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WORKPLAN
FOR
GROUNDWATER MONITORING WELL
INSTALLATION

AMERICAN BUILDING COMPONENTS CO.
6253 DOUGHERTY ROAD
DUBLIN, CA 94568

Prepared For:
MR. ED OMERNIK
AMERICAN BUILDING COMPONENTS CO.
6253 DOUGHERTY ROAD
DUBLIN, CA 94568

Submitted By:
TANK PROTECT ENGINEERING
Of Northern California, Inc.
May 4, 1994

Project Number 176

(510) 429-8088

John V. Mrakovich, Ph.D.
Registered Geologist

Jeff J. Farhoomand, M.S.
Civil Engineer

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This workplan has been prepared by the staff of **Tank Protect Engineering of Northern California, Inc.** under direction of an Engineer and/or Geologist whose seal(s) and/or signature(s) appear hereon.

The findings, recommendations, specifications or professional opinions are presented, within the limits prescribed by the client, after being prepared in accordance with generally accepted professional engineering and geologic practice. We make no other warranty, either expressed or implied.

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1.0 INTRODUCTION

The subject site is located at 6253 Dougherty Road in the City of Dublin in Alameda County, California and is occupied by the American Building Components Co. [(ABC) see Figure 1]. The contact person for ABC is Mr. Ed Omernik; telephone number (510) 828-0400. Soil samples collected during the removal of an underground diesel and gasoline storage tank documented the presence of soil contamination. As a result of the contamination, the Alameda County Health Care Services Agency (ACHCSA) has required a groundwater investigation to determine the vertical and lateral extent of groundwater contamination and suggested that the investigation may consist of installing 1 groundwater monitoring well in the verified downgradient direction (of groundwater flow) from the former tank location.

ABC has contracted with Tank Protect Engineering of Northern California, Inc. (TPE) to prepare this workplan for conducting the above investigation.

2.0 PROPOSED WORKPLAN FOR A GROUNDWATER INVESTIGATION

As a preliminary investigation of groundwater contamination, TPE proposes to install 1 groundwater monitoring well in the verified downgradient direction of the former underground diesel and gasoline tanks at the location shown in Figure 1. This location is based on gradient information obtained from the ACHCSA.

TPE proposes the following scope of work:

- Conduct a subsurface utility survey, if necessary, and contact Underground Service Alert to minimize the potential of encountering unexpected utilities and to assist in selecting a location for installing a groundwater monitoring well.

- Obtain a well installation permit.

- Drill a soil boring for installing a groundwater monitoring well.

- Continuously core and collect soil samples from the boring for selection for chemical analysis and construction of a boring log as required by the ACHCSA.

- Analyze 2 vadose zone soil samples for total petroleum hydrocarbons as diesel (TPHD), as gasoline (TPHG), and for benzene, toluene, ethylbenzene, and xylenes (BTEX).

- Convert the boring into a 2-inch diameter casing groundwater monitoring well.

- Develop, purge, and sample groundwater from the well.

- Analyze the groundwater sample for TPHD, TPHG, and BTEX and 1 trip blank sample for TPHG and BTEX.

- Prepare a Groundwater Monitoring Well Installation Report (GMWIR).

Details of the proposed scope of work are presented below.

2.1 Predrilling Activities

Before commencing drilling activities, TPE will obtain a well installation permit from the Alameda County Flood Control and Water Conservation District, Water Resources Management Zone 7 and visit the site to select the proposed soil boring location. TPE will conduct a subsurface utility survey, if necessary, and contact Underground Service Alert to minimize the potential of encountering unexpected utilities and to assist in selecting the monitoring well location.

The location of the proposed monitoring well will be within 10 feet and in the verified downgradient direction of the former underground tank location according to recommendations in the California Regional Water Quality Control Board-San Francisco Bay Region's (CRWQCB) "Tri-Regional Board Staff Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites", dated August 10, 1990.

2.2 Soil Boring and Sampling Procedures

The exploratory boring for the monitoring well will be drilled by a State of California licensed water well driller (C-57 Water Well Driller contractor's license) using 8-inch diameter, hollow-stem, auger drilling equipment. The augers will be steam-cleaned before drilling the boring to minimize the potential of introducing off-site contamination to the boring. The boring will be continuously cored and 2 soil samples will be collected for chemical analysis in the vadose zone. Continuous coring has been required by the ACHCSA. Soil samples will be collected by advancing a standard penetration and/or California split-spoon sampler, equipped with 2-inch diameter by 6-inch long brass tubes, into the undisturbed soil beyond the tip of the augers. The sampling equipment will be cleaned before each sampling event by washing with a trisodium phosphate solution and rinsing in tap water.

Drill cuttings will be stored on site, contained in 55-gallon steel drums. The stored cuttings will be labeled to show contents, date stored, suspected contaminant, expected date of removal, company name, contact person, and telephone number. Disposal of the cuttings is the responsibility of the client. After the cuttings are characterized by chemical analysis, TPE will provide recommendations to the client and, upon their request, assist them in remediation or disposal of the cuttings, or both in an appropriate manner as an additional work item.

A detailed boring log will be prepared from auger return material and soil samples. The soil will be logged according to the Unified Soil Classification System under the direction of a California Registered Geologist.

See Appendices A and B for TPE's protocols relative to hollow-stem auger drilling and soil sampling procedures, and waste handling and decontamination procedures, respectively.

2.2.1 Soil Sample Selection for Chemical Analyses

Selected vadose zone soil samples will be field-screened for the presence of apparent hydrocarbon soil contamination based on visible hydrocarbon stains, odors, and headspace analysis for volatile organic compounds using a Gastech, Inc., Trace-Techtor hydrocarbon vapor tester (HVT). Headspace analysis will be conducted by partially filling a quart-size plastic bag with a soil sample, sealing the bag air tight, and warming the bag to promote volatilization of hydrocarbons, if any, into the air space of the bag. After a minimum of about 15 minutes of warming, the air space of the bag will be sampled by the HVT and the response recorded in parts per million (ppm).

Two soil samples will be selected for chemical analysis; 1 sample will be selected from immediately above groundwater and the second sample will be selected based on the presence of apparent contamination. If apparent contamination is not detected, the selection of the sample will be agreed upon between TPE and a representative of the ACHCSA.

Selected soil samples will be preserved in their tubes by quickly covering the open ends with Teflon sheeting followed by plastic end-caps. The tubes will be labeled to show site name, project number, date and time collected, sample name and depth, and sampler name; sealed in quart-size plastic bags; and placed in an iced-cooler for transport to a California Department of Health Services (DHS) certified laboratory accompanied by chain-of-custody documentation (see Appendix C for TPE's protocol relative to sample handling procedures).

