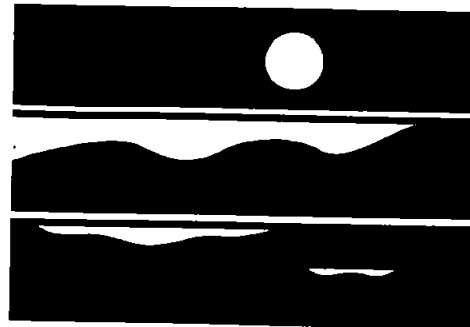


***Summary Report on Remediation
Activities U-1 Hot Spot in
Garden Avenue North***

***Paccar Renton Site
Renton, Washington***

***January 5, 1995
J-1639-35***





WASHINGTON STATE
DEPARTMENT OF
E C O L O G Y

PACCAR SITE

RESPONSIVENESS SUMMARY

for

Proposed Amendments

to the Consent Decree

August 1994

This Responsiveness Summary addresses the public comment period for the proposed amendments to the Consent Decree at the PACCAR site.

The PACCAR site is located at 1400 North 4th Street in Renton, Washington. PACCAR had operated a facility for manufacturing railcars and military vehicles at the site from 1908 until 1988. Recognizing hazardous substances at the site from eight decades of operations, PACCAR began work in 1991 to clean up the facility under a Consent Decree with Ecology.

The public was encouraged to comment from June 30 to July 30, 1994. Ecology compiled a mailing list of residents near the site, businesses in the area, environmental groups, public officials, and other interested parties. A fact sheet notifying the public of the opportunity to comment was distributed to persons on the mailing list. In addition, a notice was published in Ecology's Site Register and a display advertisement in south edition of The Seattle Times.

A public hearing was held in Renton on July 18, 1994 to answer questions and to take oral public comment.

Ecology received one written comment during the comment period. The comment was from the Puget Sound Air Pollution Control Agency (PSAPCA). The response to the comment includes a memo from the site manager, the written comment letter, and a response letter from PACCAR.

IF YOU HAVE QUESTIONS:

Contact Dr. David L. South (Site Manager) for questions regarding the Consent Decree amendments and technical aspects of the cleanup at (206) 649-7200.

Contact Susan Lee (Public Involvement) for questions about the Responsiveness Summary and public involvement opportunities at (206) 649-7138.

INFORMATION REPOSITORIES:

Remember, documents concerning the PACCAR site are available for your review at the following locations:

Department of Ecology
3190 160th Avenue SE
Bellevue, WA 98008-5452
(206) 649-7239
Attn: Judy Fisher

Renton Public Library
100 Mill Avenue South
Renton, WA 98055
(206) 235-2610



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

Northwest Regional Office, 3190 - 160th Ave S.E. • Bellevue, Washington 98008-5452 • (206) 649-7000

August 1, 1994

TO: Interested Parties

RE: PACCAR Defense Systems: Responsiveness Summary for Consent Decree Amendment, August 1994

Public comment was received on proposed amendments for the Consent Decree governing cleanup of PACCAR Defense Systems during the period July 1, 1994 to July 30, 1994. One comment was received from the Puget Sound Air Pollution Control Agency. This comment and PACCAR's response are attached. No changes in the proposed amendment are necessary.

Sincerely,

David L. South

David L. South
Senior Engineer
Toxics Cleanup Program

DLS:dls

cc: PACCAR/SIT7.13



July 7, 1994

David L. South
Department of Ecology
3190 160th Avenue SE
Bellevue, WA 98008-5452

Dear Mr. South:

PACCAR Site Remediation

Thank you for the opportunity to comment on the proposed consent decree amendments for the PACCAR Site in Renton, Washington. The Puget Sound Air Pollution Control Agency (PSAPCA) has several requirements that might be applicable at this site depending on the amendments.

A notice of construction permit is required if a vapor extraction system or an air stripper will be installed at the site. Agency review and subsequent approval of the notice of construction permit assures Ecology and the public that the best available control technology has been applied on air contaminant generating equipment at the site. The application forms are available upon request.

Other applicable requirements that apply to this remediation site include registration of any air contaminant generating or control equipment with PSAPCA, control of fugitive dust and odors, maintenance of equipment and control equipment, implementation of an operation and maintenance plan, etc. PSAPCA is willing to assist you in determining all applicable or relevant and appropriate requirements.

Feel free to contact me at (206) 689-4057 if you have further questions or comments.

Sincerely,

Margaret L. Corbin
Air Pollution Engineer

jrs

Dennis J. McLerran, Air Pollution Control Officer

B O A R D O F D I R E C T O R S

Chairman: Win Granlund, Commissioner, Kitsap County
Janet Chalupnik, Member at Large
Edward D. Hansen, Mayor, Everett

Lynn S. Horton, Mayor, Bremerton
R.C. Johnson, Councilman, Snohomish County
Gary Locke, King County Executive

Harold G. Moss, Mayor, Tacoma
Norman B. Rice, Mayor, Seattle
Doug Sutherland, Pierce County Executive

RECEIVED

JUL 28 1994

DEPT. OF ECOLOGY

PACCAR Inc

CORPORATE ENVIRONMENTAL

July 26, 1994

Mr. David L. South, P.E.
Department of Ecology
3190 160th Avenue SE
Bellevue, WA 98008-5452

Dear Dave:

I have reviewed the PSAPCA letter of July 7, 1994 submitted during the 30-day review period on the proposed PACCAR Renton site Amended Consent Decree. I have the following responses to their comments.

A vapor extraction system is not proposed. A piping system will be installed, if residual TPH contamination exists below the groundwater level, to pump the contaminated groundwater to the surface during this work. The actual pumping and treatment system would then be designed and installed after approval from proper agencies including Ecology and PSAPCA.

PACCAR does not plan the use of any air contaminant generator equipment or control equipment, except construction equipment, during this project. The control of dust and odors is a standard requirement on the site.

Please call me at 455-7435 if you wish to discuss this issue further.

Sincerely,



R. K. Butler,
Corporate Environmental Manager

RKB/jk

cc: James Leonard
Dennis Opacki

SOUTH-re.p

RECEIVED

JAN 09 1995

PACCAR DEPT. OF ECOLOGY

January 6, 1995

Mr. Neil Watts
CITY OF RENTON
200 Mill Avenue South
Renton, WA 98055

Dear Mr. Watts:

Attached are two copies of Hart Crowser's final report dated January 5, 1995 covering remediation activities in Garden Avenue North by PACCAR, Inc. As-built drawings are included in the package.

Please call me at 455-7435 if you have any questions concerning this final report.

Cordially,



R. K. Butler, P.E.

Corporate Environmental Manager

RKB/jk
Attachment

cc: R. E. Bangert, II (w/o attachment)
P. E. Gladfelter (w/attachment)
J. H. Kleppe (w/o attachment)
J. C. Leonard (w/attachment)
D. L. South (3) attachments

Watts-rem.Gar

RECEIVED

JAN 09 1995

DEPT. OF ECOLOGY



HARTCROWSER

Earth and Environmental Technologies

***Summary Report on Remediation
Activities U-1 Hot Spot in
Garden Avenue North***

***Paccar Renton Site
Renton, Washington***

***Prepared for
PACCAR, Inc.***

***January 5, 1995
J-1639-35***

HARTCROWSER

CONTENTS

	<u>Page</u>
PURPOSE OF THIS REPORT	1
BACKGROUND	1
<i>U-1 Hot Spot Identified During Remedial</i>	1
<i>Investigation/Feasibility Study (RI/FS) Work</i>	1
<i>Additional Studies of Conditions beneath Garden Avenue Completed</i>	1
<i>Excavation and Biotreatment of Affected Soils Chosen</i>	2
<i>Amendments to PACCAR Renton Site Consent Decree Made</i>	2
<i>Substantive Requirements Address City of Renton Standards</i>	2
<i>Additional Agency Requirements</i>	3
SCOPE OF REMEDIATION	3
<i>Hot Spot Soils Action Levels</i>	3
<i>Planned Soil Excavation Location and Methods</i>	3
<i>Soil Sampling Methodology</i>	4
<i>Planned Soil Treatment Method</i>	5
<i>Utility and Roadway Restoration (SSOE Inc. Plans and Specifications)</i>	5
RESULTS OF REMEDIATION ACTIVITIES	6
<i>Extent of TPH-Hot Spot Soils Excavation</i>	6
<i>Dewatering/METRO Reporting</i>	7
<i>Well Abandonment</i>	7
<i>Backfilling of Excavations</i>	8
<i>Utility Restoration</i>	9
<i>Pavement Restoration</i>	10
CONCLUSIONS	10
LIMITATIONS	10
REFERENCES	12

CONTENTS (Continued)

Page

TABLES

Table 1 - Summary of Analytical Results for Soil Samples	14
--	----

FIGURES

Figure 1 - Vicinity Map

Figure 2 - Site Plan

Figure 3 - Excavation and Sampling As-Built Plan

Appendix A - Backfill Grain-Size Analyses and Summary of In-Place Density Tests

Attachment A - As-Built Plan Sheets, U-1/Garden Avenue North Remediation

**SUMMARY REPORT ON REMEDIATION ACTIVITIES
U-1 HOT SPOT IN GARDEN AVENUE NORTH
PACCAR RENTON SITE
RENTON, WASHINGTON**

PURPOSE OF THIS REPORT

This report summarizes the results of recent remediation activities for the U-1 Hot Spot in Garden Avenue North in Renton, Washington. As will be described in more detail below, the U-1 Hot Spot is an area containing soil affected by petroleum hydrocarbons (primarily diesel) and is an extension of the U-1 Hot Spot on the PACCAR Renton property. The remediation of the U-1 Hot Spot beneath Garden Avenue North was voluntarily undertaken by PACCAR under the amended Consent Decree (Ecology, 1991 amended 1994) between PACCAR and the Washington State Department of Ecology (Ecology) with the involvement and approval of the City of Renton (Renton).

BACKGROUND

***U-1 Hot Spot Identified During Remedial
Investigation/Feasibility Study (RI/FS) Work***

The U-1 Hot Spot was identified during the Remedial Investigation and Feasibility Study work (Hart Crowser, 1989 and 1990) and was incorporated into the Final Cleanup Action Plan (FCAP) as part of the Consent Decree (Figure 1). Originally, the U-1 Hot Spot was believed to exist solely south of Building 17, in the area of eight former diesel underground storage tanks. The remediation of this area was planned as part of two phases of on site remediation - an interim action in 1990 and Phase IV in 1993. Observations made during the Phase IV remediation of U-1 Hot Spot indicated an extension of the Hot Spot beneath Garden Avenue North.

Additional Studies of Conditions beneath Garden Avenue Completed

In November 1992 and 1993, PACCAR initiated additional studies regarding the extent of the U-1 Hot Spot which included 22 soil borings, 5 monitoring wells, and associated analytical testing for petroleum hydrocarbons (19 of those borings were within Garden Avenue North). The results of that work are summarized in a report to PACCAR (Hart Crowser, 1994) and briefly herein.

As a result of that work, an estimate of the extent of the diesel-affected soils was made (see Figure 2).

Excavation and Biotreatment of Affected Soils Chosen

In the spring of 1994, PACCAR chose to remediate the diesel-affected soils under Phase IV remediation activities by excavating and biotreating the soils in on-site land treatment units (LTUs). Excavation was deemed feasible to a depth of about 15 feet. If affected soil was present at 15 feet or deeper, *in situ* bioremediation was to be used. *In situ* bioremediation was ultimately not necessary.

Discussions with Ecology and the Renton led to an agreement on this approach.

Amendments to PACCAR Renton Site Consent Decree Made

As a result of the agreement between PACCAR, Ecology, and Renton, an amendment to the Consent Decree governing the remediation at this site was made to allow this U-1 Garden Avenue work to be completed as part of the overall PACCAR Renton site remediation. The amendment was finalized on October 11, 1994.

In general, the amendment extended the Point of Compliance for the PACCAR Renton site to include a portion of Garden Avenue as shown on Figure 2. The amendment also included other items not related to the U-1 Garden Avenue remediation, such as the incorporation of the Puget Western parcel into the site boundary.

The agreement between PACCAR and Renton also included a list of Substantive Requirements for the remediation within Garden Avenue North. These requirements are provided below.

Substantive Requirements Address City of Renton Standards

The substantive requirements address Renton's standards for the design, construction, and restoration process of Garden Avenue North and required that all work meet Renton standards, that Renton would approve all plans, that the street and utility restoration be to an equal or better condition than prior condition, and that a Renton inspector observe and approve the restoration. These requirements are provided by Renton and are included as an exhibit to the Consent Decree (Renton, 1994).

Additional Agency Requirements

As will be discussed later, dewatering was necessary for part of the excavation. A request for a short-term volume increase to PACCAR's existing METRO Discharge Authorization for Special/Minor Discharger Number 292 was made to METRO and later granted. As a result of the short-term increase, additional monitoring requirements regarding the quality of discharged wastewater were imposed and performed.

