RO 262

aqua science engineers inc.

October 27, 2003

WORKPLAN
for
ADDITIONAL SOIL AND GROUNDWATER ASSESSMENT
at
Albany Hill Mini Mart
800 San Pablo Avenue
Albany, California

Submitted by:
AQUA SCIENCE ENGINEERS, INC.
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(925) 820-9391

1.0 INTRODUCTION

This submittal presents Aqua Science Engineers, Inc. (ASE)'s subsurface conduit study and workplan for additional soil and groundwater assessment at the Albany Hill Mini Mart located at 800 San Pablo Avenue in Albany, California (Figures 1 and 2). The proposed site assessment activities were initiated by Dr. Joginder Sikand, owner of the property, as requested by the Alameda County Health Care Services Agency (ACHCSA) in their letter dated May 13, 2003.

2.0 BACKGROUND INFORMATION

The subject site is currently a mini market and gasoline service station. It is ASE's understanding that the site has operated as a gasoline service station since 1930. Dr. Sikand, the present owner, purchased the property in 1973. At that time, three underground fuel storage tanks (USTs) operated at the site. These tanks consisted of two 500-gallon regular gasoline USTs and one 1,000-gallon super gasoline UST. In 1986, the site was remodeled and the three old USTs were removed and were replaced by four new USTs. These new USTs consisted of two 10,000-gallon gasoline USTs, one 6,000-gallon gasoline UST, and one 2,000-gallon diesel UST. The automotive repair operation also ceased at that time.

2.1 March 1997 Underground Storage Tank (UST) Removal

In March 1997, Superior Underground Tank Services removed five USTs. These USTs consisted of the four USTs installed in 1986 and one 750-gallon UST, which was previously unknown and was found during excavation activities at the site. Soil samples collected from the excavations following the UST removal contained up to 3,800 parts per million (ppm) total petroleum hydrocarbons as gasoline (TPH-G), 820 ppm total petroleum hydrocarbons as diesel (TPH-D), and detectable concentrations of benzene, toluene, ethylbenzene and total xylenes (collectively known as BTEX) and methyl tertiary butyl ether (MTBE). Groundwater samples collected from the excavations also contained elevated concentrations of TPH-G, TPH-D, BTEX and MTBE.

2.2 August 1999 Preliminary Soil and Groundwater Assessment

In August 1999, Advanced Assessment and Remediation Services (AARS) conducted a preliminary soil and groundwater assessment at the site. This assessment included the installation of monitoring wells MW-1, MW-2 and MW-3 at the site. Sediments encountered during drilling generally

consisted of clay from the ground surface to approximately 13-feet below ground surface (bgs), and sand or silty sand from 13-feet bgs to the total depth explored of 25-feet bgs. Groundwater was encountered at approximately 17-feet bgs and rose to approximately 10.5-feet bgs in the completed monitoring wells. Relatively low concentrations of hydrocarbons were detected in soil samples collected from MW-1, and no hydrocarbons were detected in soil samples collected from MW-2 and MW-3. Groundwater samples collected from the monitoring wells contained up to 1,500 parts per billion (ppb) TPH-G, 1,200 ppb TPH-D, 4.3 ppb benzene, 2.9 ppb toluene, 9.1 ppb ethylbenzene, and 28 ppb total xylenes. The highest concentrations were in monitoring well MW-1, with much lower or non-detectable concentrations in the other two wells. The groundwater flow direction during this assessment was calculated to be to the southeast.

2.3 June 2001 Soil and Groundwater Assessment

In June 2001, AARS conducted an additional soil and groundwater assessment at the site. This assessment included the drilling of four temporary soil borings (SB-1 through SB-4). Hydrocarbons were detected in soil samples collected from approximately 10-feet bgs in all four borings. The highest concentrations were in SB-1, which contained 2,300 ppm TPH-G, 550 ppm TPH-D, 5.3 ppm benzene, 78 ppm toluene, 45 ppm ethylbenzene, and 330 ppm total xylenes. Elevated petroleum hydrocarbon concentrations were detected in groundwater samples collected in all four borings. The highest concentrations were in SB-2 and SB-4, which contained up to 8,900 ppb TPH-G, 19,000 ppb TPH-D, 1,400 ppb benzene, 1,900 ppb toluene, 280 ppb ethylbenzene, 1,300 ppb total xylenes, and 4,500 ppb MTBE.

2.4 June 2002 Soil and Groundwater Assessment

In June 2002, AARS conducted an additional soil and groundwater assessment at the site. This assessment included the installation of six additional monitoring wells (MW-4 through MW-9) and one temporary soil boring (SB-6). Hydrocarbons were detected in soil samples collected from all of these borings, with the highest concentrations detected in the soil samples collected from 11-feet bgs in MW-4 and 15-feet bgs in MW-9. All of the hydrocarbon concentrations in soil were well below the concentrations detected in previous boring SB-2. The groundwater samples collected from these new monitoring wells contained up to 24,100 ppb TPH-G, 19,000 ppb TPH-D, 2,300 ppb benzene, 1,900 ppb

toluene, 1,050 ppb ethylbenzene, 5,410 ppb total xylenes, and 12,000 ppb MTBE.

2.5 June 2002 Area Well Survey

In June 2002, AARS also conducted an area well survey that identified wells within a 2,000-foot radius of the site. AARS listed seven wells in the site vicinity. However, all of the wells are over 2,000-feet from the site and none of the wells are domestic, municipal, irrigation or other water supply wells.

2.6 Quarterly Groundwater Monitoring

Between August 1999 and February 2003, groundwater samples were collected from the site monitoring wells on an approximate quarterly sampling schedule. The analytical results are tabulated in Table One.

3.0 CONDUIT AND POTENTIAL PREFERENTIAL PATHWAY STUDY

This study was conducted by reviewing Underground Service Alert (USA) markings in the site vicinity, reviewing documents such as as-built drawings supplied by the city and individual utility companies, and contacting individuals that would have knowledge of the individual utility lines. Figure 3 presents the location of all known utility lines in the site vicinity. A discussion of each type of line is presented below along with an evaluation as to whether each line could present a potential preferred pathway for the movement of groundwater contamination.

3.1 Water Lines

Water lines in the site vicinity belong to the East Bay Municipal Utility District (EBMUD). The lines were installed in the 1910s and 1930s, and the as built drawings show no depth or backfill information. However, Nancy Garcia, Senior Pipeline Designer for EBMUD, indicated that the lines in the site vicinity are typically 36-inches deep with little or no pitch. Since the shallowest groundwater has been measured at the site since the project began was 8.21-feet bgs, the water lines will not present a preferential pathway for the movement of groundwater in the site vicinity.

3.2 Natural Gas Lines

Natural gas lines in the site vicinity belong to Pacific Gas and Electric (PG&E). The gas main in Washington Avenue is at a depth of 32-inches

bgs. The service at the site connects to the main on Washington Avenue at 32-inches bgs. The service lateral for the site was trenched and backfilled by the customer so no information on depth or backfill material is available. The service laterals are generally 18 to 24-inches bgs on average.

The gas main in San Pablo Avenue is at a depth of 30-inches bgs where the service lateral for the south adjacent property (806 San Pablo Avenue) connects. OK

Since the shallowest groundwater has been measured at the site since the project began was 8.21-feet bgs, the gas lines will not present a preferential pathway for the movement of groundwater in the site vicinity.

3.3 Electric Lines

Electric lines in the site vicinity belong to PG&E. The electric lines in the site vicinity are typically 30-inches bgs with no pitch. No information is available on the backfill material used. Since the shallowest groundwater has been measured at the site since the project began was 8.21-feet bgs, the electric lines will not present a preferential pathway for the movement of groundwater in the site vicinity. OK

3.4 Telephone Lines

The telephone line in San Pablo Avenue belongs to SBC. The line is 30-inches bgs and is not pitched. No information is available on the backfill used. Since the shallowest groundwater has been measured at the site since the project began was 8.21-feet bgs, the telephone lines will not present a preferential pathway for the movement of groundwater in the site vicinity. OK

3.5 Caltrans Communication Conduit

Caltrans owns a communication conduit in the San Pablo Avenue sidewalk adjacent to the site. ASE spoke to Kwan Lau, chief of Electric Design for Caltrans, who told ASE that the line is 18-inches below sidewalk areas and 12-inches below shoulder areas with no pitch. No information on backfill material is available. Based on the depth to groundwater in the site vicinity, this conduit will not present a preferential pathway for the movement of groundwater in the site vicinity. OK

3.6 Cable Television Lines

The cable television lines in the site vicinity belong to Comcast. These lines are overhead, and therefore not a potential preferential pathway for the movement of groundwater in the site vicinity. 6K

3.7 Sewer Lines

Both the City of Albany and the City of Berkeley have lines in the site vicinity. Available drawings for these lines are presented in Appendix A.

The City of Albany's sewer lines were built in the 1930s. Although the City of Albany generally installs sewers to a depth of 6-feet bgs, Angil Silva, sewer inspector for the City of Albany, stated that the lines are approximately 4-feet deep in the site vicinity. The pitch of the lines are shown on Figure 3. The backfill material is unknown.

The City of Berkeley have 18-inch sewer mains in both San Pablo Avenue and Washington Avenue. This line is approximately 6 to 8-feet deep below San Pablo Avenue and grades to the north. There is no information available regarding the backfill material for this conduit.

Since the shallowest groundwater has been measured at the site since the project began was 8.21-feet bgs, this line lies above, but close to the groundwater potentiometric surface. It is possible that during periods of high groundwater conditions, this conduit may present a preferred pathway for the movement of groundwater. However, based on the boring logs for the wells drilled at the site, it actually appears that water is encountered at deeper depths and the water rises within the monitoring wells due to artesian conditions. If this is actually the case, then this sewer line will not present a potential preferred pathway for the movement of groundwater. Because of this uncertainty, ASE will (a) make an extra effort during the drilling of future borings and monitoring wells to identify sand stringers or other features that may indicate groundwater shallower than the identified sand/silty sand water-bearing zone encountered at approximately 13-feet bgs, (b) analyze data (both existing and future) with a possible sewer conduit in mine, and (c) will make special note if the water levels in the wells rise to a depth shallower than 8-feet bgs. ASE will not, however, recommend that additional borings be placed immediately adjacent to this line at this time until further data is collected since (a) it does not appear to be necessary at this time due to hydrogeologic conditions (lithology and current depth to groundwater), (b) drilling next to deeper lines presents a great risk to damaging these

lines, and (c) the drilling would need to take place in traffic areas of San Pablo Avenue, a busy state highway, where it would be difficult to get permission to conduct this drilling.

4.0 CONCEPTUAL SITE MODEL

The site has had a release of both gasoline and diesel fuel, although the age and extent of the release are unknown. Since the site has been in operation since the 1930, it is likely that there have been multiple releases in the 73 years of site operation. Given the presence of diesel fuel and MTBE at the site, it is likely that at least part of the release occurred at the site after the UST upgrade in 1986, although it is not known whether the release is related to USTs, piping or dispensers. The MTBE could also be related to a vapor release.

The lithology beneath the site consists generally of low permeability clay from beneath the asphalt/concrete surface to approximately 13-feet bgs, and sand from 14-feet to approximately 25-feet bgs, which is the total depth explored. Groundwater generally occurs at a depth of approximately 13-feet bgs and rises in monitoring wells to depths of 9 to 11-feet bgs. The shallowest groundwater depth in monitoring wells to date is 8.21-feet bgs. ASE believes that groundwater in the shallow water-bearing zone is under artesian conditions based on the lithology (lower permeability clays overlying higher permeability sand and silty sand) as well as the rise of water levels in monitoring wells and borings. It is not known whether sand stringers may be present in the low permeability clay. This possibility will be investigated in future drilling activities. The thickness of the sand/silty sand water-bearing zone is not known at this time.

Since the bottom of the USTs either extend into groundwater or are very close to groundwater, ASE will work under the assumption that the release is primarily a liquid release, although a vapor release (particularly for MTBE) may be possible.

