Gas Works Sediment Area

Joint Source Control Evaluation

Appendix A
Shoreline Facilities Evaluation

ECOLOGY REVIEW DRAFT

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1.0 Introduction

As part of this Joint Source Control Evaluation (JSCE), an evaluation of shoreline and/or over water facilities within the geographic scope of the JSCE was conducted in Fall 2006. This appendix to the JSCE provides a description of the methodology used to evaluate the facilities and presents the detailed evaluation of each facility.

Numerous shoreline facilities contribute stormwater, industrial process water and/or washwater directly to North Lake Union. This section evaluates those overwater and shoreline facilities that could directly discharge to the portion of North Lake Union within the JSCE geographical extent (i.e., west of and including Lake Union Yacht Center [LUYC], and east of and including Emerald Landing). This evaluation addresses discharges occurring through normal business activities and does not address potential discharges from catastrophic events such as fires, earthquakes, etc. or contributions from groundwater. Stormwater runoff that is conveyed to the lake via overland flow and not through a conveyance system was evaluated for the shoreline facilities except for Gas Works Park which is evaluated in the remedial investigation and feasibility study (RI/FS).

In general, shoreline facilities are not of concern relative to sediment recontamination potential if they comply with the appropriate source control measures of the Stormwater Code, National Pollutant Discharge Elimination System (NPDES) permits, and implement corrective actions identified by the BIP. Requirements typically include the development and implementation of a spill control plan, provision of an adequate amount of appropriate materials for spill prevention and containment, routine maintenance of catch basins, proper storage and disposal of hazardous wastes and the on-going education of employees. In general, with compliance with the Washington State Department of Ecology (Ecology) and the City of Seattle (City) regulations and on-going City and Ecology inspections, it is expected that the majority of facilities have a low risk of recontaminating post-remedial sediment.

A more detailed discussion of several facilities and/or areas that that pose a potential concern for the Gas Works Sediment Area (GWSA) sediment recontamination is presented in the JSCE.

1.1 FACILITIES EVALUATED AND METHODOLOGY

Within the JSCE Geographic Extent there are shipyards, light industrial, marina, and commercial facilities. Shoreline facilities that could potentially contribute discharges to North Lake Union were evaluated for the potential of recontamination of the post-remedial Lake Union sediment within the GWSA. The overwater and shoreline facilities within the JSCE Geographic Extent and listed in an east to west direction below, and are shown on Figure 3.1 of the JSCE. Aerial photographs of each facility are included in Appendix B of the JSCE.

- Emerald Landing
    - Emerald Landing, LLC
    - BlueView Technologies
    - Union Bay Fabrication
    - Matt Pontius, Inc.

    * Seattle Shipwrights
    * Tuckerman's Fine Woodwork
    * Susan Neff
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    * Bernstein Woodworking
- Gasworks Park Marina
- Gas Works Park
- Seattle Police Department Harbor Patrol
- Metro Lake Union South Yard
    * Northwest Schooner Society
- Northlake Shipyard
    * Northlake Shipyards, Inc.
    * Jeff's Diesel Works
    * Isotron
    * Ehler Marine and Industrial Service Co.
    * Western Industrial
    * The Signmaster
    * All Ocean Service, LLC
- Lake Union Yacht Center
- Honda Marine Center

Each facility was evaluated using material drawn from multiple sources including the findings from the Seattle Public Utilities (SPU) Business Inspection Program (BIP) (described in further detail in Section 1.2), Ecology inspections and files, NPDES Permits, City records, facility websites and additional field evaluation, when necessary. Conclusions regarding the potential discharges to North Lake Union and the risk of post-remedial sediment recontamination were drawn from these multiple sources. Ecology file contents were reviewed for facilities with NPDES violations and/or are facilities that are MTCA sites; these facilities include Lake Union Yacht Center, Metro Lake Union South Yard, and Northlake Shipyards.

Briefly, the BIP inspects facilities to assess their compliance with the stormwater pollutant source control requirements of the City's Stormwater, Grading and Drainage Code (Stormwater Code). Facility inspection results, together with an understanding of facility operational characteristics, provide a useful basis to evaluate the potential for sediment impacts from a given facility. Of note, although in many cases private outfalls were noted in individual BIP reports and/or the general location of the outfall(s) are known, precise private outfall locations and number were not investigated for the JSCE.

