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EQUILON
ENTERPRISES LLC
Shell & Texaco Working Together

June 7, 2002

Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

RE: EQUILON ENTERPRISES LLC / Equiva Services LLC dba SHELL OIL PRODUCTS US

Dear Sir or Madam:

The Shell purchase of Texaco's interest in Equilon Enterprises LLC and Equiva Services LLC has been approved by government authorities and was completed in early February.

Please be advised that effective March 1, 2002, Equilon Enterprises LLC and Equiva Services LLC will begin doing business as (DBA) "Shell Oil Products US." Since Equilon Enterprises LLC will remain the owner and/or the responsible Party of remediation activities at 461 8th Street, Oakland, California, no changes are needed or requested for permits.

If you have any questions please contact Ms. Karen Petryna at 559.645.9306.

Yours truly,

(Amber) for

Karen Petryna
Sr. Environmental Engineer

CAMBRIA

fc0343

June 7, 2002

Mr. Barney Chan
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

Re: **Agency Response and Work Plan Addendum**
Former Shell Service Station
461 8th Street
Oakland, California
Incident #97093399
Cambria Project #244-1501

Dear Mr. Chan:

On behalf of Shell Oil Products US (Shell), Cambria Environmental Technology, Inc. (Cambria) is submitting this *Agency Response and Work Plan Addendum* in response to a May 6, 2002 Alameda County Health Care Services (ACHCSA) letter. Presented below are the site summary, our response to the ACHCSA letter, and our proposed scope of work.

SITE SUMMARY

Site Description: The site is currently a paved parking lot located at the southwest corner of the intersection of 8th Street and Broadway in Oakland, California (see Figure 1). The property was leased by American Oil Company from at least 1965 until 1972 when the lease was assigned to Shell. A Shell service station operated on the property from 1972 to 1980. The underground storage tanks (USTs) associated with the former Shell service station were removed after Shell terminated operations at the site in May 1980.

Site History: In January 1979, separate phase hydrocarbons (SPH) were reported in a Bay Area Rapid Transit (BART) tunnel under the intersection of 7th Street and Broadway. Product line testing at the site indicated a pressure leak, and the product lines were replaced in January 1979. The USTs were also tested for tightness and passed. According to the *Bart Recovery Project Log* (chronological list of events – 1/10/97 through 12/3/81) and a 1981 Groundwater Technology, Inc. (GTI) *Considerations on Infiltration of Gasoline into BART KE Line* report, one observation well is reported to have been drilled to a depth of 25 feet concurrent with piping replacement with no reports of contamination. Separate-phase product samples taken from the BART tube in

Oakland, CA
San Ramon, CA
Sonoma, CA

Cambria Environmental Technology, Inc.

1144 65th Street
Suite B
Oakland, CA 94608
Tel (510) 420-0700
Fax (510) 420-9170

January 1979 and in May 1981 reported the product as Shell Regular. Approximately 2,600 gallons (48 55-gallon drums) of a gasoline-and-water mixture are reported to have been removed from the BART tunnel between October 1979 and April 1980. The Shell station discontinued operation in May 1980, and all existing improvements, tanks and associated piping were removed at that time. It is unknown whether a UST and piping removal report exists; to date, it has not been located.

Seven monitoring wells (L-1 through L-7) were installed in 1981. Based on recommendations following this investigation, a recovery well was installed in the vicinity of well L-6 (now re-named S-6) in 1982. According to a September 14, 1993 GeoStrategies Inc. (GSI) *Work Plan*, groundwater extraction from the recovery well began in February 1982 and continued until August 1982, when the system was shut down because the effluent discharge exceeded permitted discharge levels.

Wells L-1 through L-3 were destroyed during construction in the mid-1980's and are no longer accessible. Records of the well destructions are not available. Wells L-4, L-5 and L-6 were renamed S-4, S-5 and S-6. Gettler-Ryan Inc. began gauging wells S-4 through S-6 in 1986 and collecting groundwater samples for analysis in 1988. A November 2, 1993 *Work Plan for Soil and Groundwater Sampling* prepared by Enviros, Inc. (Enviros) indicates that groundwater was extracted from wells S-5 and S-6 by bailing or by a vacuum truck beginning in October 1988.

Information collected by GSI and reported in a June 30, 1993 *Phase I Preliminary Site Assessment* identified seven sites with known UST leaks within a ¼-mile radius of the site. One of the seven sites identified is the Oakland Police Department site, which was noted in the *Bart Recovery Project Log* to have replaced leaking USTs in October 1979 and to have accepted product deliveries by a local Shell gasoline distributor. During a review of available regulatory files, GSI noted a permit to repair the product lines and dispensers at the Oakland Police Department parking lot taken out in 1984 by Egan and Paradiso Company, but no additional information was available. It appears that no environmental investigation has been conducted for this site.

In July 1994, nine soil borings were installed in the vicinity of the former pump islands and the former USTs at the site. Investigation activities are described in an August 16, 1994 Enviros *Site Investigation Report.* The maximum total petroleum hydrocarbons as gasoline (TPHg) and benzene concentrations reported in soil samples were 15 parts per million (ppm) and 0.24 ppm, respectively, collected near the former pump islands. No TPHg or benzene was reported in the area of the former piping or the former UST locations.

In December 1994, onsite monitoring wells S-8, S-9 and S-10 were installed. Investigation activities are described in a February 14, 1995 Enviros *Site Investigation Report and Quarterly Monitoring Report – First Quarter 1995*. Except for 0.014 ppm benzene in sample S-8-21.5, no TPHg or benzene was reported in soil samples collected from wells S-8 and S-9. Except for 760 ppm TPHg and 0.0032 ppm benzene reported in sample S-10-11.5, no TPHg or benzene was reported in soil samples collected from well S-10.

Groundwater Monitoring: Periodic gauging of the site wells began at the site in 1981, and quarterly groundwater monitoring began in late 1988. Depth-to-water has ranged historically between 12.82 and 25.84 feet below grade (fbg), and typically flows south to south-southwest. Historical groundwater monitoring data indicates that onsite monitoring wells S-8, S-9 and S-10 have reported TPHg concentrations ranging from below method detection limits to 4,800 parts per billion (ppb) and benzene concentrations ranging from 1.0 ppb to 1,800 ppb. No SPH have been reported onsite. Prior to 1998, offsite well S-5 consistently reported SPH. Wells S-5 and S-6 have historically reported up to 142,000 ppb TPHg and 29,000 ppb benzene. Currently, Blaine Tech Services, Inc. extracts groundwater from wells S-5 and S-6 during quarterly monitoring activities.

RESPONSE TO MAY 6, 2002 LETTER

The May 6, 2002 ACHCSA letter makes several recommendations associated with our April 30, 2002 *Agency Response and Investigation Work Plan*. Our responses to each recommendation follow excerpts from the ACHCSA letter, as indicated below.

A total of seven wells and two borings are indicated on Figure 2 of your proposed investigation work plan, contrary to the eight borings and six wells mentioned in your work plan.

The work plan should have indicated a total of nine borings, seven of which will be converted to groundwater monitoring wells. The borings which will be converted to groundwater monitoring wells are shown as wells on the figure, which is why only two borings were indicated on the figure. As discussed below, we will include one additional boring and one additional well, making it an end total of three borings and eight groundwater monitoring wells. The proposed locations of borings and wells are shown on Figure 2, amended from our previously submitted figure.

One of the County concerns is the lack of deep soil samples onsite. This leaves the possibility that the early release from the product line to soil may have been over-excavated and therefore

not detected in subsequent soil investigations. If the exact location of the line leak can be determined, a deep boring should be advanced there. If the location cannot be determined, please explain why the proposed boring locations are appropriate. It appears that there has been only one deep soil sample collected from the dispenser areas.

The location of the previous line leak could not be determined based on a review of our available files for the site. No records of over-excavation have been found in site files. Because the tanks were removed in 1980, present regulations requiring soil samples during tank removal were not in place. Soil boring logs have not identified any extensive areas of fill, only shallow fill beneath the asphalt. Therefore we believe it is unlikely that soil over-excavation took place when the tanks and lines were removed.

The onsite soil boring locations were determined based on previous soil analytical results. Compiled previous soil analytical data was presented with the site conceptual model (SCM) in our April 30, 2002 work plan and is included as Attachment A presented herein. Soil samples collected from up to 21 fbg in wells L-1, L-2 and L-3, installed onsite in 1981, did not contain detectable hydrocarbon concentrations. In 1994, nine soil borings were installed onsite in the vicinity of the former dispenser islands, product piping and former UST pit, and soil samples were collected from up to 20 fbg. Hydrocarbons were detected in the shallow soil sample collected from boring B-1, located near the easternmost former dispenser island; in soil samples collected from boring B-3, located within the former tank pit; and in soil samples collected from borings B-4 and B-7, located near two of the former dispenser islands. The vertical extent of contamination was defined in boring B-1 by a deeper soil sample collected at 10 fbg. Well S-10 was later installed in the vicinity of boring B-3, and the vertical extent of contamination was defined by deeper soil samples collected from well S-10. The vertical extent of contamination detected in soil samples collected from borings B-4 and B-7 was not defined. Soil samples collected from up to 20 fbg in boring B-2, located near the assumed location of the former product lines onsite, did not contain any TPHg or benzene, toluene, ethylbenzene and xylenes (BTEX). Soil samples were collected from up to 21.5 fbg during the installation of onsite wells S-8 though S-10 in 1995. Except for 0.014 ppm benzene in the soil sample collected from 21.5 fbg in well S-8, the deepest soil samples collected from each well did not contain any TPHg or BTEX. The [redacted]

As stated in our work plan, the proposed borings will be installed to 30 fbg. Soil samples will be collected at a minimum of 5-foot intervals, and at least the deepest soil sample collected from each boring will be analyzed for TPHg, BTEX and methyl tert butyl ether (MTBE). [redacted]

The proposed well locations onsite are approved. Our office recommends the use of continuous coring and logging to possibly identify permeable lenses for preferential migration. Soil samples should be screened at least every five foot interval.