The extent of contamination is not yet defined either laterally or vertically in any direction. In addition, there is conflicting information on the groundwater flow direction at the site. The groundwater flow direction should be confirmed during the upcoming assessment and the extent of groundwater contamination should be defined regardless of calculated groundwater flow direction.

Although the hydrocarbon and oxygenate concentrations in groundwater are relatively high, no water supply wells are located within 2,000-feet of the site. Since local water supplies are provided by EBMUD, and since EBMUD does not use local groundwater for its water supplies, it is unlikely that groundwater will be used for drinking water in the foreseeable future. It is also unknown whether the groundwater should be considered a potential source of drinking water based on dissolved solids content.

The primary risk related to groundwater contamination at the site appears to be vapor intrusion from soil and groundwater to indoor air. A Tier I Risk-Assessment should take place in the upcoming soil and groundwater assessment to evaluate this risk.

5.0 OUTLINE OF PROPOSED SCOPE OF WORK (SOW)

The purpose of this assessment is to further define the extent of soil and groundwater contamination at the site and to assess the risk associated with the presence of soil and groundwater contamination beneath the site. The scope of work for this project is to:

1) Obtain a drilling permit from the Alameda County Public Works Agency.

2) Obtain encroachment permits from Caltrans and the City of Albany to drill in San Pablo Avenue and Washington Avenue.

3) Obtain access agreements from the property owners at 1020 Washington Avenue and 806 San Pablo Avenue to drill soil borings on their property.

4) Contract with a subsurface utility locating service to clear drilling locations of underground utility lines.

5) Drill at least 10 soil borings in on and off-site locations. Soil borings will be drilled using dual-wall samplers to a depth of 50-feet bgs collecting soil samples continuously and collecting groundwater samples from adjacent borings using a Hydropunch sampler. Based on the results from these initial soil borings, additional borings will be drilled to depths appropriate for the project using whatever method is needed to complete the assessment. These methods could include any combination of direct-push methods such as Geoprobe sampling, Cone Penetrometer Testing (CPT), etc. Soil samples will be

collected continuously from these additional borings and groundwater samples will be collected from appropriate intervals.

6) Following collection of the soil and groundwater samples, backfill the borings described in task 5 with neat cement placed by tremie pipe.

7) Analyze soil and groundwater samples collected from each boring described in task 5 at a CAL-DHS certified analytical laboratory for TPH-D by EPA Method 8015 and TPH-G, BTEX, fuel oxygenates and lead scavengers by EPA Method 8260B.

8) Prepare an interim report presenting the results from the initial soil borings and propose the location and construction of groundwater montoring wells.

9) Drill additional soil borings and install groundwater monitoring wells at appropriate intervals. The location and construction of these additional wells will be provided in the interim report and approved by the ACHCSA prior to construction.

10) Develop each new monitoring well using surge block agitation and pump and/or bailer evacuation.

11) Collect groundwater samples from all site monitoring wells.

12) Analyze the groundwater samples at a CAL-DHS certified analytical laboratory for TPH-D by EPA Method 8015 and TPH-G, BTEX, fuel oxygenates and lead scavengers by EPA Method 8260B. Selective samples will also be analyzed for total dissolved solids (TDS).

13) Survey the top of casing elevation of each new well relative to the mean sea level (msl), and determine the groundwater flow direction and gradient beneath the site.

14) Prepare a report presenting results from this assessment. This report will present tabulated analytical results, geologic cross-sections, potentiometric surface maps, an updated conceptual site model, a corrective action plan, a Tier I Risk-Assessment, and recommendations for appropriate feasibility tests, as necessary.

6.0 DETAILS OF PROPOSED SOW

Details of the assessment are presented below.

TASK 1 - *OBTAIN A DRILLING PERMIT FROM THE ALAMEDA COUNTY PUBLIC WORKS AGANCY*

Prior to drilling, ASE will obtain a drilling permit from the Alameda County Public Works Agency.

TASK 2 - *OBTAIN ENCROACHMENT PERMITS TO DRILL IN THE CITY STREETS*

Prior to drilling, ASE will obtain encroachment permits from both Caltrans and the City of Albany to drill in San Pablo Avenue. ASE will also obtain an encroachment permit from the City of Albany to drill in the Washington Avenue right-of-way.

TASK 3 - *OBTAIN ACCESS AGREEMENT FROM NEIGHBORING PROPERTY OWNERS TO ALLOW FOR DRILLING ON THEIR PROPERTY*

Prior to drilling, ASE will obtain access agreements from the property owners at 1020 Washington Avenue and 806 San Pablo Avenue to allow for drilling on their property.

TASK 4 - CONTRACT WITH AN UNDERGROUND UTILITY LINE LOCATING SERVICE TO ACCURATELY LOCATE UNDERGROUND UTILITY LINES IN STREET AREAS

ASE will contact Underground Service Alert (USA) at least 48 hours prior to drilling. ASE will also contract with a private underground utility locating service to pinpoint the location of utility lines in the drilling locations.

TASK 5 - *DRILL 10 SOIL BORINGS ON AND OFF-SITE AND COLLECT SOIL AND GROUNDWATER SAMPLES FROM THE BORINGS FOR ANALYSIS*

ASE will drill 10 soil borings in both on and off-site locations (Figure 4) and will collect soil and groundwater samples to define the extent of groundwater contamination both horizontally and vertically at the site. The borings will be drilled using a Geoprobe or similar type drill rig. A qualified ASE geologist will direct the drilling.

Soil borings will be drilled using dual-wall samplers to a depth of 50-feet bgs collecting soil samples continuously. The dual-walled sampler allows

the boring to advance with an external conductor casing to minimize potential cross-contamination into deeper water-bearing zones. Undisturbed soil samples will be collected continuously for subsurface hydrogeologic description and possible chemical analysis. The internal drive sampler is lined with acetate tubes and the internal sampler will be removed and then replaced after each sampling run.

The geologist will describe the soil according to the Unified Soil Classification System. Samples to be retained for analysis will be immediately removed from the sampler, trimmed, sealed with Teflon tape and plastic caps, secured with duct tape, labeled with the site location, sample designation, date and time the sample was collected, and the initials of the person collecting the sample. The samples will be placed into an ice chest containing wet ice for delivery under chain of custody to a CAL-DHS certified analytical laboratory. Samples will be retained for analysis at least every 5-feet, in areas of obvious soil contamination and at each lithologic contact.

Soil from the remaining tubes not sealed for analysis will be removed for hydrogeologic description and will be screened for volatile compounds with a photoionization detector (PID). The soil will be screened by emptying soil from one of the tubes into a plastic bag. The bag will be sealed and placed in the sun for approximately 10 minutes. After the hydrocarbons have been allowed to volatilize, the PID will measure the vapor through a small hole, punched in the bag. These PID readings will be used as a screening tool only since these procedures are not as rigorous as those used in an analytical laboratory.

Once the lithology is known, ASE will collect groundwater samples from a second boring drilled immediately adjacent to the first boring. Groundwater samples will be collected from targeted zones using a Hydropunch sampler. Target sampling locations will include at least one location from each identified water-bearing zone. If water-bearing zones are greater than 5-feet in thickness, then multiple samples will be collected from the zones at vertical intervals of 5-feet.

In each boring, the Hydropunch will be driven into the target sampling zone. The Hydropunch sampler will be checked to verify that there has been no leakage of groundwater into the rods prior to opening. Once the rods are shown to be dry, the Hydropunch screen will be opened and groundwater will be allowed to enter the rods. Groundwater samples will then be collected from within the rods using a bailer. Groundwater samples will then be decanted from the bailer into 40-ml volatile organic

analysis (VOA) vials, preserved with hydrochloric acid and sealed without headspace. The samples will then be labeled with the site location, sample designation, date and time the samples were collected, and the initials of the person collecting the samples. The samples will then be sealed in plastic bags and cooled in an ice chest with wet ice for transport to a state-certified analytical laboratory under chain-of-custody.

All sampling equipment will be cleaned in buckets with brushes and a TSP or Alconox solution, then rinsed twice with tap water. Rinsates will be contained on-site in 55-gallon steel drums and stored on-site until off-site disposal can be arranged.

If the extent of groundwater contamination is not defined (either laterally or vertically) based on these samples, then additional borings will be drilled to complete these definitions. If deeper drilling is required to complete the vertical definition, then ASE will likely utilize Cone Penetrometer Testing (CPT) for the deeper boring.

TASK 6 - BACKFILL THE BORINGS WITH NEAT CEMENT

Following collection of the soil and groundwater samples, the boreholes described in Task 5 will be backfilled with neat cement placed by tremie pipe.

TASK 7 - ANALYZE SOIL AND GROUNDWATER SAMPLES COLLECTED FROM THE BORINGS

Each soil and groundwater sample will be analyzed at a CAL-DHS certified environmental laboratory for TPH-D by modified EPA Method 3510/8015M, and TPH-G, BTEX, oxygenates and lead scavengers by EPA Method 8260B.

TASK 8 - PREPARE AN INTERIM ASSESSMENT REPORT

ASE will prepare an interim report presenting the findings of this assessment to date. This report will include tabulated analytical results for the borings and boring logs. It will also propose the location and construction of additional borings and groundwater monitoring wells. This report will be submitted under the seal of a California registered civil engineer or geologist.

TASK 9 - INSTALL GROUNDWATER MONITORING WELLS

ASE will install additional groundwater monitoring wells based on our recommendations in the interim report once approved by the ACHCSA. ASE's recommendation for well construction will be provided in the interim report. The wells will be constructed with 2-inch diameter, flush-threaded, schedule 40, 0.020-inch factory slotted PVC well screen and blank casing in 8-inch diameter borings. The well casing in each well will be lowered through the augers and #3 Monterey sand will be placed in the annular space between the well casing and the borehole to approximately 1-foot above the screened interval. Approximately 0.5-foot of bentonite pellets will be placed on top of the sand pack, and the bentonite will be hydrated with deionized water if placed above the water table. This bentonite layer will prevent the cement sanitary seal from infiltrating into the sand pack. Cement mixed with 3 to 5 percent bentonite powder by volume will be used to fill the annular space between the bentonite layer and the surface to prevent surface water or groundwater from higher water-bearing zones from infiltrating into the well. The well heads will be protected by locking well plugs and at-grade, traffic-rated well boxes.

As requested by the ACHCSA, ASE will screen only very short intervals (3-feet maximum). The exact well construction recommendations will be included in the interim report.

TASK 10 - DEVELOP THE MONITORING WELLS

The new monitoring wells will be developed after waiting at least 72 hours after well construction. The wells will be developed using at least two episodes of surge block agitation and bailer and/or pump evacuation. At least ten well casing volumes of water will be removed during the development, and development will continue until the water appears to be reasonably clear. The well development purge water will be stored temporarily on-site in sealed and labeled 55-gallon steel drums until off-site disposal can be arranged.

TASK 11 - SAMPLE THE MONITORING WELLS

After waiting 72 hours after the well development of the new wells, ASE will collect groundwater samples from all site monitoring wells. Prior to purging and sampling, the groundwater surface in each well will be checked for sheen or free-floating hydrocarbons. The thickness of any free-floating hydrocarbons will be measured with an oil/water interface probe and an acrylic bailer lowered slowly to the groundwater surface and

filled approximately half full for direct observation. ASE will also measure the depth to groundwater in all site wells prior to purging water from any well. Prior to sampling, each well will be purged of at least four well casing volumes of groundwater. The temperature, pH and electrical conductivity of evacuated water will be monitored during the well purging, and purging will continue beyond four well casing volumes if these parameters have not stabilized. Groundwater samples will be collected from each well using disposable polyethylene bailers. Groundwater samples will be decanted from the bailers into 40-ml glass volatile organic analysis (VOA) vials, preserved with hydrochloric acid, and sealed without headspace. The samples will then be labeled with the site location, sample designation, date and time the samples were collected, and the initials of the person collecting the samples. In the event that free-floating product is present in a well, then a sample will be collected of the product for analysis. The samples will be placed into an ice chest with ice for transport to the analytical laboratory under chain of custody. Purged groundwater will be stored temporarily on-site in sealed and labeled 55-gallon steel drums until off-site disposal can be arranged.