SCOPE OF REMEDIATION

Details of soil remediation at U-1/Garden Avenue North are provided in PACCAR's Garden Avenue Soil Remediation Plans (SSOE, 1994) and also addressed in Wilder's Hot Spot U-1/Garden Avenue North Street Excavation Specifications and Work Plan (Wilder, 1994). These details include limits of soil excavation, surface paving and utility demolition, backfilling and compaction, and site restoration. A brief summary of this work is provided below.

Hot Spot Soils Action Levels

The FCAP for the PACCAR Renton site and U-1/Garden Avenue North excavation includes requirements for excavation and treatment of soil with constituent concentrations exceeding prescribed Hot Spot Action Levels (HSALs). The HSALs specified in the CAP for total arsenic, chromium, and lead in soil are 100, 600, and 3,000 mg/kg, respectively. For carcinogenic polycyclic aromatic hydrocarbons and PCBs, the HSALs are 100 and 7 mg/kg, respectively.

The HSAL for total petroleum hydrocarbons (TPH) in soil is 2,500 mg/kg. However, it was recognized there may be future maintenance work of underground utilities by Renton and/or other utilities within Garden Avenue North. In response, PACCAR, Ecology, and Renton agreed to a more stringent action level of 200 mg/kg between depths of 0 and 8 feet below grade. The FCAP's HSAL of 2,500 mg/kg for TPH in soil would be used below 8 feet. Soil which is sampled and does not exceed the appropriate action level will be left in-place. Utilizing these action levels and previous subsurface investigations, soil excavation locations and methods were developed.

Planned Soil Excavation Location and Methods

Based on Hart Crowser's Report of Findings and Recommendations, Additional Subsurface Exploration and Engineering at Hot Spot U-1, (Hart

Crowser, 1994a), PACCAR selected to excavate TPH-affected soils exceeding the HSALs and treat the soil on site using bioremediation. Excavation within Garden Avenue North was complicated by the depth of TPH-affected soils, the presence of groundwater at a depth of 8 to 10 feet below the surface, and existing underground utilities. As a result, PACCAR installed 35-foot-long sheetpiles surrounding the suspected area of TPH-Hot Spot excavation that was deeper than 8 feet.

In August 1994, sheetpiles were driven within Garden Avenue North and embedded about 30 to 35 feet below grade to surround and capture the suspected limits of TPH-Hot Spot soils (see Figure 3). Support for the sheetpiles was enhanced by structural steel walers and steel pipe cross bracing. Dewatering well points were installed along the perimeter walls of the sheetpiling, with the depth of the wells averaging approximately 20 feet, under Ecology permit numbers D 06640 and R 16763.

Groundwater within the sheetpiles was successfully lowered through pumping on the well points. All recovered groundwater was treated, handled, and disposed of in accordance with METRO requirements.

Soil Sampling Methodology

The U-1/Garden Avenue North soil excavation and sampling was performed in general accordance with PACCAR's Engineering Design Report (EDR), Volume C and EDR Volume C Addendum No. 1 (Hart Crowser, 1991a and b).

As previously mentioned, the initial limits of soil excavation (sheetpile placement locations) were based on the results of our U-1/Garden Avenue North soil exploration borings. As soil excavation reached these initial limits, side wall and bottom soil samples were screened in the field using visual guidance and a hand-held organic vapor analyzer. If field screening indicated no or low levels of TPH in soil, a verification soil sample was collected and analyzed. Verification samples were submitted to Analytical Technologies, Incorporated (ATI) for the following analyses:

- ▶ PAH by EPA Method 8310;
- ▶ PCBs by EPA Method 8080, PCB only;
- ▶ Arsenic by EPA Method 7060 (GFAA); and
- ▶ Chromium and lead by EPA Method 6010 (ICP).

Samples were submitted to the Hart Crowser Chemistry Laboratory for TPH by EPA Method 8015 Modified.

Verification sample locations and designations for excavation side walls and bottoms which are less than the TPH HSAL for this site are shown on Figure 3 and listed in Table 1.

If a soil sample contained TPH in excess of the action level of 200 mg/kg from 0 to 8 feet below grade or 2,500 mg/kg below 8 feet, then the excavation was enlarged to include the minimum dimensions representing the location of the sample. Similarly, the excavation was enlarged if the verification sample exceeded the HSALs for CPAH, PCBs, or total metals including arsenic, chromium, and lead. The enlarged area was then resampled in accordance with EDR Volume C. Soil sampling methodology for excavation side walls and bottom are briefly described below.

Excavation Side Wall Sampling. One composite side wall sample was collected about every 40 linear feet of exposed side wall for excavations less than 8 feet below grade. For excavations greater than 8 feet deep, one composite side wall sample was collected for about every 20 linear feet of exposed side wall. Each sample was a four-point composite, and was located based on visual guidance (isolating TPH-stained areas) and equal spacing.

Excavation Bottom Sampling. A four-point composite bottom sample was collected from about every 800 square feet of excavation, as measured from the footprint of the excavation. Sample locations were based on visual guidance (isolating TPH-stained areas) and equal spacing.

In both cases, samples were collected using stainless steel spoons and bowls, and each composite sample was mixed thoroughly before placement in glass jars. Care was taken to thoroughly decontaminate the spoons and bowls between each sample. Sample collection, handling, and equipment documentation was performed in general accordance with EDR Volume C.

Planned Soil Treatment Method

TPH-Hot Spot soils excavated from the U-1/Garden Avenue were hauled and placed in prepared temporary stockpiles on the PACCAR Renton site. Weather permitting, the stockpiled soils were screened, fertilized, and placed in on-site LTU on the PACCAR site. Bioremediation of the Hot Spot soils is being performed in accordance with the Engineering Design Report Volume D (Hart Crowser, 1991c).

Utility and Roadway Restoration (SSOE Inc. Plans and Specifications)

The civil engineering design for the restoration of the street and utilities was provided by SSOE, Inc. and approved by Renton. The documents

included a set of plans including specifications on the plans that met Renton's standards for this work.

The street was to be restored by placing compacted import backfill and paving with 4 inches of Class B asphalt pavement over 4 inches of crushed rock. Affected utilities included a storm drain, a water line, a natural gas pipeline, and an electrical line. The plans called for the temporary disruption of the utilities (except the electrical line) with subsequent replacement. Before the work began, Washington Natural Gas required that the natural gas utility remain in service. Support for the gas utility was provided by Wilder Construction Company (WCC) during the excavation.

The following text provides details regarding remediation activities, including roadway and utility restoration activities. All minor changes or substitutions associated with roadway or utility activities were performed by Wilder with concurrence by Renton.

RESULTS OF REMEDIATION ACTIVITIES

Extent of TPH-Hot Spot Soils Excavation

An original excavation layout for the TPH-affected soils was shown in the SSOE Plans and Specifications. As excavation and soil sampling proceeded, TPH-affected soils exceeding the HSAL for TPH continued toward the north, west, and south of the sheetpile limits. PACCAR pursued overexcavation of these areas until reaching the final excavation limits as shown. These final limits were bounded and confined by the side wall and bottom verification samples shown on Figure 3 and in Table 1. To the north and south, the U-1/Garden Avenue North Hot Spot excavation was closed with final verification samples below the site's HSALs for TPH, CPAHs, PCBs, and total metals including arsenic, chromium, and lead. To the west, the U-1/Garden Avenue Hot Spot moved onto the neighboring Renton School District (RSD) property. The remediation of RSD property was performed as an Independent Action Remedial Action, in accordance with Ecology's Model Toxics Control Act (Hart Crowser, 1994b).

A total of approximately 4,900 cubic yards of diesel-affected soils were excavated, removed, and eventually placed in on-site LTUs from this work.

Dewatering/METRO Reporting

To accommodate deep excavations (greater than 8 feet) within the U-1/Garden Avenue North sheetpiles, PACCAR installed well points along the interior walls of the sheetpiles (see Figure 3). Pumping from these well points successfully lowered the water table within the sheetpiles permitting deep excavation and representative soil sampling to occur. As a result, the daily discharge quantity of wastewater to METRO was drastically increased, and an authorization for a short-term volume increase from METRO was obtained. The authorization allowed an increase from 25,000 gallons per day (gpd) up to 150,000 gpd of wastewater to METRO between August 15 and November 28, 1994.

Wastewater (including recovered groundwater, collected surface waters, and decontamination water) generated during U-1/Garden Avenue North soils remediation activities was stored, handled, and treated in general accordance with METRO's DA Number 292 and Authorization for Short-Term Increase (METRO, 1993 and 1994). Wastewater quality monitoring was performed on the discharge and results were submitted to METRO in monthly letter reports. There were no exceedences of the METRO discharge authorization limits reported.

Well Abandonment

As previously discussed, PACCAR installed a series of soil borings and groundwater monitoring wells within the U-1/Garden Avenue North remediation area to assess local subsurface soil and groundwater conditions. Additionally, a series of injected well points were installed along the interior west and east sheetpiles to lower the local water table elevation. A list and brief description of these monitoring wells is as follows. See Figure 2 for approximate locations of the monitoring wells.

- ▶ In November 1992, following excavation of the U-1 Hot Spot identified in the CAP, two soil borings were advanced and completed as groundwater wells designated U1N and U1S.
- ▶ In January 1993, additional soil borings were advanced and U1W was completed as a groundwater monitoring in Garden Avenue North.
- ▶ In May and June 1993, two monitoring wells (U1W2 and U1W3) were completed along the property line along Garden Avenue North and RSD property.

As soil excavation progressed, the U-1/Garden Avenue North soils excavation continued west, intersecting monitoring wells U1W, U1N,

U1W2, and U1W3. At that point, these monitoring wells were abandoned. At the conclusion of soil excavation and dewatering within the sheetpiles, the well points were abandoned. All monitoring wells and well points were abandoned by a licensed well driller in general accordance with Chapter 173-160 WAC, Minimum Standards for Construction and Maintenance of Wells.

Backfilling of Excavations

The SSOE plans called for two types of backfilling:

- ▶ At depths greater than 5 feet below crushed rock: Place gravel fill in 2-foot lifts (or less) and compact with methods approved by Engineer; and,
- ▶ At depths less than 5 feet below crushed rock: Place import fill in 12-inch lifts (or less) and compact to a dry density equal to or greater than 95 percent of the maximum dry density as determined by ASTM D 1557.

Backfill Soil. The specifications provided for two types of Backfill - gravel fill and import fill. WCC found a source of backfill that met both specifications and thus, this source of soil was used as backfill throughout the entire excavation. Two grain sizes analyses for this material are provided in Appendix A.

Backfilling at Depths Greater than 5 Feet. Because the eventual depth and size of the excavations made compaction of backfill by equipment infeasible at all areas, the contractor proposed an alternate method for backfilling of excavations 15 feet deep. This alternate method, which was approved by Renton, consisted of backfilling in one lift to a depth of 9 feet (or a thickness of about 6 feet) with import backfill soil. The contractor then ceased dewatering, allowing the groundwater to rise within the backfill. After some period of time, the contractor then began to dewater again. This method can densify granular soils because of the flow of water through the soil. It is our opinion that the use of the high quality backfill soil and this method of densification provided a subgrade that was better than prior to the excavation.

Backfilling at Depths Less than 5 feet. This backfilling was accomplished in general accordance with the specifications, i.e., compaction to 95 percent of the maximum dry density as determined by ASTM D 1557. Summary tables of the field density testing are provided in Appendix A.

Backfilling around Natural Gas Utility. Special precautions were taken to protect this utility during backfilling by placing controlled density fill (CDF) beneath and around the gas line. Backfilling with soil adjacent to the gas line was not accomplished until the CDF had achieved some hardness and compressive strength.

Utility Restoration

Utility restoration work included the demolition and restoration of portions of an 18-inch-diameter storm drain and a 12-inch-diameter water line and other minor modifications within Garden Avenue North. All utility demolition and restoration work was performed by either Wilder or the appropriate utility service, in the presence of the PACCAR representative. As-built utility demolition and restoration details are shown in Attachment A and briefly described below.

18-inch Storm Drain. A 170-foot-long section of an 18-inch-diameter storm drain running parallel and approximately 5 feet below Garden Avenue North were demolished and replaced. The former concrete pipe was replaced with new 18-inch-diameter double-walled corrugated polyethylene pipe (CPEP), to matching grade. The CPEP was substituted for concrete pipe by Wilder and with concurrence by Renton.

12-inch Water Line. A 250-foot-long section of an 12-inch-diameter water line running parallel and approximately 2 feet below Garden Avenue North were demolished and replaced. The former transite pipe was replaced with new 12-inch-diameter ductile iron pipe, to grades as shown in the plans. In order to reach the minimum 48-inches of cover above the replacement line, 45-degree vertical bends were placed at the connection points per the direction of and with concurrence by Renton. The demolished transite pipe was saw cut and buried in place as part of the backfill of the new pipe, in accordance with PSAPCA requirements.

