SEATTLE CITY LIGHT WORK ORDER #90-A (CONTINGENCY)

DUWAMISH SUBSTATION BREAKER PADS SOIL TESTING

Raven Services Corporation

2200 Sixth Avenue, Suite 519, Seattle, Washington 98121 • (206) 443-1126 • FAX (206) 443-1128

Lorton, Virginia • Anchorage, Alaska • Atlanta, Georgia

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April 20, 1990

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DUWAMISH SUBSTATION BREAKER PADS SOIL TESTING

I. INTRODUCTION

This project involves the testing of soils around five large breaker systems at Duwamish substation, as authorized by Seattle City Light Work Order #90-A (Contingency). Seattle City Light is planning to install an oil spill containment and drainage system to protect the soils in the event of leaks or spills of dielectric fluid from the tanks of the breakers. Since this construction involves trenching of some fill soils around the concrete pads of the breakers, the quality of the soils as they now exist comes into question. Samples of these soils were subjected to PCB analysis to determine the concentrations before trenching starts. The fate of the trenched materials depends upon their present PCB levels. Composite soil samples were obtained for the testing of 28 February 1990.

II. SAMPLING METHODOLOGY

A. Container and Sampling Equipment

All samples were placed in 30 ml wide-mouth glass containers that had been pre-cleaned. The metal screw cap lids were lined with aluminum foil such that the dull side was in contact with the sample.

The pre-cleaning procedure involved scrubbing with a special petrochemical dissolving biodegradable soap [HarborMaster Products, Inc., Edmonds, Washington]. The terminal end of the brush applied had sufficient bristles to scrub the seam where the side connects with the bottom. A final rinsing with methylene chloride was undertaken to remove any invisible greases and detergent residues.

Scoops and collection pans are laboratory grade stainless steel. Digging tools are high carbon tool steel. Tools were cleaned with the aforementioned detergent and rinsed with methylene chloride. The tools were buffed free of rust before arriving at the site. The soil composites were mixed in a stainless steel bowl 30 cm in diameter.

B. Field Observations

Data on the collection process and observations of the physical nature of the sample were kept in the bound field log book. The format for this book is chronological.

C. Sampling Strategy

In accordance with EPA SW-846, sampling strategy was chosen from sections most analogous to the nature of the site. These sections are "waste piles" [1.4.3] and "landfills" [1.4.4]. Individual decisions were required for these sites with the purpose of the study in mind. These include choosing subsample locations to provide information of the occurrence of any spills. Positions of the tank spouts and observable spills influence selection. In most cases, some samples were obtained near the proposed trench line. Composite samples were collected, four to five subsamples for each breaker pad.

D. Sample Collection

Method 8080 in the EPA SW-846 manual describes the protocol for handling of organochlorine pesticides and polychlorinated biphenyls. Compliance with these instructions necessitated using glass containers and specified conditions for refrigeration. All samples in our case were delivered to the laboratory in time to comply with the maximum seven days storage for extraction and thirty days for complete analysis. Soil samples were collected with an auger to depth after the top rock layer had been shovelled away.

All samples from the breaker areas are listed in Table I. Their descriptions are given in Table II. Sample locations at the individual breakers are presented in Figure 2.

E. Analysis

Samples, stored no longer than five days at 4° C, were extracted with methylene chloride and taken up with pesticide grade hexane. Colored

extracts were pre-treated with Florisil filters to remove residues that interfere with the PCB determination [cleanup modification of USEPA Method 3540, as specified by 40CFR136]. The samples were analyzed by a modification of the packed column gas chromatography procedure described in Method 8080. Detection and confirmation of positive signals was accomplished with a Tracor Waters Dimension One chromatograph with automated database Aroclor identification. This is a state-of-the-art commercial system evolved from those designated in Method 8080. Concentrations below 0.10 ppm are specified not detectable. QA/QC data and raw signal data are available upon request.