TASK 12 - ANALYZE THE GROUNDWATER SAMPLES

The groundwater samples will be analyzed by a CAL-DHS certified analytical laboratory for TPH-D by modified EPA Method 3510/8015M, and TPH-G, BTEX, oxygenates and lead scavengers by EPA Method 8260B. Selective samples will also be analyzed for total dissolved solids (TDS).

TASK 13 - SURVEY THE TOP OF CASING ELEVATION OF EACH WELL

ASE will contract with a California licensed surveyor to survey the top of casing elevation of each well and boring relative to mean sea level (msl). These elevations will be used with the depth to groundwater measurements to determine the groundwater flow direction and gradient beneath the site. The longitude and latitude of each well location will also be surveyed to Geotracker standards.

TASK 14 - PREPARE A SUBSURFACE ASSESSMENT REPORT

ASE will prepare a subsurface assessment report outlining the methods and findings of this assessment. This report will include a summary of the results, the site background and history, description of the well construction, development and sampling, tabulated soil and groundwater analytical results, geologic cross-sections, potentiometric surface maps, an updated conceptual site model, a corrective action plan, a Tier I Risk-

Assessment, conclusions and recommendations for appropriate additional assessment and feasibility tests for remediation, as necessary. Formal boring logs, analytical reports, and chain of custody documents will be included as appendices. This report will be submitted under the seal of a California registered civil engineer or geologist.

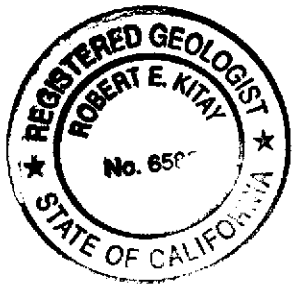
5.0 SCHEDULE

ASE will proceed with this project immediately upon approval of this workplan by the ACHCSA and approval of the costs from the UST Cleanup Fund.

Should you have any questions or comments, please call us at (925) 820-9391.

Respectfully submitted,

AQUA SCIENCE ENGINEERS, INC.

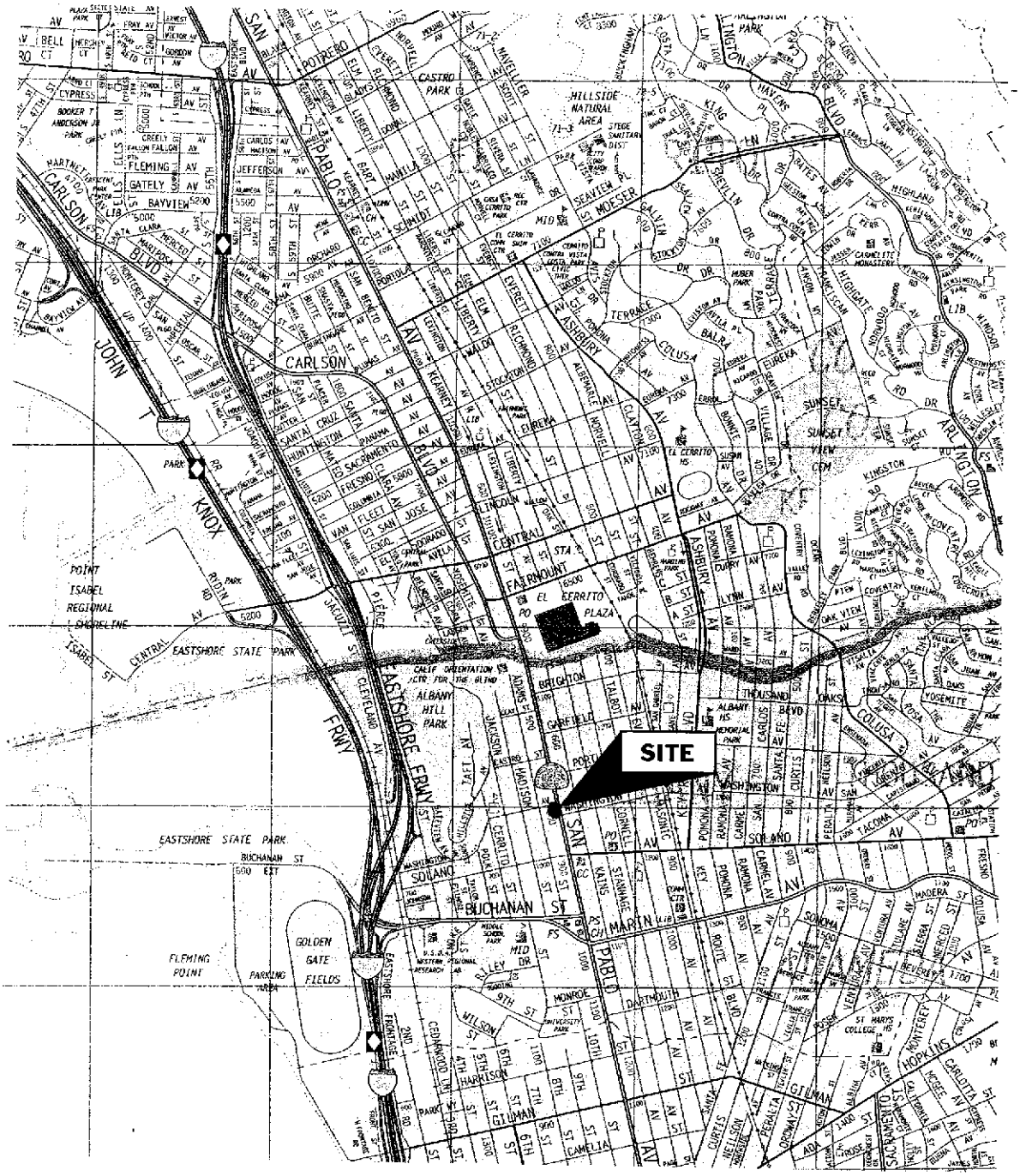


Robert E. Kitay, R.G., R.E.A.
Senior Geologist

cc: Dr. Joginder Sikand, 1300 Ptarmingan Drive #1, Walnut Creek, CA 94595

Mr. Scott Seery, Alameda County Health Care Services Agency, 1131 Harbor Bay Parkway, Suite 250, Alameda, CA 94502

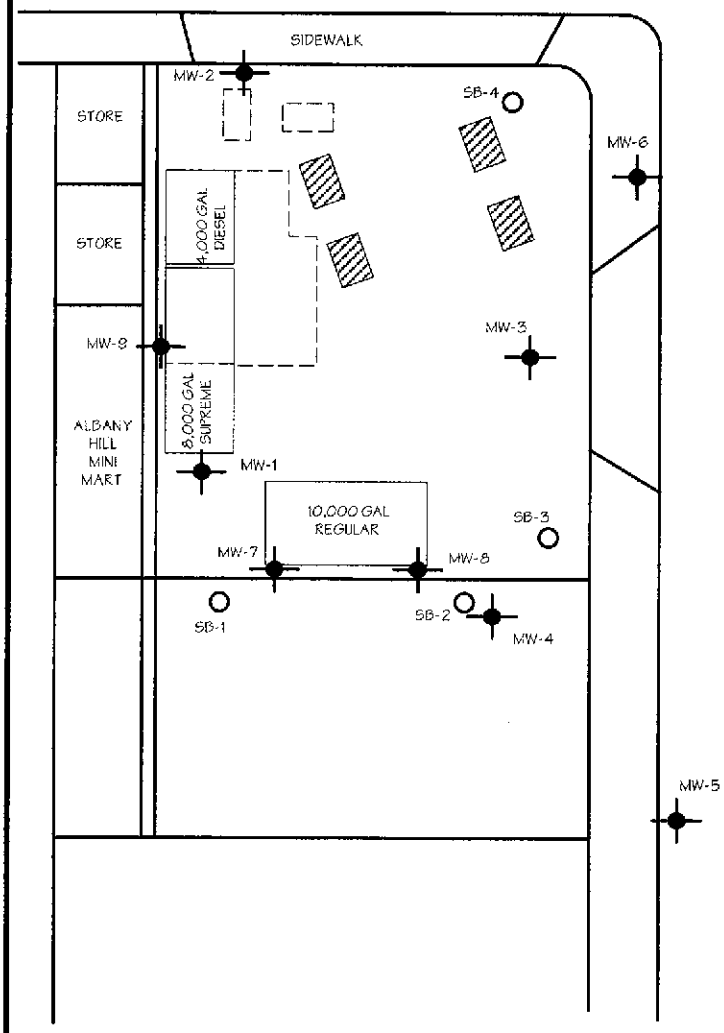
Ms. Betty Graham, California Regional Water Quality Control Board, San Francisco Bay Region, 1515 Clay Street, Suite 1400, Oakland, CA 94612



SITE LOCATION MAP

ALBANY HILL MINI MART
800 SAN PABLO AVENUE
ALBANY, CALIFORNIA

AQUA SCIENCE ENGINEERS | Figure 1



LEGEND

MW-2 — MONITORING WELL

SB-2 — SOIL BORING

LIMITS OF EXCAVATION

NORTH

SCALE: 1" = 20'

SITE PLAN

ALBANY HILL MINI MART
800 SAN PABLO AVENUE
ALBANY, CALIFORNIA

AQUA SCIENCE ENGINEERS | Figure 2

12" Sanitary Sewer-Abandoned
4" EBMUD Water
4" PG&E Electric
3" PG&E Gas
18" Albany Sanitary Sewer
Cal Trans Signal Electric
Cal Trans Signal Electric

SAN PABLO AVENUE - (WIDTH NOT TO SCALE)

4" SBC Telephone
18" Berkeley Sanitary Sewer
3" PG&E Electric
8" EBMUD Waters
Cal Trans Comm
3" PG&E Gas
6" Albany Sanitary Sewer

poles
8" EBMUD Water
18" Berkeley Sanitary Sewer
WASHINGTON AVENUE
4" EBMUD Water
3" PG&E Gas
FUEL DISPENSERS
ALBANY HILLS MINI MART
800 SAN PABLO AVENUE

NORTH

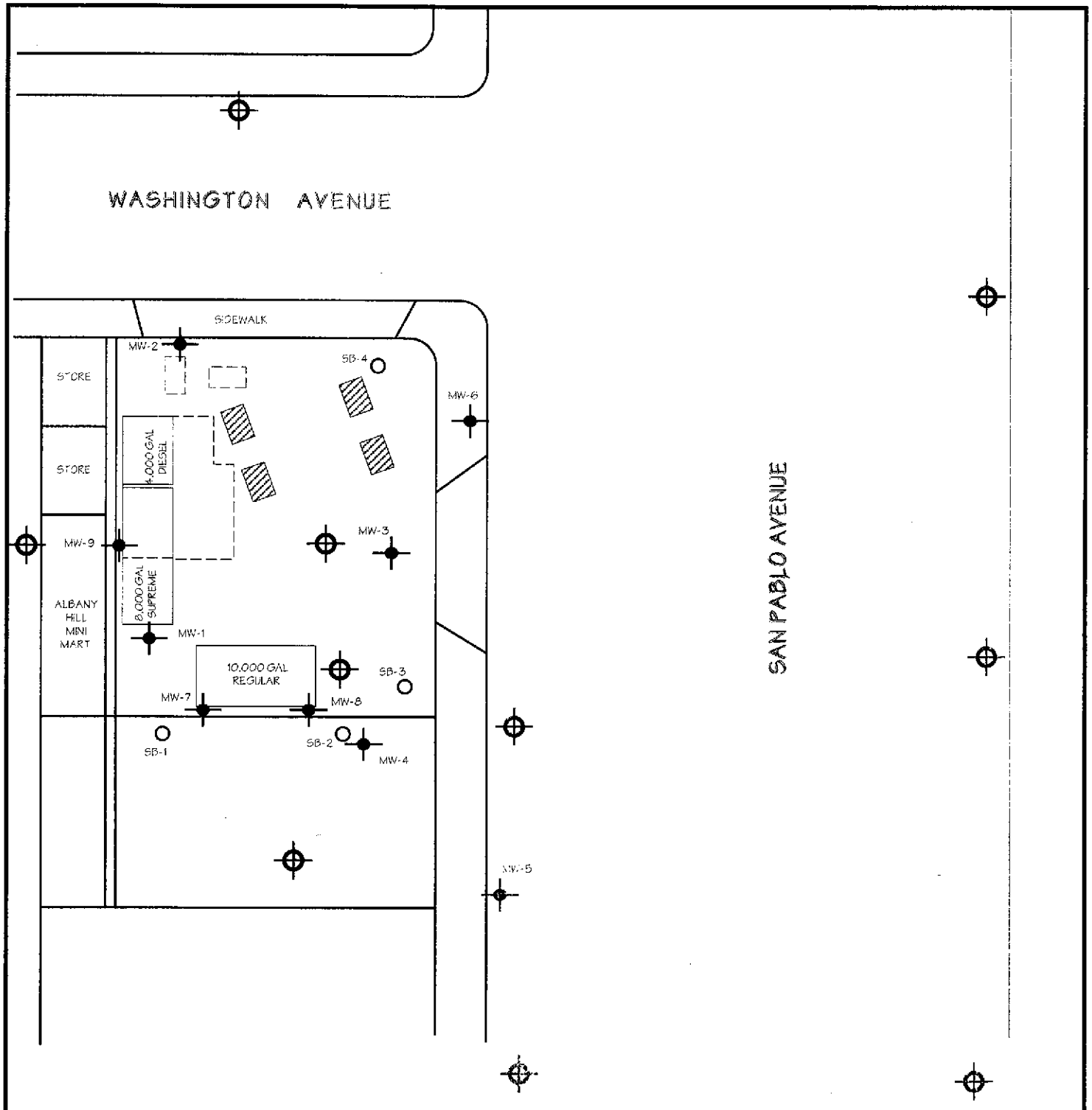
1" = 10'

NOTES:

SCALE AND LINE LOCATIONS ARE APPROXIMATE.