2.2.1.1 Chemical Analyses

Soil samples are proposed to be analyzed for TPHD and TPHG by the DHS Method and for BTEX by the United States Environmental Protection Agency (EPA) Method 8020.

2.3 Groundwater Monitoring Well Installation

Based on an estimated depth of about 15 feet to groundwater, the exploratory boring is proposed to be drilled to a depth of about 30 feet. The boring will be converted into a groundwater monitoring well by installing 2-inch diameter, flush-threaded, schedule 40, polyvinyl chloride (PVC) casing and 0.010-inch machine-slotted screen. The exact depth of the boring and screen length will be determined by the geologic profile, depth of groundwater, and whether the groundwater is confined or unconfined. If groundwater is unconfined, the screen is proposed to extend about 5 feet above and about 10 feet below the water table surface. The length of screen below the water table surface may be less than 10 feet if an aquiclude/aquitard is encountered. If groundwater is confined, the screen length will extend from the upper contact of the aquifer to a maximum depth of about 10 feet. If the aquifer is less than 10 feet thick, the screen length will equal the thickness of the aquifer. A sand pack of #2/12 filter sand will be placed in the annular space from the bottom of the boring to a maximum of 2 feet above the top of the screened interval. Approximately 1 foot of bentonite will be placed above the sand pack followed by a sand/cement slurry seal. A traffic rated, bolt-locked, vault box will be set in concrete to protect the well. A locking well cap with lock will be installed on the well casing.

Appendix D documents TPE's protocol relative to groundwater monitoring well construction procedures.

2.4 Groundwater Monitoring Well Development

The groundwater monitoring well will be developed a minimum of 48 hours after well construction is completed. Before development, depth to water will be measured from the top-of-casing (TOC) to the nearest 0.01 foot using an electronic Solinst water level meter. A minimum of 3 repetitive measurements will be made for each level determination to ensure accuracy. The well will be checked for floating product using a dedicated polyethylene bailer. If floating product is present, the thickness of product in the bailer will be measured and recorded to the nearest .05 inch. TPE will recommend to the client that removal of floating product should commence as soon as possible.

The well will be developed by using a 1.7-inch, positive displacement, PVC hand pump or by bailing with a PVC bailer until the well is free of sand, silt, and turbidity or no further improvement is apparent.

Development water will be stored on site in 55-gallon steel drums labeled to show contents, date filled, suspected contaminant, company name, contact person, and telephone number. Disposal of the drummed water is the responsibility of the client. After the water is characterized by chemical analysis, TPE will provide recommendations to the client and, upon their request, assist them in remediation or disposal of the fluids, or both in an appropriate manner as an additional work item.

Appendix E documents TPE's protocol relative to groundwater monitoring well development procedures.

2.5 Groundwater Monitoring Well Sampling

After a minimum of 48 hours after well development, depth to stabilized water will be measured and recorded as discussed above under section 2.4 Groundwater Monitoring Well Development and the well will be sampled.

Prior to sampling, the well will be purged a minimum of 3 wetted well volumes with a polyethylene bailer. Temperature, pH, and electrical conductivity will be monitored and purging will continue until they are stabilized. After purging is completed, turbidity will be measured and the water sample will be collected in sterilized glass vials having Teflon-lined screw caps, immediately sealed in the vials, and labeled to include: date, time, sample location, project number, and sampler name. The sample will be immediately stored in an iced-cooler for transport to a DHS certified laboratory accompanied by chain-of-custody documentation.

Appendix F documents TPE's protocol relative to groundwater monitoring well sampling procedures. Appendices B and G document TPE's protocols relative to waste handling and decontamination procedures, and quality assurance and quality control procedures (QA/QC).

Purge water will be stored on site in 55-gallon drums. After the drummed water is characterized by chemical analysis, TPE will provide recommendations to the client and, upon their request, assist them in remediation or disposal of the fluids, or both in an appropriate manner as an additional work item.

2.5.1 Chemical Analyses

The water sample is proposed to be analyzed for TPHD and TPHG by the DHS Method and for BTEX by EPA Method 8020. A trip blank sample will be analyzed for TPHG and BTEX by the above methods.

2.6 Monitoring Well Installation Report

The information collected, analytical results, and TPE's conclusions and recommendations will be summarized in a report. The report will describe the work performed and include: copies of all required permits, an area map, a detailed site plan showing location of the installed monitoring well, a graphic boring log, a graphic monitoring well construction detail, tables summarizing results of chemical analyses, and copies of certified analytical reports and chain-of-custodies.

Conclusions regarding the extent and type(s) of contamination will be presented within the context of this workplan. Recommendations for feasible remedial alternatives and/or supplemental sampling and analyses will be included.

3.0 SITE SAFETY PLAN

A Site Safety Plan for conducting work under this workplan is included in Appendix H.

4.0 TIME SCHEDULE

The projected time schedule for implementation of the activities described in this workplan is presented below. The schedule reflects a relatively problem-free program. However delays in the workplan review, permitting, or laboratory analyses could lengthen the project schedule. Access difficulties, adverse weather, and regulator review could also delay the proposed time schedule. TPE will make every effort to adhere to the project schedule.