Following water line installation, a series of tests and services were performed on the new line. They included: cleaning the line with a "pig"; testing for tightness; filling and cleaning the line with a high concentrate of chlorine; draining the chlorine bath into the sanitary sewer; filling with potable water and chemically testing the water; and finally, authorized hook up and use. These tests and services were performed either in the presence of or by Renton.

Natural Gas Pipeline. The gas pipeline was exposed, supported, and protected throughout this work. Washington Natural Gas was present during all activities that posed a potential risk to their pipeline and approved of the procedures used by WCC during their site observations.

At no time during this work was the pipeline shutdown of service. Defects in the pipeline discovered by Washington Natural Gas (WNG) were repaired or patched by WNG while the pipeline was exposed. Following the soil excavation work, the pipeline was backfilled.

Electrical Lines. Buried electrical lines were effectively protected during the remediation.

Pavement Restoration

At the time the excavations were fully backfilled and ready for paving, the weather had become colder than typically allowed for the placement of Class B asphalt pavement. With the concurrence of Renton, an interim pavement section was installed by WCC consisting of: a 6-inch-thick lift of 2- to 4-inch rock spalls, 6-inch-thick lift of railroad ballast rock, and a 4-inch-thick lift of asphalt-treated base (ATB). WCC reports that the ATB as provided meets the Washington State Standard Specifications for ATB. As weather conditions improve, WCC will repair any damaged areas of ATB and complete the paving by placing 2 inches of Class B asphalt and completing pavement striping.

CONCLUSIONS

It is our opinion, based on our observations of the remediation work and the as-built information provided to us and approved in the field by Renton, that the remediation work for the U-1 Hot Spot in Garden Avenue North has met the requirements of the Consent Decree, Renton's Substantive Requirements, and METRO's requirements for the discharge of wastewater. At the time of this report, only two activities remain: final paving of Garden Avenue North (with traffic striping) and sidewalk restoration. We assume that Renton inspectors will inspect and approve of that work as it is completed. Completions of paving and sidewalk restoration will be accomplished as weather conditions allow.

LIMITATIONS

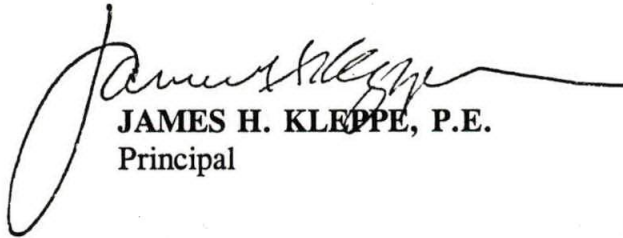
Work for this project was performed, and this report prepared, in accordance with generally accepted professional practices for the nature and conditions of the work completed in the same or similar localities, at the time the work was performed. It is intended for the exclusive use of PACCAR for specific application to the referenced property. This report is not meant to represent a legal opinion. No other warranty, express or implied, is made.

Any questions regarding our work and this letter report, the presentation of the information, and the interpretation of the data are welcome and should be referred to the undersigned.

We trust that this report meets your needs.

Sincerely,

HART CROWSER, INC.



JAMES H. KLEPPE, P.E.
Principal

JHK/JKK:bjg
\unigard.rpt



ROY K. KUROIWA
Project Engineer

REFERENCES

Ecology, 1991. Consent Decree No. 912250537, PACCAR INC, November 8, 1991. Stipulation to Amend Consent Decree, Amendment No. 1 through 5. October 11, 1994.

Hart Crowser, 1989. Remedial Investigation Report, PACCAR Site, Renton, Washington. September 1, 1989.

Hart Crowser, 1990. Feasibility Report, PACCAR Site, Renton, Washington. February 23, 1990.

Hart Crowser, 1991a. Engineering Design Report, Volume C, Phase IIB Remediation Work, PACCAR Renton Site, Renton, Washington. September 6, 1991.

Hart Crowser, 1991b. Addendum No. 1, Engineering Design Report, Volume C, Phase IIB Remediation Work, PACCAR Renton Site, Renton, Washington. September 30, 1991.

Hart Crowser, 1991c. Engineering Design Report Volume D—Phase III and IV Remediation Work: Soil Treatment by Solidification and Biotreatment, PACCAR Renton Site. December 17, 1991.

Hart Crowser, 1994a. Report of Finding and Recommendation Additional Subsurface Exploration and Engineering at Hot Spot U-1, PACCAR Renton Site, Renton, Washington. February 24, 1994.

Hart Crowser, 1994b. Draft Independent Remedial Action Report. Renton School District Soil Excavation, Renton School District Property, Renton, Washington. December 14, 1994.

METRO, 1993. METRO Discharge Authorization for Special/Minor Discharger Number 292 for Paccar Incorporated. King County Department of Metropolitan Services. January 6, 1993.

METRO, 1994. Authorization for Short-Term Volume Increase, Authorization No. 292. PACCAR INC August 16, 1994.

Renton, 1994. Exhibit D, Substantive Requirements for Work within Public Right-of-Way (Garden Avenue North) City of Renton. May 25, 1994.

SSOE, 1994. PACCAR Garden Avenue North Remediation, Renton, Washington. Plan Sheets 8 of 8. July 18, 1994.

Wilder, 1994. PACCAR INC. Hot Spot U-1 Garden Avenue North Street Excavation, Specifications and Work Plan. August 5, 1994.

Table 1 - Summary of Analytical Results for Soil Samples

Sample ID	Date	TPH Concentration in mg/kg	Sample Location Description	Comments
U1-1-BE	08/25/94	290	Section 1 - Bottom (East)	
U1-1-N	08/25/94	100	Section 1 - North Side wall	Final verification sample
U1-1-E	08/25/94	ND	Section 1 - East Side wall	Overexcavated
U1-1-W	08/25/94	ND	Section 1 - West Side wall	Final verification sample
U1-2-BE	08/26/94	29	Section 2 - Bottom (East)	Final verification sample
U1-2-BW	08/26/94	ND	Section 2 - Bottom (West)	Final verification sample
U1-2-E	08/26/94	2,600	Section 2 - East Side wall	Overexcavated
U1-2-W	08/26/94	ND	Section 2 - West Side wall	Overexcavated with U1-5
U1-3-BE	08/29/94	ND	Section 3 - Bottom (East)	Final verification sample
U1-3-BW	08/29/94	ND	Section 3 - Bottom (West)	Final verification sample
U1-3-E	08/29/94	980	Section 3 - East Side wall	Overexcavated
U1-3-W	08/29/94	ND	Section 3 - West Side wall	Final verification sample
U1-4-BE	08/30/94	110	Section 4 - Bottom (East)	Final verification sample
U1-4-BW	08/30/94	ND	Section 4 - Bottom (West)	Final verification sample
U1-4-E	08/30/94	14,000	Section 4 - East Side wall	Overexcavated
U1-4-W	08/30/94	ND	Section 4 - West Side wall	Final verification sample
U1-1-BW	08/30/94	ND	Section 1 - Bottom (West)	Final verification sample
U1-5-BE	08/30/94	ND	Section 5 - Bottom (East)	Final verification sample
U1-5-BW	08/30/94	55	Section 5 - Bottom (West)	Final verification sample
U1-5-E	08/30/94	2,900	Section 5 - East Side wall	Overexcavated
U1-5-W	08/30/94	214	Section 5 - West Side wall	Overexcavated
U1-5-N	09/01/94	390	Section 5 - North Side wall	Overexcavated
U1-5-W2	09/01/94	ND	Section 5 - West (#2) Side wall	Overexcavated
U1-6-BE	09/06/94	ND	Section 6 - Bottom (East)	Final verification sample
U1-6-BW	09/06/94	ND	Section 6 - Bottom (West)	Final verification sample
U1-7-B	09/07/94	300	Section 7 - Bottom	Final verification sample
U1-7-WA2	09/07/94	6,100	Section 7 - West (0-8') Side wall	Overexcavated with RSD
U1-7-WB1	09/07/94	3,200	Section 7 - West (8-15') Side wall	Overexcavated with RSD
U1-7-WA2	09/07/94	5,100	Section 7 - West (0-8') Side wall	Overexcavated with RSD
U1-7-WB2	09/07/94	2,400	Section 7 - West (8-15') Side wall	Overexcavated with RSD
U1-7-NA	09/07/94	120	Section 7 - North (0-8') Side wall	Overexcavated with RSD
U1-7-NB	09/07/94	35	Section 7 - North (8-15') Side wall	Overexcavated with RSD
U1-8-WA1	09/08/94	6,500	Section 8 - West (0-8') Side wall	Overexcavated with RSD
U1-8-WB1	09/08/94	17,000	Section 8 - West (8-15') Side wall	Overexcavated with RSD
U1-8-WA2	09/08/94	7,500	Section 8 - West (0-8') Side wall	Overexcavated with RSD
U1-8-WB2	09/08/94	16,000	Section 8 - West (8-15') Side wall	Overexcavated with RSD
U1-8-B	09/08/94	590	Section 8 - Bottom	Final verification sample
U1-9-W	09/08/94	530	Section 9 - West Side wall	Overexcavated with RSD
U1-9-B	09/08/94	ND	Section 9 - Bottom	Final verification sample
U1-10-WA1	09/09/94	830	Section 10 - West (0-8') Side wall	Overexcavated with RSD
U1-10-WB1	09/09/94	7,700	Section 10 - West (8-15') Side wall	Overexcavated with RSD
U1-10-WA2	09/09/94	1,400	Section 10 - West (0-8') Side wall	Overexcavated with RSD
U1-10-WB2	09/09/94	8,600	Section 10 - West (8-15') Side wall	Overexcavated with RSD
U1-10-B	09/09/94	22	Section 10 - Bottom	Final verification sample
U1-11-WA1	09/10/94	ND	Section 11 - West (0-8') Side wall	Overexcavated with RSD
U1-11-WB1	09/10/94	84	Section 11 - West (8-15') Side wall	Overexcavated with RSD
U1-11-WA2	09/10/94	ND	Section 11 - West (0-8') Side wall	Overexcavated with RSD
U1-11-WB2	09/10/94	61	Section 11 - West (8-15') Side wall	Overexcavated with RSD
U1-11-B	09/10/94	ND	Section 11 - Bottom	Overexcavated with RSD
U1-11-SA	09/10/94	1,800	Section 11 - South (0-8') Side wall	Overexcavated with U1-16
U1-11-SB	09/10/94	18,000	Section 11 - South (8-15') Side wall	Overexcavated with U1-16

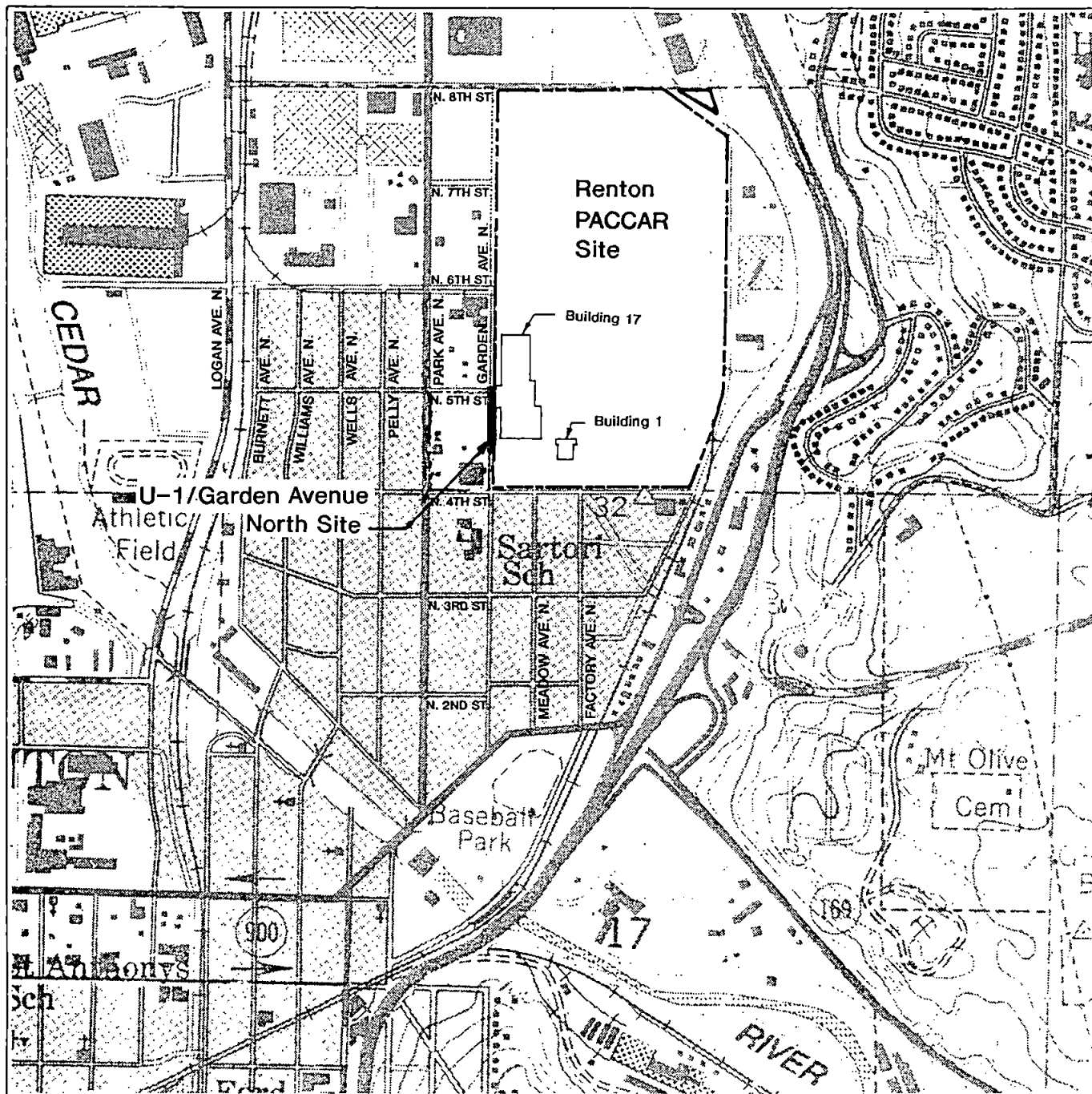
Table 1 – Summary of Analytical Results for Soil Samples

