JANUARY 2022

EAST BAY PLAIN SUBBASIN GROUNDWATER SUSTAINABILITY PLAN APPENDIX 4

PREPARED FOR

East Bay Municipal Utility District GSA and
City of Hayward GSA

PREPARED BY

Luhdorff & Scalmanini Consulting Engineers
Geosyntec
Brown and Caldwell
Environmental Science Associates
Dr. Jean Moran
Farallon Geographics

APPENDIX 4

APPENDIX 4.A.

EBMUD GSA Project Supporting Information

Appendix 4.A

EBMUD GSA Project Supporting Information

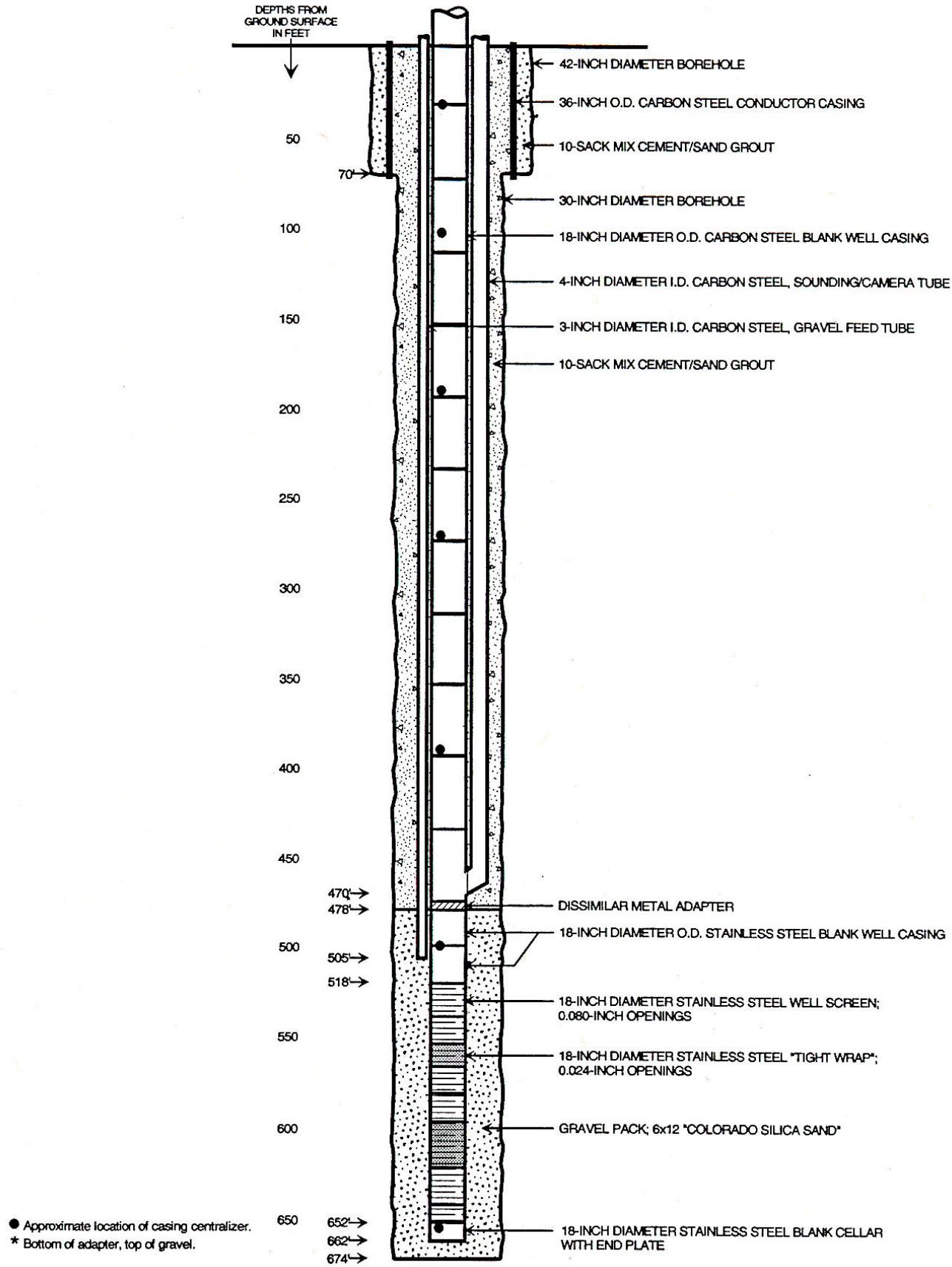
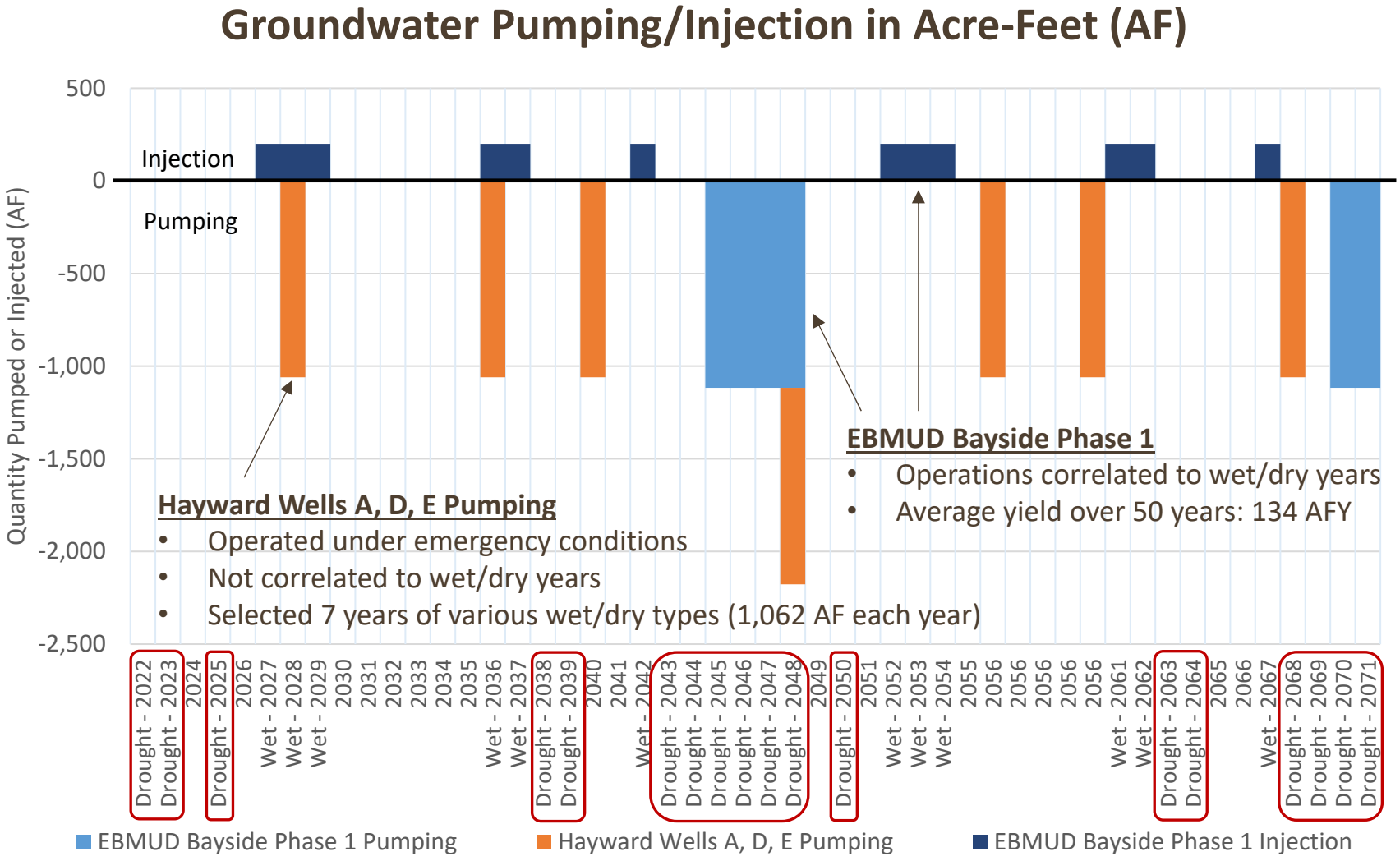