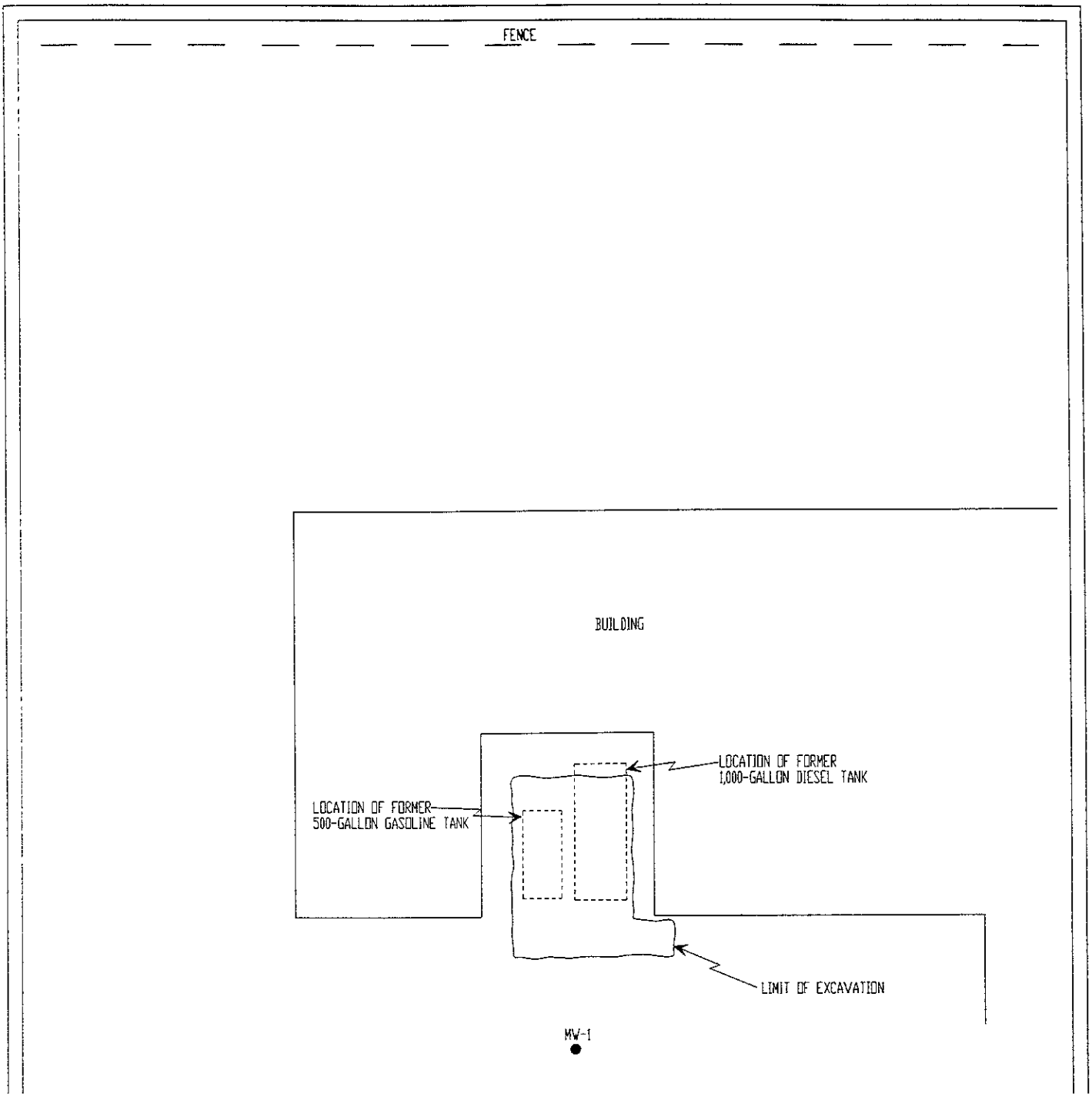
Week 1: Client Submits Workplan for Regulator Approval.

Week 2: Regulator Approval Received; Subcontracting, Conduct Underground Utility Survey, if necessary.

Week 3: Install 1 Groundwater Monitoring Well and Submit Soil and Groundwater Samples for Chemical Analyses.

Week 5: Receive Chemical Analyses, Interpret Data and Write GMWIR.

Week 8: Submit GMWIR to Client.


FENCE
BUILDING
LOCATION OF FORMER
1,000-GALLON DIESEL TANK
LOCATION OF FORMER
500-GALLON GASOLINE TANK
LIMIT OF EXCAVATION
MW-1

APPENDIX A

HOLLOW-STEM AUGER DRILLING AND SOIL SAMPLING PROCEDURES

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HOLLOW-STEM AUGER DRILLING AND SOIL SAMPLING PROCEDURES

Undisturbed soil samples will be recovered from soil without introducing liquids into the borings. At a minimum, soil samples as core will be taken at 5-foot depth intervals, changes in lithology, and when encountering apparent soil contamination to termination depth, or through the aquifer zone of interest for lithologic logging.

Borings will be drilled with a hollow-stem auger and sampled with a California or modified California-type split-spoon sampler. Soil samples will be of sufficient volume to perform the analyses which may be required, including replicate analyses.

Soil from all borings will be described in detail using the Unified Soil Classification System and will be logged under the direction of a geologist, civil engineer, or engineering geologist who is registered or certified by the State of California and is experienced in the use of the Unified Soil Classification System.

All wet zones above the free water zone will be noted and accurately logged.

Soil samples will be collected in clean brass or stainless steel sampling tubes in the split-spoon. Sediment traps will be used when unconsolidated sands and gravels fall from the sampler during retrieval. The brass tubes will be cut apart using a clean knife. The ends of the tubes will be covered with Teflon sheets or aluminum foil beneath plastic end caps and sealed with electrical or duct tape and properly labeled. In lieu of electrical or duct tape, the tubes may be individually sealed in plastic bags. The samples will be stored on ice at a temperature of 4 degrees Celsius.

Drill cuttings will be stored on site in 55-gallon drums or covered with plastic sheeting. Analytical results will be submitted immediately to the site owner for determination of appropriate disposal procedures. The soil borings not completed as wells will be backfilled with a cement grout.

APPENDIX B

WASTE HANDLING AND DECONTAMINATION PROCEDURES

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WASTE HANDLING AND DECONTAMINATION PROCEDURES

Decontamination: Any drilling, sampling or field measurement equipment that comes into contact with soil or groundwater will be properly decontaminated prior to its use at the site and after each incident of contact with the soil or groundwater being investigated. Proper decontamination is essential to obtain samples that are representative of environmental conditions and to accurately characterize the extent of soil and groundwater contamination. Hollow-stem auger flights and the drill bit will be steam-cleaned between the drilling of each well.

All sample equipment, including the split-tube sampler and brass tubes, will be cleaned by washing with trisodium phosphate detergent, followed by rinsing with potable water. Where required by specific regulatory guidelines, a nonphosphate detergent will be used.

Waste Handling: Waste materials generated during site characterization activities will be handled and stored as hazardous waste and will be stored on site in appropriately labeled containers. Waste materials anticipated include excavated soil, drill cuttings, development and purge water, water generated during aquifer testing, water generated during decontamination, and used personnel protection equipment such as gloves and Tyvek. The site owner will be responsible for providing the storage containers and will be responsible for the disposal of the waste materials. Drill cuttings from individual borings will be stored separately in drums or covered by plastic sheeting and the appropriate disposal procedure will be determined by the site owner or TPE following receipt of the soil sample analytical results. Drums will be labeled to show material stored, known or suggested contaminant, date stored, expected removal date, company name, contact, and telephone number.

APPENDIX C

SAMPLE HANDLING PROCEDURES

APPENDIX C

SAMPLE HANDLING PROCEDURES

Soil and groundwater samples will be packaged carefully to avoid breakage or contamination, and will be delivered to the laboratory in an iced-cooler. The following sample packaging requirements will be followed.

- Sample bottle/sleeve lids will not be mixed. All sample lids will stay with the original containers and have custody seals affixed to them.

- Samples will be secured in coolers to maintain custody, control temperature, and prevent breakage during transportation to the laboratory.

- A chain-of-custody form will be completed for all samples and accompany the sample cooler to the laboratory.

- Ice, blue ice, or dry ice (dry ice will be used for preserving soil samples collected for the Alameda County Water District) will be used to cool samples during transport to the laboratory.