III. RESULTS AND DISCUSSION

As shown in Table I, no PCBs were detected in any of the samples except for the sample obtained at Breaker Spare. The presence of 0.7 ppm PCBs could potentially represent one subsample out of four that contributed 2.8 ppm PCB as a theoretical maximum. Even if that concentration did exist, it would not restrict use of the excavated soil. The regulatory threshold for the contaminated soil to be designated as a hazardous waste is 50 ppm PCB. It is interesting that near subsample #1, as shown in Figure 1, the surface of the rock fill was oily. Subsample location #1 should be reoccupied if any further testing is contemplated. Raven recommends no further testing at this time.

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Sample #	# Sub-Samples	Location	Breaker #	Concentration PCB [ppm]
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DP-2	4	South	spare	0.7 [Aroclor 1254]
DP-3	5	West Central	240-85	<0.1
DP-4	5	East Central	240-84	<0.1
DP-5	4	Northeast	240-82	<0.1

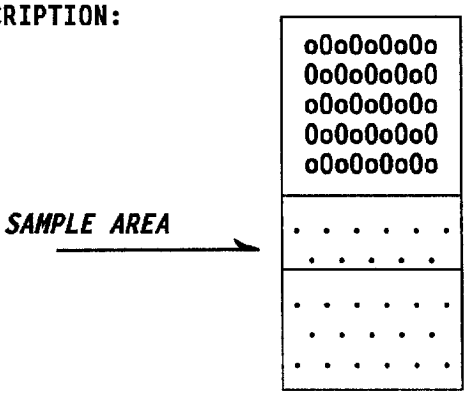
SEATTLE CITY LIGHT WORK ORDER #90-A (CONTINGENCY)

DUWAMISH SUBSTATION BREAKER PADS SOIL TESTING

TABLE II

SAMPLE DESCRIPTIONS

GENERAL DESCRIPTION:



Top: Mix of cobbles and crushed rock from 1/2" to 2" long. Rock layer varies from 5" to 10" thick.

The layer below is dark brown fill sand.

The depths of the rock layers above the subsamples are indicated below.

