N00217.000576
HUNTERS POINT
SSIC NO. 5090.3

5090
Ser 1811/HP/DHS

21 NOV 1988

From: Commander, Western Division, Naval Facilities Engineering Command
To: Distribution

Subj: CHARACTERIZATION OF SURFACE-WATER RUNOFF AND STORM-SEWER DISCHARGES AT NAVAL STATION, TREASURE ISLAND, HUNTERS POINT ANNEX

Encl: (1) U.S. Geological Survey ltr of 12 Oct 88
(2) Proposed Reconnaissance Study of Storm Water Quality, Hunters Point Annex, November 1988

1. We requested the U.S. Geological Survey's (USGS) assistance in characterizing surface-water runoff and storm-sewer discharges at Naval Station, Treasure Island, Hunters Point Annex (HPA). Enclosure (1) is a summary of their observations and recommendations. We are presently developing a stormwater sampling and analysis program based on the USGS assessment. Enclosure (2) is a summary of our proposed approach. We wish to implement it during the earliest feasible storm event that occurs this season. We therefore request that the review and comment process be expedited and that verbal comments be provided to this Command by 2 December 1988. My staff is available to discuss any questions which arise in order to facilitate your review.

2. Questions regarding this matter can be directed to Commander, Western Division, Naval Facilities Engineering Command (Attn: Louisa T. Lew, Code 1311, 415/877-7502).

L. M. SMITH
VICE COMMANDER

Distribution:
Department of Health Services (Attn: Dwight Hoenig)
Regional Water Quality Control Board (Attn: Steve Ritchie)
Bay Area Air Quality Management District (Attn: Scott Lutz)
U.S. Environmental Protection Agency (Attn: Jerry Clifford)
California Dept. of Fish & Game (Attn: Mike Rugg)
U.S. Fish & Wildlife Service (Attn: Don Palawski)
National Oceanic & Atmospheric Administration (Attn: Sharon Christopherson)
City and County of San Francisco (Attn: David Wells)

Copy to:
San Francisco District Attorney (Attn: Steve Castleman)
Blind copy to: 09B, 09C5, 18, 181, 1811, 1811GB, 1811CL, Admin. Record
COMNAVBASE San Francisco, NAVSTA Treasure Island
OIC Treasure Island Hunters Point Annex
Harding Lawson Associates (Lisa Teague)

WRITER: G. Brown/1811GB/7502
TYPIST: B. Palmer/18 Nov 88/Ser 3842h
FILE: HP/DOHS

N/W 13

United States Department of the Interior

GEOLOGICAL SURVEY
District Office
Water Resources Division
Room W-2234, Federal Building
2800 Cottage Way
Sacramento, California 95825
(916) 978-4633

October 12, 1988

Mr. Alex E. Dong
Head, Environmental Operations Section
Western Division
Naval Facilities Engineering Command
Post Office Box 727
San Bruno, California 94066

Dear Alex:

In regard to your request to have the U.S. Geological Survey (Survey) assist the U.S. Department of the Navy (Navy) in the characterization of surface-water runoff and storm-sewer discharges at Hunters Point Annex, the Survey believes only qualitative results of flow volumes and constituent loadings could be obtained, unless significant modifications are made to the present drainage system.

The Survey's approach to a quantative study would be to (1) implement a storm-water runoff quantity- and quality-data collection program and (2) use these collected data in the application of a rainfall-runoff mathematical model to generate long-term records and frequency analyses. The most desirable approach for monitoring the runoff from the Annex would be to have runoff quantity- and quality-monitoring instrumentation installed near the invert of one of the larger storm drain pipes that services a significant part of the Annex' drainage area. The 6-feet diameter mainline storm drain running parallel with "K" Street on the southwest side of the Annex, would be an ideal location for such monitoring, if it was not affected by intrusion of seawater. Review of the maps and plans of the Annex' storm-drain system suggest that seawater is present within the primary storm-drain pipes almost 100 percent of the time.

The presence of seawater would cause significant problems on the monitoring of the quantity and quality of runoff. The flow rate within the mainline storm drain probably could be monitored. However, it would be extremely difficult, if not impossible, to separate the tidal flows within the pipe from the monitored flow data to obtain the storm-runoff hydrograph needed for model calibration. If a storm-runoff hydrograph could be extracted, it would be distorted with respect to magnitude and timing of the runoff peak. This distortion would make calibration of a model very difficult. The presence of seawater also would dilute almost all runoff quality samples. In addition, sloshing within the pipe would greatly distort the timing of the monitored contaminant hydrograph when compared to the computed hydrograph from the model. The exposure of the monitoring equipment to the corrosiveness of seawater would greatly increase the chance of instrumentation failures.