Sample ID	Date	TPH Concentration in mg/kg	Sample Location Description	Comments
U1-12-W	09/12/94	840	Section 12 – West Side wall	Overexcavated with U1-15
U1-12-B	09/12/94	240	Section 12 – Bottom	Final verification sample
U1-9-W2	09/12/94	ND	Section 9 – West (#2) Side wall	Overexcavated with RSD
U1-9-N	09/12/94	ND	Section 9 – North Side wall	Overexcavated with U1-15
U1-13-W	09/14/94	1,200	Section 13 – West Side wall	Overexcavated with U1-15
U1-13-B	09/14/94	420	Section 13 – Bottom	Final verification sample
U1-5-2N	09/14/94	110	Section 5 – North (#2) Side wall	Overexcavated further
U1-5-3W	09/14/94	640	Section 5 – West (#3) Side wall	Overexcavated further
U1-14-B	09/16/94	ND	Section 14 – Bottom	Final verification sample
U1-14-N	09/16/94	55	Section 14 – North Side wall	Final verification sample
U1-14-W	09/16/94	510	Section 14 – West Side wall	Overexcavated with U1-15
U1-15-WN	09/19/94	260	Section 15 – West (North) Side wall	Overexcavated with RSD
U1-15-B	09/19/94	56	Section 15 – Bottom (#1)	Final verification sample
U1-15-WS	09/19/94	1,400	Section 15 – West (South) Side wall	Overexcavated with RSD
U1-15-N	09/19/94	ND	Section 15 – North Side wall	Final verification sample
U1-5-S	09/19/94	770	Section 15 – South Side wall	Overexcavated further
U1-5-2B	09/19/94	ND	Section 15 – Bottom (#2)	Final verification sample
U1-5-3N	09/19/94	500	Section 5 – North (#3) Side wall	Overexcavated further
U1-5-4W	09/19/94	460	Section 5 – West (#4) Side wall	Overexcavated further
U1-5-4N	09/22/94	ND	Section 5 – North (#4) Side wall	Final verification sample
U1-5-5W	09/22/94	ND	Section 5 – West (#5)	Final verification sample
U1-5-2S	09/22/94	ND	Section 5 – South (#2)	Final verification sample
U1-5-3B	09/22/94	ND	Section 5 – Bottom (#3)	Final verification sample
U1-16-SWA	10/18/94	ND	Section 16 – South (West 0-8') Side wall	Final verification sample
U1-16-SWB	10/18/94	ND	Section 16 – South (West 8-15') Side wall	Final verification sample
U1-16-SEA	10/18/94	ND	Section 16 – South (East 0-8') Side wall	Final verification sample
U1-16-SEB	10/18/94	ND	Section 16 – South (East 8-15') Side wall	Final verification sample
U1-16-B	10/18/94	ND	Section 16 – Bottom	Final verification sample

ND Not Detected at a detection limit of 20 mg/kg, C12 to C24 (diesel) and/or 50 mg/kg, C24 to C37 (oil).

soil2.wk1

Vicinity Map



Note: Base map prepared from USGS 7.5 quadrangle map of Mercer Island and Renton, Washington.



0 1000 2000
Scale in Feet



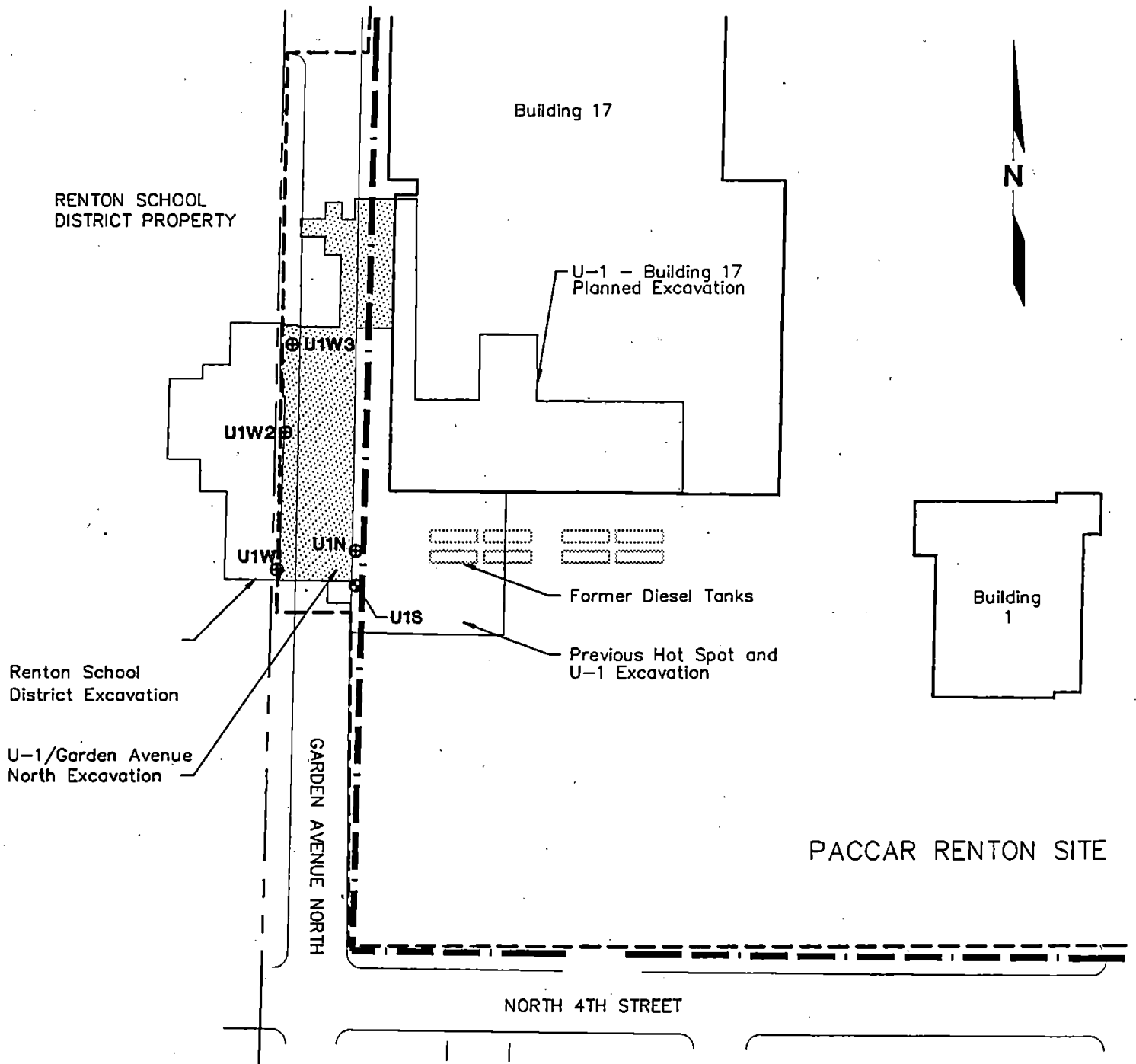
HARTCROWSER

J-1639-35 1/95

Figure 1

Site Plan

U-1/Garden Avenue North Soil Excavation



Monitoring Well Location and Designation

- U1S Existing
- ⊙ U1N Abandoned

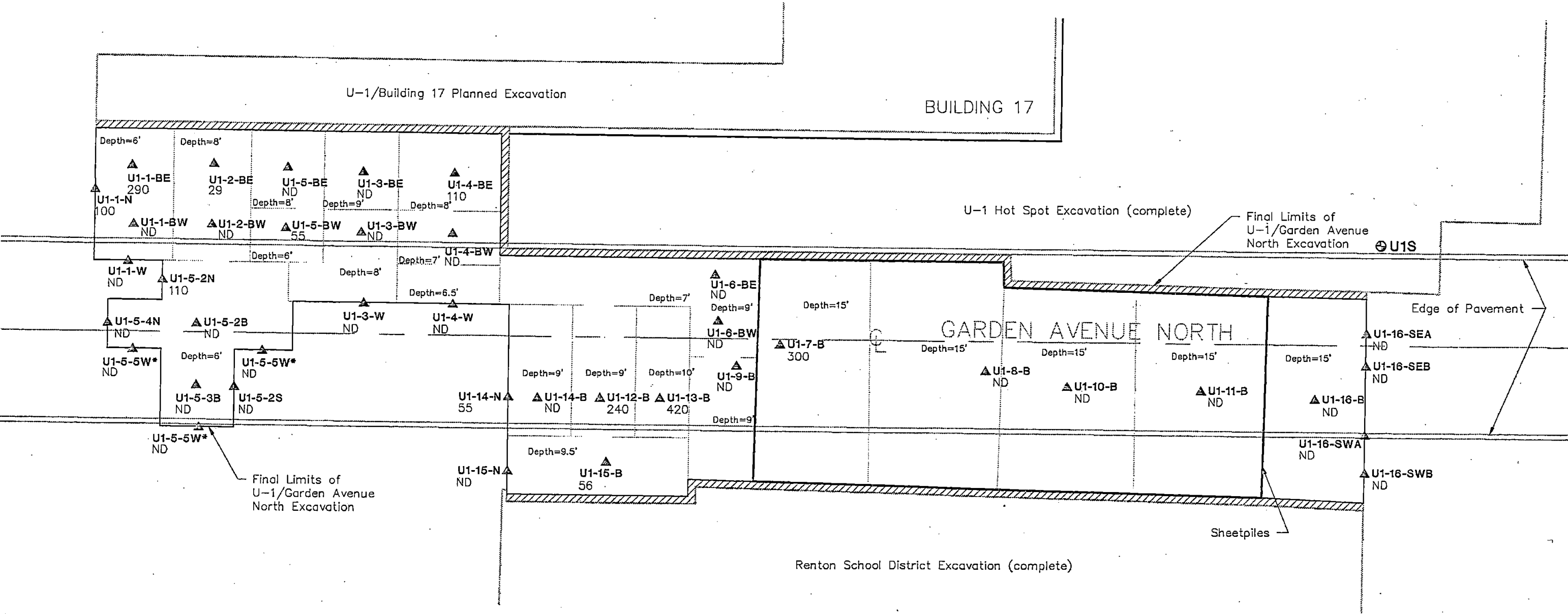
- - - - - PACCAR Property Boundary
 - - - - - Point of Compliance
 - - - - - Edge of City Property

0 100 200
Scale in Feet


HARTCROWSER
 J-1639-35 1/95
 Figure 2

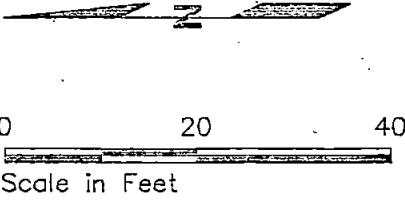
Excavation and Sampling As-Built Plan

U-1/Garden Avenue North



- ▲ U1-14-B Sample Location and Designation
- ND Sample Concentration in mg/kg (TPH in soil)
- * Side Wall Composite Sample
- ⊕ U1S Monitoring Well Location and Designation
- //// Side Wall addressed as part of other U-1 excavation activities

