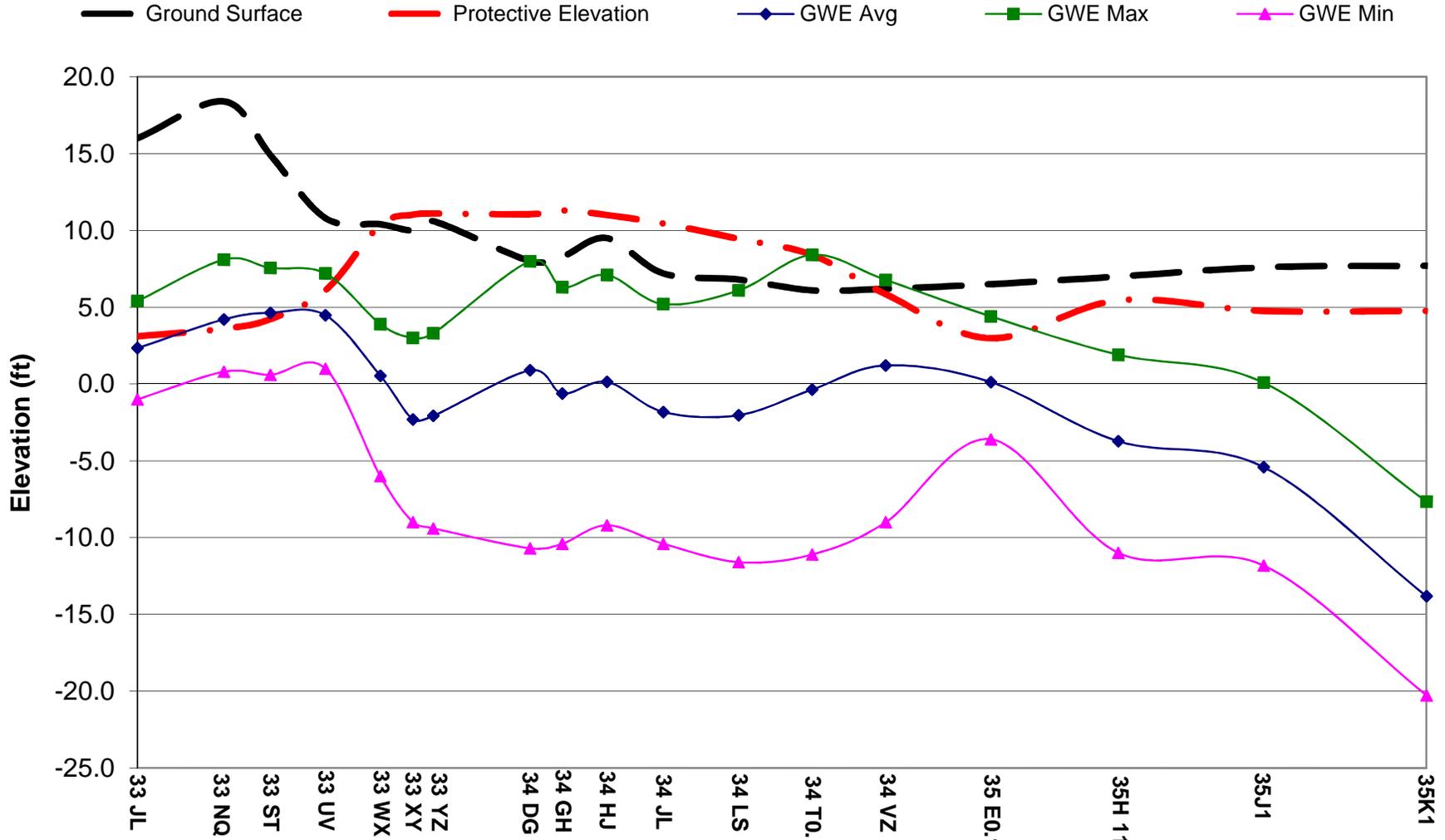
B Zone - Groundwater Elevation (GWE) Along the ABP FY 2012-13



A Zone - Groundwater Elevation (GWE) Along the ABP FY 2012-13



I Zone - Groundwater Elevation (GWE) Along the ABP FY 2012-13



Current Capital Improvement Projects and Contracts (July 2012 through June 2013)