ENCl (1)

A possible approach to increasing the success of a monitoring program would be to exclude seawater from the system by plugging the mainline between the outlet and the 30-inch line that enters near Mahan Street and using a water-level activated pump to remove the runoff water from the mainline to the bay (see attached illustration). The 30-inch line entering the mainline from Mahan Street also would need to be plugged. The monitoring site possibly could be located in the section of pipe along Manseau Street between "J" and "K" streets. The removal of seawater from the system also would enable one to investigate ground-water infiltration into the storm-water drainage system during non-storm runoff periods.

If the Navy were to pursue this approach, an engineering feasibility study on the effectiveness of a pump to remove runoff water would be required. The feasibility study and the installation of the plugs and pumps are not within the Survey's scope of expertise.

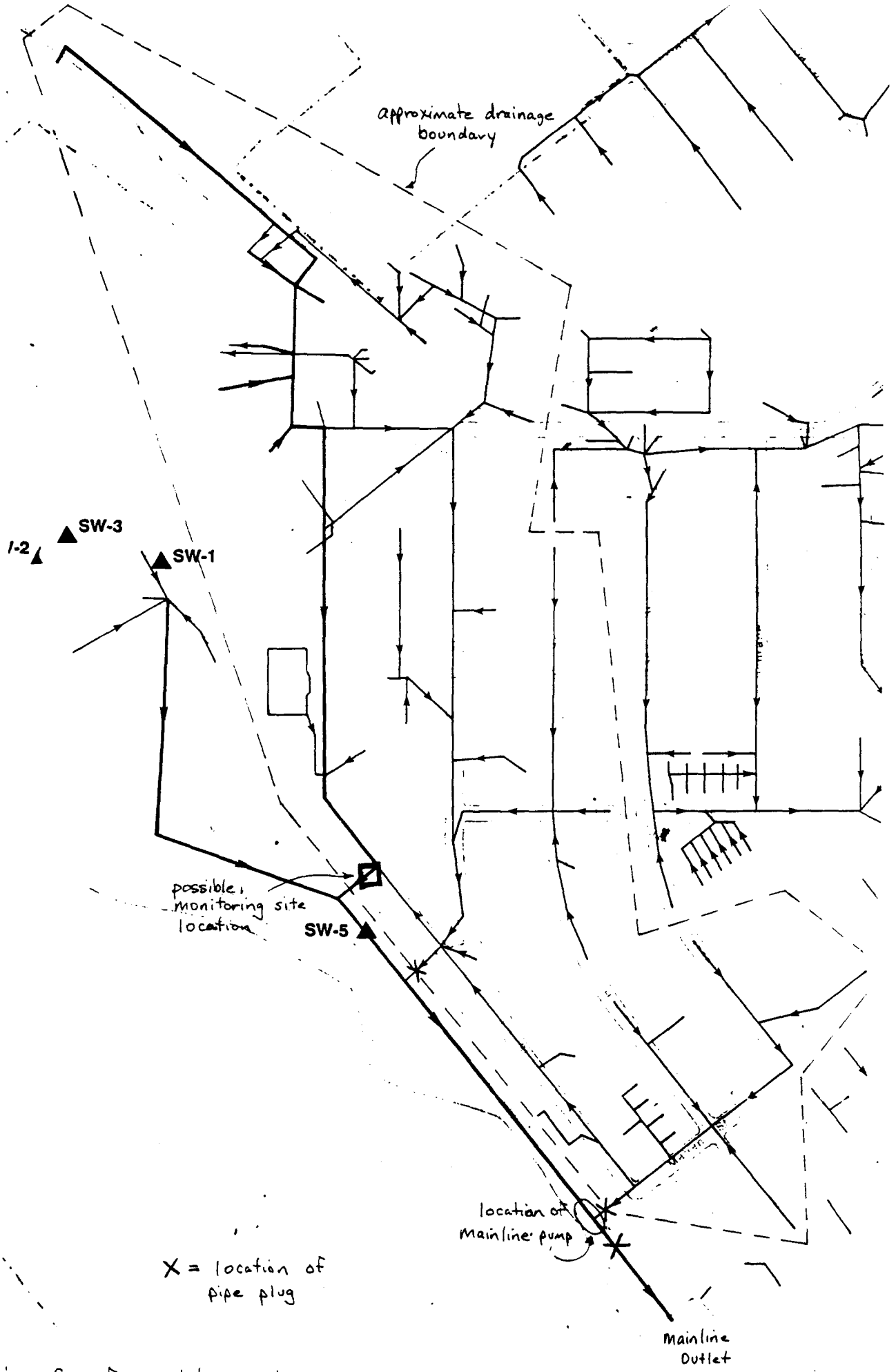
An approach to a qualitative study would be to (1) apply a rainfall-runoff model to estimate storm runoff and (2) collect surface-storm runoff quality samples from representative areas. Contaminant loads, subsequently, could be estimated by applying the concentrations from the samples to model generated runoff values. This approach has severe limitations because the model can not be calibrated and the relation between contaminant concentrations of surface-runoff samples to the concentrations of total runoff can not be determined. In addition, this approach would require an extensive number of surface-runoff samples requiring considerable manpower and the ability of the manpower to respond quickly to storm events. The Survey would have extreme difficulty in meeting these requirements. This qualitative approach also would not be able to characterize the quantity and quality of ground-water infiltration into the storm drains.