Several of the facilities addressed in this JSCE have individual surface water or sanitary sewer discharge permits under NPDES and/or King County Industrial Waste programs. Due to these regulatory overlaps, BIP inspections were occasionally conducted with Ecology and/or King County Hazardous Waste staff. When inspection reports from these agencies were available, information from those reports is included in the evaluation. These agencies also track and enforce compliance with permit requirements.

1.2 SEATTLE PUBLIC UTILITIES BUSINESS INSPECTION PROGRAM

The BIP program has its origin in the City's NPDES municipal stormwater permit, which is regulated by Ecology. As a condition of the City's NPDES permit and through the Seattle Municipal Code Chapter 22.800, Stormwater, Grading and Drainage Control Code, (Stormwater Code), the City regulates development and land use activities that impact the quality and quantity of stormwater runoff.

The Stormwater Code regulates source control in two ways:

- **Requirements for all Discharges.** All businesses that drain to the public storm drain system are required to maintain their drainage control systems (such as catch basins, detention systems, etc.), identify and eliminate illicit connections to storm drains; and maintain street, driveway, parking lot, and sidewalks. Related technical specifications are identified in the Stormwater Code.
- **Requirements for High-risk Pollution-generating Activities (HRPG).** The Stormwater Code identifies eight HRPG activities, consisting of fueling operations; vehicle, equipment, and building washing and cleaning operations; truck or rail loading and unloading of liquid and solid materials; liquid storage in stationary above ground tanks; outside portable container storage of liquids, food wastes, or dangerous wastes; outside storage of non-containerized materials, by-products or finished products; outside manufacturing activity; and landscape construction and maintenance. All businesses engaged in one or more of these activities must obtain a spill kit and develop a spill plan, as well as implement operational source controls specific to their activities. Technical specifications are identified in the Stormwater Code for all of these types of activities.

In addition, the City recently revised the Stormwater Code to clarify that it has the authority to regulate direct discharges to surface waters (i.e., stormwater or other discharges to surface water that are not conveyed via a constructed conveyance [e.g., stormwater runoff from a dock or other overwater structure]).

The first step in implementation of the Stormwater Code via the BIP involves inspections of commercial and industrial properties. In accordance with the Stormwater Code, businesses are required to implement source controls to reduce the amount of pollutants discharged directly to surface water or to the storm drains in Seattle. The BIP inspects properties to evaluate whether these actions are occurring.

Typically, initial inspections are unannounced visits by one to two members of a trained inspection team and are guided by a site representative. During the inspection the facility is notified of corrective actions that are identified for the facility to be in compliance and a letter is later sent documenting these corrective actions. The letter also defines a deadline by which the corrective actions must be implemented, usually 30 to 60 days from the date of the letter, and identifies potential consequences of non-compliance, including a Notice of Violation and daily fines. Letters of corrective actions for the inspected facilities are included in Appendix C.

A follow up inspection is conducted by the BIP to determine the facility's compliance. If the facility has implemented the corrective actions, a letter of compliance with the City's stormwater pollutant source control requirements will be sent to the facility. If not, further action may be necessary, as described above. Additional technical and financial assistance information is usually provided to the facility if corrective actions are required. For facilities that do not conduct any of the high risk pollution generating activities, a screening visit is conducted by SPU in lieu of a full site inspection.

The BIP does not specifically evaluate the potential for facility discharges to affect sediment quality. Rather, the purpose of the BIP is solely to address stormwater code compliance. Information from the BIP inspection provided useful information regarding individual shoreline businesses and provided corrective action recommendations relative to stormwater compliance at each inspected facility. This information is useful for the evaluation of potential sediment recontamination as discharges affecting water quality frequently have effects on sediment quality. For the JSCE, the effect of business operations on potential sediment recontamination is evaluated based on the assumption that the corrective actions required by SPU for stormwater code compliance will be implemented by the shoreline facilities.

2.0 Operating Facilities

2.1 EMERALD LANDING

Ecology—There have possibly been monitoring wells recently installed in this area, in addition to a small excavation conducted in the parking lot. Do you have any further information regarding this?