FIGURE BASED ON FIELD OBSERVATION, FILE REVIEW, AND PERSONAL INTERVIEWS.

UNDERGROUND UTILITY CONDUIT MAP	
Albany Hill Mini Mart 800 San Pablo Avenue Albany, California	
Aqua Science Engineers	Figure 3



LEGEND

MW-2 — MONITORING WELL

SB-2 — SOIL BORING

PROPOSED SOIL BORING

NORTH

SCALE: 1" = 20'

PROPOSED BORING LOCATION MAP

ALBANY HILL MINI MART
800 SAN PABLO AVENUE
ALBANY, CALIFORNIA

AQUA SCIENCE ENGINEERS | Figure 4

TABLE ONE

Summary of Chemical Analysis of GROUNDWATER Samples
Albany Hill Mini Mart, 800 San Pablo Ave
Albany, California
All results in parts per billion (ppb)

Well/Boring	DATE SAMPLED	TPH Gasoline	TPH Diesel	Benzene	Toluene	Ethyl Benzene	Total Xylenes	MTBE
MW-1	8/6/99	1,500	1,200	4.3	2.9	9.1	28	ND
	11/5/99	1,800	1,400	5.1	3.2	8.9	33	ND
	2/7/00	1,100	890	3.3	1.9	5.6	21	ND
	5/7/00	970	650	2.9	1.7	4.9	18	ND
	8/3/00	1,200	270*	190	43	41	160	360
	11/8/00	4,200	230*	990	200	130	560	840**
	2/8/01	2,800	380*	630	130	51	250	390
	6/7/01	650	190	97	13	20	62	320
	9/7/01	970	400	260	17	44	140	460
	12/13/01	291	< 50	91.7	1.4	17.4	7.2	499
	6/13/02	5,120	2,160*	1,860	22	316	318	325
	11/11/02	824	< 50	216	< 5	22	20	290
	2/14/03	1,783	590*	546	5	90	52	321
MW-2	8/6/99	ND	340	ND	ND	ND	ND	ND
	11/5/99	ND	420	ND	ND	ND	0.7	ND
	2/7/00	ND	310	ND	ND	ND	0.6	ND
	5/7/00	ND	280	ND	ND	ND	< 1	ND
	8/3/00	460	70*	79	3	43	8	3,300
	11/8/00	200	120	57	2	13	8	3,000
	2/8/01	290	80	50	1	0.6	4	3,100
	6/7/01	210	80	18	0.6	3	5	2,000
	9/7/01	230	ND	51	ND	8	8	2,400
	12/13/01	172	ND	53	1.2	7.7	8.4	1,780
	6/13/02	86	< 50	6	6.7	1.1	4.5	1,830
	11/11/02	1,040	< 50	5	1	< 1	5	1,250
	2/14/03	82	< 50	8	< 1	1	< 3	1,520
MW-3	8/6/99	ND	ND	ND	ND	ND	ND	ND
	11/5/99	92	54	ND	ND	0.6	1.7	ND
	2/7/00	120	71	ND	0.6	0.8	2.2	ND
	5/7/00	100	68	ND	ND	0.7	1.9	68
	8/3/00	910	300*	220	9	35	16	11,000**
	11/8/00	990	200	320	0.8	18	9	8,000
	2/8/01	990	110	180	21	7	24	5,200**
	6/7/01	370	140	62	4	8	13	6,600**
	9/7/01	460	ND	87	1	11	25	9,400**
	12/13/01	251	ND	66.8	0.9	2.6	8.4	6,610
	6/13/02	3,630	< 50	41	60	41	187	8,820**
	11/11/02	6,210	< 50	150	< 1	5	< 3	7,770
	2/14/03	176	< 50	31	< 1	2	< 3	5,040
MW-4	6/13/02	4,460	1,500*	425	409	115	730	32
	11/11/02	5,150	2,380*	2,010	74	399	252	< 20
	2/14/03	6,360	2,410*	1,560	82	274	573	< 1
MW-5	6/13/02	536	< 50	6.4	0.6	22	23	11
	11/11/02	3,270	1,230*	< 1	< 1	28	8	< 1
	2/14/03	1,260	610*	9	7	22	5	< 1

TABLE ONE

Summary of Chemical Analysis of GROUNDWATER Samples
Albany Hill Mini Mart, 800 San Pablo Ave
Albany, California
All results in parts per billion (ppb)

Well/Boring	DATE SAMPLED	TPH Gasoline	TPH Diesel	Benzene	Toluene	Ethyl Benzene	Total Xylenes	MTBE
MW-6	6/13/02	2,980	1,460*	31	2.3	3.8	12	310
	11/11/02	3,570	1,210*	336	5	< 5	< 15	95
	2/14/03	3,770	1,620*	429	12	7.0	10	122
MW-7	6/13/02	24,100	1,570*	2,310	657	945	5,430	951
	11/11/02	4,760	2,160*	1,820	21	316	1,141	702
	2/14/03	4,320	2,380*	1,020	7	223	293	1,410
MW-8	6/13/02	20,000	7,760*	2,200	1,140	1,050	4,090	12,000
	11/11/02	5,010	2,010*	187	< 1	15	< 3	16,600
	2/14/03	1,980	< 50	607	6	113	40	11,500
MW-9	6/27/02	19,000	< 50	1,430	1,750	501	5,410	< 0.5
	11/11/02	19,000	13,200*	3,390	4,540	1,020	9,050	549
	2/14/03	21,300	8,200*	1,700	2,200	701	4,970	< 1
SB-1	6/7/01	1,400	250*	120	160	48	240	33
SB-2	6/7/01	8,900	770*	1,100	1,900	280	1,300	26
SB-3	6/7/01	2,400	430*	280	31	110	340	3,600
SB-4	6/7/01	8,800	19000*	1,400	190	86	230	4,500**
SB-6	6/6/02	4,270	1340*	332	226	127	511	5,300**

Notes:

Table based on table compiled by AARS - ASE has not checked results against original laboratory reports.

Samples analyzed by EPA Method 8020

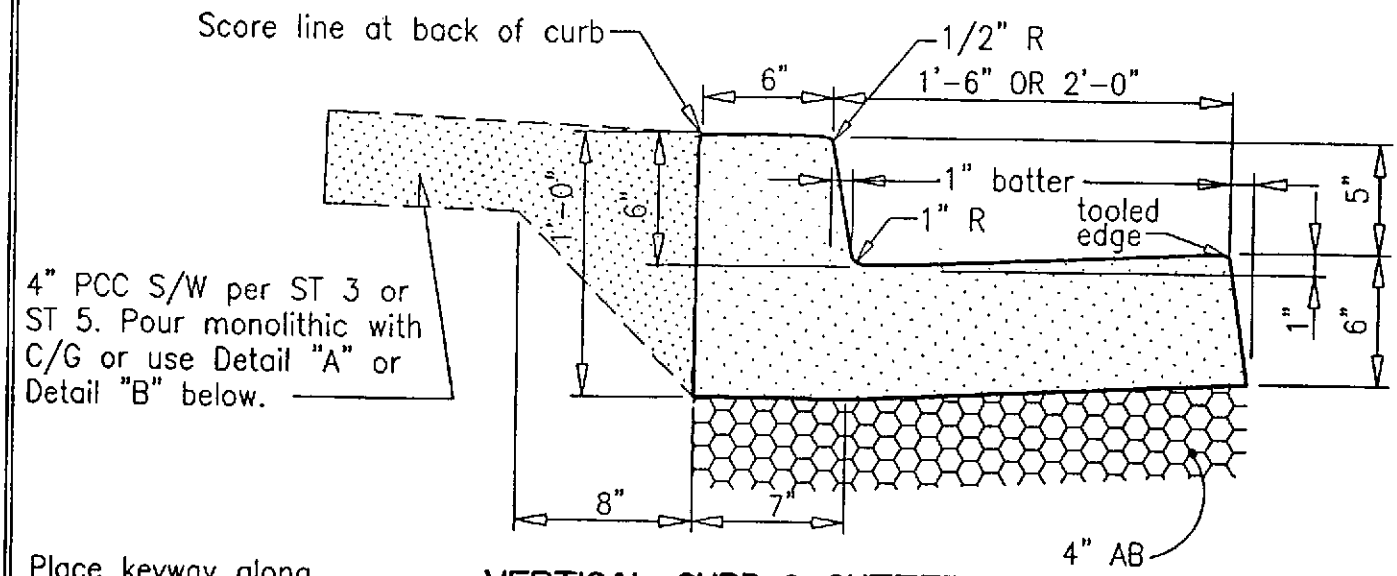
Non-detectable concentrations are noted by the less than symbol (<) followed by the detection limit or ND if detection limits are not listed.