FIGURE 2-5
WELL DIAGRAM FOR BAYSIDE WELL NO. 1
EAST BAY MUNICIPAL UTILITY DISTRICT
BAYSIDE GROUNDWATER PROJECT
DRAFT EIR

Source: Fugro 1998

Future Scenario

Pumping and Injection of Future Projects



APPENDIX 4.B.

EBMUD GSA Management Actions Supporting Information

Table 4B-1. EBMUD Management Action Implementation Costs

Work Item	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	10-Year Total	Initial 5-Year Total
Annual Reporting	$48,750	$32,500	$32,500	$32,500	$32,500	$32,500	$32,500	$32,500	$32,500	$32,500	**$341,250**	**$178,750**
Data Management System	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	**$50,000**	**$25,000**
GSP 5-year Updates					$162,500					$162,500	**$325,000**	**$162,500**
RMS GW Level Monitoring	$14,500	$14,500	$14,500	$14,500	$14,500	$14,500	$14,500	$14,500	$14,500	$14,500	**$145,000**	**$72,500**
Monitoring Network (in addition to RMS Wells)	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	**$200,000**	**$100,000**
Baseline RMS WQ Sampling			$44,000	$44,000							**$88,000**	**$88,000**
RMS WQ Sampling (TDS, nitrate, arsenic, chloride)	$22,000	$22,000	$22,000	$22,000	$22,000	$22,000	$22,000	$22,000	$22,000	$22,000	**$220,000**	**$110,000**
Update WQ Plume Info		$6,500		$6,500		$6,500		$6,500		$6,500	**$32,500**	**$13,000**
Fate & Transport Modeling					$65,000					$65,000	**$130,000**	**$65,000**
Extensometer Monitoring	$15,500	$15,500	$15,500	$15,500	$15,500	$15,500	$15,500	$15,500	$15,500	$15,500	**$155,000**	**$77,500**
Shallow Wells Near Creeks (10)			$115,000								**$115,000**	**$115,000**
Shallow Well Level Monitoring			$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	**$56,000**	**$21,000**
Shallow Well WQ Monitoring			$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	**$80,000**	**$30,000**
Install New Nested Wells (3)			$400,000								**$400,000**	**$400,000**
New Nested Wells GW Level Monitoring			$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	**$56,000**	**$21,000**
New Nested Wells WQ Sampling			$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	**$80,000**	**$30,000**
Install Stream Gages (2)			$32,500	$32,500							**$65,000**	**$65,000**
Stream Gauge Monitoring			$17,500	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	**$262,500**	**$87,500**
Synoptic Stream Monitoring	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	**$150,000**	**$75,000**
Isotopic Sampling			$100,000								**$100,000**	**$100,000**
Baseline Habitat Survey (1 Event)			$150,000								**$150,000**	**$150,000**
Habitat Survey (Every 5 Years)					$50,000					$50,000	**$100,000**	**$50,000**
Total (including capital costs; every five year costs)	**$140,750**	**$131,000**	**$1,017,500**	**$276,500**	**$471,000**	**$200,000**	**$193,500**	**$200,000**	**$193,500**	**$477,500**	**$3,301,250**	**$2,036,750**
Total (ongoing annual costs only)	**$140,750**	**$131,000**	**$176,000**	**$200,000**	**$193,500**	**$200,000**	**$193,500**	**$200,000**	**$193,500**	**$200,000**	**$1,828,250**	**$841,250**