We agree with the recommendation of continuous soil sampling onsite to better characterize soil types. There are five proposed borings onsite, three of which will be converted to groundwater monitoring wells. Cambria proposes to continuously core two of the monitoring wells and one of the soil borings onsite. The northern-most proposed boring onsite, the eastern-most monitoring well proposed between existing wells S-8 and S-9, and the monitoring well proposed west of existing well S-9 will be continuously cored. In addition, soil samples will be collected at least every 5 feet and transported to a State-approved analytical laboratory for chemical analysis. Cambria believes this will provide sufficient onsite lithological information for determining if permeable lenses exist in the subsurface beneath the site. During installation of the remaining proposed boring and monitoring well onsite, soil samples will be collected at 5-foot intervals. In all proposed wells and borings, soil samples will be field-screened for hydrocarbons using a photo-ionization detector at a minimum of 5-foot intervals.

Our office recommends at least one additional boring between wells S-9 and S-5 for site characterization.

We agree with your recommendation and will install one additional boring to 30 fbg in the approximate location shown on Figure 2, assuming the absence of subsurface and overhead obstructions. This boring will be continuously cored to total depth, and field-screened for hydrocarbons at a minimum of 5-foot intervals. Additionally, soil samples will be collected at least every 5 feet and a grab groundwater sample will be collected at first encountered groundwater for transportation to a State-approved laboratory for chemical analysis. Following installation, the boring will be backfilled with grout and capped to match the existing grade.

The wells proposed adjacent to the former Chevron Station may not be necessary. Temporary borings should be considered instead and permanent wells only if contamination observed.

As stated in our May 14, 2001 *Agency Response*, the former Chevron station located at Seventh Street and Broadway is the closest potential source to the initial intrusion into the BART tube. No investigation has been conducted in reference to the former Chevron station. Cambria feels strongly that the snapshot data provided by temporary borings will not be sufficient to rule out the possibility that the contamination detected in offsite wells S-5 and S-6, located across Broadway from the former Chevron station, originated from the former Chevron station. The installation of groundwater monitoring wells will allow for collection of more steady-state data. Cambria proposes to move forward with well installation in lieu of temporary borings.

Please explain the logic for the location of the proposed well southwest of S-6. Do you assume the plume is funneled in this direction by the BART tunnel? Please consider adding another boring between S-6 and this proposed well for site characterization.

As noted in the site history above, the Oakland Police Department operates USTs near the intersection of Washington Street and Sixth Street. According to the *Bart Recovery Project Log*, a copy of which was included in our May 14, 2001 *Agency Response*, the Oakland Police Department reportedly accepted product deliveries by a local Shell gasoline distributor and replaced leaking USTs in October 1979. According to the June 30, 1993 *Phase I Preliminary Site Assessment*, a permit to repair the product lines and dispensers at the Oakland Police Department parking lot was taken out in 1984. The BART tunnel runs close to this potential source, and the construction of the tunnel or the tunnel itself could have allowed for preferential migration at one point from the Oakland Police Department USTs to wells S-5 and S-6. It appears that no subsequent environmental investigation was conducted for the site. Cambria again feels strongly that the possibility of the contamination having originated from a different source has not been fully investigated. The proposed well location is intended to investigate this possibility. In the event that the contamination is determined to have originated from the former Shell station, the proposed well will serve to assist in downgradient definition.

Cambria agrees with the County's request for additional investigation between well S-6 and the proposed well, but recommends an additional well location in lieu of a temporary boring. Again, we feel that more steady-state data is warranted to determine the source and mechanism for contaminant transport in the vicinity of the site.

Please include additional analysis for the following compounds by EPA Method 8260; TAME, ETBE, DIPE, TBA, EDB and EDC. Monitoring wells S-8, S-5 and S-6 should be sampled for these analytes once minimally.

Except for 253 ppb in well MW-5 and 72.7 ppb in well MW-6 in July 2000 (both analyzed outside of hold time), MTBE has never been detected by EPA Method 8260 in the site wells. On several occasions (i.e. S-5 in April 2001, S-6 in January 2001 and April 2001), MTBE reported as high as 1,400 ppb by EPA Method 8020 was confirmed to be non-detect when analyzed by EPA Method 8260. The USTs operated by Shell were removed in 1981, at least a decade prior to the introduction of reformulated gasoline with MTBE in the 1990s. As stated in the SCM provided in our April 30, 2002 work plan, MTBE was likely never present at the site and is not considered a constituent of concern for the site. Therefore, we disagree with the recommendation that all investigation samples be analyzed for the entire suite of oxygenates and lead scavengers. Based on your request, however, we will analyze quarterly groundwater samples collected from wells S-5, S-6 and S-8 during the next monitoring event for, in addition to the typical analytical

suite, tertiary amyl methyl ether (TAME), ethyl tertiary butyl ether (ETBE), di-isopropyl ether (DIPE), tertiary butyl alcohol (TBA), ethylene dibromide (EDB) and 1,2-dichloroethane (1,2-DCA or EDC) by EPA Method 8260. In addition, we will analyze grab groundwater samples collected from the proposed borings which will not be converted to groundwater monitoring wells during the investigation for, in addition to the analytical suite proposed in our work plan, TAME, ETBE, DIPE, TBA, EDB and 1,2-DCA by EPA Method 8260. Future analysis for these analytes in other site monitoring wells (including the proposed wells) will be based on the investigation grab groundwater results and the results from wells S-5, S-6 and S-8. OK

Once the migration pathway is determined an appropriate remediation approach should be proposed. Considering the amount of product collected from BART in the past, the release from the former Shell site must have been much greater than the initial amount assumed.

Cambria recently completed an additional review of both our files and Shell's files for the site and noted some new information which may provide a migration pathway. The 1981 GTI report titled *Considerations of Infiltration of Gasoline into BART K E Line 7th and Broadway Oakland, California* includes a copy of a portion of plans for the BART lines in the site vicinity (Attachment B). The plans indicate that the section of the BART tunnel south of Seventh Street was installed "cut and cover". The sections north of Seventh Street were driven/tunneled. "Engineering Station 915+64", where the gasoline intrusion was detected in the BART tube, is at the exact juncture of the cut-and-cover section of the tube and the driven section of the tube. Groundwater flow direction in the vicinity would have been largely affected by the amount of dewatering necessary to install a cut-and-cover tube to a total depth of approximately 35 fbg, so it is feasible that groundwater could have been pulled toward the excavation from both the former Chevron station and the Oakland Police Department at one time. In addition, the amount of backfill likely used during the cut-and-cover construction would provide an extensive preferential pathway for the migration of contaminants. Since the cut-and-cover section of the construction ends at Seventh Street, this migration pathway would end there as well, which would mean that the pathway does not run adjacent to the former Shell station at the corner of Eighth Street and Broadway. This pathway does, however, run adjacent to the former Chevron station and in the vicinity of the Oakland Police Department, which reportedly had leaking USTs in October 1979. SPHs have been detected in well S-5, located at the corner of Seventh Street and Broadway, where the cut-and-cover section ends, and native material would again be encountered.

While a release from the Shell station was reported, the volume of the release is unknown. As we have previously discussed, free product has never been detected on the Shell site, dissolved concentrations in wells onsite are low, and soil data are not indicative of a large release. Data from this proposed investigation will provide further data to evaluate the source and migratory pathway of the separate phase product.

CLOSING

We appreciate the opportunity to work with you on this project. Please call Jacquelyn Jones at (510) 420-3316 if you have any questions or comments.

Sincerely,
Cambria Environmental Technology, Inc

Jacquelyn L. Jones
Project Geologist

Diane M. Lundquist, P.E.
Principal Engineer

Figures: 1 - Vicinity/Area Well Survey Map
2 - Proposed Monitoring Well Location Map

Attachments: A - Background Data
B - BART Construction Plan

cc: Karen Petryna, Shell Oil Products US, P.O. Box 7869, Burbank, CA 91510-7869
Rory Campbell, Hanson, Bridgett, Marcus, Vlahos, & Rudy, 333 Market Street, Suite 2300, San Francisco, CA 94105-2173
Wells Fargo Bank National Association, Tr. (Property Owners), c/o Pacific Property, 364 Bush Street, San Francisco, CA 94104-2805
R. Casteel & Co., P.O. Box 6839, Moraga, CA 94570

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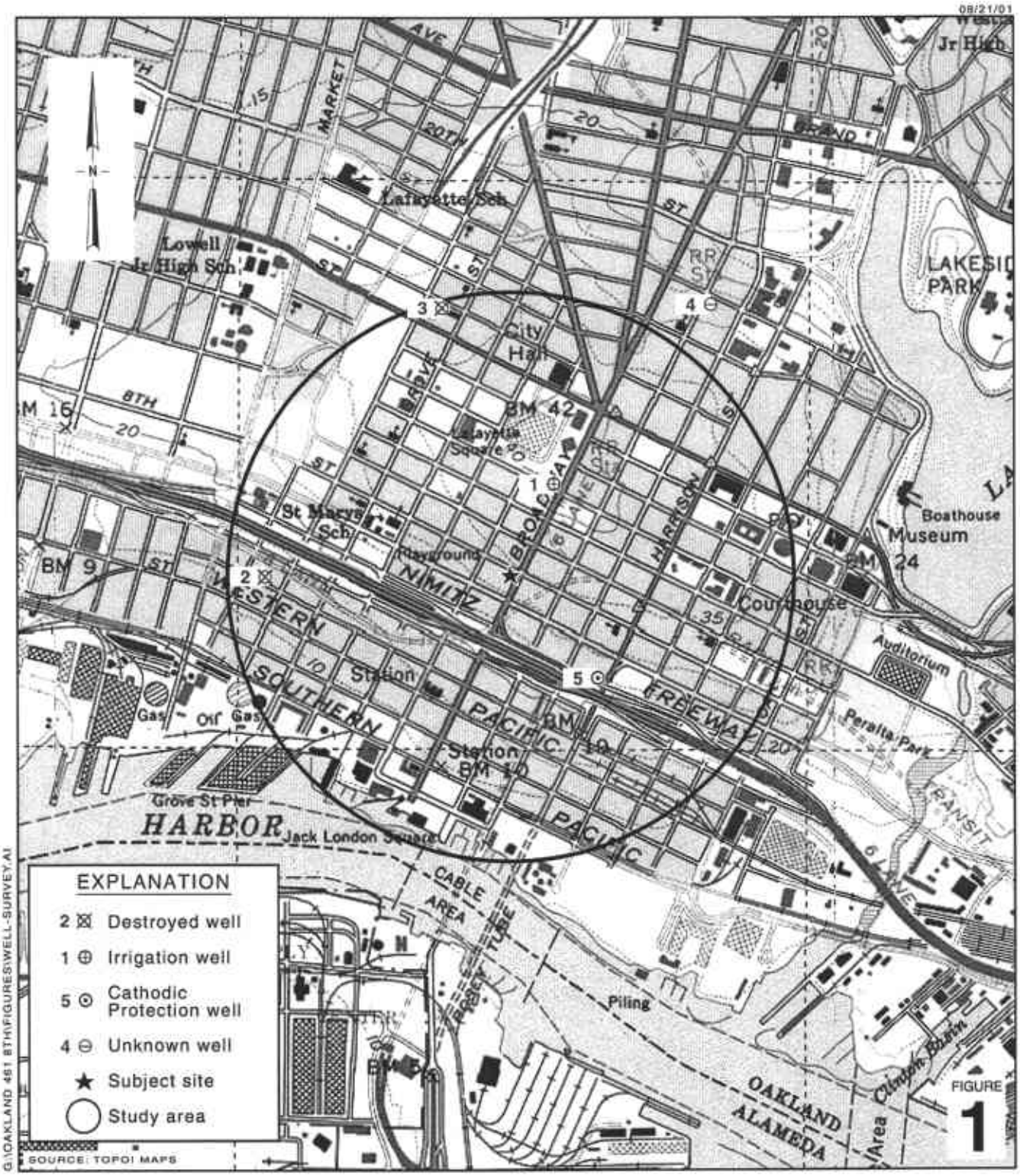