* Does not match diesel pattern

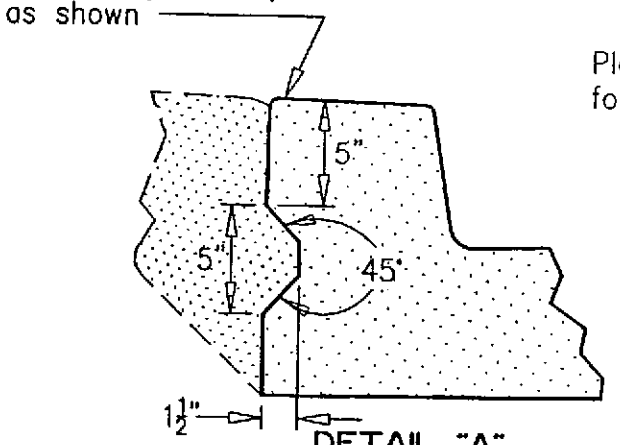
** Confirmed by GC/MS method 8260

APPENDIX A

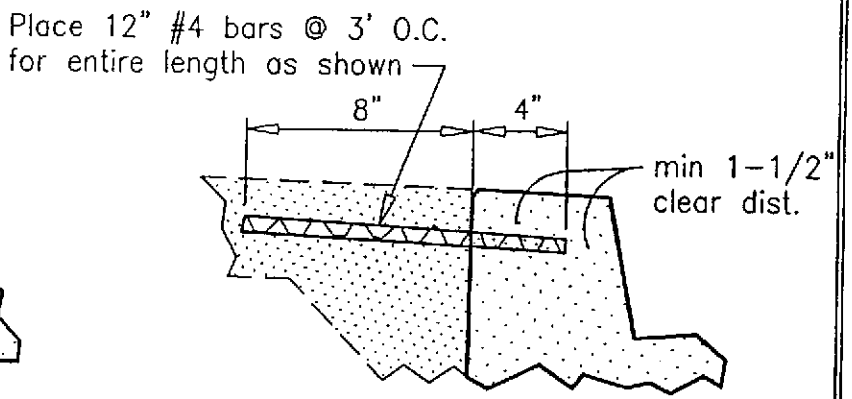
Sewer Line Maps



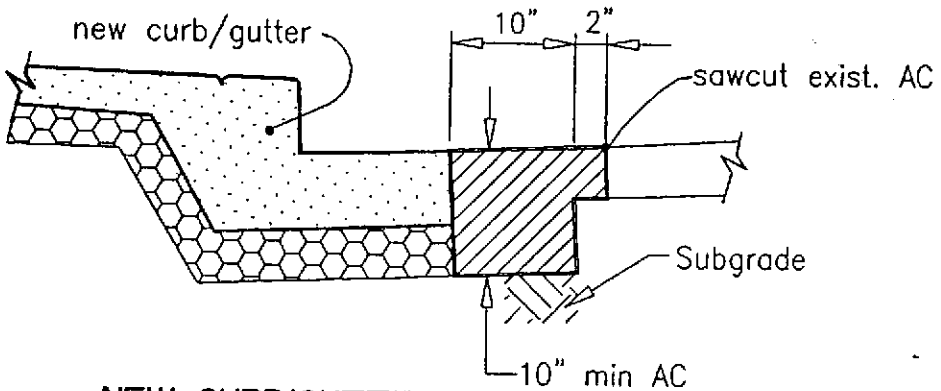
VERTICAL CURB & GUTTER



DETAIL "A" (KEYWAY)



DETAIL "B" (DOWELS)



NEW CURB/GUTTER AT EXISTING STREET

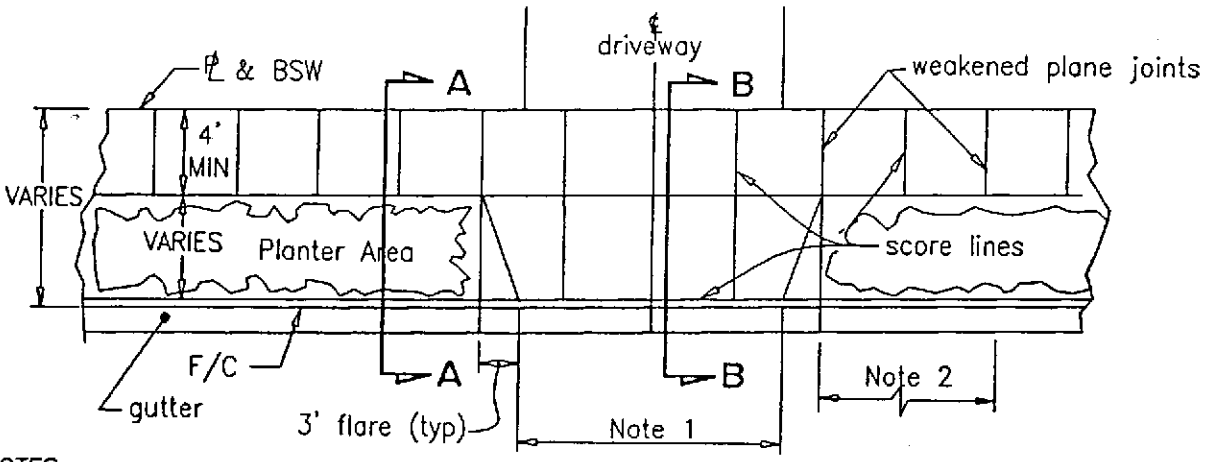
SEE ST 7 FOR MATERIALS / CONSTRUCTION REQUIREMENTS
SEE ST 4 FOR JOINT CONSTRUCTION REQUIREMENTS

CITY OF ALBANY
ALAMEDA COUNTY, CALIFORNIA

VERTICAL CURB AND GUTTER

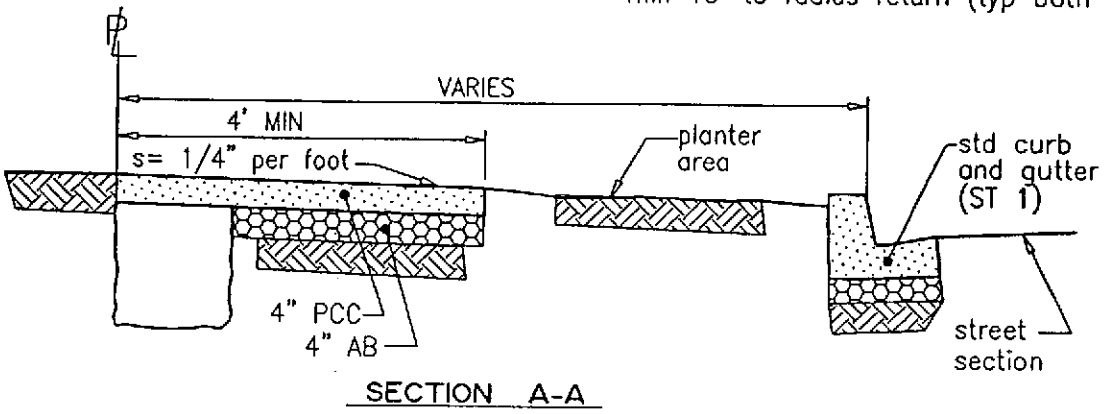
Approved: Date: 7-21-00
City Engineer RCE 29392 (Exp. 3-31-03)

ST 1

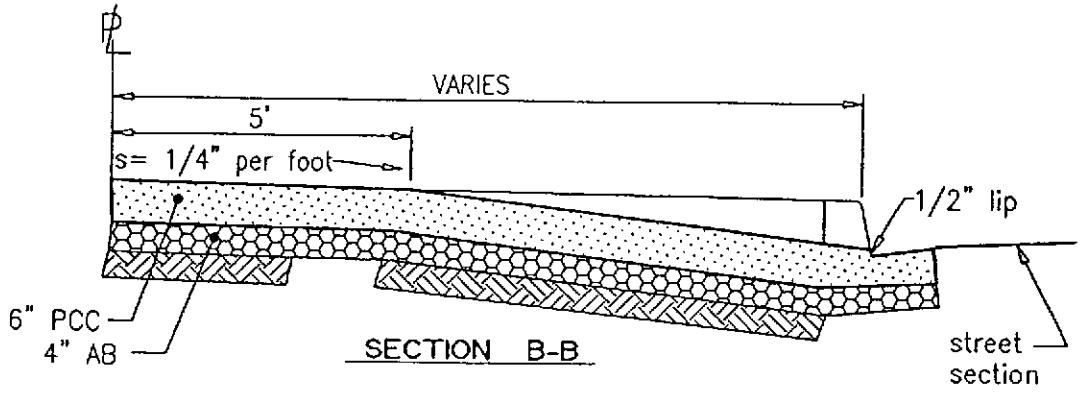


NOTES:

1. Driveway entrance to be 6" wider than driveway (symetric about centerline)
2. 3' min. dist. from edge of driveway to ℄ street light, fire hydrant, or other D/W; min 10' to radius return (typ both sides)



SECTION A-A



SECTION B-B

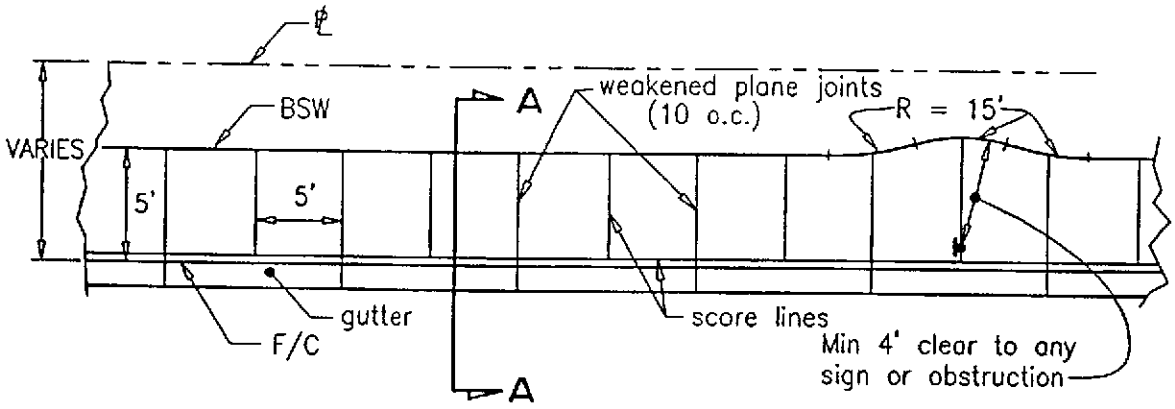
SEE ST 7 FOR MATERIALS / CONSTRUCTION REQUIREMENTS
SEE ST 4 FOR JOINT CONSTRUCTION REQUIREMENTS

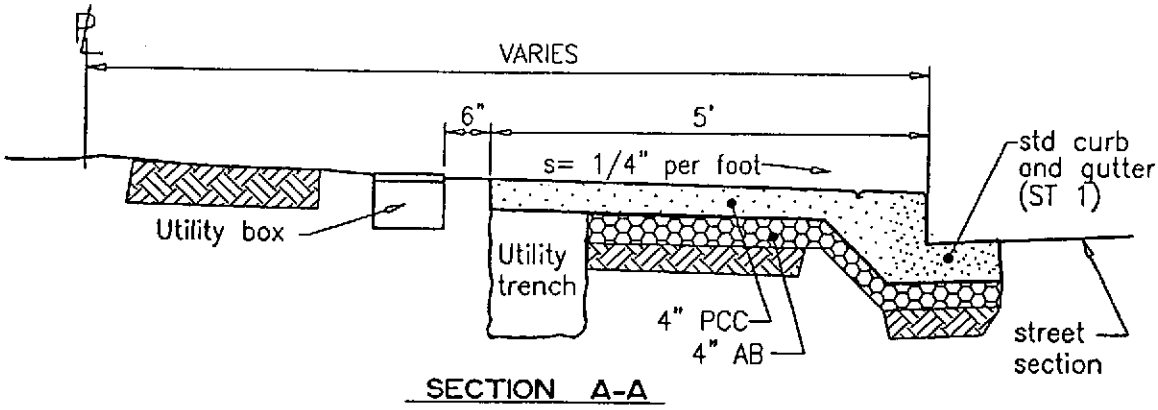
CITY OF ALBANY
ALAMEDA COUNTY, CALIFORNIA

SIDEWALK / DRIVEWAY (SEPARATED)

Approved: Date: 7-21-00
City Engineer RCE 29302 (Exp. 3-31-03)