Costs above don't include EBMUD/Hayward Staff time to meet with stakeholders, provide Board updates, DMS capital costs/maintenance, etc.

Capital or one-time costs

Every five year costs

APPENDIX 4.C.

Hayward GSA Projects Supporting Information

Appendix 4.C

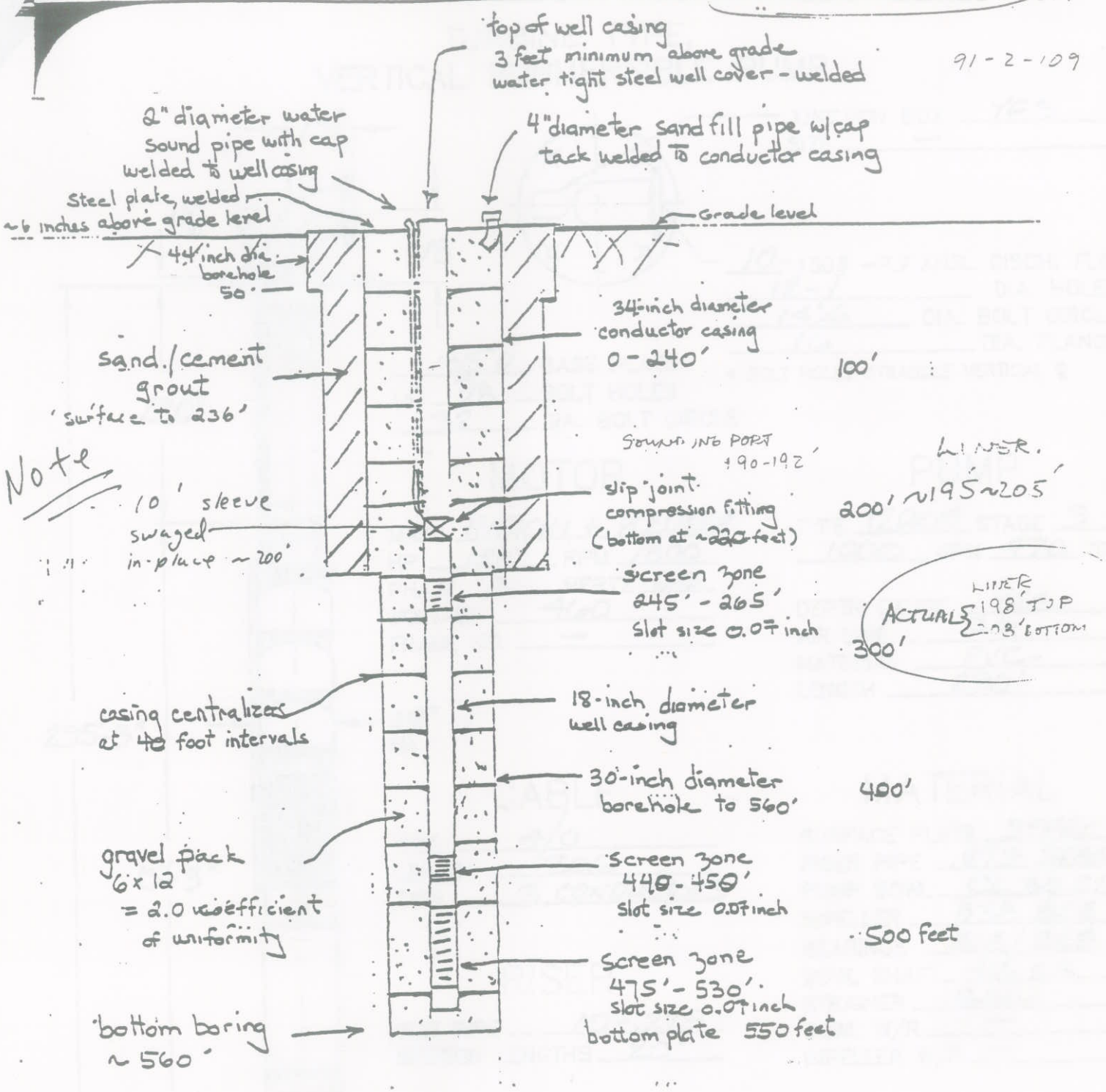
Hayward GSA Projects Supporting Information

AQUIFER SCIE ES, INC.