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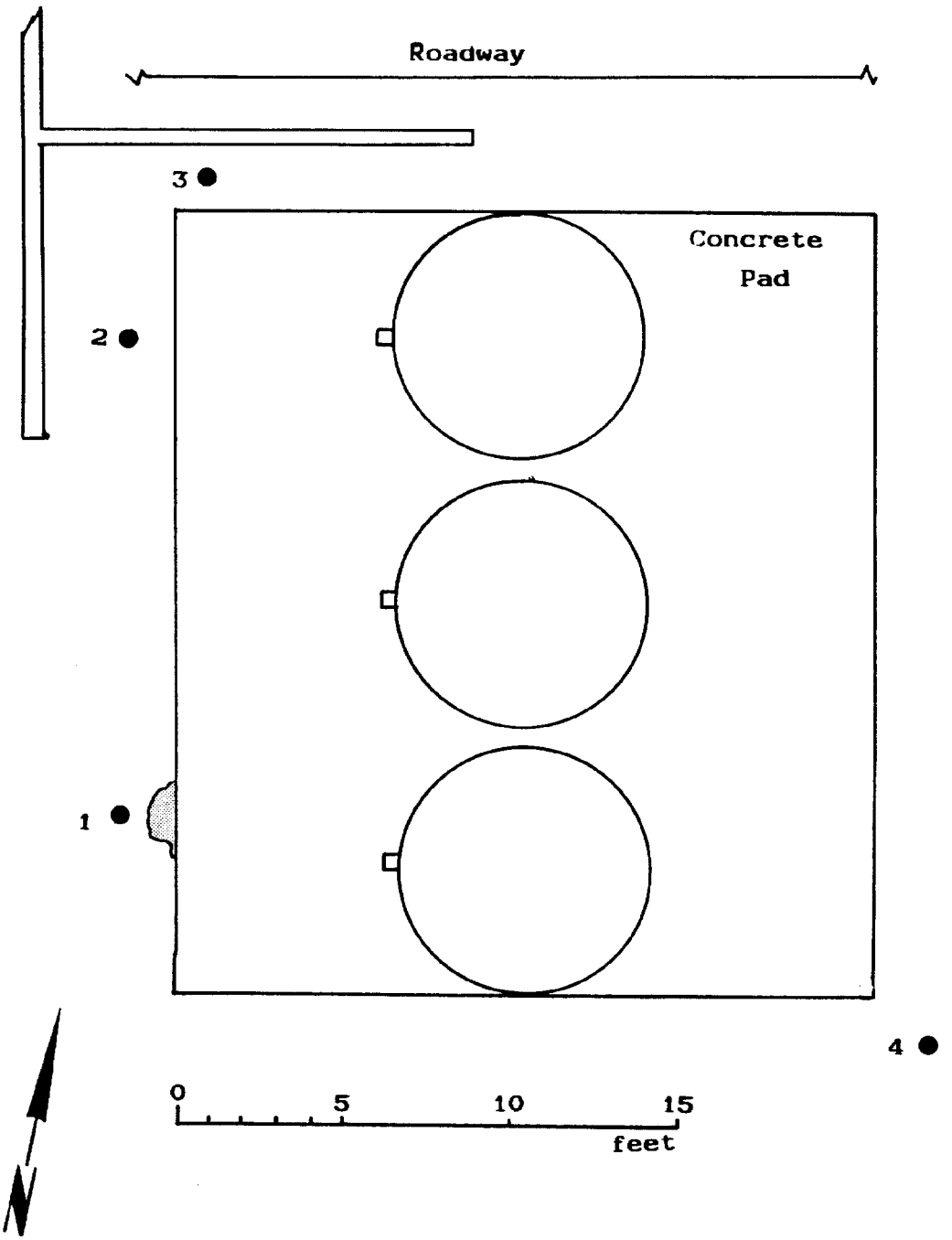
DP-5	240-82	#1 - 7" rock; #2 - 8" rock, crushed 1" to 2" long. #3 - 7" sandy rock; #4 - 7" sandy rock.