Emerald Landing LLC (Emerald Landing) is an approximately three acre waterfront facility to the east of Gasworks Park Marina and is the easternmost facility that was evaluated by the JSCE. Emerald Landing's legal business name is Starbound, but it does business as Emerald Landing, LLC. Emerald Landing is a partially overwater facility with approximately 700 feet of shoreline. Emerald Landing leases its space (which includes a warehouse, office, outdoor space, and mooring space along its eastern boundary of Waterway #18) to six tenants. Emerald Landing has one dock that is approximately 200 feet long. Emerald Landing encompasses the street addresses: 2151, 2155, and 2161 N. Northlake Way.

Emerald Landing and its individual tenants were inspected by the BIP in order to ensure proper responsibility and complete compliance with the City's source pollutant control requirements. Businesses at this facility that are only comprised of office space did not require a complete BIP inspection and a simpler screening visit was conducted. A summary of the BIP inspection reports for the inspected facilities follows.

2.1.1 Emerald Landing, LLC

Facility Description

As described above, Emerald Landing is a partially overwater three acre facility, which leases its facilities, including a warehouse, office space, and outdoor space to numerous tenants. The outdoor space includes moorage along its piers and one dock that it leases to several unassociated tenants. Emerald Landing also maintains a crane on-site for lease to tenants. Emerald Landing is listed as a marine refueling facility by the fire department; however, this is for mobile fueling only (i.e., fueling of vessels from mobile fuel units on land or from a bulk fuel vessel to land) and fueling facilities do not permanently exist on-site.

The owners of Emerald Landing employ a maintenance person who is responsible for maintaining common yard areas and doing repairs on the common areas. The maintenance person's duties include: sweeping, general yard housekeeping, and cleaning the catch basins. Stormwater at the facility is collected in a series of three catch basins and discharged directly to North Lake Union. The catch basins contain poly vinyl chloride (PVC) elbow outlet traps and are cleaned semi-annually.

Numerous high risk pollution generating activities occur on-site including: truck loading of liquids and solid materials, outside portable container storage of liquids (including dangerous wastes), parking and storage of vehicles and equipment, and painting or finishing of vehicles, boats, building, and equipment. Emerald Landing does not have a spill plan for the facility and spill cleanup materials are not readily available on-site.

The site has containers of liquids including: paints, solvents, oils, and fuels that are stored outside uncovered and not in secondary containment systems. Numerous 55 gallon drums that are unlabeled are stored outside on pallets near the shoreline as well. Various parts, equipment, and debris are scattered around the site.

Potential Discharges to North Lake Union

Stormwater from the site is collected in a three catch basin system and discharges directly into North Lake Union from an outfall on the eastern side of the facility. In general, items on-site both inside and outside, were poorly labeled and improperly stored, and there was evidence of oil spills from the crane. Emerald Landing has the potential to contribute contamination to North Lake Union if a spill or leak occurs from these products or if stormwater or washwater comes in contact with this material and is discharged to North Lake Union. Vessel parts and various pieces of machinery were also located on-site and stored outside and may impact stormwater runoff quality.

Discharge to North Lake Union could also occur from work being conducted on the moored boats. It was noted by SPU that welding was being conducted on a boat at the dock with no cover. SPU also noted that overwater painting was also being conducted. In addition, with the lack of a spill plan or a spill cleanup kit, the potential spreading of any spill or leak that could occur would be a significant threat. In-water washing of vessels by individuals may also occur at this facility. This activity could lead to the direct runoff of washwater into the lake.

National Pollutant Discharge Elimination System Status

During a BIP re-inspection, Ecology provided technical assistance to determine if a shipyard or boatyard permit is necessary.

Additional Inspections

No additional inspection was conducted at the time of the BIP inspection; however, Emerald Landing will be referenced to King County Hazardous Waste in order to properly deal with used and left over chemicals.

Identified Corrective Actions

The BIP identified numerous required corrective actions for the site, such as ensuring that painting or boat repair of the hull is not done overwater or else Emerald Landing will need to obtain a boatyard or shipyard permit with Ecology. The BIP also required that all outside manufacturing should be done under a cover or the work should be moved inside the building. Emerald Landing must also complete and implement a written spill plan, obtain the necessary spill containment and cleanup materials, put these in the appropriate location, and educate the employees about the spill plan and spill kit. SPU also requires Emerald Landing to improve the level of housekeeping at the facility including, but not limited to, sweeping the lot and loading area regularly, catch basin inspection and maintenance, and proper disposal and storage of excess waste, old equipment, and scrap metal.