Board Award Date	Project Title	Description	Contractor	Final Contract Amount	Field Acceptance
06/29/2010	ABP, DGBP, and WCBBP Injection Well Condition Assessment	Assessment of injection wells on all three barriers (including the 14 ABP casings NOT a part of the ABP Condition Assessment)	MWH	\$2,356,474 (ABP portion = \$361,188)	July 2012 Final Report
08/14/2012	ABP Unit 13 - Observation Wells	Construction of 8 new observation wells (21 casings total) near west end of the ABP	Bakersfield Well and Pump	\$1,511,288 [Pending] (\$300,000 from WRD)	November 2013 [Estimated]
Anticipated early 2014 by OCWD	ABP Unit 14 - Injection and Observation Wells	Construction of 17 new clustered injection wells (8 locations), 4 nested observation wells, and 2 shallow piezometers	Unknown	\$8,826,000 total \$758,000 for LACFCD facilities [Estimated]	Fall 2015 [Estimated]

Note: For a full history of improvement projects and contracts on record, please contact LACDPW.

Summary of the Alamitos Barrier Project Shutdowns (July 2012 through June 2013)

Shutdown	Startup	Duration (days)	Impacted Portion of ABP	Reason	Addressed By	Means of Repair/Remediation
12/28/2011	11/29/2012	337	Well 33T	Return of Surface Leakage	LACDPW	Verified the surface leakage and resumed injection with limited flowrate. Demolished slab to investigate leakage, and rebuilt slab in preparation for repair using pressure grouting. Well was repaired using pressure grouting in September 2012, returned to service in November 2012 at reduced flowrate.
06/15/2012	12/15/2012	183	Well 33S	Offline Awaiting Parts	LACDPW	Well was modified with 6" injection piping to accommodate self-juttering equip. Procured needed parts to transition from 6" piping to 4" piping.
10/21/2012	10/22/2012	1	Entire Barrier	Supply pipeline was shut off at the RW Blend Station (Point D) by unknown parties	LACDPW/LBWD	Butterfly valves at the RW Blend Station were re-opened
12/04/2012	12/10/2012	6	East Leg	To replace/upgrade Point B and Point C flow meters and tie-in to existing telemetry system	LACDPW (via New Creation Builders)	Remove old equipment, then install new meters and tie-in to existing telemetry system.
02/15/2013	11/06/2013	264	Well 34G	Return of Surface Leakage	LACDPW	Verified the surface leakage and resumed injection with limited flowrate.
03/26/2013	06/06/2013	72	Well 35H2	Suspected surface leakage	LACDPW /OCWD	OCWD investigated, and constructed a small monitoring well to determine whether the water levels fluctuate with the operation of well 35H2. OCWD found issue was unrelated to injection well operations.

Notes:

* Routine and/or minor shutdowns of individual wells are not listed here but are included in Figure 3 of the Annual JMC Report and Table 2 for the Semi-Annual Meeting.