1/14/81 WELLA

Police Station Well

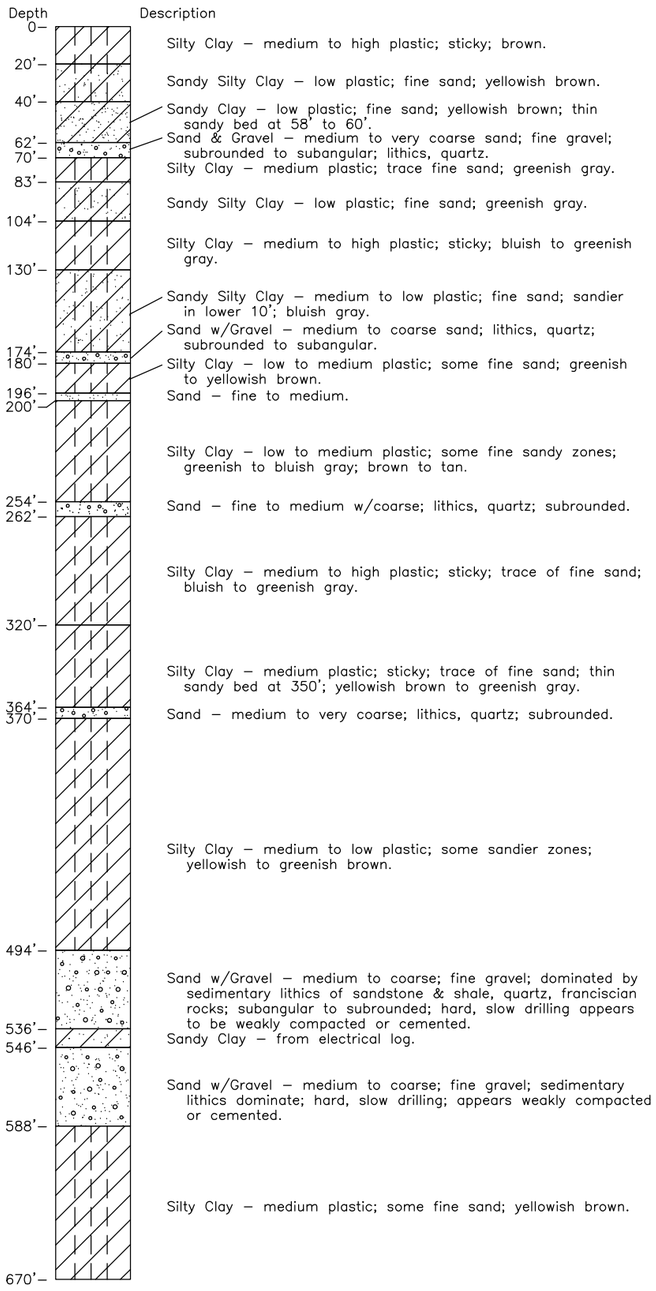
91-2-109



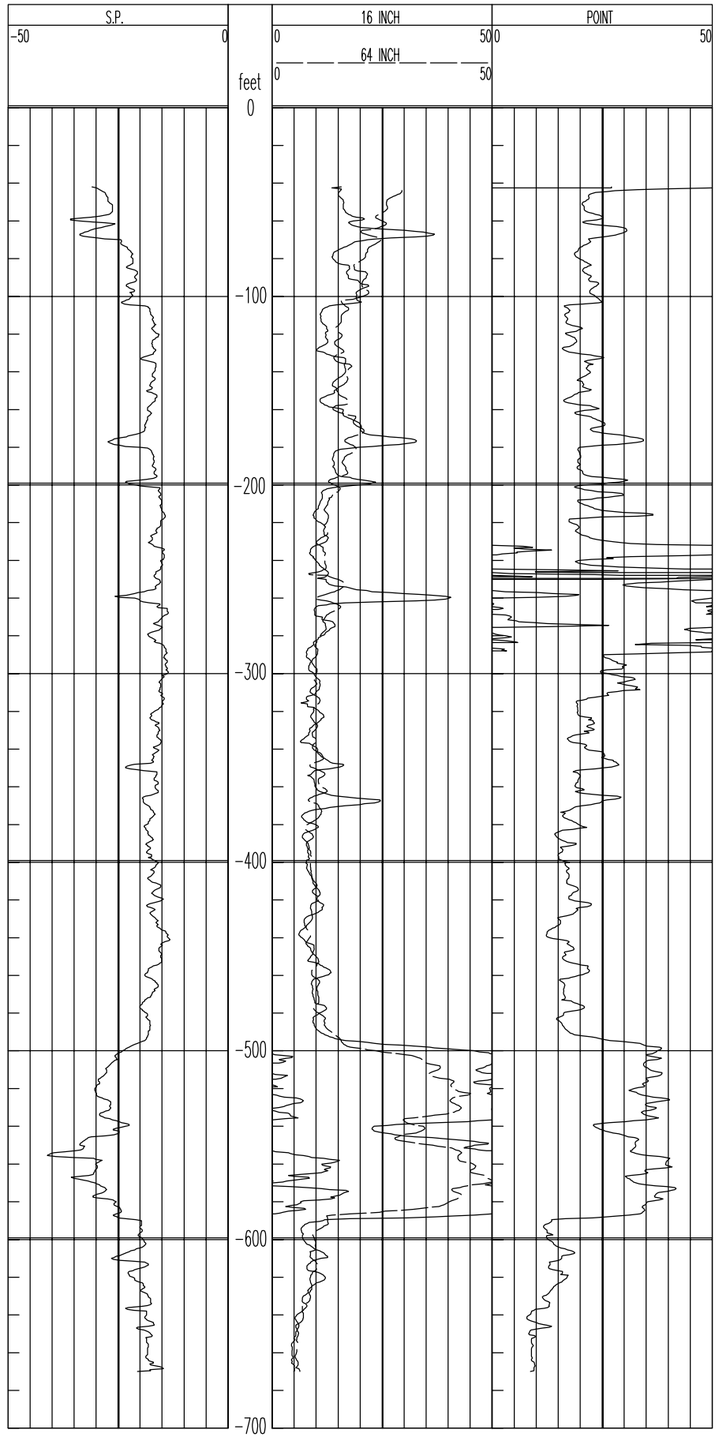
FINAL DESIGN OF
EMERGENCY SUPPLY WELL No. 1
7/14/81