0 1/8 1/4 1/2 1

SCALE : 1" = 1/4 MILE

Former Shell Service Station
461 Eighth Street
Oakland, California
Incident #97093399

CAMBRIA

Vicinity / Area Well Survey Map

1/2 Mile Radius

EXPLANATION

- Proposed monitoring well location
- Proposed soil boring location
- S-4 Monitoring well
- S-1 Abandoned monitoring well
- MH Manhole
- FL = 16.50' Flow line depth below ground surface
- Flow direction indicator
- Underground BART line
- Storm Drain line
- Water line
- Sanitary Sewer line
- Pacific Bell line
- Gas line
- Electrical line

Groundwater Flow Direction
(1Q00 to 1Q02)

Approximate Groundwater Gradient (ft/ft)
(1Q02)

S-1
former UST
S-10
former dispenser islands and fuel lines
Former Shell Station
S-8
S-9
S-6
S-5
S-4
FL = 19.12'
FL = 13.27'
FL = 17.00'
FL = 17.50'
FL = 13.60'
FL = 13.25'
FL = 16.50'
MH
SS
8" W
12" W
16" Gas
14" Gas
8" Gas
3" Gas
6" W
14" SS
18" SD
16" SS

BROADWAY
SIXTH STREET
SEVENTH SRTEET
EIGHTH STREET

Former Chevron Station

0 25 50 100
Scale (ft)

FIGURE
2

Proposed Monitoring Well Location Map

Former Shell Service Station
461 Eighth Street
Oakland, California
Incident #97093399

CAMBRIA

G:\OAKLAND\REDSHIFT\FIGURES\PROP-WELLS-4-22-02.DWG

Attachment A

Background Data

FIGURE
1

Site Map

Former Shell Service Station
461 Eighth Street
Oakland, California
Incident #97093399

CAMBRIA

TABLE 1
SOIL CHEMICAL ANALYTICAL DATA

FORMER SHELL SERVICE STATION
461 8TH STREET,
OAKLAND, CALIFORNIA
WIC 204-5508-6205

WELL NUMBER	SAMPLE NO.	DEPTH (FT.)	SAMPLE DATE	TPH-G (PPM)	BENZENE (PPM)	TOLUENE (PPM)	ETHYL BENZENE (PPM)	XYLENES (PPM)
S-8	S-8-6.5	6.5	7-Dec-94	<1	<0.0025	<0.0025	<0.0025	<0.0025
	S-8-11.5	11.5	7-Dec-94	<1	<0.0025	<0.0025	<0.0025	<0.0025
	S-8-21.5	21.5	7-Dec-94	<1	0.014	<0.0025	<0.0025	<0.0025
S-9	S-9-6.5	6.5	7-Dec-94	<1	<0.0025	<0.0025	<0.0025	<0.0025
	S-9-11.5	11.5	7-Dec-94	<1	<0.0025	<0.0025	<0.0025	<0.0025
	S-9-21.5	21.5	7-Dec-94	<1	<0.0025	<0.0025	<0.0025	<0.0025
S-10	S-10-6.5	6.5	7-Dec-94	<1	<0.0025	<0.0025	<0.0025	<0.0025
	S-10-11.5	11.5	7-Dec-94	760	0.0032	0.028	6.4	6.9
	S-10-16.5	16.5	7-Dec-94	<1	<0.0025	<0.0025	0.0031	<0.0025
	S-10-21.5	21.5	7-Dec-94	<1	<0.0025	<0.0025	<0.0025	<0.0025

Abbreviations:

FT = Measurements in feet

TPH-G = Total Petroleum Hydrocarbons calculated as Gasoline.

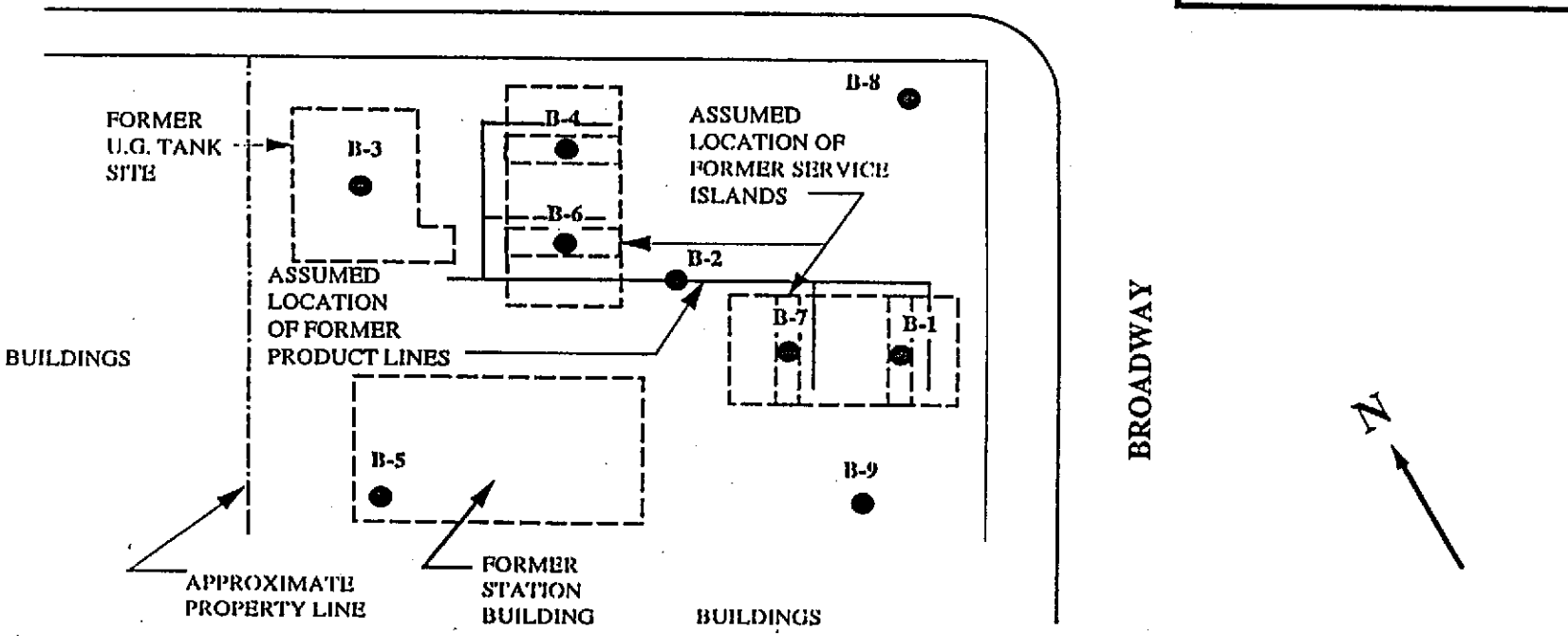
PPM = Parts Per Million.

<x = Not Detected at detection limit of x

EXPLANATION

● Exploratory Soil Boring

Note: Soil probes driven on 7-6-94 and 7-7-94.



Base Map: GeoStrategies, Inc. Site Plan 9/93

PLATE **2**

SITE PLAN
Former Shell Service Station
461 Eighth Street
Oakland, California

enviros®
E493216

Drawn By: DML/JLP Date: 8-4-94

Approved By: _____ Date: 8-15-94

TABLE 1
SOIL ANALYTICAL DATA
Former Shell Service Station
461 Eighth Street
Oakland, California
WIC 204-5508-6205