ALAMITOS BARRIER PROJECT COST FOR FY 2012-13

ITEM NO.	JOB NO.	DESCRIPTION	SERVICES AND SUPPLIES	FY 2012-13 BUDGET	% BUDGET FY 12-13	OCWD SHARE 31%	OCWD BUDGET FY 12-13	% OCWD BUDGET FY 12-13	LADPW SHARE	LADPW BUDGET FY 12-13	% LADPW BUDGET FY 12-13	
1.	H0321551	ABP ANALY&DIR OF INJECTION O	15,759.86									
		Subtotal #1	15,759.86	90,000	17.5	4,941.46	31,500	15.7	10,818	58,500	18.5	
2.	F6004011 F5064011 H0321911 F54732152	MAINT INJECTION WELLS - ABP INJECT. WELLS-MAINTAIN(ALAMITO Alamitos Barrier Proj-Telemetry Maint. REPAIR WELL 33T - A.B.P.	259,625.45 28,571.82 68,280.60 60,059.88									
		Subtotal #2	416,537.75	250,000	166.6	130,604.28	87,500	149.3	285,933	162,500	176.0	
3.	F6004000	RECHARGE OPER U/S - ABP	22,749.23									
		Subtotal #3	22,749.23	50,000	45.5	7,132.56	17,500	40.8	15,616	32,500	48.1	
4.	H0321555	ANALYSIS & DIR OF EXTR OPER	132.78									
		Subtotal #4	132.78	0	N/A	0.00	0	0.0	133	-	-	
5.	F54747267 F54753023 F54753026 F54758883	REDEVELOP INJ WELL 33S EXT WELL 34V15P, - REDEVELOP PUMPING WELL 334H17P - A.B.P. REDEVELOP PUMPING WELL 34H18P - A.B.P. REDEVELOP PUMPING WELL 34S22P - A.B.P.	12,792.72 9,993.17 24,303.77 17,978.27									
		Subtotal #5	65,067.92	5,000	1,301.4	0.00	0	0.0	65,068	5,000	1301.4	
6.	F6000090	ELEC UTIL BILL FOR EXT	5,194.03									
		Subtotal #6	5,194.03	5,200	99.9	0.00	0	0.0	5,194	5,200	99.9	
7.	H0321569 H0321899* F6001904 F6001907 F6001920 F6004012 N2420007 F6004013F F6004014F HF01512000 F6001006	ALAMITOS BARRIER PROJECT RW Mitigation for Existing ABP Facilities CONDUCT QUARTERLY INSPECTION INSPECT CRANE PRES REDUCE - ABP CONDUCT QUARTERLY INSPECTION MAINT PRS - ABP MISC. SUPPLIES SEAWATER INTRUS. Locate and Mark Barrier Proj u/grnd line Locate & Mark Barrier Proj U/ Grnd. Lines DGBP/ABP Maint & Repair - ABP meters CRANE & HOIST MAINT.- Alamitos B.P.	193,128.45 1,478.22 404.51 1,376.14 195.18 48,355.45 840.16 2,575.30 39,917.37 171,756.61 232.06									
		Subtotal #7	460,259.46	200,000	230.1	144,313.10	70,000	206.2	315,946	130,000	243.0	
8.	F5064044	OBSERV. WELLS-CLEANOUT(ALAMITOS)	5,149.82									
		Subtotal #8	5,149.82	50,000	10.3	1,614.71	17,500	9.2	3,535	32,500	10.9	
9.	H0321552	COLLECTN OF GRNDWR DATA	166,613.83									
		Subtotal #9	166,613.83	100,000	166.6	52,241.31	35,000	149.3	114,373	65,000	176.0	
10.	PFM34107	Facility Maintenance Alamitos YG F107	66,494.38									
		Subtotal #10	66,494.38	40,000	166.2	375.00	375	100.0	66,119	39,625	166.9	
11.	H0321565 H0321554 F54730968 F54734681 F54747270 F54753019 F54753027 F54786984 F54790564 F54853784 F54853785 F54863241 F54870794 F54870796 F54870797 F54877770 F54878467 F54878473 F54894380 F54900973 F54900977 F54900996 F54900998 F6009118 F5064022 F4046508	NPDES MONITOR. & REPORT. WELL DEVELOPMENT REDEVELOP INJ. WELL 33Q, - A.B.P. REDEVELOP INJ. WELL 33N, - A.B.P. REDEVELOP INJ. WELL 33J, - A.B.P. REDEVELOP INJECTION WELL 33G, - A.B.P. REDEVELOP PUMPING WELL 34G22P 33E - A.B.P. REDEVELOP INJ. WELL 33W 33T, - A.B.P. REDEVELOP INJ. WELL 33W - A.B.P. REDEVELOP INJ. WELL, 35P - A.B.P. REDEVELOP INJ. WELL, 34Z - A.B.P. REDEVELOP INJ. WELL 35G, - A.B.P. REDEVELOP INJ. WELL, 34S A-ZONE - A.B.P. REDEVELOP INJ. WELL, 34S I-ZONE - A.B.P. REDEVELOP INJ. WELL, 34S BC-ZONE - A.B.P. REDEVELOP INJ. WELL, 34V - A.B.P. REDEVELOP INJ. WELL 34V, CB-ZONE - A.B.P. REDEVELOP INJ. WELL 34V, A-ZONE - A.B.P. REDEVELOP INJ. WELL, 34H, A-ZONE - A.B.P. REDEVELOP INJ. WELL, 34P I ZONE - A.B.P. REDEVELOP INJ. WELL, 34Q2 - A.B.P. REDEVELOP INJ. WELL, 34E I ZONE - A.B.P. REDEVELOP INJ. WELL, 34E BC ZONE - A.B.P. Disassemble/Reassemble of Wells ABP Redevelop injections wells - ABP Safety, fabricate hndrails (redevlpmt trle	41,798.21 118,938.20 315.85 13,810.28 15,820.80 15,131.44 15,319.57 22,646.82 36,843.48 11,385.54 12,077.25 16,590.60 13,222.46 12,134.89 7,043.54 9,639.98 8,721.85 5,782.57 13,883.43 14,220.43 2,739.53 10,413.98 10,709.20 882.65 40,351.42 57,846.53									
		Subtotal #11	528,260.41	450,000	117.4	165,634.62	157,500	105.2	362,626	292,500	124.0	
		Subtotal #12	54,811.72	70,000	78.3	17,186.07	24,500	70.1	37,626	45,500	82.7	
13.	H0321591 H0321590 EF02610112	PLANNING-ABP PLANNING (BARRIER) Additional Wells at Alamitos Barrier Projec	29,261.14 6,212.33 687,389.02									
		Subtotal #13	722,862.49	2,100,000	34.4	0.00	0	0.0	722,862	2,100,000	34.4	
14.	H0321556	RECLAIM WATER PROGRAM	10,446.20									
		Subtotal #14	10,446.20	8,000	130.6	3,275.38	2,800	117.0	7,171	5,200	137.9	
15.	HP13509001	Injection Well Condition Assessment	1,031.50									
		Subtotal #15	1,031.50	120,000	0.9	323.42	42,000	0.8	708	78,000	0.9	
16.	N/A	ABP Liability Insurance	0.00									
		Subtotal #16	0.00	0	0.0	0.00	0	0.0	-	-	0.0	
17. ³	H0321899** X5009642	RW Mitigation for Existing ABP Facilities Cathodic protection system Ph.2	6,233.14 191.01									
		Subtotal #16	6,424.15	0	0.0	1,396.55	0	0.0	5,028	-	0.0	
TOTAL			2,547,795.54	3,538,200	72.0	529,038.87	486,175	108.8	2,018,757	3,052,025	66.1	