Prepared by
Aquifer Sciences Inc./
ENTRIX Inc.
Rebecca Sterbentz
Grace Haggerty

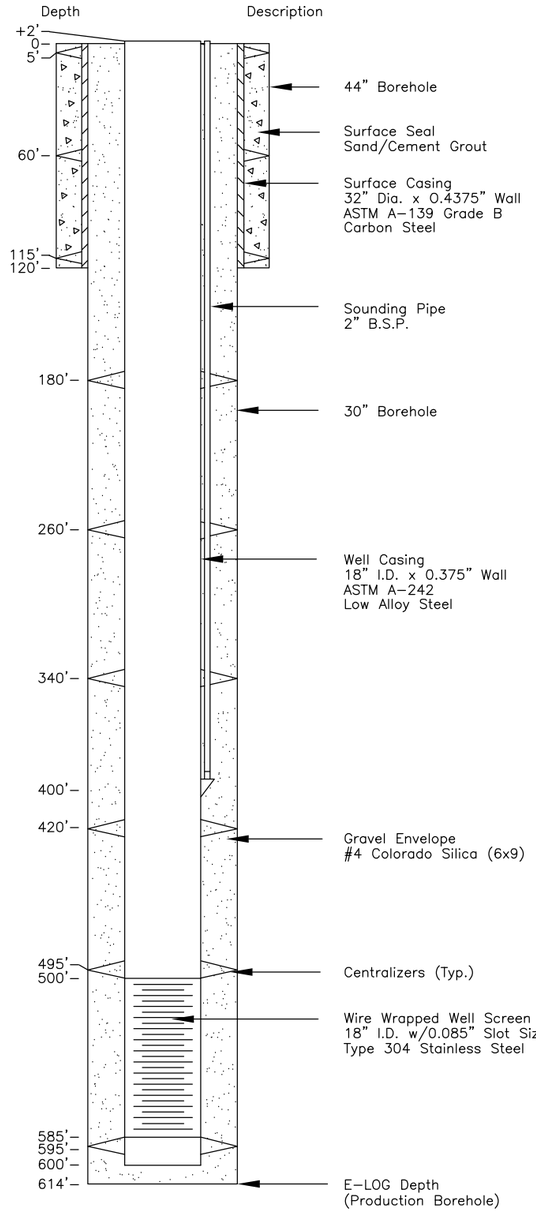
TEST HOLE LITHOLOGY



TEST HOLE GEOPHYSICAL SURVEY



WELL D-2 AS-BUILT



AS-BUILT

EMERGENCY WATER SUPPLY WELL D
PHASE I – DRILLING & CONSTRUCTION
HAYWARD AIRPORT SITE
WELL PROFILE
SCALE: 1" = 40'
TOTAL SHEETS: 5
FILE NO.: E-1300
SHEET NO. 3

CITY OF HAYWARD
DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION
DESIGNED BY: TDE/LCS
DRAWN BY: LDC
APPROVED BY:
CHECKED BY: LHE
APPROVAL REC'VD:
APPROVED:
CITY ENGINEER
DIR. PUBLIC WORKS
DATE: JUNE 1993
PROJ. NO.: 7103

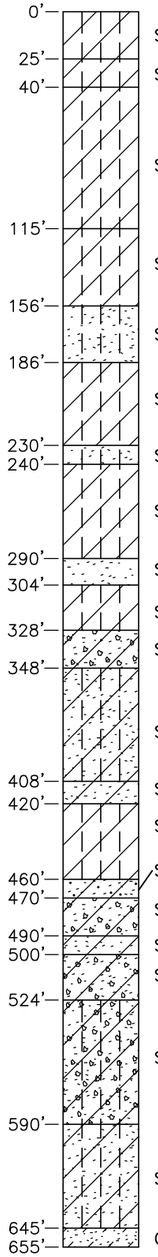
REV.	DATE	DESCRIPTION	BY

DESIGN ENGINEER'S STAMP

LUHDORFF & SCALMANINI
Consulting Engineers
Woodland, California 95695
92-2-085 TEHAYP3

CAD FILE: G:/Projects/City of Hayward/95-2-132/Tehayp3(ab).dwg CFG FILE: LSCE2500.PCP_MRG DATE: 03-17-10 1:44pm

Test Hole Lithology



0'–25': Silty Clay – some fine to medium sand, dark brown to gray.