DETAIL OF BREAKER SPARE
SUBSAMPLE LOCATIONS



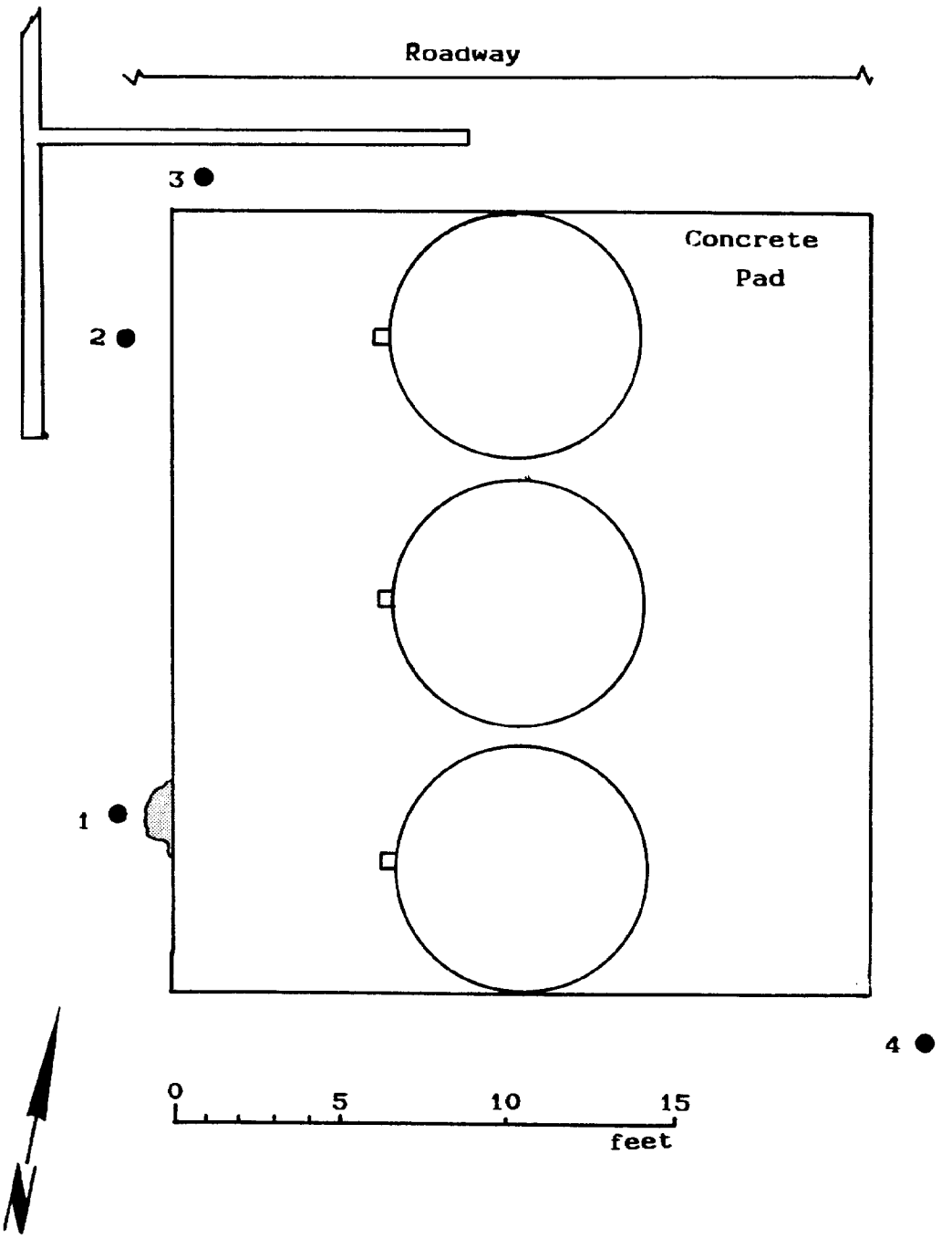
Legend:

- Soil subsample
- Oil stain
- Tank spout
- Proposed drain pipe

RAVEN SERVICES CORP.		
SCALE feet	APPROVED BY mlh	DRAWN BY LSG
DATE 4/20		REVISED
Breaker Pad Detail		
LA TERRE ENVIRONMENTAL CONS.		DRAWING NUMBER 90 A-1

SEA036735

DETAIL OF BREAKER SPARE
SUBSAMPLE LOCATIONS



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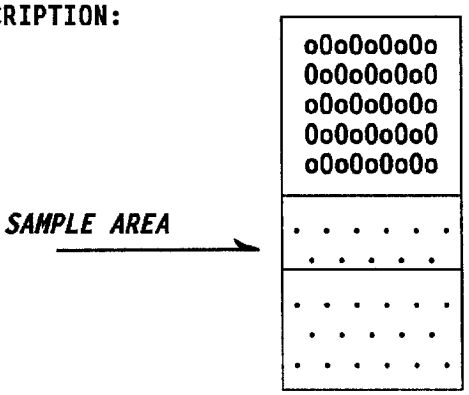