¹ OCWD share represents 31% of the total costs in all Items except for 4, 5, 6, 10, and 13. The percentage is based on amount of overall barrier injection water provided to Orange County portion of the ABP during this fiscal year.

² Per Agreement No. 8458 between the LACPCD and the OCWD, all costs included in Items 4, 5, 6 and 13 are not reimbursable with respect to OCWD and the OCWD cost for Item 10 is fixed at \$375.00.

³ Per Agreement No. 8458 between the LACPCD and the OCWD, all costs included in Item 16 are reimbursable at the same ratio as ownership of the pipeline upstream of the T-vault (18/23 LACPCD, 5/23 OCWD).

* Charges for LADWP License Renewal to be split by water ratio

** Charges for obtaining easement from LADWP along the San Gabriel River. Cost split 5/23

\$ 2,547,795.54
\$ 529,038.87
\$ (243,088.00)
\$ 285,950.87

* AS OF FY09-10. SHOWING CAPITAL IMPROVEMENT PROJECTS AS THEIR OWN CATEGORY AND ALSO SPLITTING UP LABOR EXPENSES FROM CONTRACT EXPENSES FOR APPLICABLE PROJECTS (WHERE SEPARATE COST-SHARING AGREEMENTS ARE IN PLACE FOR CONTRACT AMOUNTS)