If you have questions concerning these two approaches, please do not hesitate to call me at (916) 978-4633.

Sincerely,

Peter W. Anttila
Assistant District Chief for
Hydrologic Investigations

Attachments



Copy from plate #2 of June 1988 Harding Lawson Associates report

PROPOSED RECONNAISSANCE STUDY OF STORM WATER QUALITY, HUNTERS POINT ANNEX

Introduction

This document describes the proposed reconnaissance program to sample the water and sediment associated with the storm sewer system at the Naval Station, Treasure Island, Hunters Point Annex (HPA), San Francisco, California.

Previous studies have shown that many different types of contaminants are present in the soils at HPA (*DA, 1986; EMCON, 1987; WESTEC, 1984*). These investigations indicated that the contaminants occur both as locally concentrated "hot spots" and as apparent random or scattered concentrations. The potential exists for introduction of these contaminants into San Francisco Bay. Such contaminants could enter the bay through direct surface water runoff, seepage of shallow ground water, and/or direct discharge through the storm sewer outfalls.

The Navy conducted an initial reconnaissance study, the Storm Water Runoff Sampling Program (*HLA, 1988c*) based upon sampling requirements specified by the California Regional Water Quality Control Board, San Francisco Bay Region (*RWQCB, 1987a-b*). This sampling effort produced some results that will aid in assessing the chemical quality of storm water runoff, but many questions are still unanswered about contaminant sources and water quality variability during rainfall events.

While still reconnaissance in nature, this proposed investigation (the study), will address some questions regarding the temporal and spatial variability in the chemical quality of the runoff entering the storm drains and the potential for contaminant discharges to the bay. The study will provide qualitative information that will aid in evaluating the need for a substantially more complex quantitative hydrologic

ENCl (2)

investigation. The U.S. Geological Survey commented that a quantitative hydrologic study of the site is not feasible under present conditions (due to the design of the storm drainage system), nor warranted on the basis of information currently available (*USGS, 1988*).

Study Approach

This study consists of the collection and chemical analysis of samples of water and sediment present under several conditions. These conditions include:

- Existing bottom sediments present in the storm drains
- Direct surface runoff of water and suspended sediment entering the storm drains
- Storm water and suspended sediment within the storm drains (and later discharged to the bay at the outfalls)
- Direct bulk precipitation during rainfall event.

Sampling under these conditions will permit a qualitative analysis of the contributions of direct overland runoff entering the drains versus the contributions from ground-water seepage into the storm sewer lines. Sampling of existing bottom sediment and suspended sediment will allow a qualitative evaluation of the contribution of particulates to the potential for water quality degradation.

Data collection activities will be conducted in several phases:

Phase 1 - Field screening of potential sites,

Phase 2 - Sampling of bottom sediments in storm drains, and

Phase 3 - Sampling of water and sediments produced by a significant rainfall event.

Phase 1 consists of screening potential sites during an extended high tidal flow condition in the bay. This screening is designed to identify the extent to which tidal bay waters may flow up into the storm drain system and complicate water and sediment

sampling efforts. The screening will be accomplished by evaluating site observations and field measurements (e.g. pH, specific conductance, and temperature) of waters found in the storm drain system. Observations and field measurements (where possible) will be made on as many drainage locations as feasible. The results of this phase will be used to identify potential locations to be sampled during the later phases.