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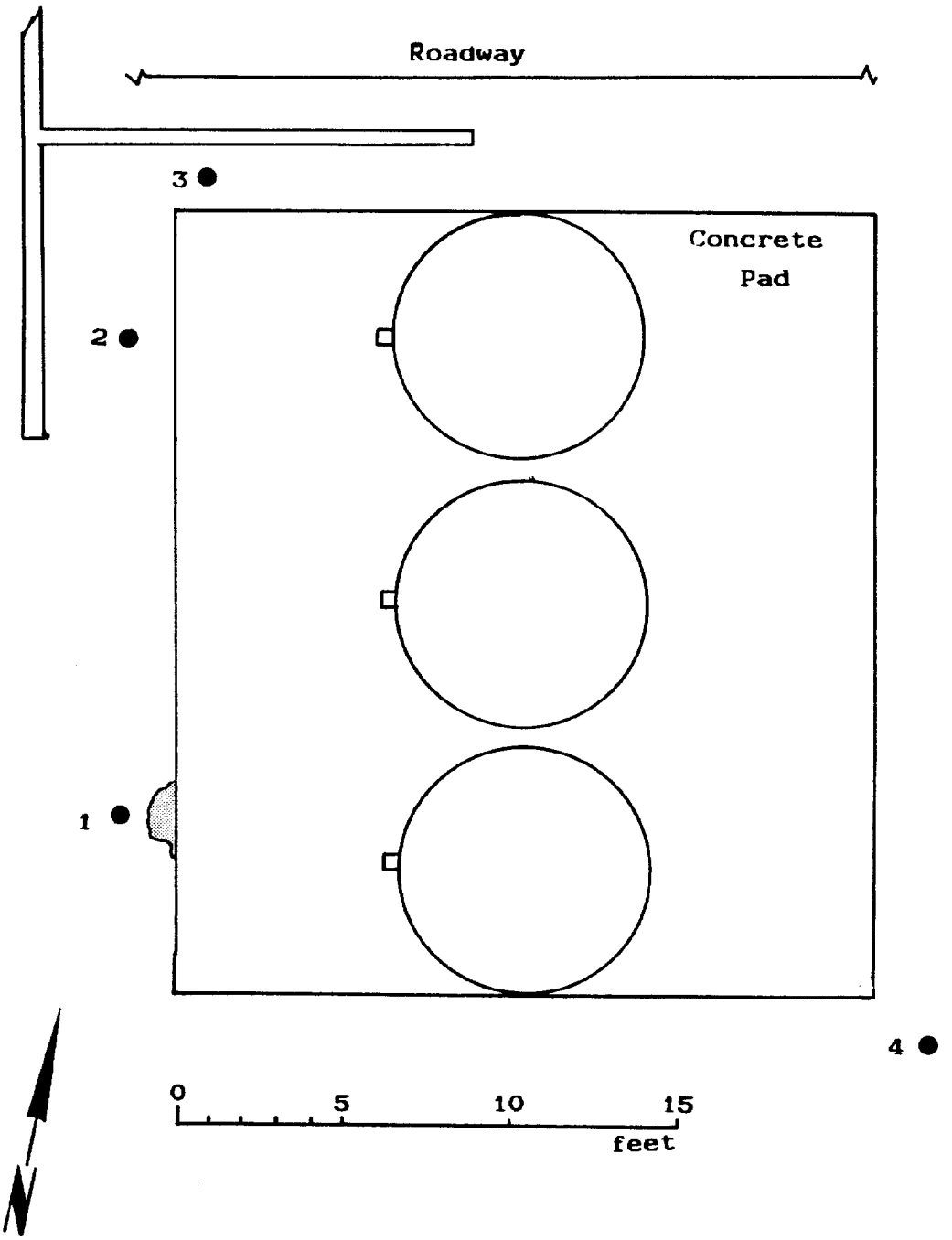
SUBSAMPLE LOCATIONS