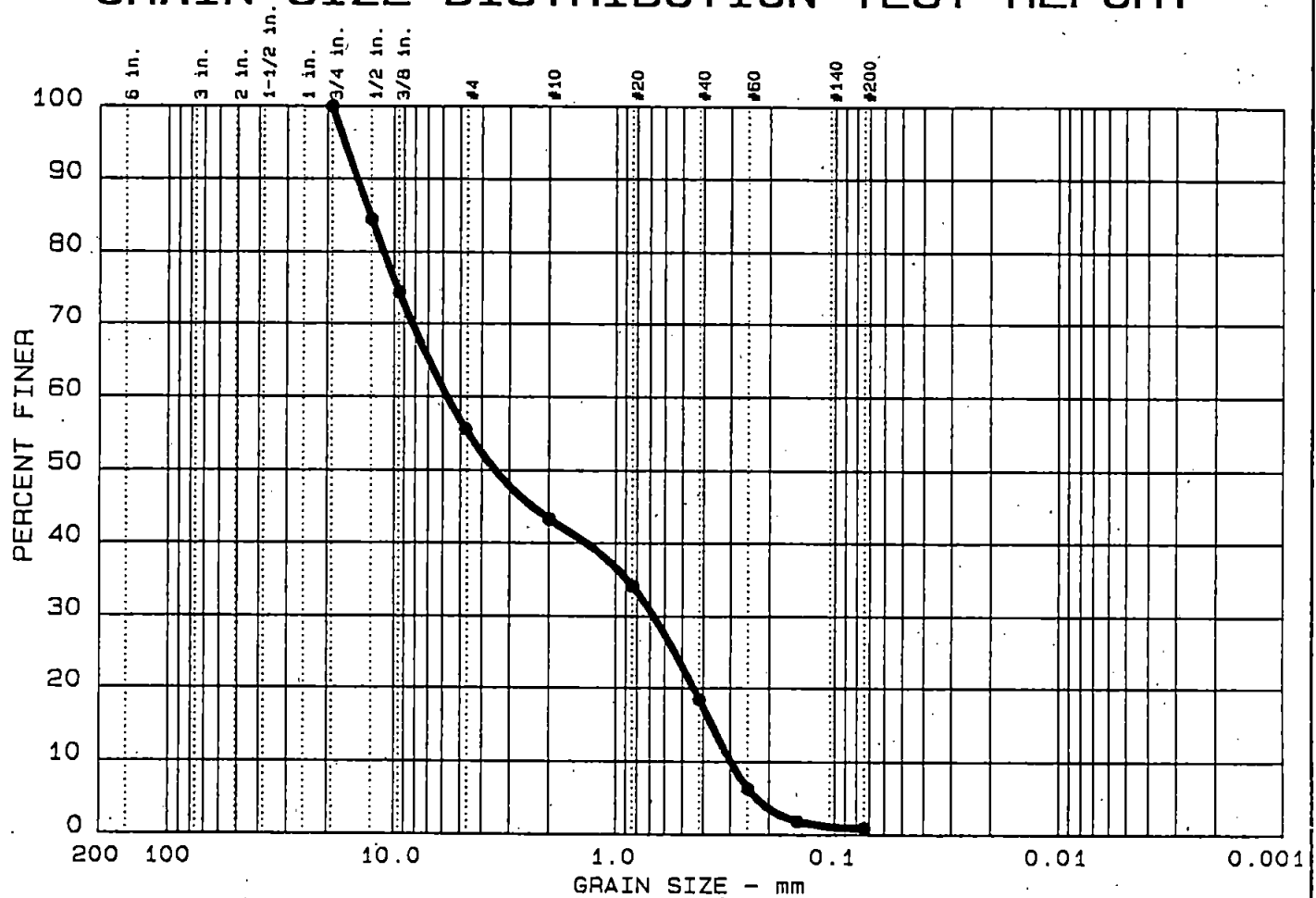
Note: Not shown are the side wall and bottom samples not used for final verification purposes (i.e., above the cleanup level: 200 mg/kg from 0 to 8 feet and 2,500 mg/kg from 8 to 15 feet)



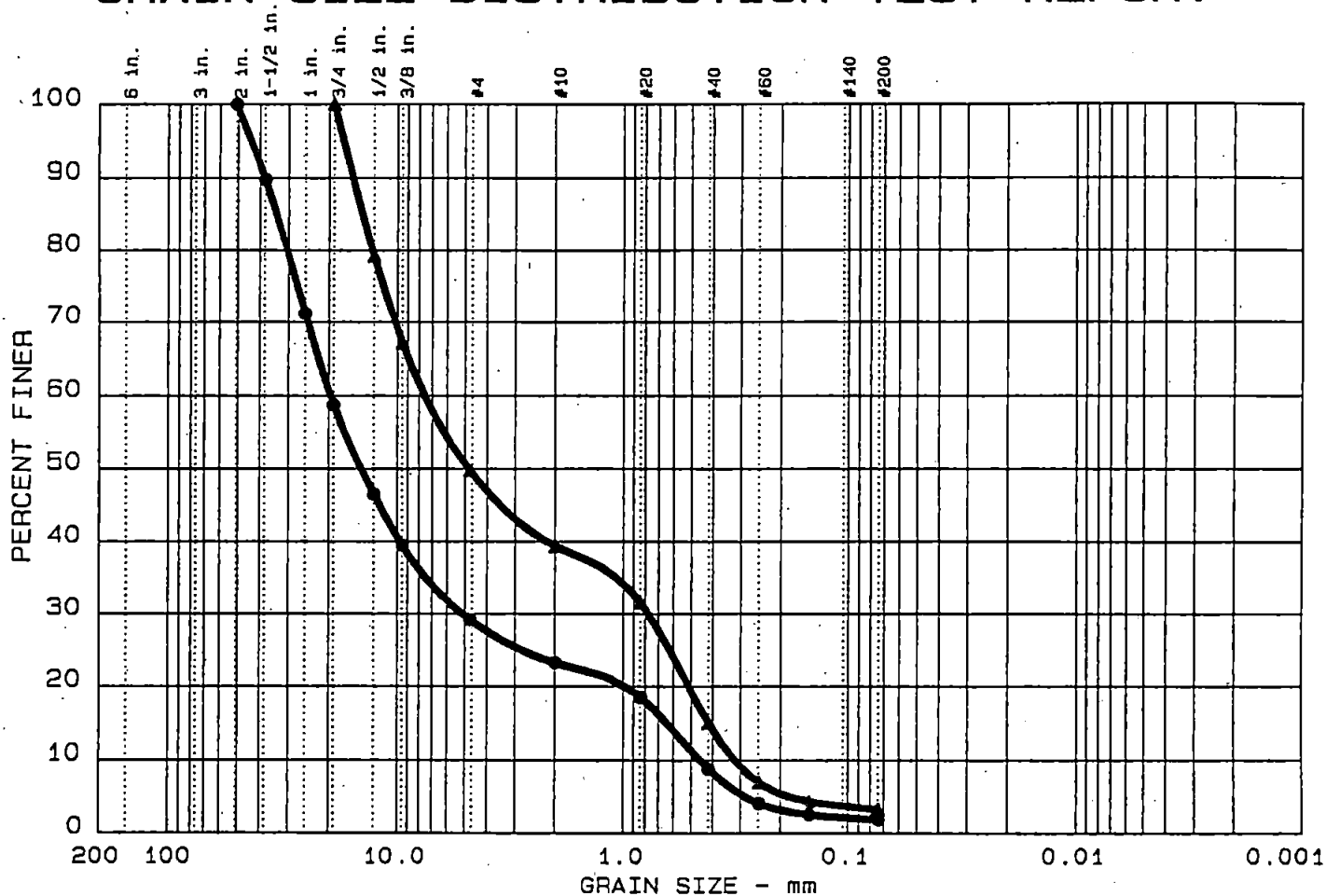
Hart Crowser
J-1639-35

APPENDIX A
BACKFILL GRAIN-SIZE ANALYSES AND SUMMARY
OF IN-PLACE DENSITY TESTS

GRAIN SIZE DISTRIBUTION TEST REPORT



GRAIN SIZE DISTRIBUTION TEST REPORT



PROJECT PACCAR-31

PROGRESS REPORT NO. 1

DATE 9/22/94

Percent compaction based on: ☐ Standard AASHTO (AASHTO T 99-57, ASTM D 690)
☐ Modified AASHTO (AASHTO T 180-57, ASTM D 1557)

N - Nuclear (ASTM D 2922)
SC - Sand Cone (ASTM D 1556)
RB - Rubber Balloon (ASTM D 3167)

S - Sand	s - sandy
G - Gravel	g - gravelly
Sl - Silt	sl - silty
C - Clay	c - clayey

R - Rubber-tired Roller
V - Vibratory Compactor
S - Sheepfoot Roller
GD - Grid Roller
L - Loaded Scraper
JJ - Jumping Jack
RV - Backhoe Vibratory Plate
VP - Vibratory Plate
HT - Hand Tamper

DT - Density Test
RT - Retest of an area following additional compaction

HART - CROWSER & associates Inc.

SUMMARY OF FIELD DENSITY TESTS

PROJECT PACCAR-01

JOB NUMBER 1639-35

PROGRESS REPORT NO. 2

DATE 9/23/94

TEST NUMBER	TEST DATE	TEST METHOD	GENERAL LOCATION	ELEV (feet)	FEET to GRADE	MAT'L TYPE	TYPE COM-PACTOR	FIELD MOIST. %	% ± OMC	DRY DENSITY (PCF)		% COMPACTION	
										FIELD	MAX.	FIELD	SPEC.
DT-6	9/23/94	N	U1-13, West of gasline		5	GS	BV	5.8	-1.7	132.4	139.0	95	95%
DT-7			U1-13, East of gasline		5			5.8	-1.7	134.1		97	
DT-8			U1-4		5			7.5	0	123.3		89	
DT-9			U1-2		5			6.2	-1.3	131.3		95	
DT-10			U1-14, West of gasline		4'			6.2	-1.3	131.6		95	
DT-11			U1-13, East of gasline		4'			7.1	-0.4	131.6		95	
DT-12			U1-2		4'			7.4	-0.1	135.4		97	
DT-13			U1-4		4'			7.7	+0.2	132.3		95	
DT-14			U1-3		4'			7.0	-0.5	134.3		97	
DT-15			U1-13, West of gasline		3'			7.1	-0.4	136.0		98	
DT-16			U1-13, East of gasline		3'			7.3	-0.2	131.6		95	
DT-17			U1-4		3'			6.6	-0.9	133.4		96	
DT-18			U1-13, West of gasline		2'			6.9	-0.6	136.5		98	
DT-19			U1-14, East of gasline		2'			7.0	-0.5	132.5		95	
DT-20	✓	✓	U1-4		2'	✓	✓	7.1	-0.4	131.9	✓	95	✓

Percent compaction based on: ☐ Standard AASHTO (AASHTO T 99-57, ASTM D 698)
☐ Modified AASHTO (AASHTO T 180-57, ASTM D 1557)

Type of Compactor

R - Rubber-tired Roller
V - Vibratory Compactor
S - Sheepfoot Roller
GD - Grid Roller
L - Loaded Scraper
JJ - Jumping Jack
BV - Backhoe Vibratory Plate
VP - Vibratory Plate
HT - Hand Tamper

OMC - Optimum Moisture Content

DT - Density Test

RT - Re-test of an area following additional compaction

Test Method

N - Nuclear (ASTM D 2922)
SC - Sand Cone (ASTM D 1556)
RB - Rubber Balloon (ASTM D 3167)

Material Type

S - Sand s - sandy
G - Gravel g - gravelly
SI - Silt si - silty
C - Clay c - clayey

PROJECT PACCAR - VI

PROGRESS REPORT NO. 2

DATE 9/23/94

[illegible]

Percent compaction based on: ☐ Standard AASHTO (AASHTO T 99-57, ASTM D 698)
☐ Modified AASHTO (AASHTO T 100-57, ASTM D 1557)

Type of Compactor

R - Rubber-tired Roller
V - Vibratory Compactor
S - Sheepfoot Roller
GR - Grid Roller
L - Loaded Scraper
JJ - Jumping Jack
BV - Backhoe Vibratory Plate
VP - Vibratory Plate
HT - Hand Tamper

OMC - Optimum Moisture Content

DT - Density Test
RT - Retest of an area following additional compaction

Test Method

N - Nuclear (ASTM D 2922)
SC - Sand Cone (ASTM D 1556)
RB - Rubber Balloon (ASTM D 3167)

Material Type

S - Sand	s - sandy
G - Gravel	g - gravelly
Sl - Silt	sl - silty
C - Clay	c - clayey