The BIP also required the proper storage of liquids and dangerous waste in the proper containers and in covered areas. Additional items identified by the BIP include: the proper labeling, storage, and disposal of liquids and wastes at the site, and proper record keeping. Emerald Landing must also have the leaking crane repaired.

A corrective action letter documenting these issues was transmitted to the facility. Information on technical and financial assistance was also included in the letter.

2.1.2 BlueView Technologies

Facility Description

According to their website, Blueview Technologies is a technology company that develops compact sonar solutions for surface vessels, remotely operated vehicles, unmanned underwater vehicles, and diver applications. BlueView Technologies' facilities at Emerald Landing are located at 2151 North Northlake Way and consist of office space, electronic fabrication area, and a testing area. The office space and electronic fabrication area do not use any chemicals or solvents and are completely located indoors. The testing area is located inside a separate building and contains water tanks.

There are not any high risk pollution generating activities conducted by this business. However, it was noted that BlueView Technologies drains their sonar testing tanks directly to the site catch basins, which is inappropriate since BlueView Technologies adds chlorine to the water during testing.

Potential Discharges to North Lake Union

BlueView Technologies' business activities are primarily indoors and office oriented so potential discharges to North Lake Union are minimal and stormwater is not an issue. However, BlueView Technologies has been draining the testing tanks containing chlorine into the site catch basins, which in turn, discharge directly to North Lake Union.

National Pollutant Discharge Elimination System Status

This facility does not have a NPDES permit.

Additional Inspections

No additional inspection was conducted concurrently with the BIP inspections.

Identified Corrective Actions

The BIP determined that the only required corrective action was the cessation of discharging the process water from the testing tanks into the catch basin. It was requested that BlueView

Technologies drain this water to the sanitary sewer. A corrective action letter documenting this issue was transmitted to the facility.

2.1.3 Union Bay Fabrication

Facility Description

Union Bay Fabrication (Union Bay) is a tenant of Emerald Landing and is located at 2155 North Northlake Way. Union Bay is a metal fabrication company specializing in marine related work on small and large vessels (including barges) and is the largest tenant of Emerald Landing. Union Bay uses an indoor shop and outdoor facilities for their business (including portable covers). Additionally, Union Bay also has storage space in a separate warehouse building at 2161 North Northlake Way, within the Emerald Bay facility.

Metal work is conducted by Union Bay on vessels that are in the water and on land. In-water work is conducted on boats moored at Emerald Landing dock. Work done on land is conducted in the shop and in the outside lots. Work conducted outside is done under partially covered area and is not fully covered, as required by the City's Stormwater, Grading, and Drainage Code. Work done outside contributes large amounts of metal shavings to the paved ground, which were present during the inspection.

In addition to metal work, mechanical work, painting, and other marine related types of work are conducted at the facility. Engine parts, batteries, tanks, and scrap metal were located outside and were uncovered and not properly stored. In the separate warehouse there were five or six 55 gallon drums that were unlabeled and improperly stored.

Union Bay conducts several high risk pollutant generating activities (defined by the Stormwater Code) including: truck loading of liquid or solid materials, outside manufacturing activity, and painting or finishing of vehicles, boats, buildings, and equipment. The facility does not have a spill plan or spill clean up materials on-site. Stormwater runoff is collected in Emerald Landing's stormwater collection system and discharged on the eastern side of the site. Housekeeping practices at the facility were in need of work.

Potential Discharges to North Lake Union

Stormwater runoff is the prime discharge method to North Lake Union. Metal shavings, in particular, from the Union Bay business practices could be incorporated into stormwater runoff and be discharged to the lake via the Emerald Landing shared stormwater conveyance system discharging on the east side of the facility. Additional potential discharges could occur from in-water work done on boats that are moored at the site.

Other discharges to the lake could occur from a spill or leak of the liquids used at Union Bay, which may discharge through the stormwater system. Potential discharges may also occur from leaks and spills from boats moored at the marina. With the lack of a spill plan or a spill cleanup kit, the potential impact of a spill or leak that could occur is a significant threat.