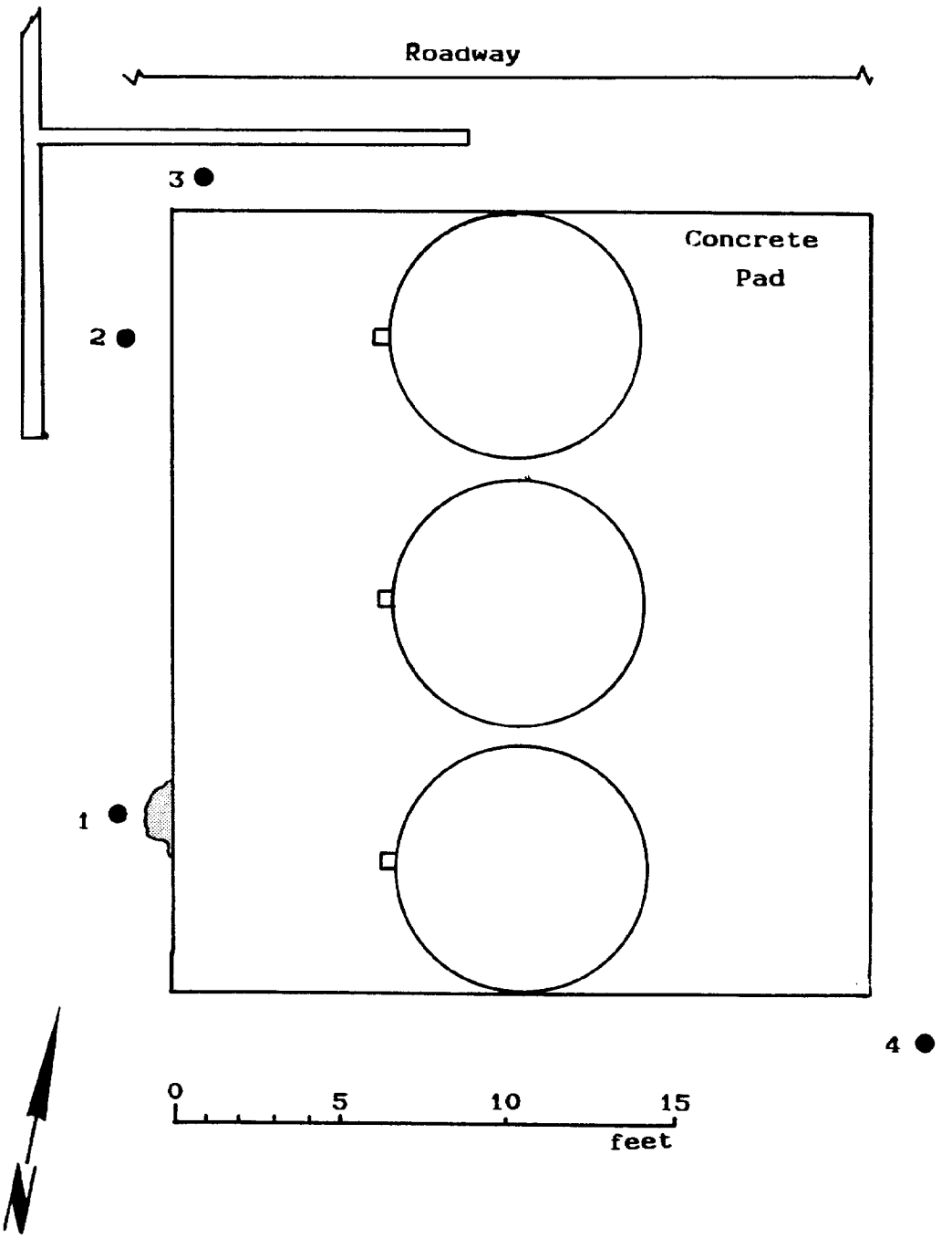


Legend:

- Soil subsample
- Oil stain
- Tank spout
- Proposed drain pipe

RAVEN SERVICES CORP.		
SCALE feet	APPROVED BY mlh	DRAWN BY LSG
DATE 4/20		REVISED
Breaker Pad Detail		
LA TERRE ENVIRONMENTAL CONS.		DRAWING NUMBER 90 A-1