SUMMARY OF FIELD DENSITY TESTS

PROJECT PACCAR - U1

JOB NUMBER 1639-35

PROGRESS REPORT NO. 3

DATE 9/26/94

TEST NUMBER	TEST DATE	TEST METHOD	GENERAL LOCATION	ELEV (feet)	FEET to GRADE	MAT'L TYPE	TYPE COM-PACTOR	FIELD MOIST. %	% ± OMC	DRY DENSITY (PCF)		% COMPACTION	
										FIELD	MAX.	FIELD	SPE
DT-27	9/24/94	N	40'S and 15'E of NW corner Sheet pile		5'	GS	BV	4.1	-3.4	119.9	139.0	86	95
DT-28			15'S and 12'E of NW corner Sheet pile					4.3	-3.2	118.6	139.0	85	95
DT-29			30'S and 40'E of NW corner Sheet pile					3.9	-3.6	118.4	139.0	85	95
RT-27			40'S and 15'E of NW corner Sheet Pile					7.1	-0.4	131.4	139.0	95	95
RT-28			15'S and 12'E of NW corner Sheet Pile					7.1	-0.4	131.1	139.0	96	95
RT-29			30'S and 40'E of NW corner Sheet Pile					6.9	-0.6	132.9	139.0	96	95
DT-30			20'N and 10'E of SW corner Sheet pile					6.8	-0.7	134.0	139.0	96	95
DT-31			40'N and 12'E of SW corner Sheet Pile					7.2	-0.3	131.6	139.0	95	95
DT-32			15'N and 30'E of SW corner Sheet Pile					6.7	-0.8	132.5	139.0	95	95
DT-33	✓	✓	35'N and 30'E of SW corner Sheet Pile		✓	✓	✓	7.9	+0.4	136.4	139.0	98	95

Percent compaction based on: ☐ Standard AASHTO (AASHTO T 99-57, ASTM D 698)
☐ Modified AASHTO (AASHTO T 100-57, ASTM D 1557)

Test Method

N - Nuclear (ASTM D 2922)
 GC - Sand Cone (ASTM D 1556)
 RB - Rubber Balloon (ASTM D 3167)

Material Type

S - Sand s - sandy
 G - Gravel g - gravelly
 SI - Silt si - silty
 C - Clay c - clayey

Type of Compactor

R - Rubber-tired Roller
 V - Vibratory Compactor
 S - Sheepfoot Roller
 GR - Grid Roller
 L - Loaded Scraper
 JJ - Jumping Jack
 BV - Backhoe Vibratory Plate
 VP - Vibratory Plate
 HT - Hand Tamper

OMC - Optimum Moisture Content

DT - Density Test
 RT - Retest of an area following additional compaction

PROJECT PACCAR - 51

PROGRESS, REPORT NO. 4

DATE 9/28/94

Percent compaction based on: ☐ Standard AASHTO (AASHTO T 99-57, ASTM D 698)
☐ Modified AASHTO (AASHTO T 180-57, ASTM D 1557)

N - Nuclear (ASTM D 2922)
 SC - Sand Cone (ASTM D 1556)
 RB - Rubber Balloon (ASTM D 3167)

S - Sand	s - sandy
G - Gravel	g - gravelly
sl - Silt	sl - silty
C - Clay	c - clayey

R - Rubber-tired Roller
V - Vibratory Compactor
S - Sheepfoot Roller
GR - Grid Roller
L - Loaded Scraper
JJ - Jumping Jack
BV - Backhoe Vibratory Plate
VP - Vibratory Plate

HT - Hand Tamper

DT - Donnelly Test

RT - Re-test of an area following additional compaction

HART - CROWSEN & associates (

SUMMARY OF FIELD DENSITY TESTS

PROJECT PACCAR - U1

JOB NUMBER 1639-35

PROGRESS REPORT NO. 5

DATE 10/14/94

TEST NUMBER	TEST DATE	TEST METHOD	GENERAL LOCATION	ELEV (feet)	FEET to GRADE	MAT'L TYPE	TYPE COM-PACTOR	FIELD MOIST. %	% ± OMC	DRY DENSITY (PCF)		% COMPACTION	
										FIELD	MAX.	FIELD	SPEC.
DT-41	10/13/94	N	30' N and 10' E of SW Corner Sheet Pile		4'	GS	R	7.1	-0.4	132.7	139	95	95
DT-42			90' N and 5' E of SW Corner Sheet Pile		4'			7.3	-0.2	131.6	139	95	95
DT-43			20' N and 5' E of SW corner Sheet Pile		3'			6.8	-0.7	132.5	139	95	95
DT-44			60' N and 12' E of SW Corner Sheet Pile		3'			7.6	+0.1	133.4	139	96	95
DT-45			100' N and 15' E of SW Corner Sheet Pile		3'			7.4	-0.1	134.3	139	97	95
DT-46			40' N and 10' E of SW Corner Sheet Pile		2'			6.9	-0.6	131.3	139	95	95
DT-47			80' N and 10' E of SW Corner Sheet Pile		2'			7.8	+0.3	136.0	139	98	95
DT-48			50' N and 8' E of SW Corner Sheet Pile		1'			7.6	+0.1	136.5	139	98	95
DT-49			70' N and 5' E of SW Corner Sheet Pile		1'			7.2	-0.3	135.2	139	97	95
DT-50			35' N and 10' E of SW Corner Sheet Pile		0'			7.1	-0.4	135.8	139	98	95
DT-51			80' N and 10' E of SW Corner Sheet Pile		0			7.0	-0.5	137.6	139	99	95
DT-52			40' N and 35' E of SW Corner Sheet Pile		4'			6.8	-0.7	131.8	139	95	95
DT-53	✓	✓	70' N and 35' E of SW Corner Sheet Pile		4'	✓	✓	6.6	-0.9	134.0	139	96	95

Percent compaction based on: ☐ Standard AASHTO (AASHTO T 99-57, ASTM D 698)
☒ Modified AASHTO (AASHTO T 180-57, ASTM D 1557)

Type of Compactor

R - Rubber-tired Roller
V - Vibratory Compactor
S - Sheepfoot Roller
GD - Grid Roller
L - Loaded Scraper
JJ - Jumping Jack
BV - Backhoe Vibratory Plate
VP - Vibratory Plate
HT - Hand Tamper

OMC - Optimum Moisture Content

DT - Density Test

RT - Retest of an area following additional compaction

Test Method

N - Nuclear (ASTM D 2922)
SC - Sand Cone (ASTM D 1558)
RB - Rubber Balloon (ASTM D 3167)

Material Type

S - Sand s - sandy
G - Gravel g - gravelly
SI - Silt si - silty
C - Clay c - clayey

SUMMARY OF FIELD DENSITY TESTS

PROJECT PACCAR - U1

JOB NUMBER 1639-35

PROGRESS REPORT NO. 6

DATE 10/14/94

TEST NUMBER	TEST DATE	TEST METHOD	GENERAL LOCATION	ELEV (feet)	FEET to GRADE	MAT'L TYPE	TYPE COM-PACTOR	FIELD MOIST. %	% ± OMP	DRY DENSITY (PCF)		% COMPACTION	
										FIELD	MAX.	FIELD	SPEC
DT-54	10/14/94	N	20'N and 40'E of SW Corner Sheet Pile		3'	GS	R	7.4	-0.1	129.8	139	93	95
DT-55			80'N and 38'E of SW Corner Sheet Pile		3'			6.8	-0.7	134.3	139	96	95
DT-56			25'N and 35'E of SW Corner Sheet Pile		2'			6.6	-0.9	136.3	139	98	95
DT-57			60'N and 35'E of SW Corner Sheet Pile		2'			7.0	-0.5	135.8	139	98	95
DT-58			100'N and 30'E of SW Corner Sheet Pile		2'			6.8	-0.7	137.1	139	99	95
DT-59			105'N and 30'E of SW Corner Sheet Pile		1'			7.1	-0.4	137.1	139	99	95
DT-60			85'N and 35'E of SW Corner Sheet Pile		1'			7.0	-0.5	136.4	139	98	95
DT-61			30'N and 38'E of SW Corner Sheet Pile		1'			7.8	+0.3	135.9	139	98	95
DT-62			20'N and 30'E of SW Corner Sheet Pile		0'			6.9	-0.6	137.5	139	99	95
DT-63			75'N and 35'E of SW Corner Sheet Pile		0'			7.3	-0.2	136.0	139	98	95
DT-64	✓	✓	U1 - Area 5 Extension		2'	✓	✓	6.9	-0.6	131.7	139	95	95

Percent compaction based on: ☐ Standard AASHTO (AASHTO T 99-67, ASTM D 698)

☒ Modified AASHTO (AASHTO T 180-67, ASTM D 1557)

Type of Compactor

R - Rubber-tired Roller

V - Vibratory Compactor

S - Sheepfoot Roller

GD - Grid Roller

L - Loaded Scraper

JJ - Jumping Jack

BV - Backhoe Vibratory Plate

VP - Vibratory Plate

HT - Hand Tamper

OMC - Optimum Moisture Content

DT - Density Test

RT - Re-test of an area following additional compaction

Test Method

N - Nuclear (ASTM D 2922)

SC - Sand Cone (ASTM D 1556)

RB - Rubber Balloon (ASTM D 3187)

Material Type

S - Sand s - sandy

G - Gravel g - gravelly

SI - Silt si - silty

C - Clay c - clayey

PROJECT

PROGRESS REPORT NO. 7

DALE 10/29/94

Percent compaction based on: ☐ Standard AASHTO (AASHTO T 99-67, ASTM D 698)
☐ Modified AASHTO (AASHTO T 100-67, ASTM D 1557)

N - Nuclear (ASTM D 2922)
SC - Sand Cone (ASTM D 1556)
RB - Rubber Balloon (ASTM D 3107)

S - Sand	s - sandy
G - Gravel	g - gravelly
SI - Silt	si - silty
C - Clay	c - clayey

R - Rubber-tired Roller
V - Vibratory Compactor
S - Sheepfoot Roller
GD - Grid Roller
L - Loaded Scraper
JJ - Jumping Jack
BV - Backhoe Vibratory Plate
VP - Vibratory Plate
HT - Hand Tamper