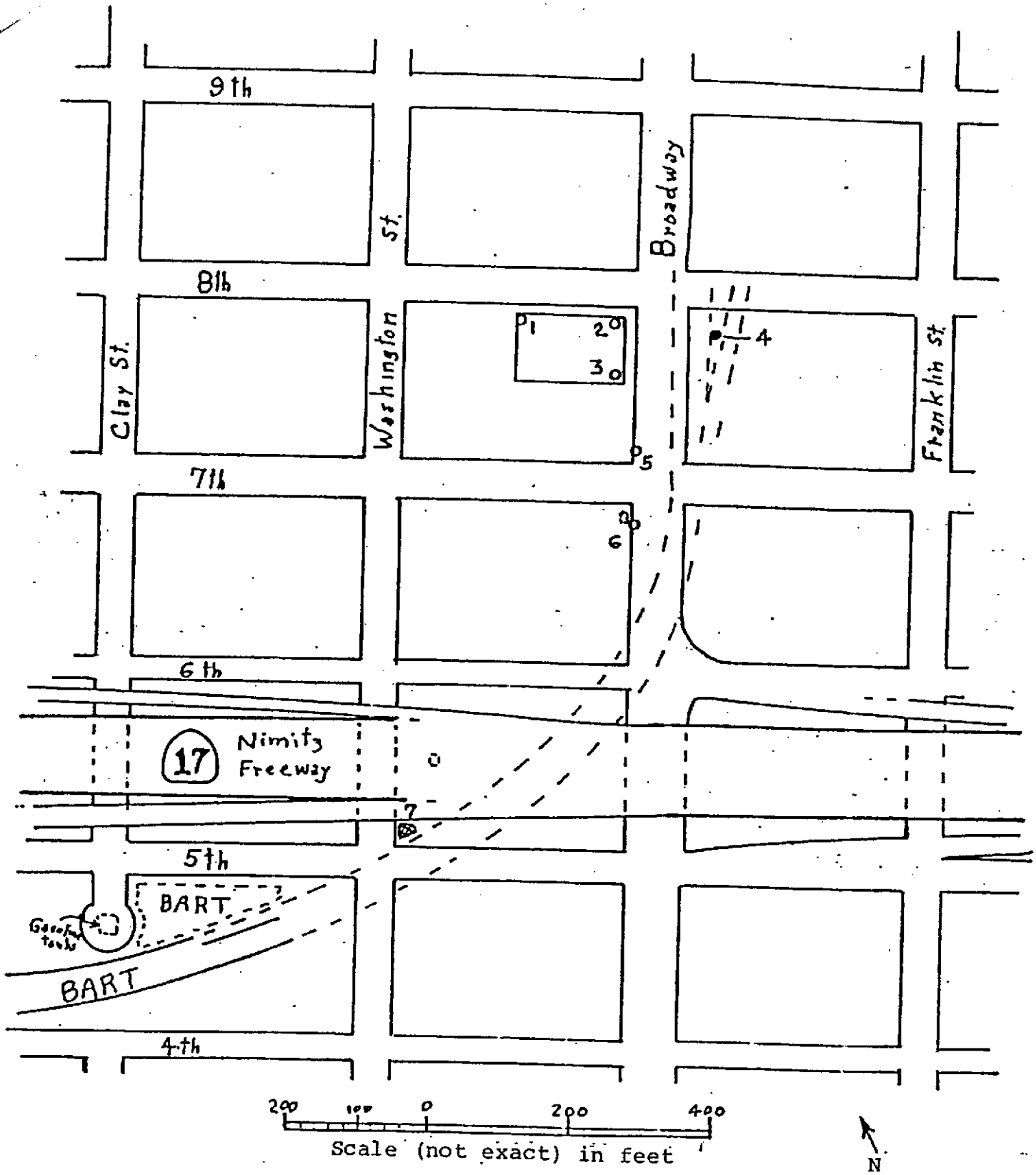
SAMPLE DATE	SAMPLE NO.	DEPTH (FT.)	TPH-G (PPM)	TPH-D (PPM)	BENZENE (PPM)	TOLUENE (PPM)	ETHYL BENZENE (PPM)	XYLENES (PPM)	OIL & GREASE (PPM)
7/6/94	**B1-5.0**	5.0	<1	28a	<0.0025	<0.0025	<0.0025	<0.0025	---
7/6/94	**B1-10.0**	10.0	<1	<2	<0.0025	<0.0025	<0.0025	<0.0025	---
7/6/94	**B2-5.0**	5.0	<1	<2	<0.0025	<0.0025	<0.0025	<0.0025	---
7/6/94	**B2-15.0**	15.0	<1	<2	<0.0025	<0.0025	<0.0025	<0.0025	---
7/6/94	**B2-20.0**	20.0	<1	<2	<0.0025	0.0028b	<0.0025	0.003b	---
7/6/94	**B3-10.0**	10.0	<1	50a	<0.0025	<0.0025	<0.0025	<0.0025	---
7/6/94	**B3-15.0**	15.0	<1	4.1	<0.0025	<0.0025	<0.0025	0.025	---
7/6/94	**B4-5.0**	5.0	<1	<2	<0.0025	<0.0025	<0.0025	<0.0025	---
7/6/94	**B4-10.0**	10.0	15	13c	<0.0025	0.037	0.027	0.21	---
7/7/94	**B5-5.0**	5.0	<1	<2	<0.0025	<0.0025	<0.0025	<0.0025	54
7/7/94	**B5-9.75**	9.75	<1	<2	<0.0025	<0.0025	<0.0025	<0.0025	<50
7/7/94	**B6-5.0**	5.0	<1	<2	<0.0025	<0.0025	<0.0025	<0.0025	---
7/7/94	**B6-18.5**	18.5	<1	<2	<0.0025	<0.0025	<0.0025	<0.0025	---
7/7/94	**B7-5.0**	5.0	<1	31a	<0.0025	<0.0025	<0.0025	<0.0025	---
7/7/94	**B7-10.0**	10.0	14	410c	0.24	0.89	0.31	2.0	---
7/7/94	**B8-5.0**	5.0	<1	<2	<0.0025	<0.0025	<0.0025	<0.0025	---
7/7/94	**B8-9.0**	9.0	<1	<4	<0.0025	<0.0025	<0.0025	<0.0025	---
7/7/94	**B9-5.0**	5.0	<1	<1	<0.0025	<0.0025	<0.0025	<0.0025	---
7/7/94	**B9-14.5**	14.5	<1	<2	<0.0025	<0.0025	<0.0025	<0.0025	---

Abbreviations:

TPH-G = Total Petroleum Hydrocarbons calculated as Gasoline.
TPH-D = Total Petroleum Hydrocarbons calculated as Diesel.
PPM = Parts Per Million.
<x = Not Detected at detection limit of x
--- = Not Analyzed

Notes:

a = The politive result appears to be a heavier hydrocarbon than Diesel.
b = Positive result confirmed by secondary column or GC/MS analysis.
c = The positive result appears to be a lighter hydrocarbon than Diesel.



Map of part of Oakland, California
Showing location of proposed
Test wells to be drilled

8-7-81
CFB

BROWN AND CALDWELL
CONSULTING ENGINEERS

ENVIRONMENTAL SCIENCES DIVISION

D. H. CALDWELL, PE Chairman
T. V. LUTGE, PE President
R. C. ABERLEY, PE Exec Vice Pres
S. A. FISHER, Vice Pres

September 30, 1981

Mr. Terry Cowhey
Cowhey Pacific Drilling
P.O. Box 11252
Santa Rosa, CA 94506

705-4

TRANSMITTAL OF GASOLINE FINGERPRINTING RESULTS

Date Sampled: As Noted
Date Received: As Noted

Log No.	Sample Description/Identification	Results
79D1	Gas Standard; 8/25/81	Standard
79D2	Soil Sample L-1; 8/25/81	None Detected
79M2	Soil Sample L-2; 8/26/81	None Detected
80D1	Soil Sample L-3 #1; 8/28/81	None Detected
80D2	Soil Sample L-3 #2; 8/28/81	None Detected
80D3	Soil Sample L-3 #3; 8/28/81	None Detected
81A1	Soil Sample L-4 #1; 8/31/81	None Detected
81A2	Soil Sample L-3 #4; 8/31/81	None Detected
81A3	Gasoline Pump East Oakland; Police Department; 8/31/81	Standard
82W1	Soil Sample L-5 #1; 9/3/81	None Detected
82W2	Soil Sample L-5 #2; 9/3/81	None Detected
82W3	Soil Sample L-6 #1; 9/3/81	None Detected
84E1	Soil Sample L-6 #1; 9/8/81	None Detected
84E2	Soil Sample L-6 #2; 9/8/81	None Detected
84E3	Soil Sample L-6 #3; 9/8/81	None Detected
84E4	Soil Sample L-6 #4; 9/8/81	None Detected

Log No.	Sample Description/Identification	Results
85M1	Soil Sample L-7 #1; 9/10/81	None Detected
85M2	Soil Sample L-7 #2; 9/10/81	None Detected
85M3	Soil Sample L-7 #3; 9/10/81	None Detected

Positive identifications would have been made if the concentration of gasoline had been greater than 250 ppm.

Reported by: _____
Edward Wilson
Laboratory Director

cc Mr. James Ballerino, Cowhey Pacific Drilling

Attachment B

BART Construction Plan

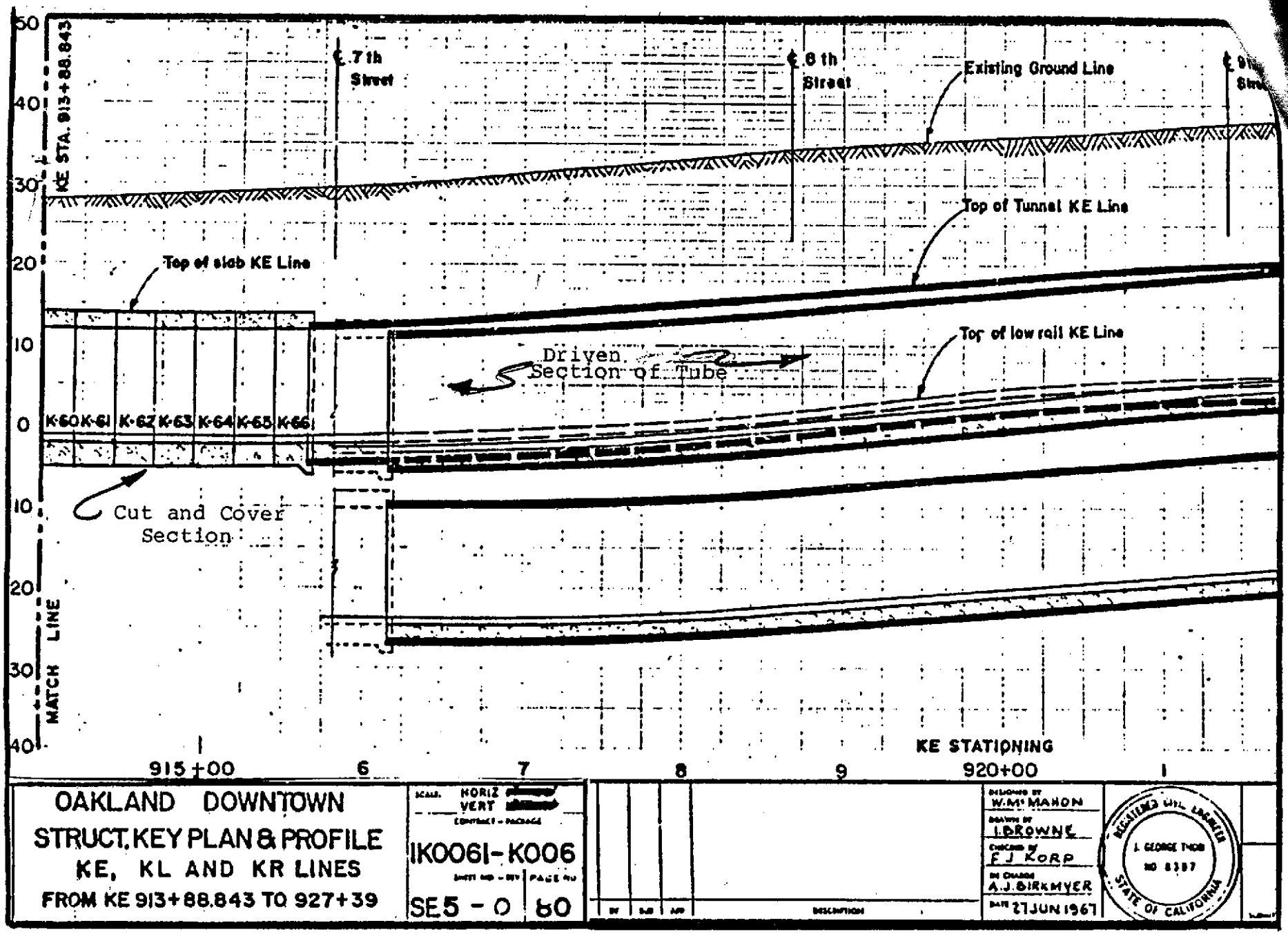


Figure # 10

Copy of portion of plans for Bart K.E. line
showing contact between cut & cover section of the tube
and driven section of the tube at 7th and Broadway in Oakland, California