National Pollutant Discharge Elimination System Status

During a BIP re-inspection, Ecology provided additional technical assistance to determine if a shipyard or boatyard permit is necessary.

Additional Inspections

No additional inspection was conducted concurrently with the BIP inspection.

Identified Corrective Actions

The BIP identified several required corrective actions for the site, such as, making sure that all outside manufacturing be done under a cover or the work be moved inside the building. Union Bay must also complete and implement a written spill plan, obtain the necessary spill containment and cleanup materials, put these in the appropriate location and educate the employees about the spill plan and spill kit. SPU also requires Union Bay to improve the level of housekeeping at the facility including, but not limited to, sweeping the lot and loading area regularly, catch basin inspection and maintenance, and proper disposal and storage of excess waste, old equipment, and scrap metal.

A corrective action letter documenting these issues was transmitted to the facility. Information on technical and financial assistance was also included in the letter.

2.1.4 Matt Pontius, Inc.

Facility Description

Matt Pontius, Inc. is a small welding company that is a tenant of Emerald Landing and is located at 2155 North Northlake Way. This business consists of a small trailer on-site that is used to store material. The majority of Matt Pontius' business activities occur outside and at the time of inspection, they were working with Union Bay on a barge project. This business consists of work done on both wood and metal structures.

Matt Pontius' high risk pollutant generating activities consist of outside manufacturing activity. The facility does not have a spill plan or spill clean up materials on-site.

Potential Discharges to North Lake Union

Stormwater runoff is the prime discharge method to North Lake Union and is managed through the Emerald Landing's shared stormwater conveyance system. Debris from outside activities can be incorporated into the stormwater and discharged to the lake. With the lack of a spill plan or a spill cleanup kit, the potential impact of a spill or leak that could occur is a significant threat.

National Pollutant Discharge Elimination System Status

This facility does not have a NPDES permit.

Additional Inspections

No additional inspection was conducted concurrently with the BIP inspection.

Identified Corrective Actions

The BIP determined several required corrective actions for the facility, such as making sure that all outside manufacturing is done under a cover or the work is moved inside the building. Matt Pontius, Inc. must also complete and implement a written spill plan, obtain the necessary spill containment and cleanup materials, put these in the appropriate location, and educate the employees about the spill plan and spill kit. SPU also requires Matt Pontius, Inc. to improve the level of housekeeping by sweeping the area at the end of each day.

A corrective action letter documenting these issues was transmitted to the facility. Information on technical and financial assistance was also included in the letter.

2.1.5 Seattle Shipwrights

Facility Description

Seattle Shipwrights is a boat repair facility that focuses on woodworking and fiberglass work. They are a tenant of Emerald Landing and are located at 2161 North Northlake Way. Seattle Shipwright facilities consist of a tool shed and a workshop, all activity at the site is conducted in the workshop and there is no outdoor activity.

The facility does not have a spill plan or spill clean up materials on-site.

Potential Discharges to North Lake Union

Seattle Shipwrights does not discharge industrial wastewater to the sewer and there are not any outdoor activities at the facility. Potential discharges to North Lake Union are not an issue at this facility.

National Pollutant Discharge Elimination System Status

This facility does not have a NPDES permit.

Additional Inspections

Ecology conducted an inspection concurrently with the BIP. The Ecology inspection suggested that a berm be inserted across a doorway to contain any indoor spills. The Ecology inspection also noted the requirement to develop and implement a spill plan immediately.

Identified Corrective Actions

The BIP identified several required corrective actions for the facility including: the completion and implementation of a written spill plan, obtaining the necessary spill containment and cleanup materials, and putting these in the appropriate location, and educating the employees about the spill plan and spill kit.

A corrective action letter documenting these issues was transmitted to the facility. Information on technical and financial assistance was also included in the letter.

Seattle Shipwrights has complied with the corrective actions required in the letter and is now considered to be in compliance with the stormwater pollutant source control requirements, as required under City code. This compliance status was based on the findings of a re-inspection conducted by the BIP. A letter identifying Seattle Shipwright's compliance was transmitted to the facility.