ST 2





SECTION A-A

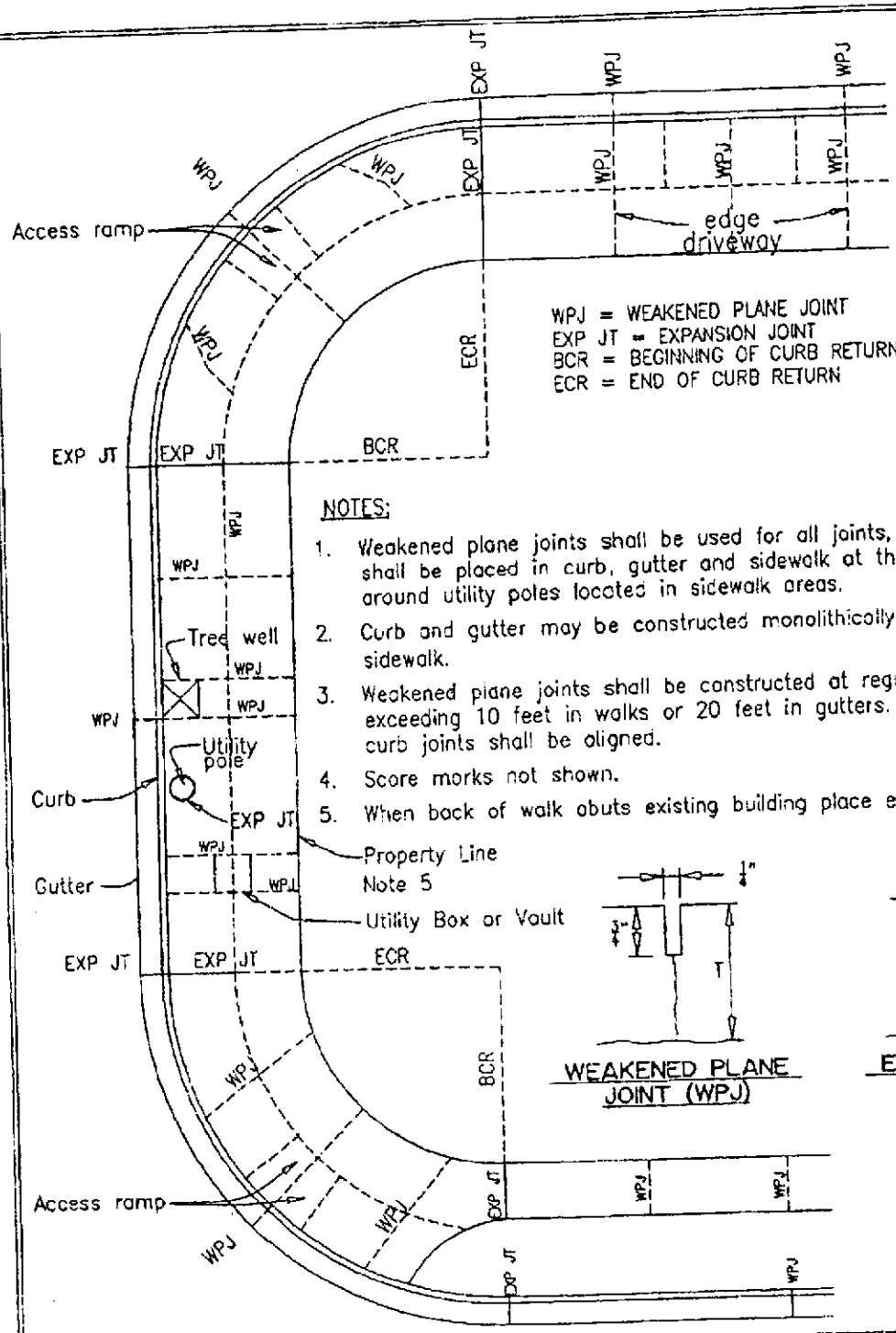
SEE ST 7 FOR MATERIALS / CONSTRUCTION REQUIREMENTS
SEE ST 4 FOR JOINT CONSTRUCTION REQUIREMENTS

CITY OF ALBANY
ALAMEDA COUNTY, CALIFORNIA

SIDEWALK (MONOLITHIC)

Approved: Date: 7-21-00
City Engineer RCE 29392 (Exp. 3-31-03)

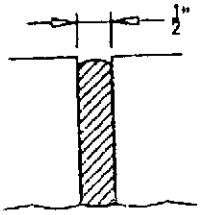
ST 3



NOTES:

1. Weakened plane joints shall be used for all joints, except expansion joints shall be placed in curb, gutter and sidewalk at the BCR and ECR, and around utility poles located in sidewalk areas.
2. Curb and gutter may be constructed monolithically or separately from sidewalk.
3. Weakened plane joints shall be constructed at regular intervals, not exceeding 10 feet in walks or 20 feet in gutters. Walk and curb joints shall be aligned.
4. Score marks not shown.
5. When back of walk abuts existing building place expansion joint.

WEAKENED PLANE JOINT (WPJ)



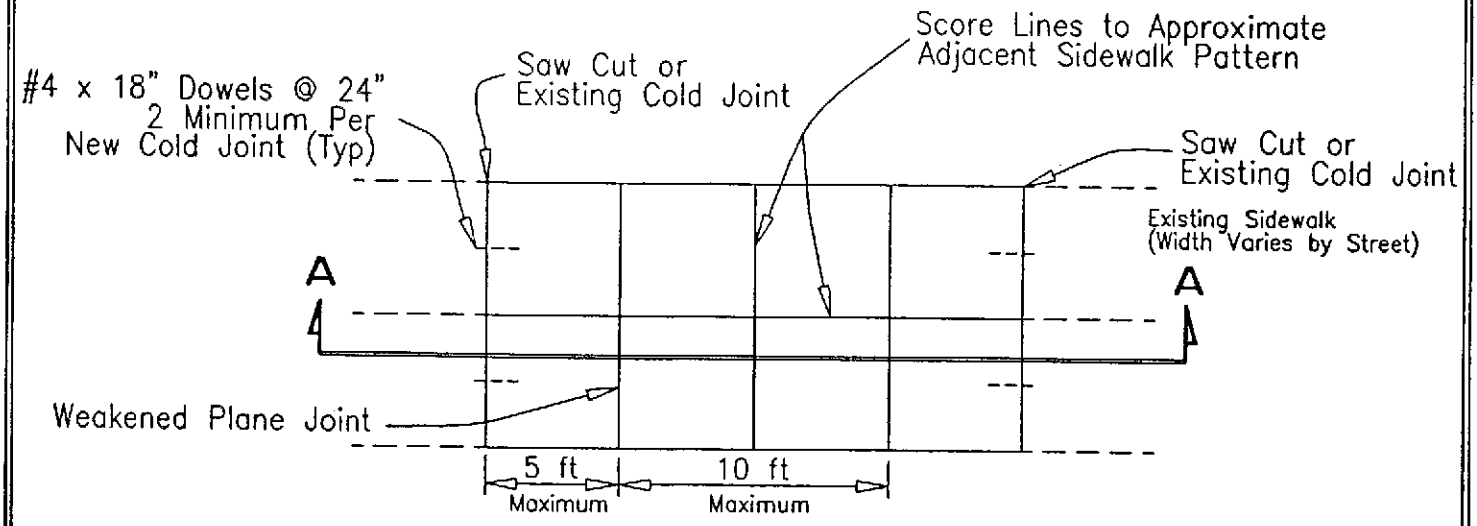
EXPANSION JOINT (EXP JT)

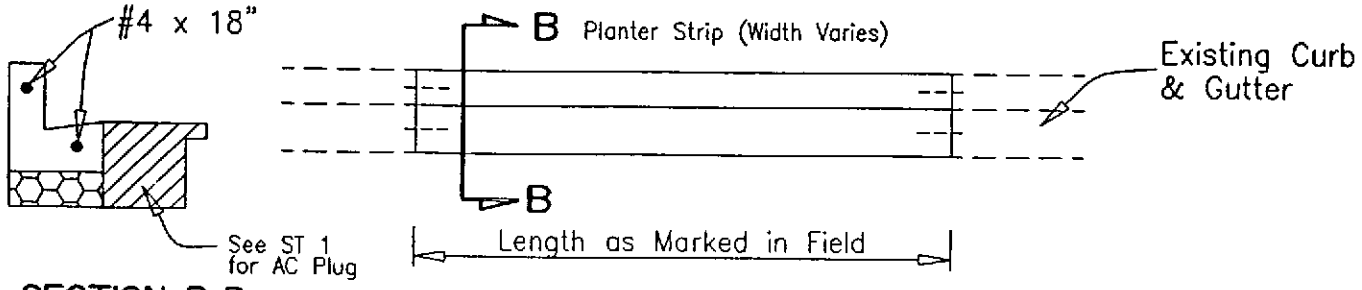
CITY OF ALBANY
ALAMEDA COUNTY, CALIFORNIA

CURB AND SIDEWALK JOINTS

Approved: Randolph W. Feist Date: 7-21-00
City Engineer RCE 20392 (Exp. 3-31-03)

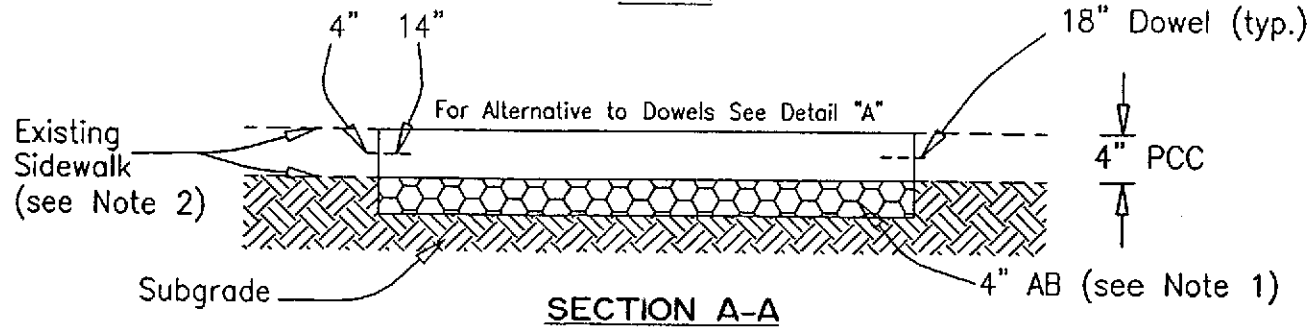
ST 4





SECTION B-B

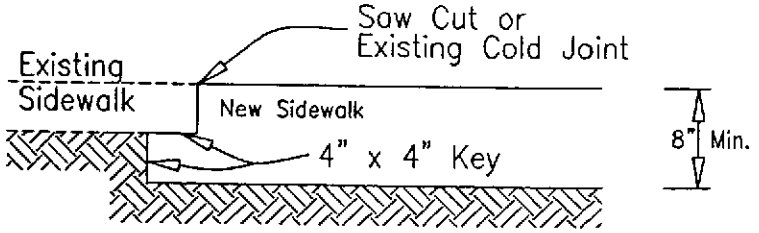
PLAN



SECTION A-A

Notes:

1. When tree roots are within 8" of finished grade, delete 4" AB and place 6" x 6" x 10 ga wire mesh in concrete.
2. When existing sidewalk is less than 4" thick, Detail A may be substituted for dowels.



DETAIL "A"
Alternative Key Detail

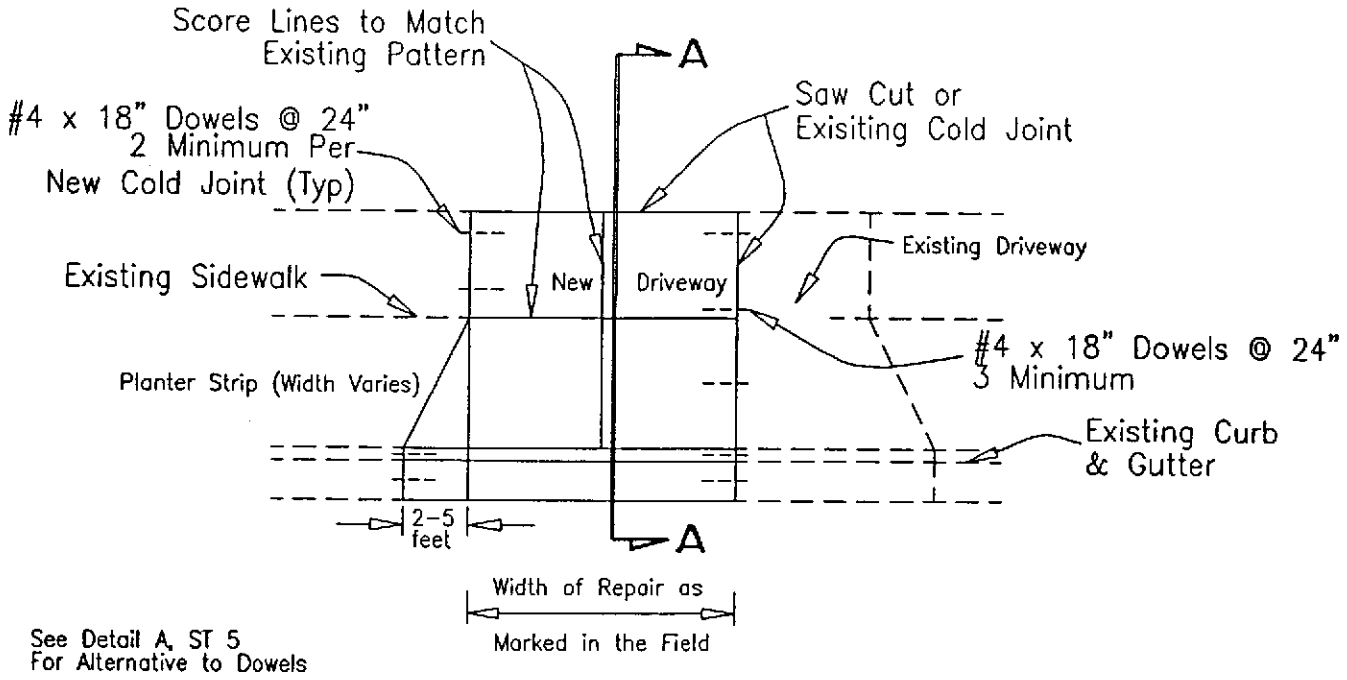
SEE ST 7 FOR MATERIALS / CONSTRUCTION REQUIREMENTS
SEE ST 4 FOR JOINT CONSTRUCTION REQUIREMENTS