BAY AREA RAPID TRANSIT DISTRICT
800 Madison Street
Oakland, California 94607
Telephone (415) 465-4100

November 25, 1981

Mr. Raymond G. Newsome, District Engineer
Shell Oil Company
2401 Crow Canyon Road
P.O. Box 250
San Ramon, California 94583

Subject: BART KE Track - Gas Leak
7th & Broadway, Oakland

Dear Mr. Newsome:

This letter is to advise you that the first phase of the KE Track construction is now completed and we would very much like to put this new facility into service on December 15, 1981. It is important we meet this target date as this new facility will greatly enhance our revenue operation capabilities.

As you are aware, we have had serious gas intrusion problems in our subway at Engineering Station 915 + 64 since January, 1979. Your company took action to eliminate this problem by drilling seven test holes during the period of August 25, 1981 to September 10, 1981. During this period, the gas intrusion subsided. With the recent rains, however, gas intrusion has once again been noted in the vicinity of Engineering Station 915 + 64.

We have now reached a point in time where this condition will hamper our revenue operation due to the safety factor involved. I was under the impression the reason test holes were drilled was to give you a location where the gas could be pumped up from the water table eliminating the problem.

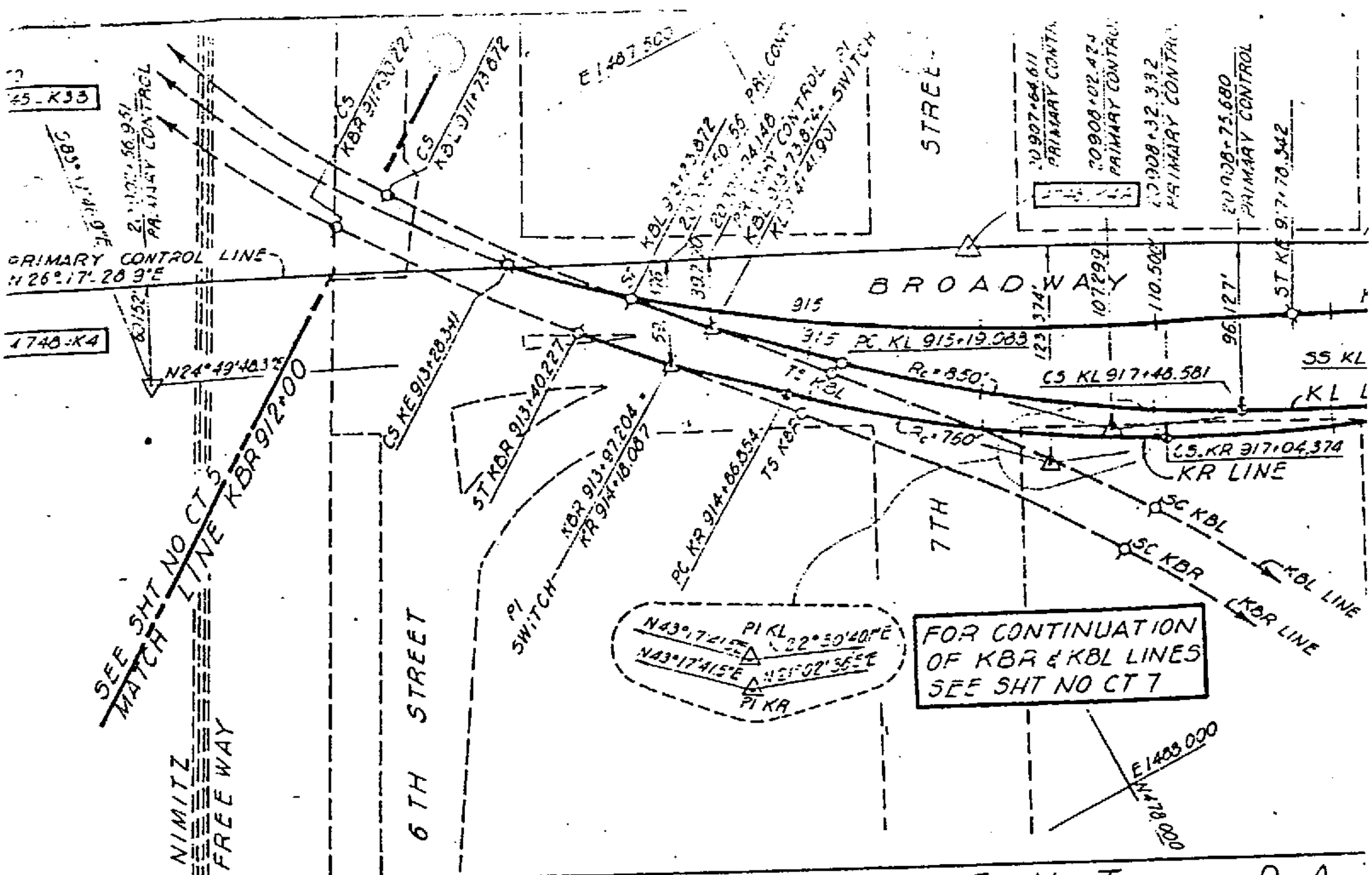
I appreciate the cooperation you have given us in the past and I am certain you will handle the problems we are now confronted with in the same manner.

If you have any questions regarding this matter, please feel free to contact me.

Very truly yours,

V. P. Mahon

V. P. Mahon, Department Manager
Power & Way Maintenance



ALIGNMENT — DA

KR LINE

POINT	& STATION	COORDINATES N	COORDINATES E	CURVE DATA
PI SW.	KBR 913+97.204 KR 914+18.087	477683.643	1487662.270	TL1 = 68.768 Ts1 = 152.949 Ls1 = 0.000
PC PI CS	KR 914+86.354 KR KR 917+04.374	477935.694 478047.016 478113.060	1487709.426 1487814.313 1487834.062	Δ = 22° 15' 05.0" Δc = 16° 23' 54.9" Rc = 760.000 Lc = 217.519
SS	KR 918+59.643	478255.926	1487894.665	K2 = 77.607 P2 = 1.321 Y2 = 5.283 X2 = 155.107 θs2 = 5° 51' 10.1" Ls2 = 155.269 Ts2 = 223.638 TL2 = 275.370 TL1 = 223.636 Ts1 = 275.370 Ls1 = 122.000 θs1 = 0° 55' 11.1" X1 = 121.997 Y1 = 0.653 P1 = 0.163 K1 = 60.999
SC PI CS	KR 919+81.643 KR KR 922+38.156	478369.552 478512.931 478604.031	1487939.103 1487993.567 1488042.996	Δ = 6° 22' 14.1" Δc = 3° 52' 03.6 Rc = 3800.000 Lc = 256.513
ST	KR 924+48.156	478791.325	1488137.959	K2 = 104.997 P2 = 0.484 Y2 = 1.934 X2 = 209.984 θs2 = 1° 34' 59.4 Ls2 = 210.000 Ts2 = 313.612 TL2 = 211.388