- Each sample will be identified by affixing a pressure sensitive, gummed label, or standardized tag on the container(s). This label will contain the site identification, sample identification number, date and time of sample collection, and the collector's initials.

- Soil samples collected in brass tubes will be preserved by covering the ends with Teflon tape and capped with plastic end-caps. The tubes will be labeled, sealed in quart size bags, and placed in an iced-cooler for transport to the laboratory.

All groundwater sample containers will be precleaned and will be obtained from a State Department of Health Services certified analytical laboratory.

Sample Control/Chain-of-Custody: All field personnel will refer to this workplan to verify the methods to be employed during sample collection. All sample gathering activities will be recorded in the site file; all sample transfers will be documented in the chain-of-custody; samples are to be identified with labels and all sample bottles are to be custody-sealed. All information is to be recorded in waterproof ink. All TPE field personnel are personally responsible for sample collection and the care and custody of collected samples until the samples are transferred or properly dispatched.

The custody record will be completed by the field technician or professional who has been designated by the TPE project manager as being responsible for sample shipment to the appropriate laboratory. The custody record will include, among other things, the following information: site identification, name of person collecting the samples, date and time samples were collected, type of sampling conducted (composite/grab), location of sampling station, number and type of containers used, and signature of the TPE person relinquishing samples to a non-TPE person with the date and time of transfer noted. The relinquishing individual will also put all the specific shipping data on the custody record.

Records will be maintained by a designated TPE field employee for each sample, site identification, sampling locations, station numbers, dates, times, sampler's name, designation of the samples as a grab or composite, notation of the type of sample (e.g. groundwater, soil boring, etc.), preservatives used, on-site measurement data, and other observations or remarks.

APPENDIX D

GROUNDWATER MONITORING WELL CONSTRUCTION PROCEDURES

APPENDIX D

GROUNDWATER MONITORING WELL CONSTRUCTION PROCEDURES

BOREHOLE DESIGN

Casing Diameter: The minimum diameter of well casings will be 2 inches (nominal).

Borehole Diameter: The diameter of the borehole will be a minimum of 4 inches and a maximum of 12 inches greater than the diameter of the well casing. The minimum annular space will be 2.5 inches as measured from the outside diameter of the casing to the drill hole wall.

Shallow (Unconfined Zone) Wells: When unconfined groundwater is encountered the borehole will be advanced through the aquifer to an underlying clay layer or aquitard or to a maximum depth of 15 feet into the saturated zone, or the maximum depths required by regulatory guidelines. The screened interval will begin a minimum of 5 feet above the saturated zone or above the anticipated seasonal high level of groundwater. The screen will extend the full thickness of the aquifer or no more than 15 feet (or 20 feet if required by regulatory guidelines) into the saturated zone, whichever is reached first. The well screen will not extend into the aquitard, nor will the screened interval exceed 20 feet in length (or 30 feet if required by regulatory guidelines).

Deep (Confined Zone) Wells: Any monitoring well to be screened below the upper aquifer will be installed as a double-cased well. A steel conductor casing will be placed through the upper water-bearing zone to prevent aquifer cross-contamination.

The conductor casing will be installed in the following manner: a large diameter borehole (typically 18 inches) will be drilled until it is determined that the first competent aquitard has been reached. A low carbon steel conductor casing will be placed in the borehole to the depth drilled. Centralizers will be used to center the casing in the borehole. The annular space between the conductor casing and the

formation will be cement-grouted from bottom to top by tremie pipe method. The grout will be allowed to set for a minimum of 72 hours.

Drilling will continue inside the conductor casing, with a drill bit of smaller diameter than the conductor casing. If additional known aquifers are to be fully penetrated, the procedure will be repeated with successively smaller diameter conductor casings.

The bottom of the well screen in a confined aquifer will be determined by presence or lack of a clay layer or aquitard as described above. The screened interval in a confined zone shall extend across the entire saturated zone of the aquifer or up to a length of 20 feet, whichever is less. The screened zone and filter pack will not cross-connect to another aquifer.

CONSTRUCTION MATERIALS

Casing and Screen Materials: Well casing and screen will be constructed of clean materials that have the least potential for affecting the quality of the sample. The most suitable material for a particular installation will depend upon the parameters to be monitored. Acceptable materials include PVC, stainless steel, or low carbon steel.

Casing Joints: Joints will be connected by flush threaded couplers. Organic bonding compounds and solvents will not be used on joints.

Well Screen Slots: Well screen will be factory slotted. The size of the slots will be selected to allow sufficient groundwater flow to the well for sampling, minimize the passage of formation materials into the well, and ensure sufficient structural integrity to prevent the collapse of the intake structure.

Casing Bottom Plug: The bottom of the well casing will be permanently plugged, either by flush threaded screw-on or friction cap. Friction caps will be secured with stainless steel set screws. No organic solvents or cements will be applied.

Filter Pack Material: Filter envelope materials will be durable, water worn, and washed clean of silt, dirt, and foreign matter. Sand size particles will be screened silica sand.

Particles will be well rounded and graded to an appropriate size for retention of aquifer materials.

Bentonite Seal Material: Bentonite will be pure and free of additives that may affect groundwater quality. Bentonite will be hydrated with potable or tap water.

Grout Seal Material: Neat cement grout or sand-cement grout will consist of a proper mixture of Type 1/11 Portland cement, hydrated with potable or tap water. Up to 3% bentonite may be added to the mixture to control shrinkage.

CONSTRUCTION PROCEDURES

Decontamination: All downhole tools, well casings, casing fittings, screens, and all other components that are installed in the well shall be thoroughly cleaned immediately before starting each well installation. When available, each component shall be cleaned with a high temperature, high pressure washer for a minimum of 5 minutes. When a washer is not available, components shall be cleaned with water and detergent, rinsed in potable or tap water, then rinsed in distilled water.

Soil and water sampling equipment and material used to construct the wells shall not donate to, capture, mask, nor alter the chemical composition of the soil and groundwater.

Drilling Methods: Acceptable drilling methods include solid and hollow-stem auger, percussion, direct circulation mud and air rotary, and reverse rotary. The best alternative is that which minimizes the introduction of foreign materials or fluids. If drilling fluid is employed, drilling fluid additives shall be limited to inorganic and non-hazardous compounds. Compressed air introduced into the borehole shall be adequately filtered to remove oil and particulates.

Casing Installation: The casing will be set under tension, when necessary, to ensure straightness. Centralizers will be used where necessary to prevent curvature or stress to the casing.

Sand Pack Installation: The sand pack will be installed so as to avoid bridging and the creation of void spaces. The tremie pipe method will be used where installation conditions or local regulations require. Drilling mud, when used, will be thinned prior to pack placement. The sand pack shall cover the entire screened interval and rise a minimum of 2 feet above the highest perforation.