RT - Re-test of an area following additional compaction

HART - CROWSEY & associates

Hart Crowser
J-1639-35

ATTACHMENT A
AS-BUILT PLAN SHEETS
U-1/GARDEN AVENUE NORTH REMEDIATION

ANTICIPATED LIMIT OF ROADWAY RE

STA 5+69

ELEV. 29.67
FIELD VERIFY

SLOPE

30

25

6+50

6+00

5+50

5+00

4+50

ROADWAY PROJ

ANTICIPATED MAXIMUM LIMITS OF SOIL REMOVAL

1"=20'-0

PROTECT EXISTING BURIED
HIGH VOLTAGE CONDUIT

CB*3
RIM = 30.00
I.C. 18" CONC. N. = 23.96
I.C. 18" CONC. S. = 24.16
I.C. 8" PVC W. = 24.51

RESTORE LANDSCAPING
AS REQUIRED

BUILDING 17

conc. bit filled
with debris

Paved

Paved

DRIVEWAY

Top 8" PVC
25.70 FORM

CB 4 WV 12" W

18" D

18" D

18" D

LINE OF ROW

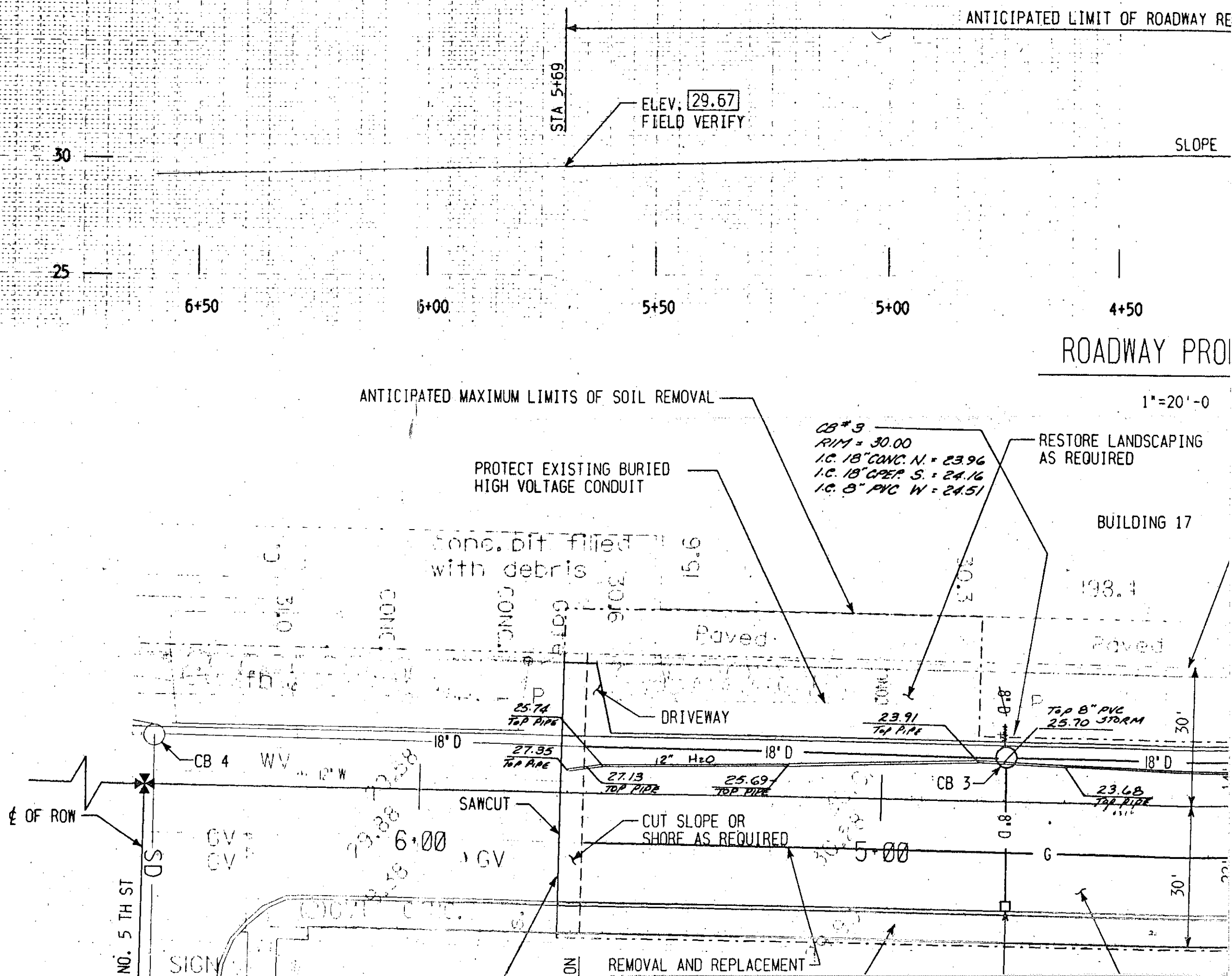
SAWCUT

CUT SLOPE OR
SHORE AS REQUIRED

NO. 5 TH ST

SIGN

REMOVAL AND REPLACEMENT



CONC

3'x3' GAS
VAULT

APPROXIMATE
EDGE OF NEW
CONSTRUCTION

ANTICIPATED
LIMIT OF SOIL REMEDIATION
STA 5+64

EXISTING GAS LINE BY WASH
NATURAL GAS Co. FORCES.
COORDINATE EXTENT OF
REMOVAL WITH WASH LIGHT
NATURAL GAS Co. VAULT

EXIST. STREET LIGHT
& FND, REMOVE AND
REPLACE AS REQUIRED.
REUSE POLE & ARM

REMOVE & REPLACE
EXISTING CB 3A w/
TYPE I CB. RIM 29.96 29.85
I.E. (E) 27.36 (8" PVC) 27.19
REUSE EXIST. GRATE & FRAME
SEE CITY OF RENTON STANDARD
PLAN PAGE B012

REMOVE
AS REQ
AND REP
SEE PRO

ROADWAY

SCALE: 1"=20'



ANTICIPATED LIMIT OF

CB 4 STA 6+58.1
RIM EL=29.56

APPROXIMATE
EDGE OF CONSTRUCTION
LIMITS

FINAL GRADE

CB 3 STA 4+72.3
RIM EL=30.08 30.00

EXISTING PIPE

18" ϕ CONC PIPE

18" ϕ CLASS II CONC PIPE ASTM C76 @ 0.22%

18" ϕ

EXIST. CATCH BASIN:

I.E. (N)=22.90 (15" CONC)
I.E. (NW)=25.91 (8" PVC)
I.E. (S)=23.68 (18" CONC)
I.E. (W)=22.78 (24" CMP)

REMOVE AND REPLACE
EXIST. CATCH BASIN w/
54" ϕ TYPE II CATCH BASIN
REUSE EXIST. GRATE & FRAME
I.E. (W)=24.54 (8" PVC) 24.3
I.E. (N)=24.09 (18" CONC) 24.0
I.E. (S)=24.09 (18" CONC) 24.0
I.E. (E)=27.36 (8" PVC)

6+50

6+00

5+50

5+00

4+50

STORM DRAIN PR

1"=20'-0"

AL & REPLACEMENT

42% (VERIFY)

DESIGN GRADE

STA 2+98

ELEV. 30.80
FIELD VERIFY

EXISTING GRADE LINE

4+00

3+50

3+00

2+50

2+00

30

25

0 5 10 15 20 40 60

1"=20' HORIZ
1"=4' VERT

GRAPHIC SCALE

ROW LINE

REMOVE AND REPLACE EXISTING STORM LINE
WITH NEW STORM LINE AS REQUIRED FOR SOIL
REMEDiation

CUT SLOPE OR
SHORE AS REQUIRED

LIGHT POLE FOUNDATION w/ VAULT,
REMOVE AND REPLACE AS REQUIRED,
COORDINATE w/ PUGET POWER.

REMOVE AND REPLACE
AS REQUIRED

DRIVEWAY

PROTECT EXIST. CB

CB #2
RIM = 30.85
I.C. 18" CPEP N = 24.15
I.C. 12" PVC S = 25.83
I.C. 12" PVC E = 25.80
I.C. 12" PVC W = 24.30
I.C. 8" PVC NE = 25.51

REMOVE AND REPLACE EXISTING
WATER LINE SEE DWG SD6

4+00

CURB

OF ROW

3+00

SAWCUT

ELEV. 30.63

ELEV. 27.67

ELEV. 27.72

26.58

2+00

GARDEN AVE NORTH

NO. 4 TH ST

STA 0+00

VERTICAL DATUM:

CITY OF RENTON DATUM PER BENCHMARK
U.S.C. & G.S. BRASS CAP FLUSH WITH
WALK AT THE NORTHEAST CORNER OF THE
INTERSECTION OF LAKE WASHINGTON BOU
AND NORTH 8TH STREET STAMPED:
"L-384 RESET 1962" ELEVATION =26.53

NOTE:

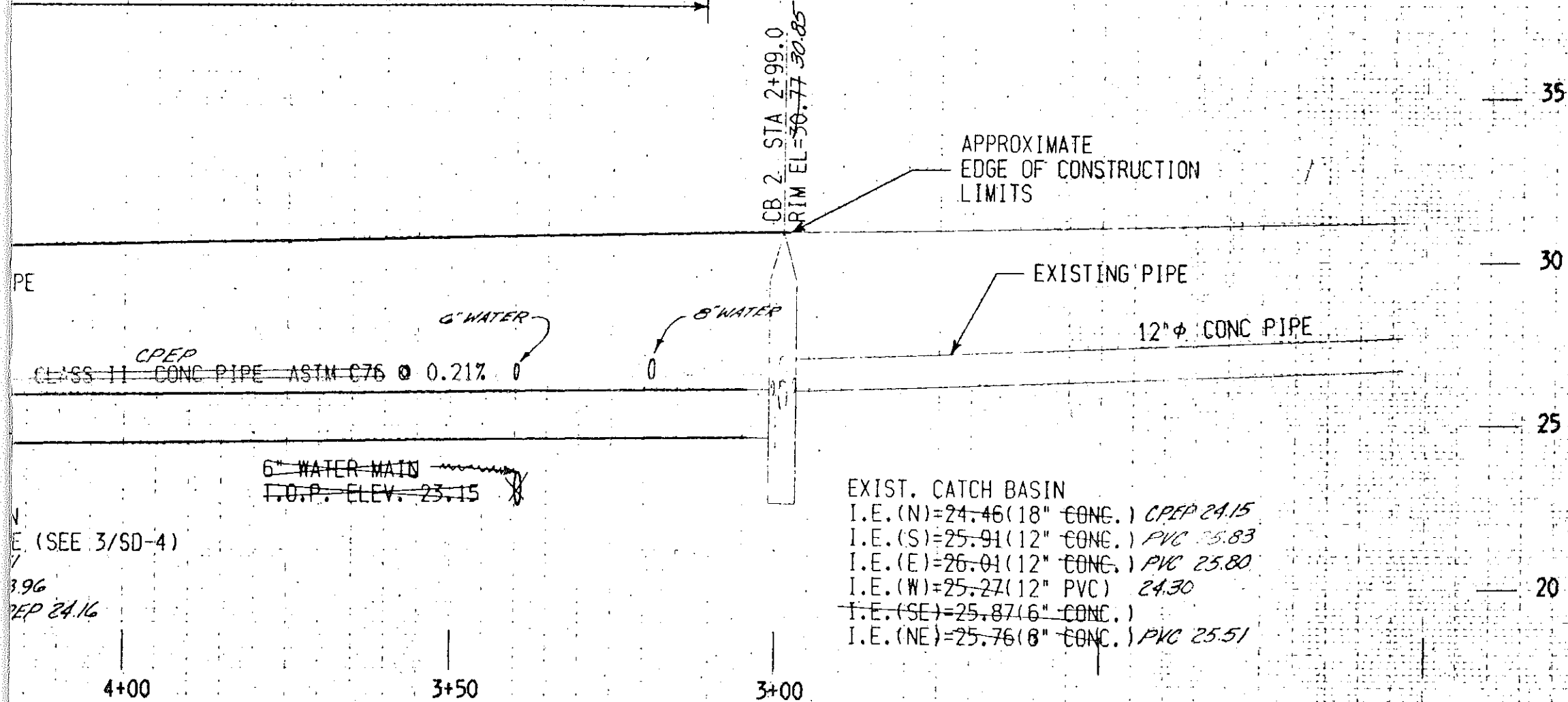
1. FOR ROADWAY, CURBS, SIDEWALKS,
CATCH BASIN TYPE II AND CROSS-
SECTION SEE DRAWING
SD4
2. FOR STORM DRAINAGE NOTES SEE
DRAWING SD4

SIDEWALK
CUT SLOPE OR
SHORE AS REQUIRED
EXISTING ROADWAY
FOR SOIL REMEDIATION
PLACE TO ORIGINAL ALIGNMENT.
FILE.

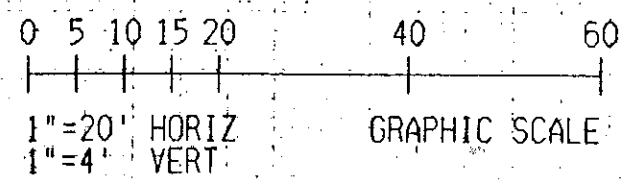
STORM DRAIN PLAN

1'-0

SOIL REMEDIATION



OF FILE

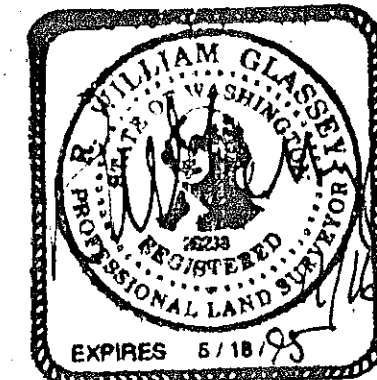


EXIST. CATCH BASIN
I.E.(N)=24.46(18\" CONC.) CPEP 24.15
I.E.(S)=25.91(12\" CONC.) PVC 25.83
I.E.(E)=26.01(12\" CONC.) PVC 25.80
I.E.(W)=25.27(12\" PVC) 24.30
I.E.(SE)=25.87(6\" CONC.)
I.E.(NE)=25.76(8\" CONC.) PVC 25.51