CITY OF ALBANY
ALAMEDA COUNTY, CALIFORNIA

CURB, GUTTER & SIDEWALK REPAIRS

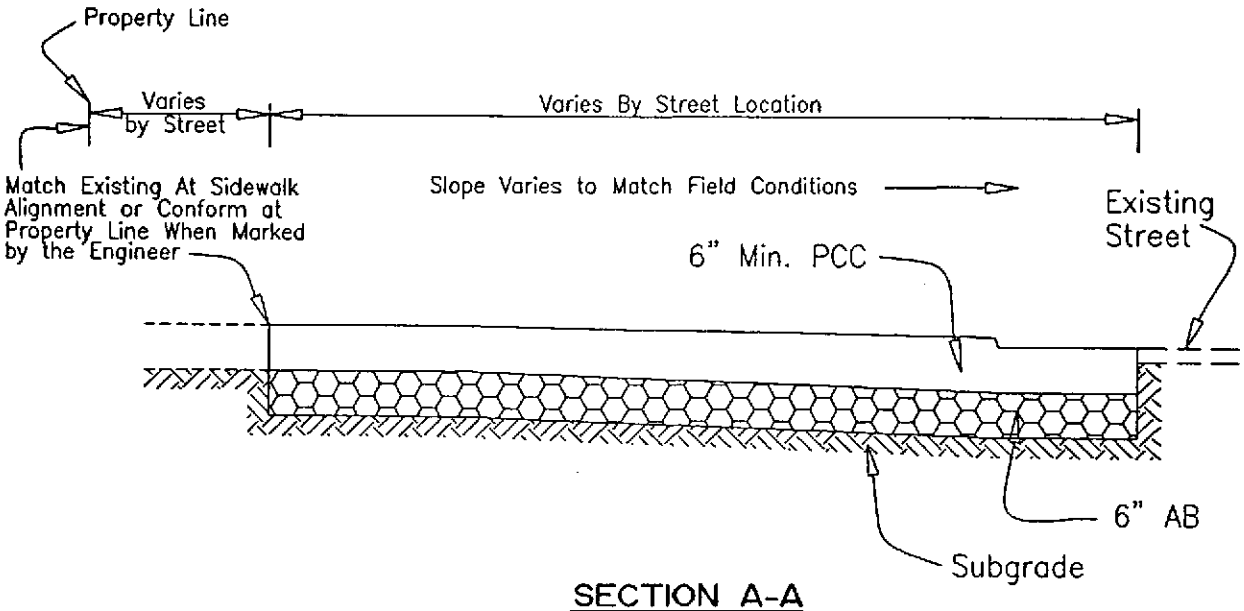
Approved: Date: 7-21-00
City Engineer RCE 29392 (Exp. 3-31-03)

ST 5



See Detail A, ST 5
For Alternative to Dowels

PLAN



SECTION A-A

SEE ST 7 FOR MATERIALS / CONSTRUCTION REQUIREMENTS
SEE ST 4 FOR JOINT CONSTRUCTION REQUIREMENTS

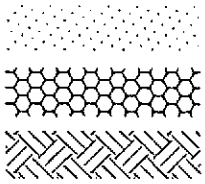
CITY OF ALBANY
ALAMEDA COUNTY, CALIFORNIA

DRIVEWAY REPAIRS

Approved: Date: 7-21-00
City Engineer RCE 29392 (Exp. 3-31-03)

ST 6

LEGEND



=concrete

=aggregate base

=subgrade/exist. grade

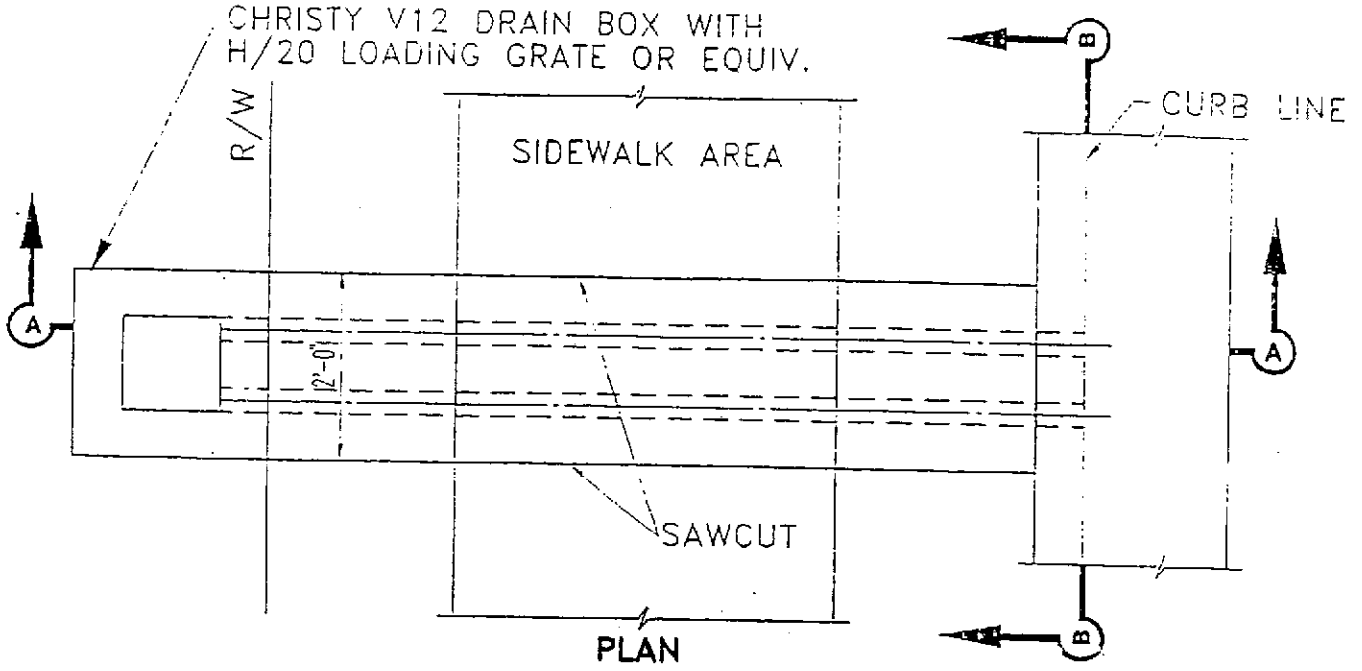
1. Subgrade shall be native material, 6" deep, compacted to 90% Relative Compaction (R.C.)
2. Cushion material shall be Class 2 aggregate base, per Caltrans Standard Specifications, Section 26; compacted to 95% R.C.
3. Concrete shall be 520-C-2500, 4" Maximum Slump.
4. Curb, gutter and sidewalk to be placed monolithically where possible. Where non-monolithic, place dowels and/or keyway per ST 1.
5. Place 1/2" expansion joint at 200' spacings and at returns.
6. Place 3/4" deep weakened plane joint at 20' maximum spacings through curb and gutter, and 10' maximum spacings through sidewalk, driveway and at edges of driveways and at 1/2 width for sidewalks and driveways over 10 feet in width.
7. Place score lines at 5' spacing between weakened plane joints and along back of curb.
8. Place no. 4 reinforcing steel bars at 18 inches each way in industrial, commercial and street level driveways.
9. Concrete to have a soft broom finish. Clear curing compound to be applied per manufacturer's specifications.
10. When replacing curb, gutter, sidewalk, and driveway, match existing width and scoring. Sawcuts shall be at joints or score lines. Insert no. 4 by 18" long steel dowels at 24" on center (2 minimum for curb and gutter). Add 1 lb. lampblack per cubic yard.
11. Stamp 3" high letters - "W"(water) and "S"(sewer) in face of curb to locate laterals.
12. Sawcut existing A.C. pavement with power saw.
13. Asphalt Concrete shall be 1/2" Max Aggregate Type A per Caltrans Sec. 39, 3" Maximum Lifts.

CITY OF ALBANY
ALAMEDA COUNTY, CALIFORNIA

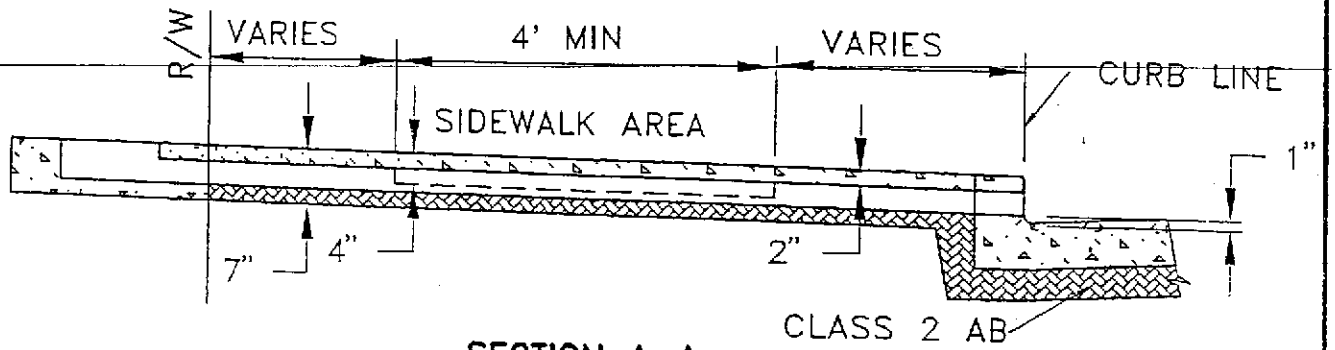
NOTES - SIDEWALKS, DRIVEWAYS, AND CURB & GUTTER

Approved: Date: 7-21-00
City Engineer RCE 29392 (Exp. 3-31-03)