Bentonite Seal Placement: A bentonite seal will be placed above the sand pack by a method that prevents bridging. Bentonite pellets can be placed by free fall if proper sinking through annular water can be assured. Bentonite slurry will be placed by the tremie pipe method from the bottom upward. The bentonite seal will not be less than 1 to 3-feet in thickness, depending on regulatory guidelines.

Grout Seal Placement: The cement grout mixture will be hydrated with potable or tap water and thoroughly mixed prior to placement. If substantial groundwater exists in the bore hole, the grout shall be placed by tremie pipe method from the bottom upward. In a dry borehole, the grout may be surface poured to a depth of 30 feet. Below a depth of 30 feet grout will be placed by tremie pipe. Grout will be placed in 1 continuous lift and will extend to the surface or to the well vault if the well head is completed below grade. A minimum of 5 feet of grout seal will be installed, unless impractical due to the shallow nature of the well.

Surface Completion: The well head will be protected from fluid entry, accidental damage, unauthorized access, and vandalism. A watertight, locking cap will be installed on the well casing. Access to the casing will be controlled by a keyed lock.

Well heads completed below grade will be completed in a concrete and/or steel vault, installed to drain surface runoff away from the vault.

Well Identification: Each well will be labeled to show well number, depth, hole and casing diameter, and screened interval.

APPENDIX E

GROUNDWATER MONITORING WELL DEVELOPMENT PROCEDURES

APPENDIX E

GROUNDWATER MONITORING WELL DEVELOPMENT PROCEDURES

INTRODUCTION

Newly installed groundwater monitoring wells will be developed to restore natural hydraulic conductivity of the formation, remove sediments from well casing and filter pack, stabilize the filter pack and aquifer material, and promote turbidity-free groundwater samples.

Wells may be developed by bailing, hand pumping, mechanical pumping, air lift pumping, surging, swabbing, or an effective combination of methods. Wells will be developed until the water is free of sand, silt, and minimum turbidity has stabilized.

In some cases where low permeability formations are involved or the drilling mud used fails to respond to cleanup, initial development pumping may immediately dewater the well casing and thereby inhibit development. When this occurs, clean, potable grade water may be introduced into the well, followed by surging of the introduced waters with a surge block. This operation will be followed by pumping or bailing. The procedure may be repeated as required to establish full development.

METHODOLOGY

Seal Stabilization: Cement and bentonite annular seals shall set and cure not less than 24 to 72 hours (according to local regulatory guidelines) prior to well development.

Decontamination: All well development tools and equipment shall be thoroughly cleaned immediately before starting each well installation. When available, each component shall be cleaned with a high temperature, high pressure washer for a minimum of 5 minutes. When a washer is not available, components shall be cleaned with potable or tap water, then rinsed with distilled water.

Development equipment shall not donate to, capture, mask, nor alter the chemical composition of the soil and groundwater.

Introduction of Water: Initial development of wells in low permeability formations may dewater the casing and filter pack. When this occurs, clean, potable or tap water will be introduced into the well to enhance development.

Bailing: Development will begin by bailing to remove heavy sediments from the well casing. Care will be taken to not damage the well bottom cap during lowering of the bailer.

Surging: Care will be exercised when using a surge block to avoid damaging the well screen and casing. When surging wells screened in coarse (sand/gravelly) aquifers, the rate of surge block lifting shall be slow and constant. When surging wells screened in fine (silty) aquifers, more vigorous lifting may be required. Between surging episodes, wells will be bailed to remove accumulated sediments.

Pumping: Development pumping rates shall be less than the recharge rate of the well in order to avoid dewatering.

Discharged Water Containment and Disposal: All water and sediment generated by well development shall be collected in labeled 55-gallon steel drums. Development water will be temporarily contained on site, pending sampling and laboratory analysis. No hazardous development water will be released to the environment. Disposal of development water will be the responsibility of the client

APPENDIX F

GROUNDWATER MONITORING WELL SAMPLING PROCEDURES

APPENDIX F

GROUNDWATER MONITORING WELL SAMPLING PROCEDURES

Groundwater monitoring wells will not be sampled until at least 24 to 72 hours (according to local regulatory guidelines) after well development. Groundwater samples will be obtained using either a bladder pump, clear Teflon bailer, or dedicated polyethylene bailer. Prior to collecting samples, the sampling equipment will be thoroughly decontaminated to prevent introduction of contaminants into the well and to avoid cross-contamination. Monitoring wells will be sampled after 3 to 10 wetted casing volumes of groundwater have been evacuated and pH, electrical conductivity, and temperature have stabilized as measured with a Hydac Digital Tester. If the well is emptied before 3 to 10 well volumes are removed, the sample will be taken when the water level in the well recovers to 80% of its initial water level or more.

When a water sample is collected, turbidity of the water will be measured and recorded with a digital turbidimeter. Degree of turbidity will be measured and recorded in nephelometric turbidity units (NTU).

TPE will also measure the thickness of any floating product in the monitoring wells using an interface or probe clear Teflon or polyethylene bailer. The floating product will be measured after well development but prior to the collection of groundwater samples. If floating product is present in the well, TPE will recommend to the client that product removal be commenced immediately and reported to the appropriate regulatory agency.

Unless specifically waived or changed by the local, prevailing regulatory agency, water samples shall be handled and preserved according to the latest EPA methods as described in the Federal Register (Volume 44, No. 233, Page 69544, Table ll) for the type of analysis to be performed.

Development and/or purge water will be stored on site in labeled containers. The disposal of the containers and development and/or purge water is the responsibility of the client.

MEASUREMENTS

Purged Water Parameter: During purging, discharged water will be measured for the following parameters.

Parameter	Units of Measurement
pH	None
Electrical Conductivity	Micromhos
Temperature	Degrees F or C
Depth to Water	Feet/Hundredths
Volume of Water Discharged	Gallons
Turbidity	NTU

Documentation: All parameter measurements shall be documented in writing on TPE development logs.

APPENDIX G

QUALITY ASSURANCE AND QUALITY CONTROL PROCEDURES

APPENDIX G

QUALITY ASSURANCE AND QUALITY CONTROL PROCEDURES

The overall objectives of the field sampling program include generation of reliable data that will support development of a remedial action plan. Sample quality will be checked by the use of proper sampling, handling, and testing methods. Additional sample quality control methods may include the use of background samples, equipment rinsate samples, and trip and field blanks. Chain-of-custody forms, use of a qualified laboratory, acceptable detection limits, and proper sample preservation and holding times also provide assurance of accurate analytical data.

TPE will follow a QA/QC program in the field to ensure that all samples collected and field measurements taken are representative of actual field and environmental conditions and that data obtained are accurate and reproducible. These activities and laboratory QA/QC procedures are described below.