KL LINE

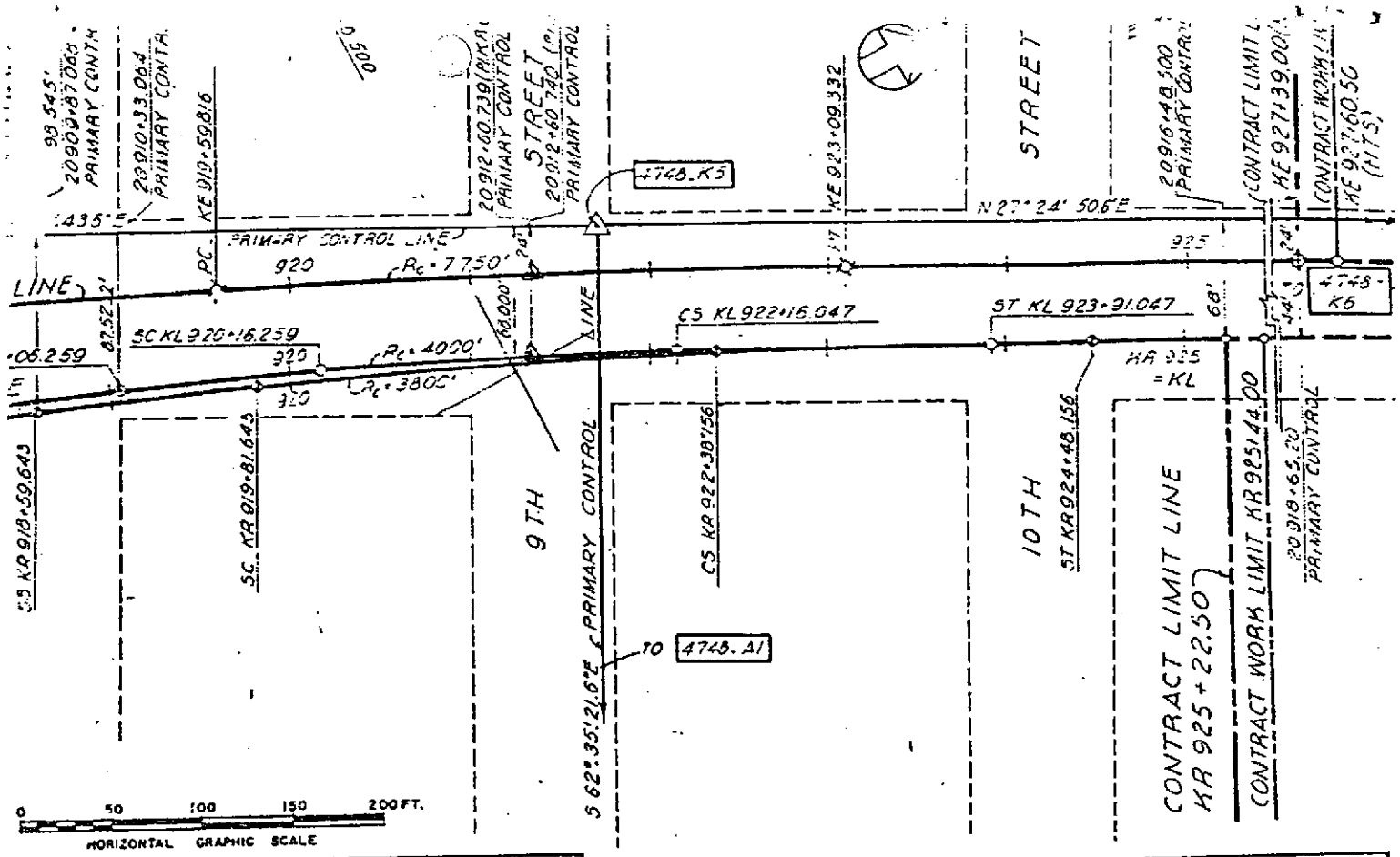
POINT	& STATION	COORDINATES N	COORDINATES E	CURVE DATA
PI SW	KBL 913+73.874 KL 914+41.901	477915.851	1487655.270	TL1 = 77.187 Ts1 = 159.313 Ls1 = 0.000
PC PI CS	KL 915+19.088 KL KL 917+48.581	477972.331 478087.984 478158.158	1487706.202 1487817.451 1487841.269	Δ = 20° 47' 01.4" Δc = 15° 28' 09.3" Rc = 850.000 Lc = 229.494
SS	KL 919+06.259	478301.632	1487906.078	K2 = 78.816 P2 = 1.218 Y2 = 4.872 X2 = 157.542 θs2 = 5° 18' 51.4" Ls2 = 157.678 Ts2 = 231.486 TL2 = 228.511 TL1 = 231.486 Ts1 = 228.511 Ls1 = 110.000 θs1 = 0° 47' 16.1" X1 = 109.998 Y1 = 0.504 P1 = 0.126 K1 = 55.000
SC PI CS	KL 920+16.259 KL KL 922+16.047	478403.255 478512.931 478584.701	1487948.650 1487993.567 1488032.229	Δ = 4° 54' 10.5" Δc = 2° 51' 42.3 Rc = 4000.000 Lc = 199.787
ST	KL 923+91.047	478740.629	1488111.665	K2 = 87.499 P2 = 0.319 Y2 = 1.276 X2 = 174.992 θs2 = 1° 15' 12.0" Ls2 = 175.000 Ts2 = 256.503 TL2 = 268.497

KE LINE

THIS PRINT REDUCED HALF SCALE

DESIGNED BY O Fitz Patrick
DRAWN BY C Glasmacher
CHECKED BY J Evers Jr.
IN CHARGE A J Dirkmyer
DATE 27 JUN 67

REGISTERED ... J. GEORGE THOR NO. 8393 STATE OF CALIFORNIA



A

POINT LOCATION	COORDINATES N	COORDINATES E	CURVE DATA
			Tc = 828.755 Ts = 174.788 Ls = 0.000
919+59.316	478 374.560 478 533.189	1487 881.109 1487 954.508	Δ = 2° 35' 023 Δc = 2° 35' 023 Rc = 7 750.000
923+09.332	478688.342	1488 034.983	Lc = 349.516 Ls2 = 0.000 Ts2 = 174.788 Tc2 = 350.212

BENCH MARKS

MT	ELEV	DESCRIPTION & LOCATION
B6	20.281	Top Disk SFBARTD Monument Intersection Broadway & 5th St
B6A	25.902	Top Pin in Std OCM Intersection Franklin St & 5th St
B6B	33.501	Top Pin in Std OCM Intersection Franklin St & 8th St
B1	33.351	Top Disk SFBARTD Monument Intersection Webster St & 8th St
B6C	38.247	Top Pin in Std OCM Intersection Franklin St & 10th St

— PRIMARY CONTROL LINE —

POINT LOCATION		STATION	COORDINATES N	COORDINATES E	DISTANCE IN FEET	BEARING
4748-K4	5TH-BDWY	20 90?+58 14	477 560 471	1487 435.324	562.393	N 26° 17' 28.9" E
4748-K4A	BDWY-7TH	20907+20.53	478 064.684	1487 684.497	576.796	N 27° 24' 43.6" E
4748-K5	BDWY-9TH	20 312+37.33	478 576.718	1487 950.047	1402.665	N 27° 24' 50.6" E
4748-K6	BDWY-14TH	20 927+00.00	479 821.869	1488 595.861		
4748-K5	BDWY-9TH	20 348+53.36	478 576.718	1487 950.047	1131.481	S 62° 35' 21.6" E
4748-A1	HAR-9TH	20 960+45.44	478 028.201	1489 007.761		

SHEET NO	TITLE
CT 14	KE Line Plan & Profile
CT 16	KL Line Plan & Profile
CT 15	KA Line Plan & Profile
GP 9	General Civil Notes

REFERENCE DRAWINGS

SAN FRANCISCO BAY AREA RAPID TRANSIT DISTRICT

BECHTEL CORPORATION ENGINEERS SAN FRANCISCO

PARSONS BRINCKERHOFF-TUDOR-BECHTEL GENERAL ENGINEERING CONSULTANTS

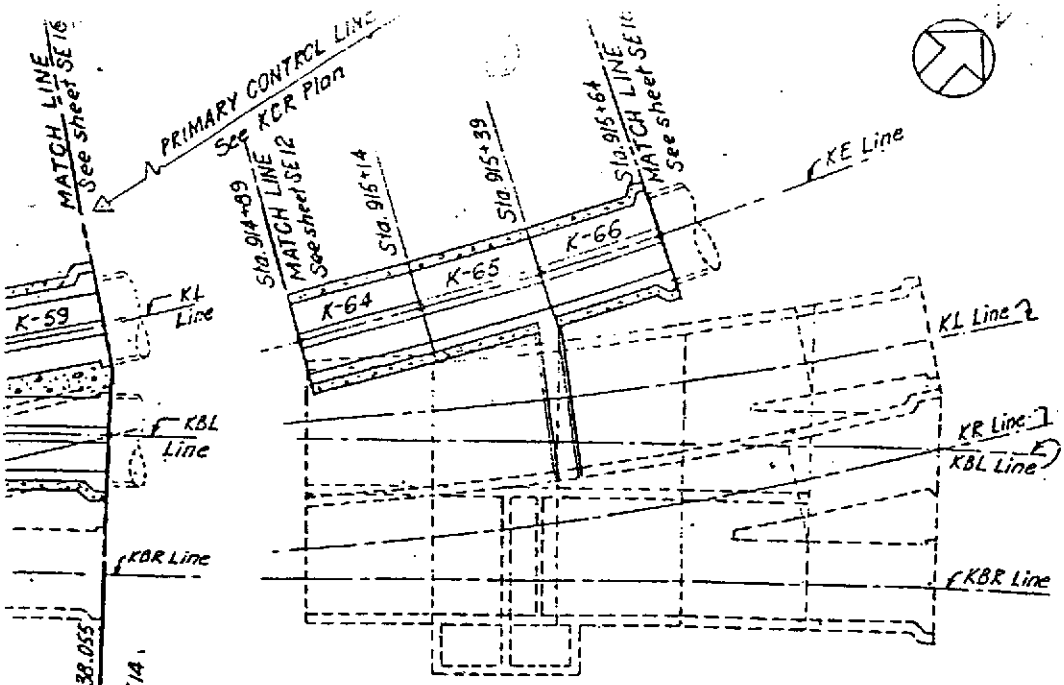
OAKLAND DOWNTOWN ALIGNMENT DATA

KE913+28.341 TO KE925+61.000

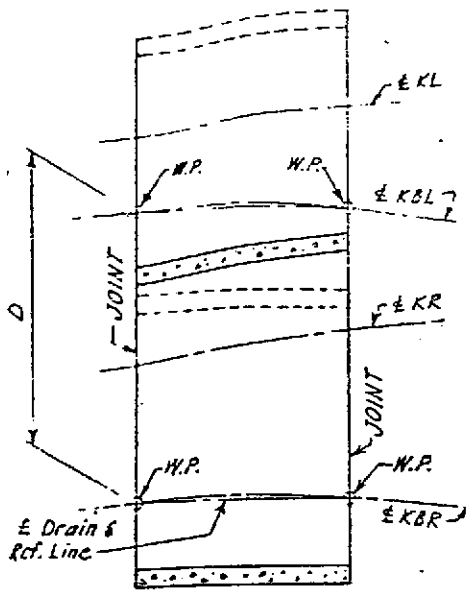
SCALE 1" = 50'

CONTRACT - PACKAGE 1KO061-KOC

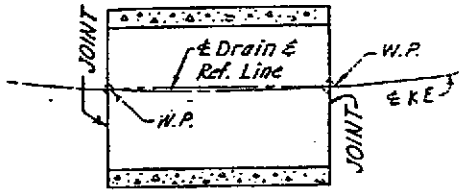
SHEET NO. CT6-0



PLAN KE LINE
(KE Stationing)