Phase 2 consists of sampling of sediments currently present in the storm drain system. Sampling locations will be selected on the basis of the results of Phase 1. Sediments are to be collected from storm drain lines that have direct outflows to the bay. In most cases it should only be necessary to collect from one sampling point on each discharge system identified in the Navy's utility report (*YEI, 1988*). It is anticipated that a total of three such sediment samples will be collected.

Phase 3 consists of sampling during a nominal 4 to 5 hour rainfall event. Both waters entering the storm sewers and waters flowing through the drains will be sampled at several locations selected on the basis of the Phase 1 results. The intent is to see how well waters flowing through the drains compare in quality with waters entering the drains from the surface. Suspended sediments entering the drains will also be sampled for chemical comparison with Phase 2 sediment samples. Data on the intensity and duration of the rainfall event will also be collected using an on-site recording rain gauge.

On the basis of a preliminary site visit, it is anticipated that there will be five locations for surface runoff sampling; these specific locations have not yet been determined. At three of these locations, samples from within the storm drain will also be collected. Field activities will be coordinated so that sample collection will occur simultaneously at each site. Field measurements are to be made at least every 30 minutes and water and sediment samples are to be collected at approximately 1-hour

intervals. As soon as necessary (based on analytical requirements) or at the conclusion of the rainfall event, selected samples will be sent to the analytical laboratory for chemical analysis. Selection of samples for analysis will be based on the field measurements and other data (e.g., rainfall record). It is anticipated that a maximum of five samples (water and suspended sediment) at each sampling point will be selected for chemical analysis. These samples will generally represent the initial runoff, the rise, the crest, and the falling stages of the storm rainfall hydrograph and some latter runoff from the storm event. Depending upon the characteristics (e.g., intensity, length) of the storm event, one or more of these samples may not be needed. In addition to the surface runoff and storm sewer samples, bulk precipitation samples will also be collected at one location near the beginning, middle, and end of the rainfall event or as rainfall volumes permit. Table 1 summarizes the distribution of sampling activities.

Sampling Methods

Although there are three parts to the sampling effort (surface runoff, storm sewer drainage, and bulk precipitation) there are four types of samples to be collected which require different sampling methodologies:

- Bottom sediments: sediments currently present in the storm drains;
- Waters: storm waters that are either entering the storm drains or are within the storm drains, flowing towards the outfalls;
- Suspended sediments: sediments carried by the storm waters that are either entering the storm drains or are within the storm drains flowing towards the outfalls; and
- Bulk precipitation: rainwater (before contact with site soils).

Bottom sediments will be collected in a fashion similar to surface grab samples using a non-metallic trowel-like tool to scoop the sediments into suitable containers. An attempt will be made to obtain these samples as far below the air-soil interface as feasible.

Runoff and storm drain water samples will be decanted directly from specially designed large volume bailers into applicable containers or pumped through a filter by use of a peristaltic pump as required by analytical protocol. If present, the sediments in the bailer will be transferred into appropriate containers. The water and suspended sediment fractions will be analyzed separately.

When possible, bulk precipitation samples will be collected by directly filling collection containers through a pre-washed large-mouth funnel. The collection location will be established such that only direct precipitation can be collected (to minimize wind-blown particulate input).

Sampling will be performed in accordance with the protocols described in the *Site Safety Plan* (*HLA, 1988b*) and the *Quality Assurance Project Plan* (*QAPP*) (*HLA, 1988a*).

Analytical Methods

Analytical requirements have been based, to the extent possible, upon quality assurance and quality control requirements specified in the QAPP (*HLA, 1988a*). HPA sampling plans (*HLA, 1988d-g*) were used to guide selection of the analytes of interest based on the potential contaminants at each site. The analytical program is outlined on Table 1.

Water (runoff, storm drain, and bulk precipitation) samples will be analyzed in accordance with the requirements for ground-water samples including a full deliverable U.S. Environmental Protection Agency (EPA) Contract Laboratory Program (CLP) package. As with other sampling, validation of the CLP data packages will, be on a ten percent basis unless an unacceptable number of samples fail acceptability criteria. The remainder of the CLP packages will be inventoried but not validated at this time. A full priority pollutant analyses for metals (only California CAM-17 metals), volatile and semivolatile organics, pesticides, and PCBs will be performed. Additionally, all samples will be analyzed for total petroleum hydrocarbons (TPH), and for oil and grease. Bulk precipitation samples will also serve as blank analyses for most analytes that are not normally expected in precipitation (e.g. PCBs, TPH, and oil and grease).