Field Samples: Additional samples may be taken in the field to evaluate both sampling and analytical methods. Three basic categories of QA/QC samples that may be collected are trip samples, field blanks, and duplicate samples.

Trip blanks are a check for cross-contamination during sample collection, shipment, and in the laboratory. Analytically confirmed organic-free water shall be used for organic parameters and deionized water for metal parameters. Blanks will be prepared by the laboratory supplying the sample containers. The blank shall be numbered, packaged, and sealed in the same manner as the other samples. One trip blank will be used for each sample set of less than 20 samples. At least 5% blanks will be used for sets greater than 20 samples. The trip blank is a water sample that remains with the collected samples during transportation and is analyzed along with the field samples to check for residual contamination. The trip blank is not to be opened by either the sample collectors or the handlers.

The field blank is a water sample that is taken into the field and is opened and exposed at the sampling point to detect contamination from air exposure. The water sample is poured into appropriate containers to simulate actual sampling conditions. Contamination for air exposure can vary considerably from site to site.

The laboratory will not be informed about the presence of field and trip blanks and a false identifying number will be put on the label. Full documentation of these collection and decoy procedure will be made in the site log book.

Duplicate samples are identical sample pairs (collected in the same place and at the same time), placed in identical containers. For soils, adjacent sample liners will be analyzed. For the purpose of data reporting, one is arbitrarily designated the sample, and the other is designated as a duplicate sample. Both sets of results are reported to give an indication of the precision of sampling and analytical methods.

The laboratory's precision will be assessed without the laboratory's knowledge by labeling one of the duplicates with false identifying information. Data quality will be evaluated on the basis of the duplicate results.

Laboratory QA/QC: Execution of a strict QA/QC program is an essential ingredient in high-quality analytical results. By using accredited laboratory techniques and analytical procedures, estimates of the experimental values can be very close to the actual value of the environmental sample. The experimental value is monitored for its precision and accuracy by performing QC test designed to measure the amount of random and systematic errors and to signal when correction of these errors is needed.

The QA/QC program describes methods for performing QC tests. These methods involve analyzing method blanks, calibration standards, check standards (both independent and EPA-certified standards), duplicates, replicates, and sample spikes. Internal QC also requires adherence to written methods, procedural documentation, and record keeping, and the observance of good laboratory practices.

APPENDIX H

SITE SAFETY PLAN

SITE HEALTH AND SAFETY PLAN
TANK PROTECT ENGINEERING OF NORTHERN CALIFORNIA, INC.

Site: **American Building Components Co.**
Dougherty Road
Dublin, CA 94568

Project Number: **176**

Original Site Safety Plan: Yes (X) No ( ) Revision Number:
Plan Prepared by: **Lee Huckins** Date: **5/2/94**
Plan Approved by: **John Mrakovich** Date: **5/3/94**

Please respond to each item as completely as possible. Where an item is not applicable, please mark "N/A".

1. KEY PERSONNEL AND RESPONSIBILITIES

Project Manager:	**John Mrakovich,**	**(510) 429-8088**
Site Safety Manager:	**Lee Huckins,**	**(510) 429-8088**
Alternate Site Safety Manager:		
Field Team Members:	**Lee Huckins,**	**(510) 429-8088**

Agency Reps: Please specify by one of the following symbols: Federal: (F), State: (S), Local: (L), Contractor(s): (C)

(L) Alameda County Health Care Services Agency: Eva Chu (510) 271-4530

2. JOB HAZARD ANALYSIS

2.1 OVERALL HAZARD EVALUATION

Hazard Level:	High ( )	Moderate ( )	Low ( )	Unknown (X)
Hazard Type:	Liquid (X)	Solid ( )	Sludge ( )	Vapor/Gas (X)

Known or suspected hazardous materials present on site

Benzene, Toluene, Ethyl-Benzene, Xylenes (BTEX)

Characteristics of hazardous materials included above (complete for each chemical presents):

MATERIAL #1

Corrosive ( )	Ignitable (X)	Toxic (X)	Reactive ( )
Volatile (X)	Radioactive ( )	Biological Agent ( )	
Exposure Routes:	Inhalation (X)	Ingestion (X)	Contact (X)

MATERIAL #2

Corrosive ( )	Ignitable ( )	Toxic ( )	Reactive ( )
Volatile ( )	Radioactive ( )	Biological Agent ( )	
Exposure Routes:	Inhalation ( )	Ingestion ( )	Contact ( )

MATERIAL #3

Corrosive ( )	Ignitable ( )	Toxic ( )	Reactive ( )
Volatile ( )	Radioactive ( )	Biological Agent ( )	
Exposure Routes:	Inhalation ( )	Ingestion ( )	Contact ( )

MATERIAL #4

Corrosive ( )	Ignitable ( )	Toxic ( )	Reactive ( )
Volatile ( )	Radioactive ( )	Biological Agent ( )	
Exposure Routes:	Inhalation ( )	Ingestion ( )	Contact ( )

2.2 JOB-SPECIFIC HAZARDS

For each labor category specify the possible hazards based on information available (i.e., Task-driller, Hazards-trauma from drill rig accidents, etc.). For each hazard, indicate steps to be taken to minimize the hazard.

Driller/Helper/Geologist-Trauma from drilling rig accidents-wear hard hat, gloves, steel-toed boots.

The following additional hazards are expected on site (i.e., snake infested area, extreme heat, etc.):

Temporary open boreholes.

Measures to minimize the effects of the additional hazards are:

Protect with barricades, caution tape, or traffic cones when unattended.

3. MONITORING PLAN

3.1 (a) Air Monitoring Plan

Action levels for implementation of air monitoring. Action levels should be based on published data available on contaminants of concern. Action levels should be set by persons experienced in industrial hygiene.

Level (i.e., .5 ppm)	Action Taken (i.e., commence perimeter monitoring)
5 ppm	**Cease work and commence perimeter monitoring** until contamination disperses.

(b) Air Monitoring Equipment

Outline the specific equipment to be used, calibration method, frequency of monitoring, locations to be monitored, and analysis of samples (if applicable).

Gastech, Inc., Trace-Techtor, hexane calibration. Monitor at borehole during each sampling event if vapors detected.

If air monitoring is not to be implemented for this site, explain why:

N/A

3.2 Personnel Monitoring

(Include hierarchy of responsibilities decision making on the site)

Site safety manager to make decision.

3.3 Sampling Monitoring

(a) Techniques used for sampling: **Sample air at borehole.**

(b) Equipment used for sampling: **Gastech, Inc., Trace-Techtor.**

(c) Maintenance and calibration of equipment: **Calibrate to hexane prior to operation.**

4. PERSONAL PROTECTIVE EQUIPMENT (PPE)

Equipment used by employees for the site tasks and operations being conducted. Be Specific (i.e., hard hat, impact resistance goggles, other protective glove, etc.).