25'–40': Silty Clay – medium plastic, some fine to coarse sand, olive gray.

40'–115': Silty Clay & Sandy Silty Clay – medium to low plastic, zones of fine to medium sand; stiff, olive gray to olive brown.

115'–156': Sandy Silty Clay – low plastic, fine sand; shell fragments; olive brown to yellow brown.

156'–186': Silty Sand – fine sand w/medium; subangular; lithics; some shell fragments; medium sand in center, yellowish brown.

186'–230': Silty Clay w/Sand – low to medium plastic, olive brown.

230'–240': Silty Sand – fine sand; some clay; olive brown.

240'–290': Silty Clay – low plastic, some fine sand; shell fragments (?); olive brown.

290'–304': Sand w/Silt – fine to medium/fine, some coarse; lithics; subangular to subrounded.

304'–328': Silty Clay – low to medium plastic; olive brown.

328'–348': Sandy Clay – low plastic, medium to coarse sand; lithics, subrounded, olive gray.

348'–408': Silty Clay w/Sand – medium to low plastic; medium to medium/coarse sand; olive gray.

408'–420': Sand & Clay – medium to coarse sand; lithics, subangular to subrounded.

420'–460': Silty Clay w/Sand – low plastic, fine to some coarse sand, olive gray.

460'–470': Silty Sand & Clay – low plastic, medium to coarse sand; lithics; olive brown.

470'–490': Sand w/Gravel & Clay – medium to coarse sand; some fine gravel, lithics; subangular to subrounded, yellowish brown.

490'–500': Sandy Clay – some sand, yellowish brown.

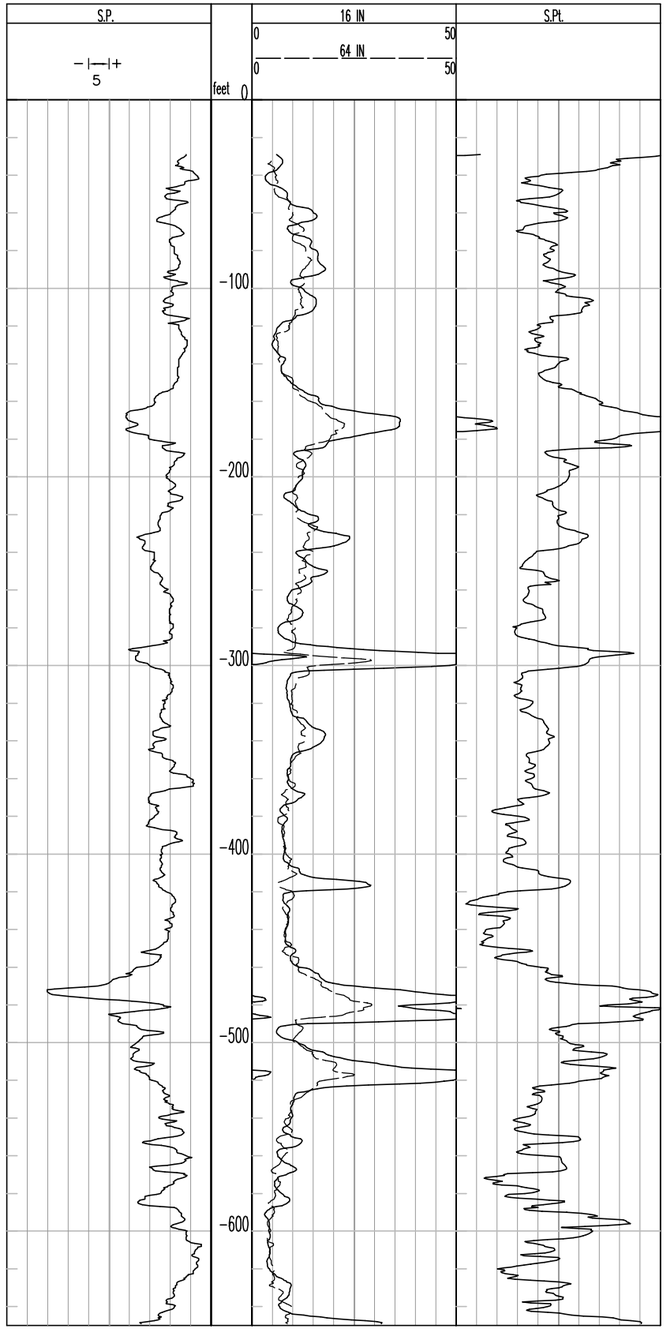
500'–524': Sand w/Gravel & Clay – medium to coarse sand; some lithics; subangular to subrounded; clayier in upper 10'; yellowish brown.