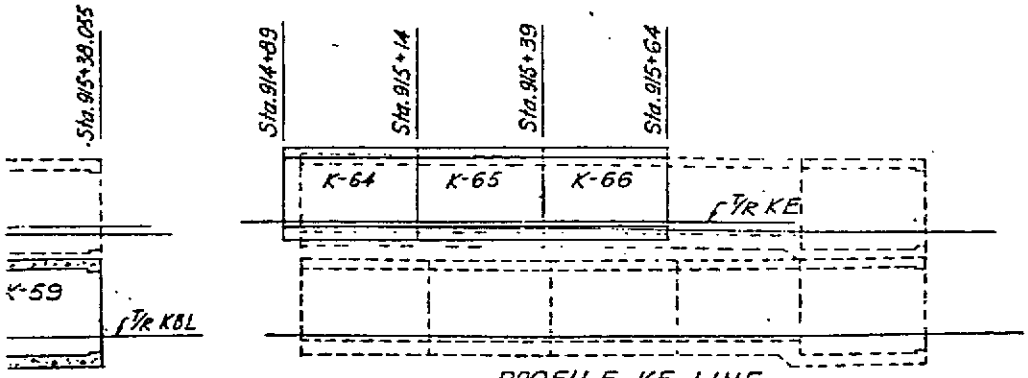


TYPICAL FOR K-55 THROUGH K-59



TYPICAL FOR K-64 THROUGH K-66

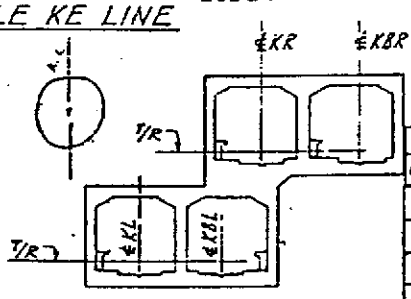
SEGMENT LAYOUT PLANS



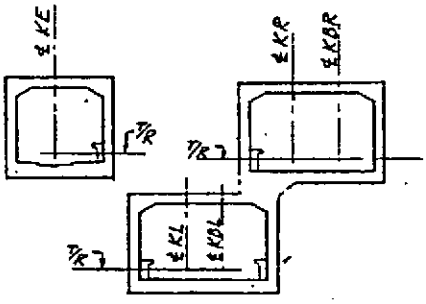
PROFILE KE LINE

NOTES :

1. Reference line is the chord between working points.



TYPICAL CROSS SECTION
SEGMENTS K-58 & K-59



TYPICAL CROSS SECTION
SEGMENTS K-55 THROUGH K-57
SEGMENTS K-64 THROUGH K-66

SHEET NO.	TITLE
SE16	Structural Alignment
CT-10,12,14,15,16	Plan & Profile
SE 67-69	Conc. Outlines Segments K58 & K59
SE-161	General Struct. Notes, Symbols & Abbreviations
SE 54-58	Conc. Outlines Segments K56 & K57
SE-48	Conc. Outlines, Segments K40 Thru K45
SE-49	Conc. Outlines Segments K 52 through K55
SE-14	Structural Alignment
SE-12	Structural Alignment
SE-445	Structural Key Plan & Profile
SE-1	General Arrangement Plan
CT-7	Alignment Data
CT-6	Alignment Data

REFERENCE DRAWINGS

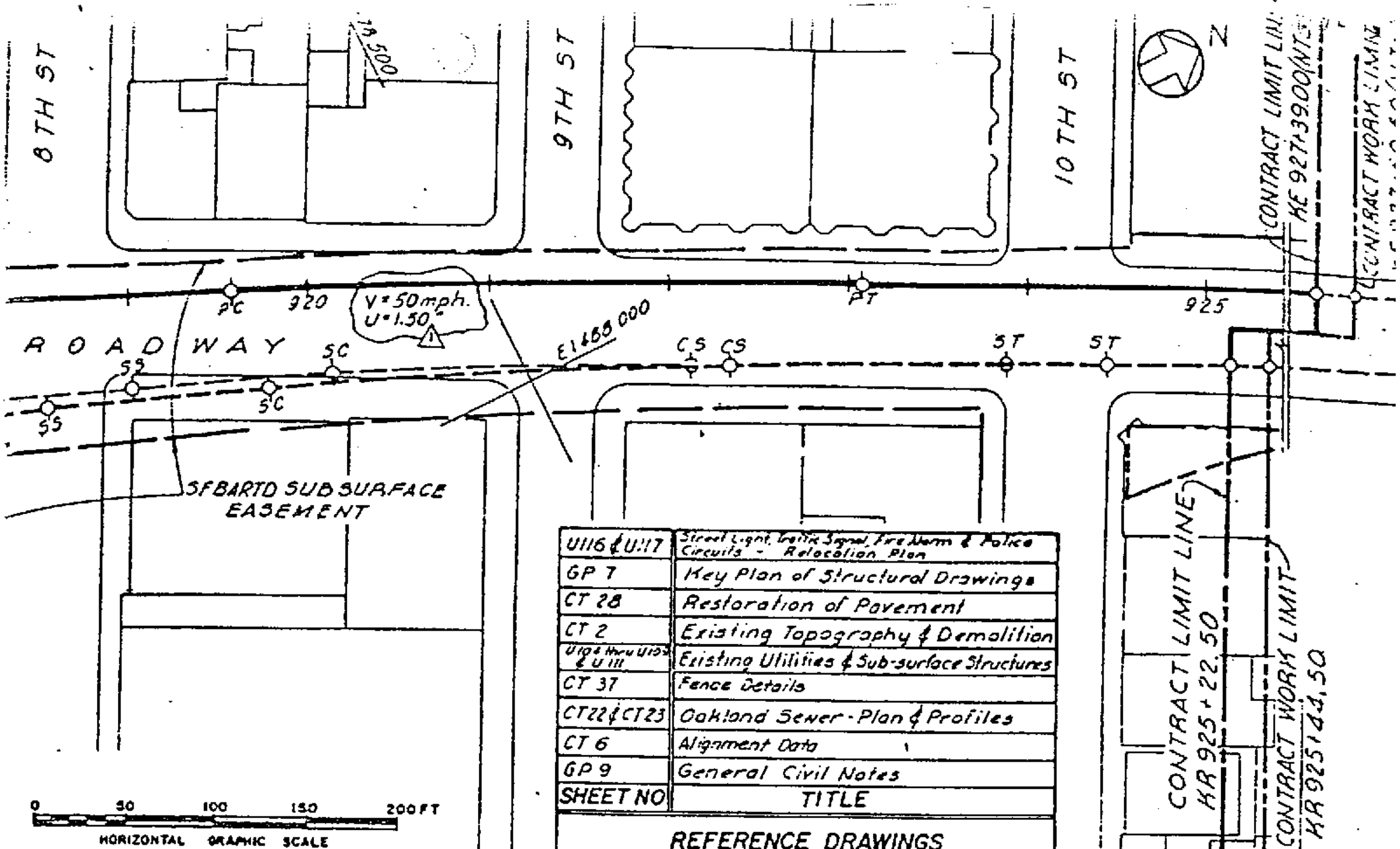
N FRANCISCO BAY AREA RAPID TRANSIT DISTRICT

SCHTEL CORPORATION
ENGINEERS
SAN FRANCISCO

PARSONS BRINCKERHOFF-TUDOR-SECHTEL
GENERAL ENGINEERING CONSULTANTS

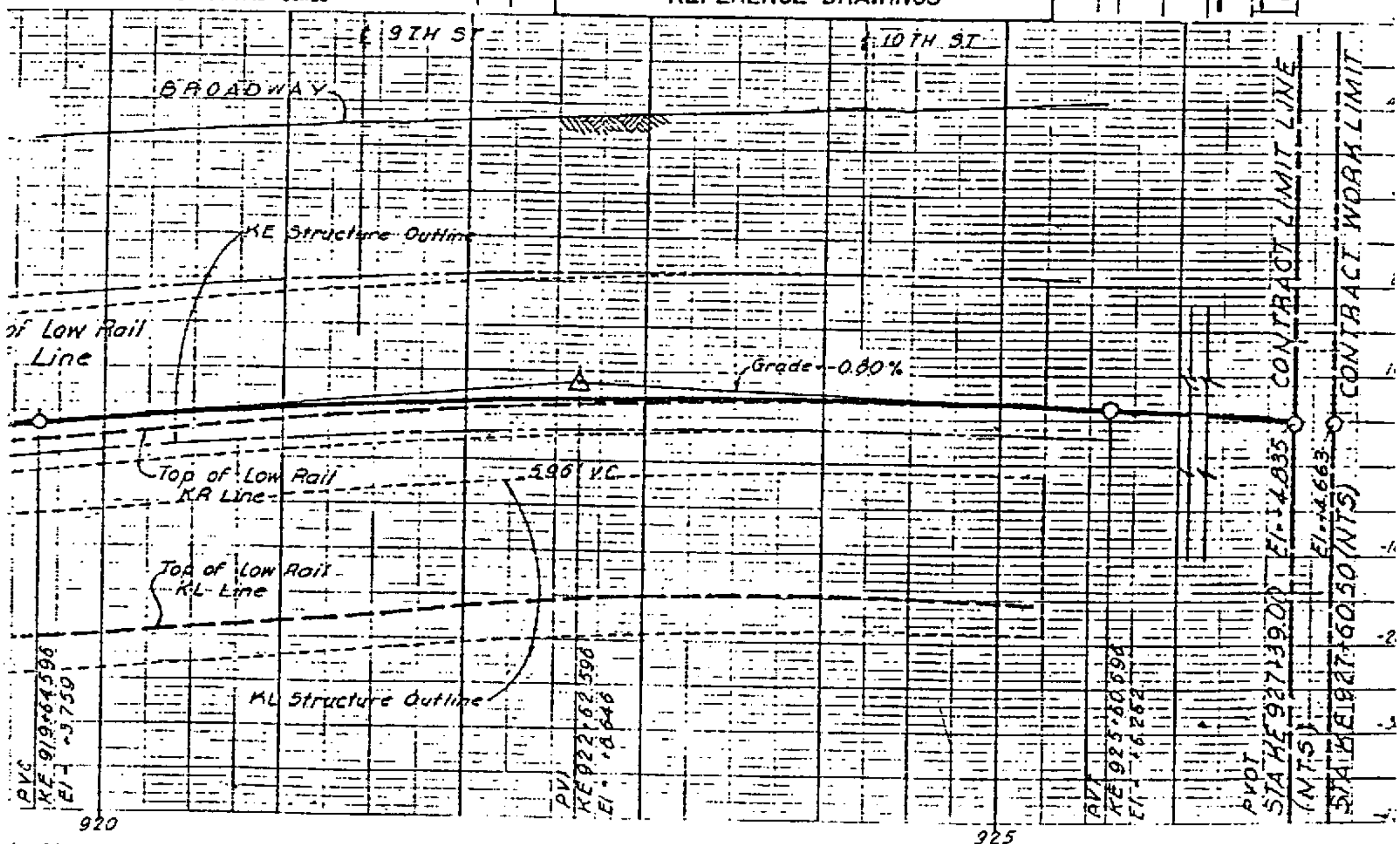
OAKLAND DOWNTOWN
STRUCTURAL ALIGNMENT
KBR, KE, KBL, KR AND KL LINES
FROM KBR 914+50 TO KBR 915+75