Hard hat, protective gloves (when necessary), steel-toed boots.

5. SITE CONTROL AND SECURITY MEASURES

The following general work zone security guidelines should be implemented:

- Work zone shall be delineated with traffic cones.
- Boreholes shall be delineated with traffic cones when drilling and sampling activities are not actually taking place.
- Excavations shall be protected when unattended. Visitors will not be allowed to enter the work zone unless they have attended a project safety briefing.

6. DECONTAMINATION PROCEDURE

List the procedures and specific steps to be taken to decontaminate equipment and PPE.

Wash equipment with a trisodium phosphate/tap water solution and rinse with clean tap water.

7. TRAINING REQUIREMENTS

Prior to mobilization at the job site, employees will attend a safety briefing. The briefing will include the nature of the wastes and the site, donning personal protection equipment, decontamination procedures and emergency procedures.

Supervisory and key contractor personnel will take an instruction course and pass an airports operations test.

8. MEDICAL SURVEILLANCE REQUIREMENTS

If any task requires a very high personnel protection level (OSHA Level A or B), personnel shall provide assurances that they have received a physical

examination and they are fit to do the task. Also personnel will be instructed to look for any symptom of heat stress, heat stroke, heat exhaustion or any other unusual symptom. If there is any report of that kind it will be immediately followed through, and appropriate action will be taken.

9. STANDARD OPERATION PROCEDURES

Tank Protect Engineering of Northern California, Inc. (TPE) is responsible for the safety of all TPE employees on site. Each contractor shall provide all the equipment necessary to meet safe operation practices and procedures for their personnel on site and be responsible for the safety of their workers.

A "Three Warning" system is utilized to enforce compliance with Health and Safety procedures practices which will be implemented at the site for worker safety:

* Eating, drinking, chewing gum or tobacco, and smoking will be allowed only in designated areas.
* Wash facilities will be utilized by workers in the work areas before eating, drinking, or use of the toilet facilities.
* Containers will be labeled identifying them as waste, debris or contaminated clothing.
* All excavation/drilling work will comply with regulatory agency requirements.
* All site personnel will be required to wear hard hats and advised to take adequate measures for self protection.
* Any other action which is determined to be unsafe by the site safety officer.

10. CONFINED SPACE ENTRY PROCEDURES

No one is allowed to enter any confined space operation without proper safety measures. Specifically in case of an excavated Tank Pit no one should enter at any time.

11. EMERGENCY RESPONSE PLAN

Fire extinguisher(s) will be on site prior to excavation. Relevant phone numbers:

Person	Title	Phone No.
John Mrakovich	Project Manager	**(510) 429-8088**
	Fire	911 or
	Police	911 or
	Ambulance	911 or
	Poison Control Center	(800) 523-2222
	Nearest off-site no.	
Amador Valley Medical	Medical Advisor	(510) 828-9211
Mr. Ed Omernik	Client Contact	**(510) 828-0400**

U.S EPA - ERT		(201) 321-6660
Chemtrec		(800) 424-9300
Centers for Disease Control	Day	(404) 329-3311
	Night	(404) 329-2888
National Response Center		(800) 424-8802
Superfund/RCRA Hotline		(800) 424-8802
TSCA Hotline		(800) 424-9065
National Pesticide Information Services		(800) 845-7633
Bureau of Alcohol, Tobacco, and Firearms		(800) 424-9555

HEALTH AND SAFETY COMPLIANCE STATEMENT

I, _____, have received and read a copy of the project Health and Safety Plan.

I understand that I am required to have read the aforementioned document and have received proper training under the occupational Safety and Health Act (29 CFR, Part 1910.120) prior to conducting site activities at the site.

_____ _____

Signature Date

_____ _____

Signature Date

Nearest Hospital/Clinic Between 8:00 a.m. to 7:00 p.m.:

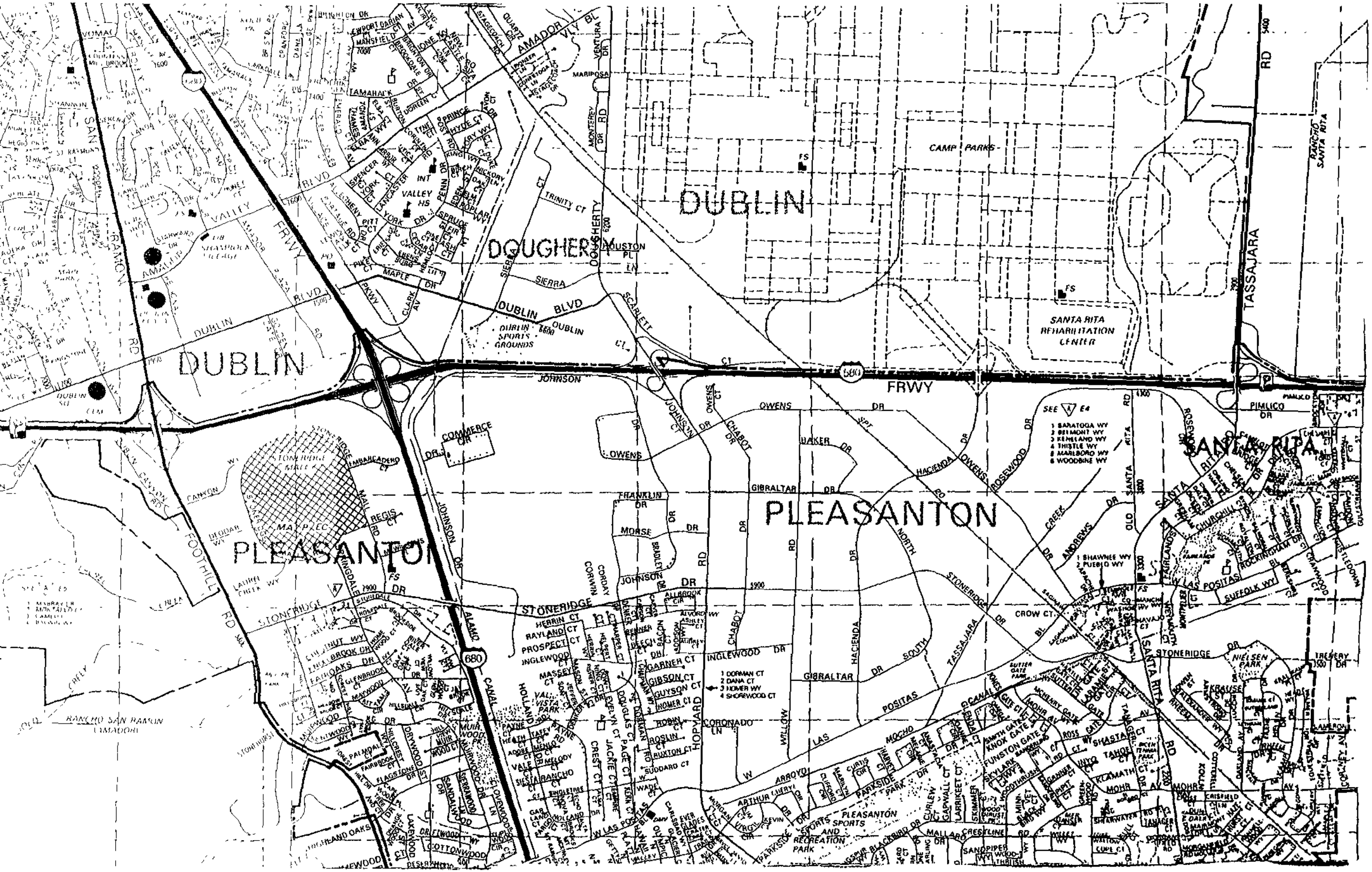
Amador Valley Medical Clinic
7667 Amador Valley Blvd.
Dublin, CA 94568
Emergency # (510) 828-9211