524'–590': Silty Clay w/Sand & Gravel – yellowish brown; thin zones of clayey sand & gravel.

590'–645': Sandy Silty Clay – fine to medium sand; lithics; yellowish brown.

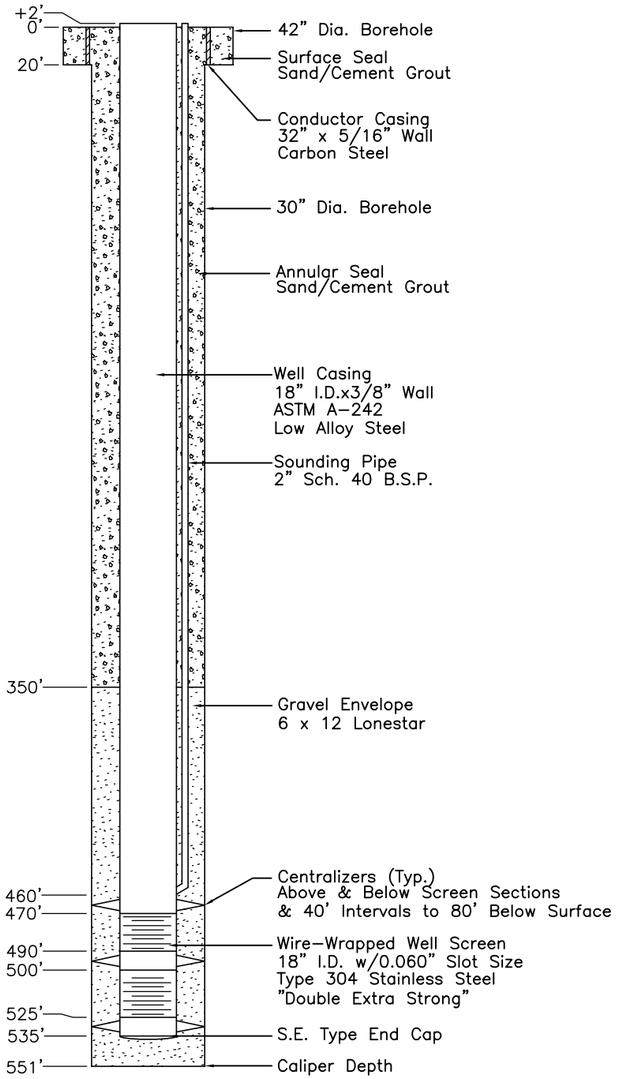
645'–655': Clayey Sand – fine to medium sand; lithics; hard; yellowish brown.

Test Hole Electrical Log



E–Log by WELENCO 4/8/98

Water Supply Well E



AS-BUILT

EMERGENCY WATER SUPPLY WELL E
28251 INDUSTRIAL BLVD.
WELL PROFILE

SHEET NO. 4
TOTAL SHEETS 6
FILE NO.: E-1498
SCALE: NONE
DATE: JAN. 1999
PROJ. NO.: 7110

CITY OF HAYWARD
DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION
DESIGNED BY: TDE/JCS
DRAWN BY: LDC
APPROVED BY:
CITY ENGINEER
CHECKED BY:
APPROVAL REC'VD.
APPROVED:
DIR. PUBLIC WORKS