2.1.6 Tuckerman's Fine Woodwork

Facility Description

Tuckerman's Fine Woodwork is a small carpentry shop located at 2161 North Northlake Way. They are a tenant of Emerald Landing and occupy a building on the eastern side of the facility. Tuckerman's Fine Woodwork facilities consist of a workshop and two small warehouse spaces. All activity at the site is conducted inside and there is no outdoor activity, except for loading and unloading of material and supplies.

Chemicals and solvents are used on the facility as part of their business practices and are stored primarily on shelving in one of the storage areas. The facility does not have a spill plan or spill clean up materials on-site.

Potential Discharges to North Lake Union

Tuckerman's Fine Woodwork does not discharge industrial wastewater to the sewer and there are not any outdoor activities at the facility. Potential discharges to North Lake Union are not an issue at this facility.

National Pollutant Discharge Elimination System Status

This facility does not have a NPDES permit.

Additional Inspections

No additional inspection was conducted concurrently with the BIP inspection.

Identified Corrective Actions

The BIP identified several required corrective actions for the facility including: properly disposing of waste, and properly labeling and identifying contents of waste containers. The BIP also identified the importance of and improving recordkeeping practices.

A corrective action letter documenting these issues was transmitted to the facility.

2.1.7 Susan Neff

Facility Description

Susan Neff has a small woodworking studio space in the same building as Tuckerman's Fine Woodwork in the eastern portion of the Emerald Landing Facility. The address of the shop is 2161 North Northlake Way and all work is conducted inside the building using only glues. Stains, solvents, paints, and treatment chemicals are not used at this facility.

Based on the absence of high risk pollutant generating activities and the lack of chemicals used in the facility, only a screening visit was conducted by the BIP. No corrective actions are required and overall compliance has been considered achieved by the BIP.

2.1.8 Bernstein Woodworking

Bernstein Woodworking is a boat building and repair facility located in the south side of the Emerald Landing building at 2155 North Northlake Way. The facility consists of a small indoor wood working studio and all work is conducted inside the building with no outdoor activity. The business does use glues, some stains, and a few cans of solvents.

Based on the absence of high risk pollutant generating activities, a screening visit was conducted by the BIP. No corrective action is required and overall compliance has been considered achieved by the BIP.

2.2 GASWORKS PARK MARINA

Facility Description

Gasworks Park Marina is located at 2143 N. Northlake Way on the eastern side of Waterway #19, directly east of the Park. The facility serves as a marina for boats and houseboats moored on two docks containing approximately 70 slips. Upland facilities at the marina include an office building that contains the marina office and a real estate office. There is also a parking lot with 25 to 30 parking stalls.

Pollution generating activities at the marina include the parking, washing, and possible maintenance of vehicles in the parking lot. The storm system at the marina consists of two catch basins at low points in the parking lot that conveys runoff directly to North Lake Union via an outfall near the easternmost dock. The catch basins have PVC elbow outlet traps and are cleaned on an as-needed basis.

Sewage and gray water from the offices on-site are discharged to the sanitary sewer system. However, vessels and houseboats at the marina are not connected to the sanitary sewer system. Sewage and gray water from the vessels and houseboats typically collects in individual holding tanks and is pumped out by an approved contractor. The BIP noted that only *some* of the tenants of the marina had holding tanks and they would send additional information to the marina regarding the discharge of waste water.

The facility does have a spill plan and spill clean-up materials, including absorbent booms and sorbent pads, which are kept on-site near the high risk area. Employees are trained annually and are aware of the spill plan.

Potential Discharges to North Lake Union

Stormwater and washwater runoff from the uplands portion of the marina (which includes the parking lot) is conveyed through a two catch basin stormwater collection system and is discharged directly to the lake. Gray water is also discharged from some of the tenants of the marina. In-water washing of vessels by individuals may also occur at this facility. This activity could lead to the direct runoff of washwater into the lake.

Additional potential discharges include the leaks and spills that may occur from boats moored at the marina and unauthorized maintenance that may occur.

National Pollutant Discharge Elimination System Status

This facility does not have a NPDES permit.

Additional Inspections

No additional inspection was conducted concurrently with the BIP inspection.