Drive north on Dougherty Road to Amador Valley Blvd. Turn left (west) onto Amador Valley Blvd. Look for the clinic on the right hand side.

Nearest Hospital/Clinic not between 8:00 a.m. to 7:00 p.m.

Valley Care Hospital
5555 W. Las Positas Blvd.
Pleasanton, CA 94588
Emergency # (510) 416-3418 or Gen. Info.# (510) 847-3000

Drive south on Dougherty Road, it will turn into Hopyard Road. Follow Hopyard Road to W. Las Positas Blvd. Turn left (east) onto W. Las Positas Blvd. The hospital is at the corner of W. Las Positas Blvd. and Santa Rita Road.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CAMP PARKS
SANTA RITA REHABILITATION CENTER
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PLEASANTON SPORTS AND RECREATION PARK
VALLEY HS
DUBLIN BLVD
AMADOR VLY BL
SAN RAMON RD
FOOTHILL RD
STONERIDGE DR
HOPYARD RD
OWENS DR
GIBRALTAR DR
JOHNSON DR
FRWY
TASSAJARA RD
SANTA RITA RD
LAS POSITAS
W LAS POSITAS
CANAL
SEE E4
1 SARATOGA WY
2 BELMONT WY
3 KENELAND WY
4 THISTLE WY
5 MARLBORO WY
6 WOODBINE WY
1 SHAWNEE WY
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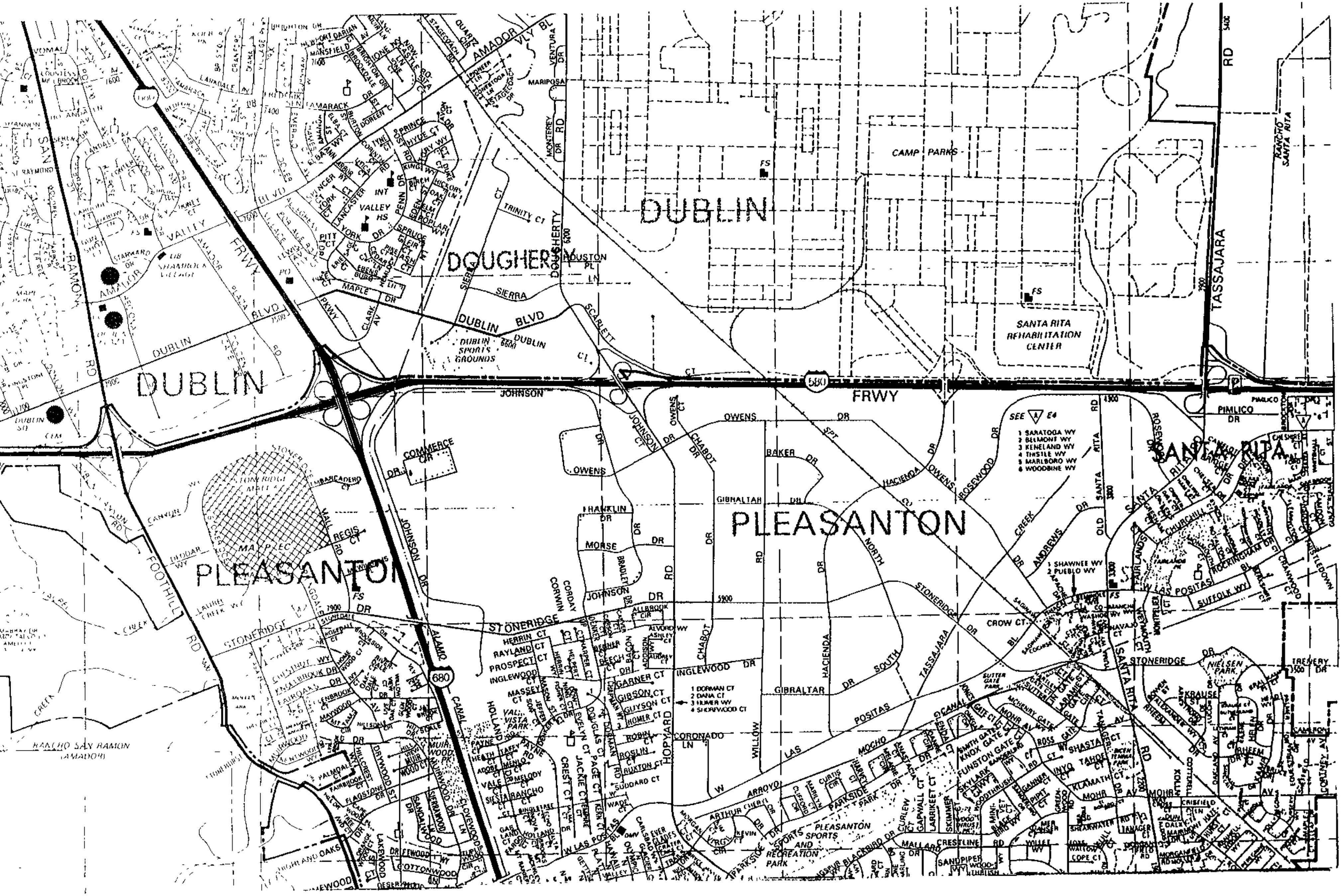

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OWENS DR
HACIENDA DR
HOPYARD RD
SANTA RITA RD
LAS POSITAS
GIBRALTAR DR
CHABOT DR
JOHNSON DR
VALLEY HS
NIELSEN PARK
RANCHO SAN RAMON (AMADOR)