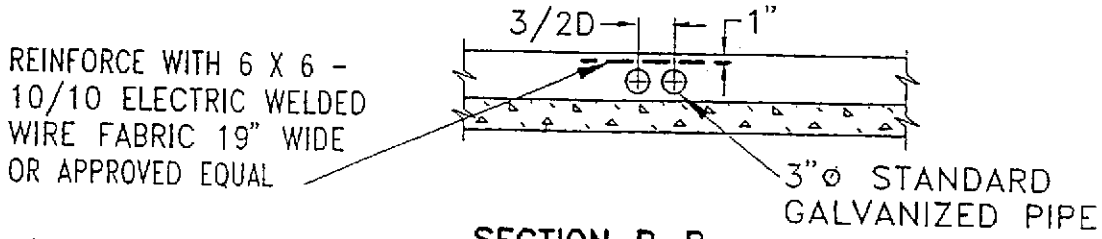
ST 7



PLAN



SECTION A–A



SECTION B–B

COUNTY OF ALAMEDA ★ PUBLIC WORKS AGENCY

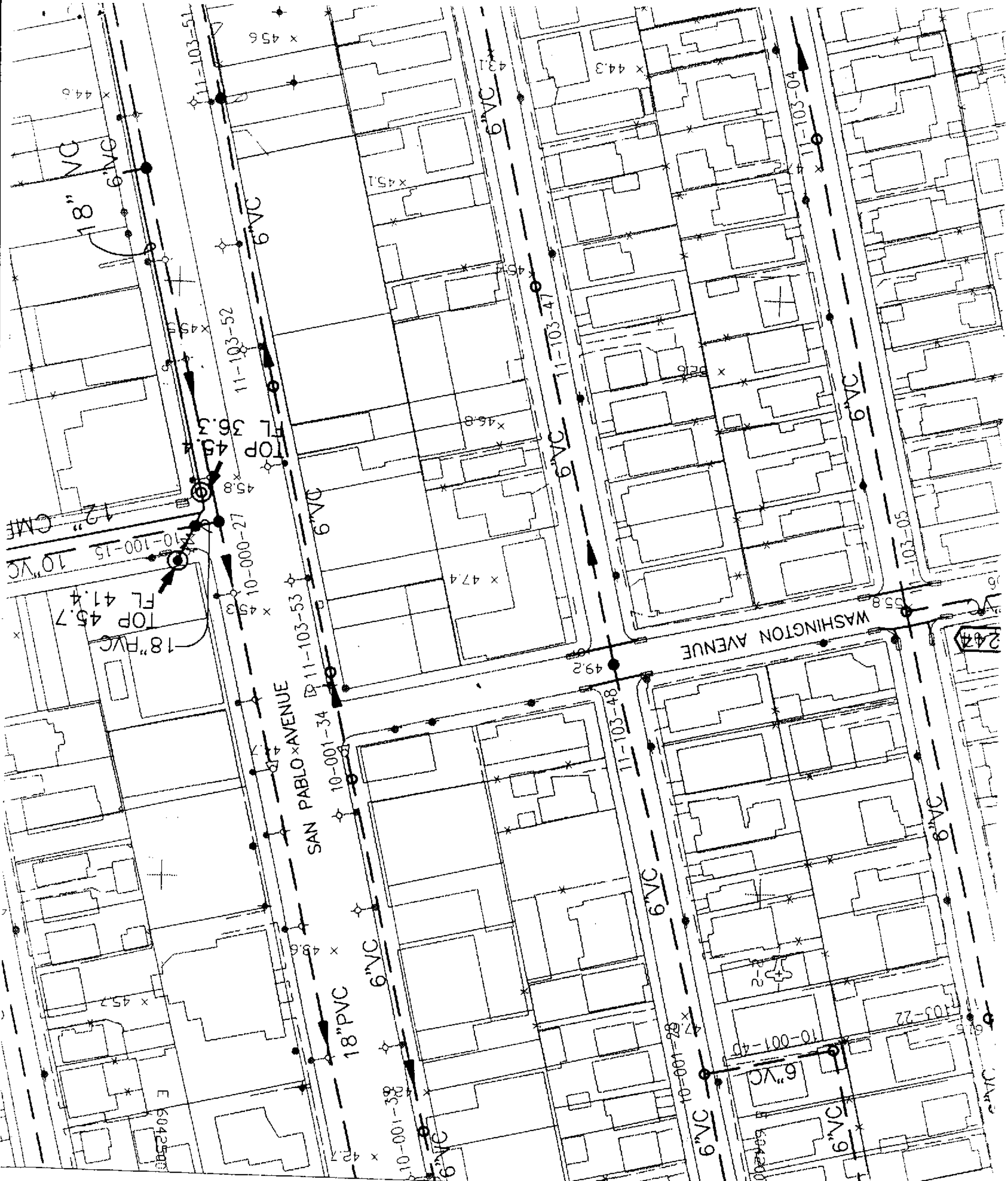
SIDEWALK DRAIN TYPE II SINGLE FAMILY RESIDENTIAL LOTS

APPROVAL REC.
APPROVED
APPROVED
COUNTY ENGINEER

REVISIONS

DRAWN	CHECKED	DATE	SCALE	FILE NO.	
JC		OCT. 1994	NONE	SD-527	1 of 1

PLU SCALE: 1 = 7


SAN PABLO AVENUE
WASHINGTON AVENUE
18"PVC
18" VC
6"VC
10"VC
TOP 45.4
FL 36.3
TOP 45.7
FL 41.4
11-103-51
11-103-52
11-103-53
11-103-47
11-103-48
11-103-04
11-103-05
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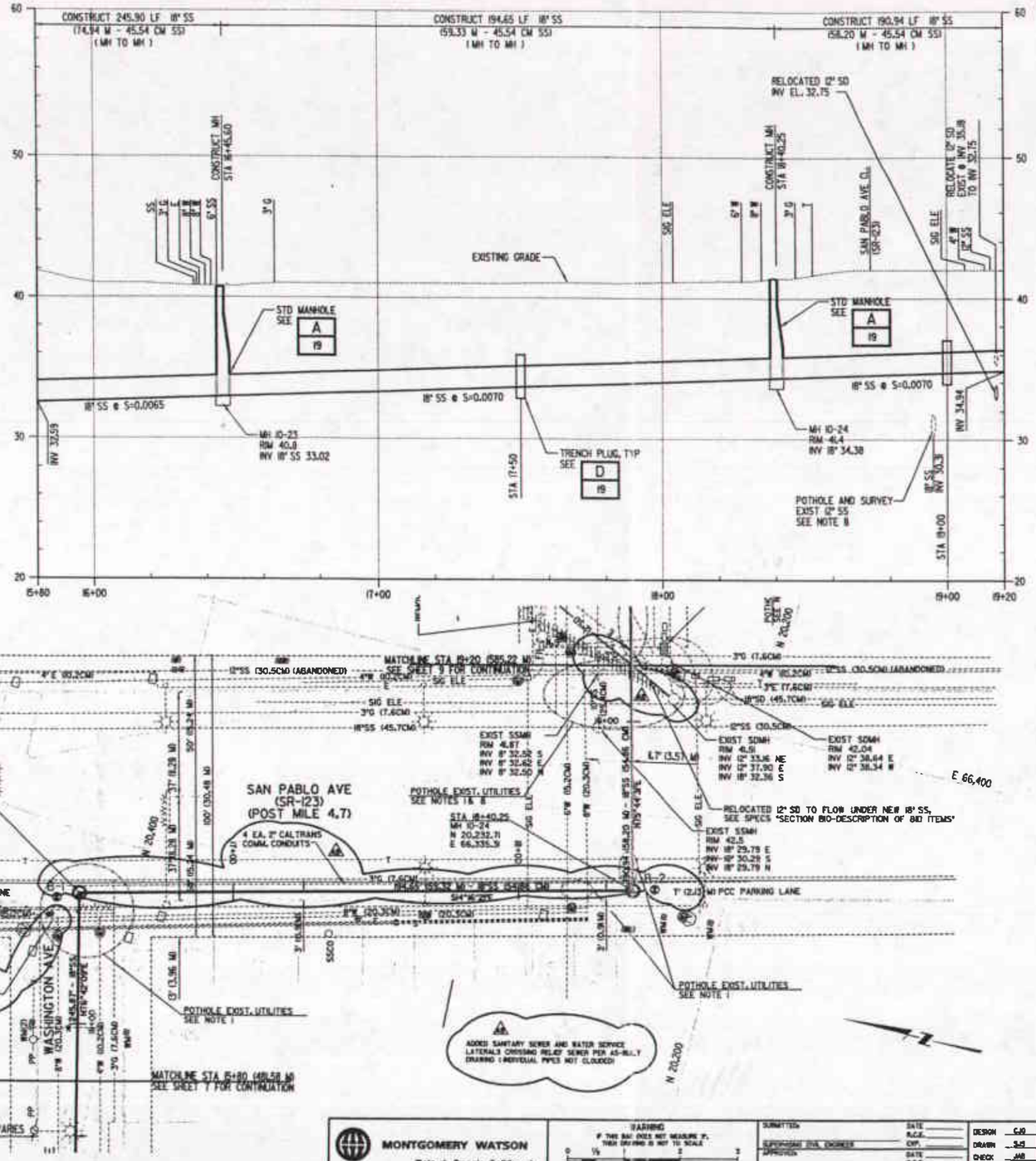
10-100-15
10-001-34
10-001-28
10-001-40



AS-BUILT (RECORD DRAWING)
These record drawings have been prepared based on information provided by others. The Engineer has not verified the accuracy of such information and shall not be responsible for any errors or omissions which may be incorporated herein as a result. See original contract drawings for wet-sand signatures.

NOTES:

1. NOTIFY U.S.A. AND POTHOLE ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION. PROTECT EXISTING UTILITIES FROM DAMAGE. REPAIR ALL UTILITIES DAMAGED BY THE WORK. SEE NOTES G2 THROUGH G6, G13, AND G17.
2. PROTECT ALL CITY OF ALBANY SURVEY MONUMENTS. RE-ESTABLISH MONUMENTS AFFECTED BY THE WORK. SEE NOTE G29.
3. PROVIDE WRITTEN NOTIFICATIONS TO ALL RESIDENTS AND BUSINESSES DESCRIBING CONSTRUCTION ACTIVITIES. SEE NOTE G30.
4. PROTECT TREES AND TREE ROOTS FROM DAMAGE. SEE NOTES G9 AND G31.
5. COMPLY WITH ALL TRAFFIC CONTROL REQUIREMENTS. SEE SHEETS 20 THROUGH 26 AND SPECIFICATION SECTION 01570.
6. PERFORM WORK ON SHOWN ON THIS SHEET IN STRICT ACCORDANCE WITH THE REQUIREMENTS OF THE ENCROACHMENT PERMIT.
7. THE CONTRACTOR IS ADVISED THAT SAN PABLO AVENUE EXPERIENCES HIGH TRAFFIC FLOWS ON A DAILY BASIS. THE WORK SHALL BE PERFORMED AS NIGHT WORK ONLY. THE CONTRACTOR SHALL OBTAIN WRITTEN PERMISSION FOR NIGHT WORK FROM THE CITY OF ALBANY AND CALTRANS PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL INCLUDE PROVISIONS FOR NIGHT WORK IN ITS BID & TRAFFIC CONTROL PLAN.
8. PRIOR TO CONSTRUCTION THE CONTRACTOR SHALL POTHOLE THE ABANDONED 12" SS. REMOVE AS NECESSARY TO INSTALL NEW 18" SS. CONTRACTOR SHALL ALSO POTHOLE EXISTING 12" SS.
9. SEE NOTE G33.
10. PROVIDE TEMPORARY TYPE "K" CONCRETE RAILING FROM STA 16+45.60 TO 18+40.25 TO ISOLATE WORK FROM TRAFFIC. PROVIDE FLASHING BARRICADES.
11. SEE NOTE G37.
12. SEE DETAIL E/19 FOR TRENCH DETAIL ON SAN PABLO AVENUE

NO.	REVISION	DATE	DESCRIPTION	APPROVAL
1	AS-BUILT RECORD DRAWING ADD CALTRANS CIRCUIT AND SS MODIFICATIONS	10-03-2000		J. BERGEN

MONTGOMERY WATSON
Walnut Creek, California

WARNING
IF THIS BAR DOES NOT MEASURE 3", THEN DRAWING IS NOT TO SCALE
0 1/2 1 2 3
FOR REDUCED PLANS - ORIGINAL SCALE IS IN INCHES

SUBMITTED: DATE ____ R.C.E. ____ EXP. ____
SUPERVISING CIVIL ENGINEER
APPROVED: DATE ____ R.C.E. ____ EXP. ____
MANAGER OF ENGINEERING

DESIGN CJO
DRAWN SJS
CHECK MB
AS BUILT ____
HORIZ. 1"= 20'
VERT. 1"= 4'
BOOK ____
DATE ____

CITY OF BERKELEY
DEPARTMENT OF PUBLIC WORKS

WASHINGTON/ADAMS RELIEF SEWER PROJECT
PLAN AND PROFILE
STATION 15+80(48.58M) TO 19+20(585.22M)

PLAN 7988
FILE 502-552
SHEET 8 OF 26

LOGIN NAME: rseeski FILE NAME: n:\projects\berkely\city\berc05.dlv TIME: 09:09 DATE: 12-OCT-2000
JOB No. ____