NO.	REVISION	BY	APPR.	DATE
1	ISSUE FOR PERMIT	SWT		07-18-94

AS CONSTRUCTED

DATE 16 Nov. 94



SSOE, INC.
ENGINEERS ARCHITECTS PLANNERS
3015 112TH AVENUE, N.E., SUITE 101
BELLEVUE, WASHINGTON 98004 TEL. 206-827-2950

PROJECT NUMBER	945012
DRAWING NUMBER	SD3

CITY OF RENTON
DEPARTMENT OF PUBLIC WORKS

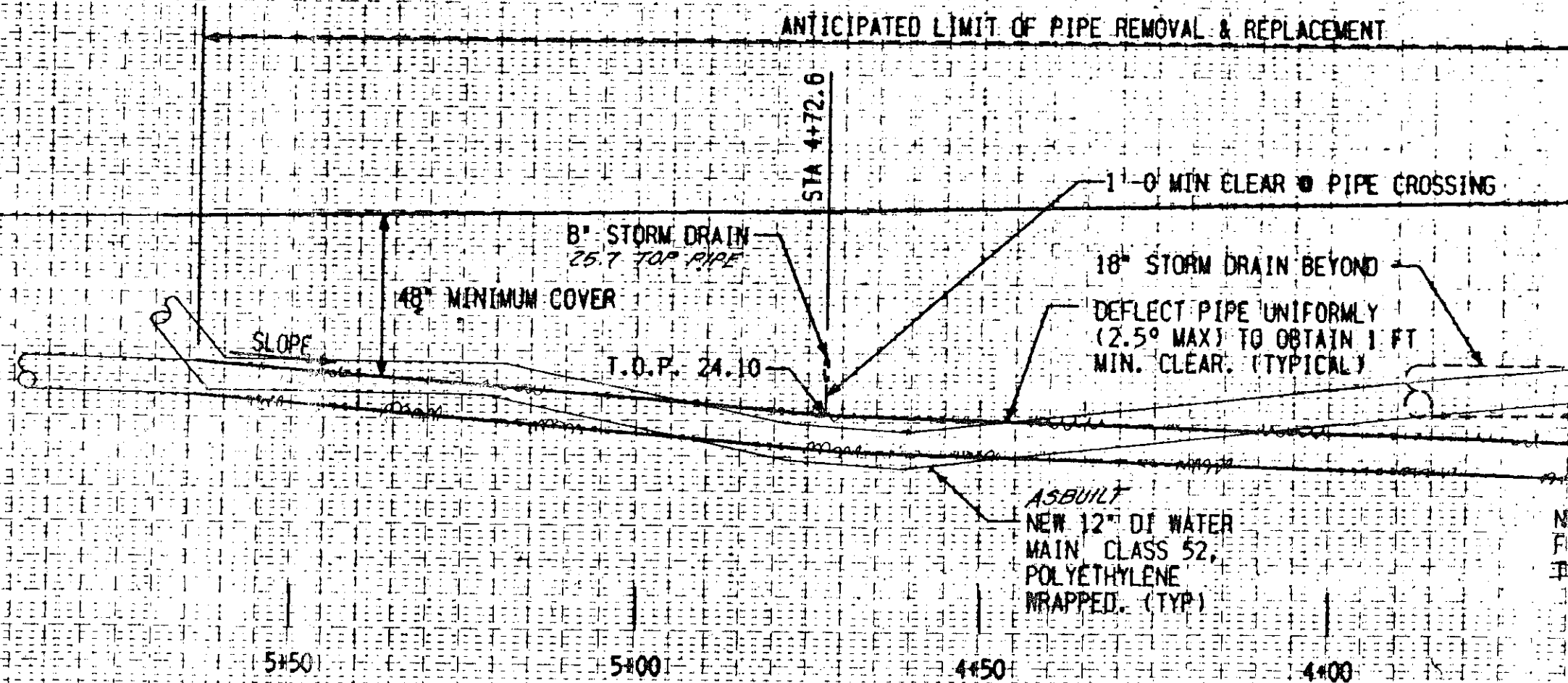
ROADWAY PLAN AND PROFILE AS BUILTS ONLY

DESIGNED: C O'CONNOR	DATE:	FILE NAME: 5
DRAWN: C O'CONNOR	SCALE: 1"=20'-0	FIELD BOOK:
CHECKED: S.W.-TODD	APPROVED: DIRECTOR OF PUBLIC WORKS	SHEET: 3 C

FIRE HYDRANT
DETAIL SEE



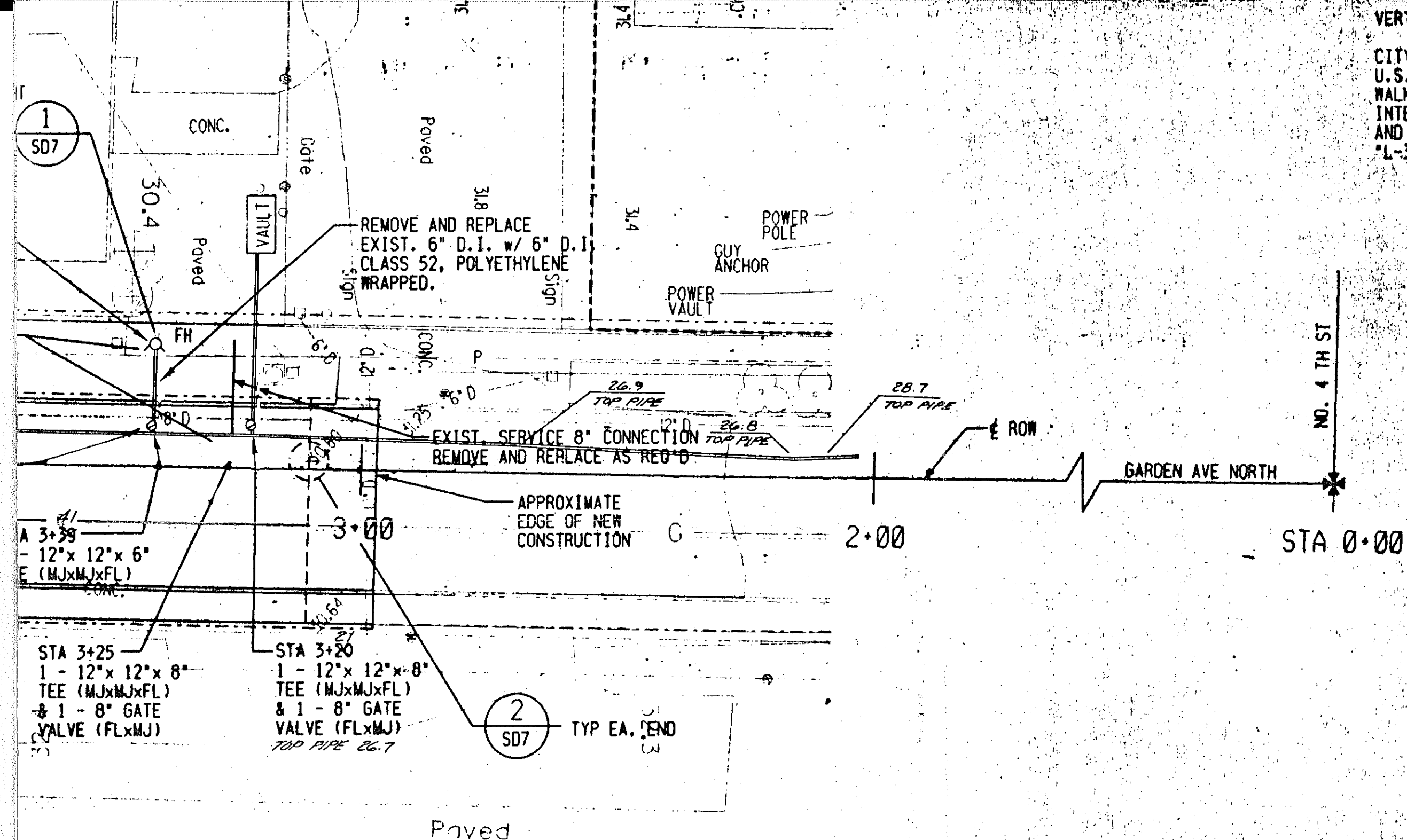
100



WATER LINE PROFILE

VERTICAL DATUM:

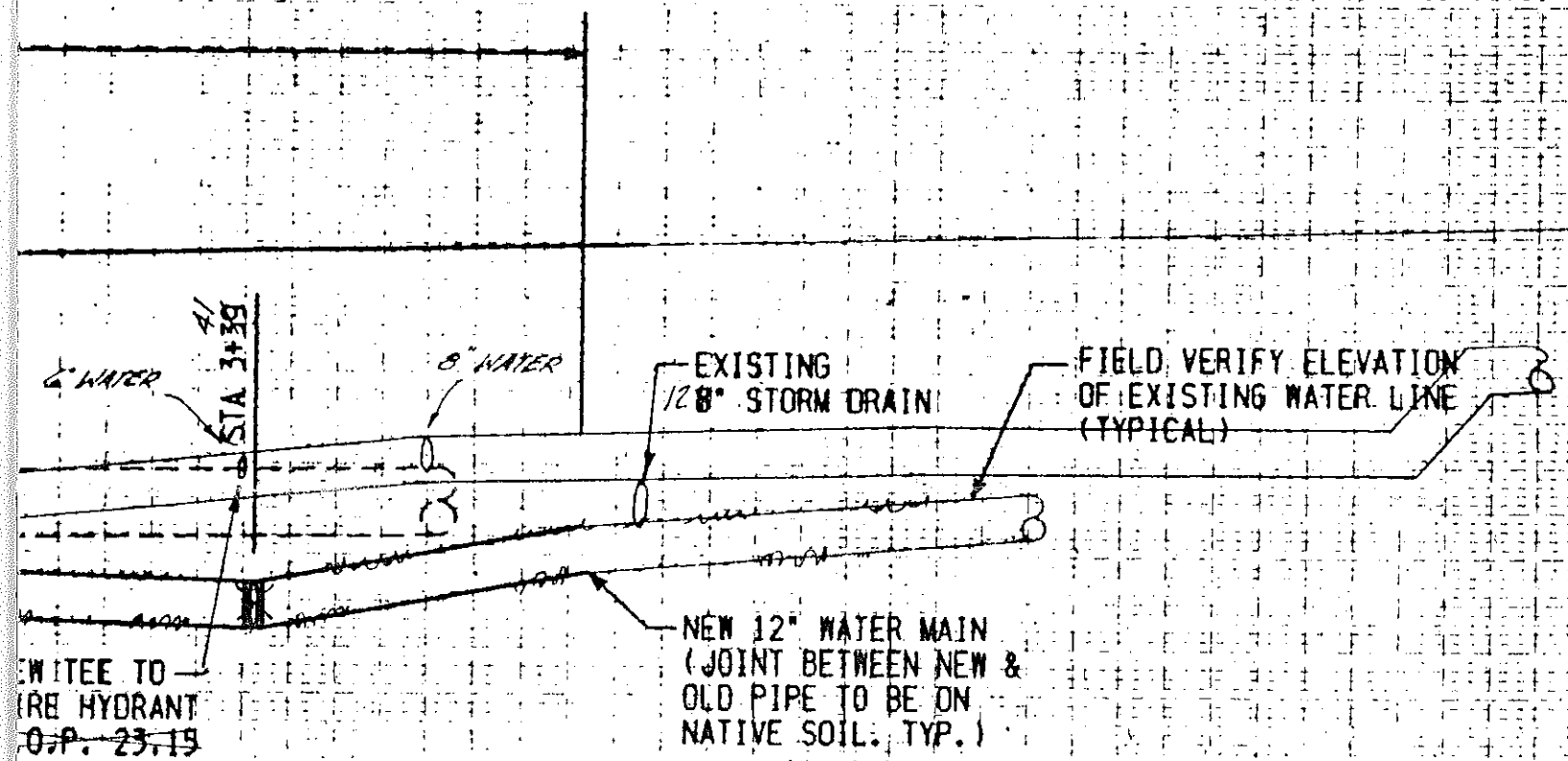
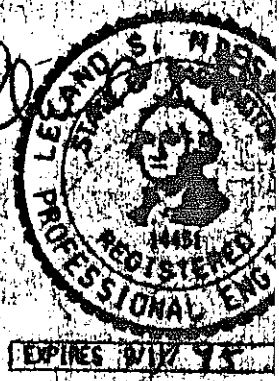
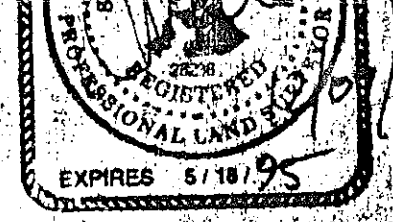
CITY OF RENTON DATUM PER BENCHMARK L-3
U.S.C. & G.S. BRASS CAP FLUSH WITH CON
WALK AT THE NORTHEAST CORNER OF THE
INTERSECTION OF LAKE WASHINGTON BOULEV
AND NORTH 8TH STREET STAMPED:
"L-384 RESET 1962" ELEVATION 25.53



AS CONSTRUCTED



DATE 12/1/94



WHITE TO
FIRE HYDRANT
O.P. 23.15

NEW 12" WATER MAIN
(JOINT BETWEEN NEW &
OLD PIPE TO BE ON
NATIVE SOIL, TYP.)

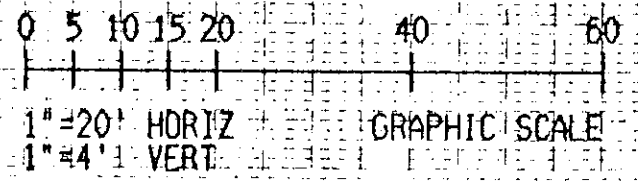
FIELD VERIFY ELEVATION
OF EXISTING WATER LINE
(TYPICAL)

EXISTING
12" STORM DRAIN

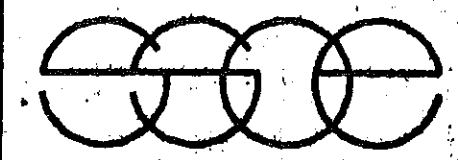
8" WATER

6" WATER

STA 3+39.41



GRAPHIC SCALE



SSOE, INC.
ENGINEERS ARCHITECTS PLANNERS
3015 112TH AVENUE, N.E., SUITE 101
BELLEVUE, WASHINGTON 98004 TEL. 206-827-2950

PROJECT NUMBER	945012
DRAWING NUMBER	SD6

CITY OF RENTON
DEPARTMENT OF PUBLIC WORKS

WATER PLAN AND PROFILE
AS BUILT

1	ISSUE FOR PERMIT	SWT		07-18-94
NO.	REVISION	BY	APPR.	DATE

DESIGNED: C O'CONNOR	DATE:	FILE NAME:
DRAWN: C O'CONNOR		
CHECKED: S.W.-TODD	SCALE: 1"=20'-0"	FIELD BOOK:
APPROVED:		SHEET: 6

DIRECTOR OF PUBLIC WORKS