1" = 20'-0"
CONTRACT - PACKAGE
IK0061-K00
SHEET NO. - OF - PARK NO.
SE13 - 01 88



SHEET NO	TITLE
U116 & U117	Street Light, Traffic Signal, Fire Alarm & Police Circuits - Relocation Plan
GP 7	Key Plan of Structural Drawings
CT 28	Restoration of Pavement
CT 2	Existing Topography & Demolition
U104 thru U105 & U111	Existing Utilities & Sub-surface Structures
CT 37	Fence Details
CT22 & CT23	Oakland Sewer - Plan & Profiles
CT 6	Alignment Data
GP 9	General Civil Notes

REFERENCE DRAWINGS



SAN FRANCISCO BAY AREA RAPID TRANSIT DISTRICT

BECHTEL CORPORATION ENGINEERS SAN FRANCISCO

PARSONS BRINCKERHOFF-TUDOR-BECHTEL GENERAL ENGINEERING CONSULTANTS

APPROVED

OAKLAND DOWNTOWN

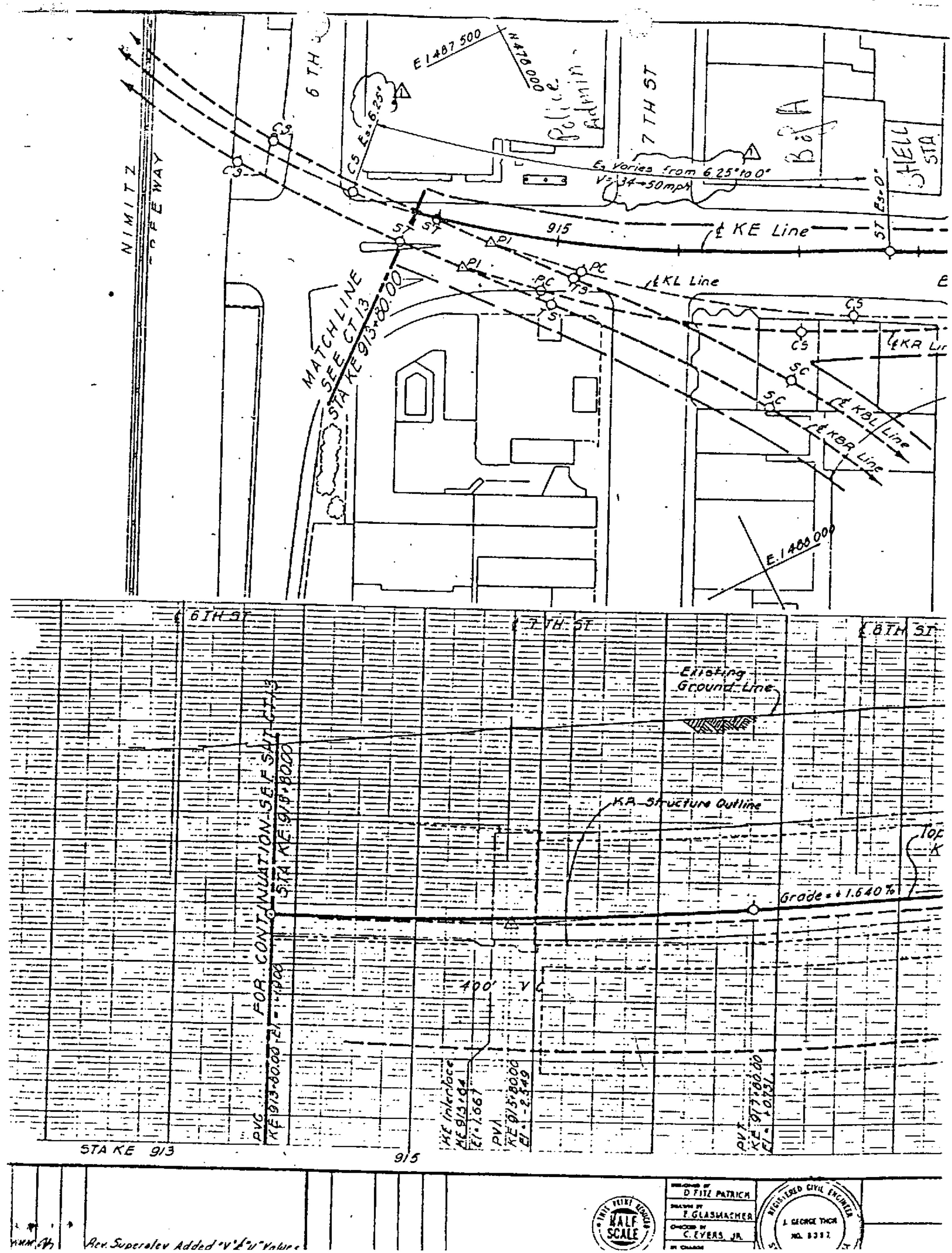
KE LINE PLAN & PROFILE

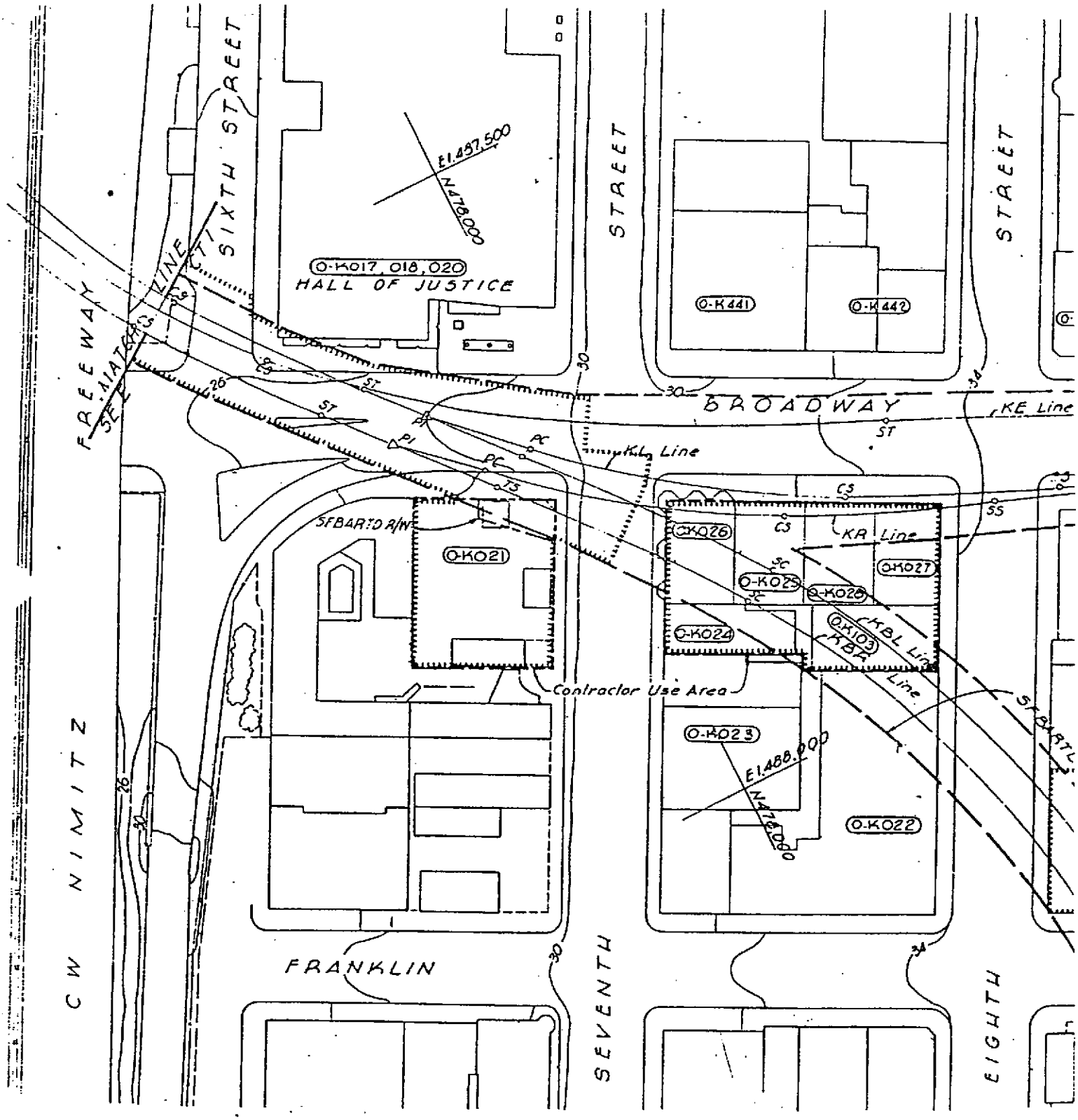
KE913+80 TO 927+39

SCALE HORIZ: 1" = 50' VERT: 1" = 10'

CONTRACT - PACKAGE 1K0061-K006

SHEET NO. - REV. CT14-1 SHEET No. 27


6 TH ST
E 1487 500
N 476 000
Police Admin
7 TH ST
BofA
SHELL STA
NIMITZ FREEWAY
C3
CS Es 6.25'
CS
Es Varies from 6.25' to 0'
V= 34→50mph
Es 0'
ST
ST
915
℄ KE Line
PI
PI
PC
PC
TS
℄ KL Line
CS
CS
℄ KR Line
SC
SC
℄ KBL Line
℄ KBR Line
MATCHLINE SEE CT 13 STA KE 913+80.00
E 1488 000
℄ 6TH ST
℄ 7TH ST
℄ 8TH ST
Existing Ground Line
KR Structure Outline
Grade = +1.640%
400' V C
FOR CONTINUATION SEE SHT CT-13
STA KE 913+80.00
PVC KE 913+80.00 El = 1.900
KE Interlace KE 913+64 El = 1.667
PVI KE 915+80.00 El = 2.549
PVT KE 917+80.00 El = 10.731
STA KE 913
915
Rev. Superelev Added "V" & "V" Values
HALF SCALE
D FITZ PATRICK
E GLASMACHER
C EVERS, JR.
REGISTERED CIVIL ENGINEER
J. GEORGE THON
NO. 8312



DESIGNED BY	A. ULRICH
DRAWN BY	A ULRICH
CHECKED BY	C. EVERS JR.
QA CHECK	J BIRKMYER

REGISTERED CIVIL ENGINEER
J. GEORGE THOM
NO. 8397
STATE OF CALIFORNIA