BY	DESCRIPTION	DATE
GDW	1st Review by City	5/29/98
1		

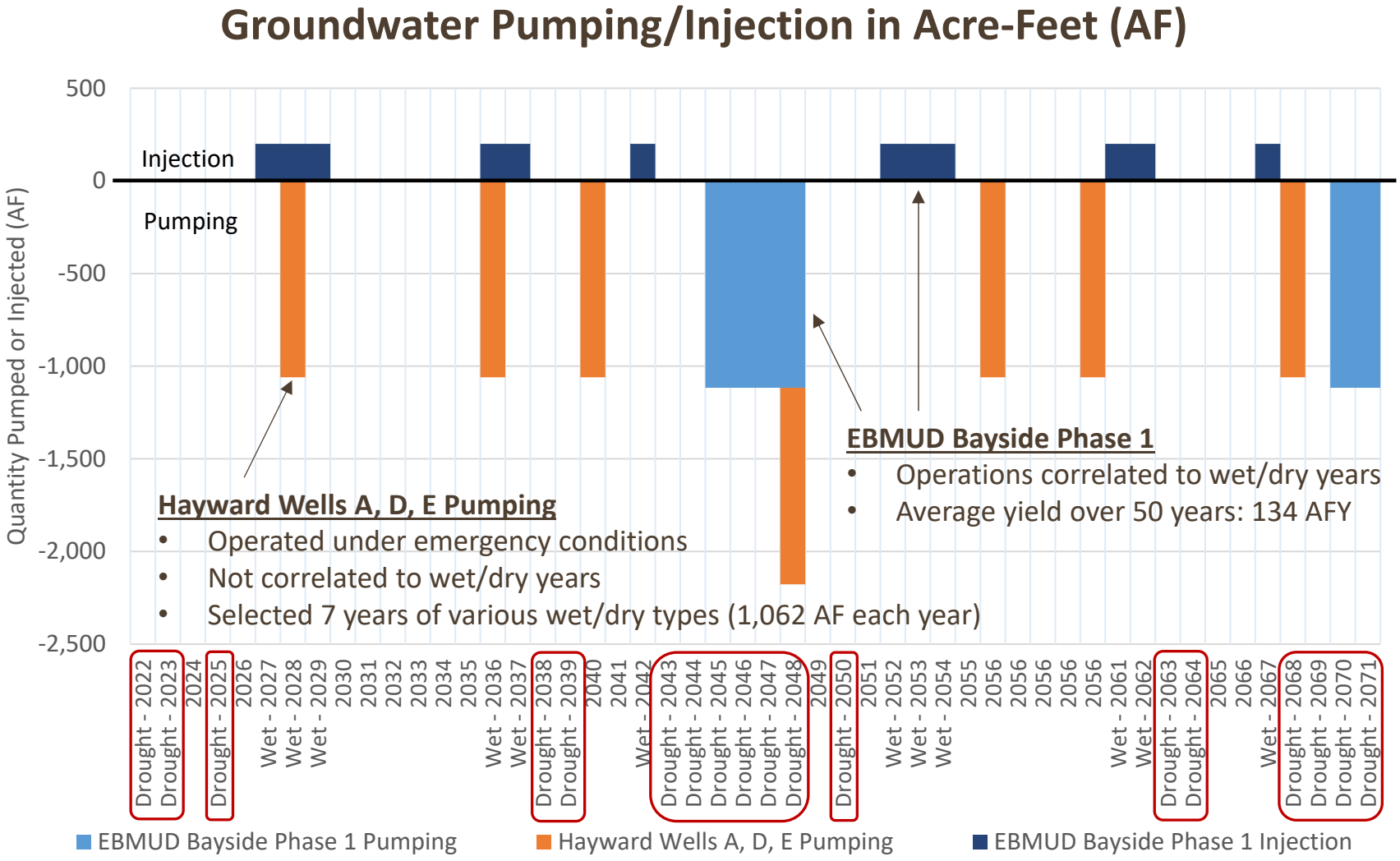
LUHDORFF & SCALMANINI
Consulting Engineers
Woodland, California 95695
98-2-011 HYW2.DWG

DESIGN ENGINEER'S STAMP

CAD FILE: G:/Projects/City of Hayward/98-2-011/Sh_4(ab).dwg CFG FILE: LSCE2500.PCP_MRG DATE: 03-17-10 1:49pm

Future Scenario

Pumping and Injection of Future Projects



APPENDIX 4.D.

Hayward GSA Management Actions Supporting Information

Table 4D-1. Hayward Management Action Implementation Costs

Work Item	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	10-Year Total	Initial 5-Year Total
Annual Reporting	$26,250	$17,500	$17,500	$17,500	$17,500	$17,500	$17,500	$17,500	$17,500	$17,500	**$183,750**	**$96,250**
Data Management System	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	**$50,000**	**$25,000**
GSP 5-year Updates					$87,500					$87,500	**$175,000**	**$87,500**
RMS GW Level Monitoring	$5,500	$5,500	$5,500	$5,500	$5,500	$5,500	$5,500	$5,500	$5,500	$5,500	**$55,000**	**$27,500**
Monitoring Network (in addition to RMS Wells)	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	**$50,000**	**$25,000**
Baseline RMS WQ Sampling			$16,000	$16,000							**$32,000**	**$32,000**
RMS WQ Sampling (TDS, nitrate, arsenic, chloride)	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	**$80,000**	**$40,000**
Update WQ Plume Info		$3,500		$3,500		$3,500		$3,500		$3,500	**$17,500**	**$7,000**
Fate & Transport Modeling					$35,000					$35,000	**$70,000**	**$35,000**
Extensometer Monitoring											**$0**	**$0**
Shallow Wells Near Creeks (10)											**$0**	**$0**
Shallow Well Level Monitoring											**$0**	**$0**
Shallow Well WQ Monitoring											**$0**	**$0**
Install New Nested Wells (3)											**$0**	**$0**
New Nested Wells GW Level Monitoring											**$0**	**$0**
New Nested Wells WQ Sampling											**$0**	**$0**
Install Stream Gages (2)											**$0**	**$0**
Stream Gauge Monitoring											**$0**	**$0**
Synoptic Stream Monitoring											**$0**	**$0**
Isotopic Sampling											**$0**	**$0**
Baseline Habitat Survey (1 Event)											**$0**	**$0**
Habitat Survey (Every 5 Years)											**$0**	**$0**
Total (including capital costs; every five year costs)	**$49,750**	**$44,500**	**$57,000**	**$60,500**	**$163,500**	**$44,500**	**$41,000**	**$44,500**	**$41,000**	**$167,000**	**$713,250**	**$375,250**
Total (ongoing annual costs only)	**$49,750**	**$44,500**	**$41,000**	**$44,500**	**$41,000**	**$44,500**	**$41,000**	**$44,500**	**$41,000**	**$44,500**	**$436,250**	**$220,750**

Costs above don't include EBMUD/Hayward Staff time to meet with stakeholders, provide Board updates, DMS capital costs/maintenance, etc.

Capital or one-time costs

Every five year costs