DETAIL OF BREAKER SPARE
SUBSAMPLE LOCATIONS



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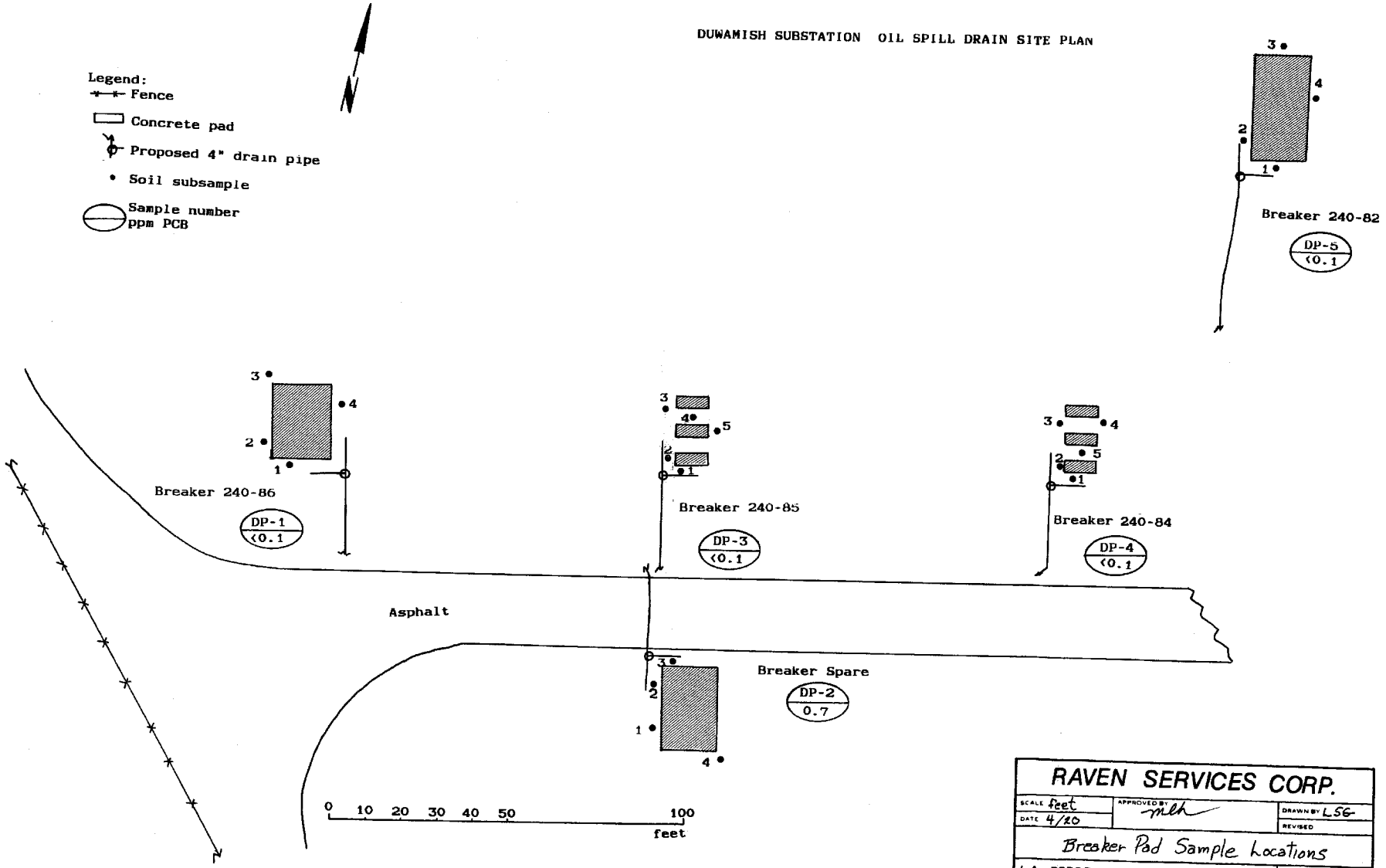
DATE 4/20		REVISED
Breaker Pad Detail		
LA TERRE ENVIRONMENTAL CONS.		DRAWING NUMBER 90A-1

DUWAMISH SUBSTATION OIL SPILL DRAIN SITE PLAN



RAVEN SERVICES CORP.		
SCALE feet	APPROVED BY mlh	DRAWN BY LSG
DATE 4/20		REVISED
Breaker Pad Sample Locations		
LA TERRE ENVIRONMENTAL CONS.		DRAWING NUMBER 90-A-2