Suspended and bottom sediment samples will be analyzed for the same constituents as the water samples, also with CLP deliverables. Analyses for organic analytes will be performed for extractable concentrations. Metals will include total and leachable concentrations. The California Waste Extraction Test (WET) methods will be used to obtain concentrations of leachable metals. Saline bay waters could be considered a more appropriate water composition for leachability testing because the solids may ultimately reside there. However, no standards are available for use in making that comparison. Further evaluation of the site conditions may reveal that this alternative leachability test could provide more useful information and therefore may be considered for additional analysis.

References

DA, 1986, See San Francisco District Attorney's Office.

EMCON Associates, 1987. *Confirmation Study, Verification Step, Hunters Point Naval Shipyard (Disestablished), San Francisco, California, March 19, 1987*, Contract N62474-85- C5501, 4 volumes.

Harding Lawson Associates (HLA), 1988a. *Quality Assurance Project Plan, Naval Station, Treasure Island, Hunters Point Annex, San Francisco, California*, May 26, 1988.

Harding Lawson Associates (HLA), 1988b. *Site Safety Plan, Naval Station, Treasure Island, Hunters Point Annex, San Francisco, California*, April 14, 1988.

Harding Lawson Associates (HLA), 1988c. *Storm Water Runoff Investigation, Naval Station, Treasure Island, Hunters Point Annex, San Francisco, California*, June 6, 1988.

Harding Lawson Associates (HLA), 1988d. *Work Plan Volume 2A, Sampling Plan - Group I Sites, Remedial Investigation/Feasibility Study, Naval Station, Hunters Point Annex, San Francisco, California, March 7, 1988.*

Harding Lawson Associates (HLA), 1988e. *Work Plan Volume 2B, Sampling Plan - Group II Sites, Remedial Investigation/Feasibility Study, Naval Station, Hunters Point Annex, San Francisco, California*, July 7, 1988.

Harding Lawson Associates (HLA), 1988f. *Work Plan Volume 2C, Sampling Plan - Group III Sites, Remedial Investigation/Feasibility Study, Naval Station, Hunters Point Annex, San Francisco, California*, March 8, 1988.

Harding Lawson Associates (HLA), 1988g. *Work Plan Volume 2D, Sampling Plan - Group VI Sites, Remedial Investigation/Feasibility Study, Naval Station, Hunters Point Annex, San Francisco, California*, March 9, 1988.

QAPP, 1988, see Harding Lawson Associates, 1988a.

Regional Water Quality Control Board (RWQCB), 1987a. Letter dated September 4, 1987.

Regional Water Quality Control Board (RWQCB), 1987b. Letter dated December 9, 1987.

San Francisco District Attorney's Office, 1986. People of the State of California v. Triple A Machine Shop, Inc., et al. (1986), Exhibits to People's Memorandum of Points and Authorities in Support of Temporary Restraining Order, Construction Trust, and Appointment of Receiver filed by Arlo Smith, District Attorney, et al. in the Superior Court of the State of California in and for the City and County of San Francisco.

WESTEC Services, Inc., 1984, *Initial Assessment Study, Hunters Point Naval Shipyard (Disestablished), San Francisco, California*, October 1984, Contract No. N62474-83-C-6972.

YEI Engineers (YEI), 1988. *Utilities Technical Study, Phase 2, Naval Station, Treasure Island, Hunters Point Annex, San Francisco, California, Volume VI, Storm Drain System*, July, 1988.

U.S. Geological Survey (USGS), 1988. Letter dated October 12 from Peter W. Anttila.

Table 1. Analytical Program
Reconnaissance Study of Storm Water Quality

	No. of Samples*	Media** Type	Metals Total	Metals WET	VOCs	SOCs	Pesti-cides/ PCBs	TPH	O&G
Phase 2									
Bottom Sediment	3	S	X	X	X	X	X	X	X
Phase 3									
Bulk Precipitation	3	W	X		X	X	X	X	X
Runoff Locations (5)									
Water	25	W	X		X	X	X	X	X
Suspended Sediment	25	S	X	X	X	X	X	X	X
Storm Drain Locations (3)									
Water	15	W	X		X	X	X	X	X
Suspended Sediment	15	S	X	X	X	X	X	X	X

* These numbers are estimates and also do not include Quality Control (QC) samples. For Phase 3, QC samples will consist of 4 duplicate water samples, 2 water equipment rinsate blanks, and 2 field water blanks; these are to be analyzed for all the parameters listed above (except the WETs). In addition, 4 trip water blanks will be collected and analyzed for volatile organics only.

** Media Type: S = Solid, W = Water.