2013-14 Costs To Date (July-Aug 2013)
2014-15 OPERATION AND MAINTENANCE BUDGET

JMC No.	Fiscal Year	LACFCD		OCWD		WRD		TOTAL	
		Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual
1.		Analysis and direction of injection operation (\$)							
	2011-12	65,000	52,575	35,000	19,711			100,000	72,286
	2012-13	58,500	10,818	31,500	4,941			90,000	15,760
	2013-14	52,000	2,185	28,000	998			80,000	3,182
	2014-15	48,750		26,250				75,000	
2.		Maintenance and repair of injection wells (\$)							
	2011-12	117,000	284,218	63,000	106,558			180,000	390,775
	2012-13	162,500	285,933	87,500	130,604			250,000	416,538
	2013-14	195,000	41,301	105,000	18,865			300,000	60,166
	2014-15	260,000		140,000				400,000	
3.		Operations of Injection Well Facilities (\$)							
	2011-12	130,000	25,116	70,000	9,416			200,000	34,532
	2012-13	32,500	15,616	17,500	7,133			50,000	22,749
	2013-14	26,000	1,201	14,000	548			40,000	1,749
	2014-15	22,750		12,250				35,000	
4.		Analysis and direction of extraction operation (\$)							
	2011-12	0	0					0	0
	2012-13	0	133					0	133
	2013-14	0	238					0	238
	2014-15	0						0	
5.		Redevelopment, maintenance, and repair of extraction wells (\$)							
	2011-12	5,000	0					5,000	0
	2012-13	5,000	65,068					5,000	65,068
	2013-14	5,000	0		0			5,000	0
	2014-15	200,000						200,000	
6.		Operations of Extraction Wells (\$)							
	2011-12	5,200	6,219					5,200	6,219
	2012-13	5,200	5,194					5,200	5,194
	2013-14	5,200	1,560					5,200	1,560
	2014-15	5,200						5,200	
7.		Maintenance and repair of ABP (\$)							
	2011-12	227,500	231,004	122,500	86,607			350,000	317,612
	2012-13	130,000	315,946	70,000	144,313			200,000	460,259
	2013-14	162,500	29,525	87,500	13,486			250,000	43,011
	2014-15	195,000		105,000				300,000	
8.		Maintenance of Observation Wells (\$)							
	2011-12	65,000	138,409	35,000	51,892			100,000	190,300
	2012-13	32,500	3,535	17,500	1,615			50,000	5,150
	2013-14	97,500	23,004	52,500	10,507			150,000	33,511
	2014-15	32,500		17,500				50,000	
9.		Collection of groundwater data (\$)							
	2011-12	58,500	105,834	31,500	39,679			90,000	145,513
	2012-13	65,000	114,373	35,000	52,241			100,000	166,614
	2013-14	65,000	16,416	35,000	7,498			100,000	23,914
	2014-15	97,500		52,500				150,000	
10.		Yard Maintenance (\$)							
	2011-12	39,625	70,455	375	375			40,000	70,830
	2012-13	39,625	66,119	375	375			40,000	66,494
	2013-14	44,625	9,706	375	375			45,000	10,081
	2014-15	53,500		6,500				60,000	
11.		Injection Well Redevelopment (\$)							
	2011-12	260,000	517,953	140,000	194,189			400,000	712,143
	2012-13	292,500	362,626	157,500	165,635			450,000	528,260
	2013-14	325,000	119,467	175,000	54,568			500,000	174,035
	2014-15	325,000		175,000				500,000	
12.		Processing of data and preparation of reports (\$)							
	2011-12	39,000	59,464	21,000	22,294			60,000	81,758
	2012-13	45,500	37,626	24,500	17,186			70,000	54,812
	2013-14	45,500	4,024	24,500	1,838			70,000	5,862
	2014-15	45,500		24,500				70,000	
13.		Special Programs (\$)							
	2011-12	95,000	141,683	70,000		70,000		235,000	141,683
	2012-13	2,100,000	722,862		0			2,100,000	722,862
	2013-14	50,000	429,913	0	0	300,000		50,000	429,913
	2014-15	1,000,000		0				1,000,000	
14.		Oversight of Reclaim Water Program (\$)							
	2011-12	6,500	19,418	3,500	7,280			10,000	26,698
	2012-13	5,200	7,171	2,800	3,275			8,000	10,446
	2013-14	7,800	1,525	4,200	697			12,000	2,222
	2014-15	7,800		4,200				12,000	
15.		Projects and Studies (\$)							
	2011-12	39,000	134,297	21,000	50,350			60,000	184,647
	2012-13	78,000	708	42,000	323			120,000	1,032
	2013-14	46,800	0	25,200	0			72,000	0
	2014-15	45,500		24,500				70,000	
16.		ABP Liability Insurance (\$)							
	2011-12	0	0	0	0			0	0
	2012-13	0	0	0	0			0	0
	2013-14	0	0	0	0			0	0
	2014-15	37,500		37,500				75,000	
17.		Joint Pipeline ROW (\$)							
	2011-12	0	0	0	0			0	0
	2012-13	0	5,028	0	1,397			0	6,424
	2013-14	0	264,066	0	73,352			0	337,417
	2014-15	0		0				0	
18.		Total ABP Expenditure (\$)							
	2011-12	1,152,325	1,786,645	612,875	588,352	70,000		1,835,200	2,374,997
	2012-13	3,052,025	2,018,757	486,175	529,039			3,538,200	2,547,796
	2013-14	1,127,925	944,129	551,275	182,732	300,000		1,679,200	1,126,861
	2014-15	2,376,500		625,700				3,002,200	
		Total ABP Operations and Maintenance (\$) [Item 17-Item 13]							
TOTALS	2011-12	1,057,325	1,644,962	542,875	588,352	0	0	1,600,200	2,233,314
	2012-13	952,025	1,295,894	486,175	529,039			1,438,200	1,824,933
	2013-14	1,077,925	514,216	551,275	182,732	0		1,629,200	696,948
	2014-15	1,376,500		625,700				2,002,200	0
		Volume of Water (ac-ft)							
	2011-12			2,400	1,182	3,600	3,153	6,000	4,335
	2012-13			2,400	1,722	3,600	3,769	6,000	5,490
	2013-14			2,100	357	3,900	836	6,000	1,193
	2014-15			2,275		4,225		6,500	