Identified Corrective Actions

Required corrective actions were determined during the inspection including: cleaning of the partially filled catch basins in the parking lot, and the repair or replacement of a broken outlet trap in a parking lot catch basin. The BIP also required the completing and posting of a written spill plan, educating employees about the spill plan and spill kit, and proper storage and labeling of the spill containment and cleanup materials.

A corrective action letter documenting these issues was transmitted to the facility. Information regarding technical assistance concerning the spill plan was also supplied to the marina.

2.3 GAS WORKS PARK

Facility Description

Gas Works Park (the Park) is a 19.1 acre park situated on the northern shore of Lake Union, a heavily developed urban lake located north of downtown Seattle, Washington. The Park is located at 1901 North Northlake Way with approximately 1,900 feet of shoreline. The Park's facilities include: grassy areas, paved trails, a concession stand, a covered play barn, a parking lot, and restrooms. Cracking towers and other features from the former Gas Works facility still remain on-site. The Park is owned by the City and is operated and maintained by the City of Seattle Parks Department. An aerial photo of the Park is included in Appendix B of the JSCE.

Historical operations at the site resulted in environmental contamination and the site is listed on Ecology's Hazardous Sites and Confirmed and Suspected Contaminated Sites lists with a ranking of 1. As described in Section 2.0 of the JSCE, the Gas Works Uplands have been investigated and remediation has been implemented, as documented in a formal MTCA CD between Ecology, PSE, and the City.

Potential Discharges to North Lake Union

Land use at the Park is limited to typical uses of a park and based on this and the absence of industrial process water, wash water, or other sources of runoff, stormwater is the only contributor to North Lake Union. The majority of the park is covered in grass and allows a portion of stormwater to infiltrate and discharge to the lake via groundwater. In addition to the stormwater conveyance system described below, stormwater at Gas Works Park is transported to North Lake Union via overland sheet flow directly to the lake and is addressed separately in the respective RI/FS documents prepared for each study area

Stormwater is also discharged to the lake by multiple smaller stormwater conveyance systems that convey runoff from sub-basins on the eastern side of the Park including the play barn and the parking lot and discharge them to Waterway #19. A smaller stormwater system conveys runoff collected from the summit of Kite Hill to North Lake Union. Another outfall on the south side of the Park conveys stormwater conveyed by overland flow and infiltration to North Lake Union. These outfalls are shown on Figure 4.1 and Figure 4.2 in the JSCE. A detailed discussion of the stormwater conveyance system at the Park is included in Section 4.1 of the JSCE.

National Pollutant Discharge Elimination System Status

The Park does not have a NPDES permit.

Additional Inspections

No additional inspections were conducted concurrently with the BIP inspection.

Identified Corrective Actions

The only required corrective action identified by the BIP was the cleaning of catch basins identified on the BIP provided map. A corrective action letter documenting these issues was transmitted to the facility.

A re-inspection of the site verified that the Parks Department had complied with the letter of corrective action and the site is now determined to be in compliance with the stormwater pollutant source control requirements as required under City code. A letter identifying the Park's compliance with the Stormwater Code was transmitted to the Park's representatives.

2.4 SEATTLE POLICE DEPARTMENT HARBOR PATROL

Facility Description

The Seattle Police Department Harbor Patrol facility (Harbor Patrol) is located at 1717 North Northlake Place, directly west of Gas Works Park. The facility is approximately 1.5 acres and has 275 feet of shoreline on North Lake Union. The site consists of a central administrative building, a maintenance shop, two storage sheds, a fueling station, a small bunker, and several docks. The primary uses of the facility include: boat mooring, boat cleaning and fueling, boat maintenance, and coordination of Seattle Police Department Harbor Patrol. There are two covered floating haul out sheds that are used to remove and store boats.

In addition, approximately 125 feet of shoreline west of the Harbor Patrol Facility, at Waterway #20, is owned by the Department of Natural Resources, and used by Harbor Patrol. This property contains a small portable building used by Harbor Patrol, and a boat launch located along the eastern side of property. The DNR shoreline is currently used by the Harbor Patrol for storage of floating debris and rubble removed from Lake Union. A log-boom containment area has been constructed around the shoreline to temporarily store this recovered material.

The shop contains solvents, greases, oils, paints, and fuels that are typical of a repair facility. The trailer in the northern portion of the facility is also used to store hazardous chemicals. In general, storage and disposal of these materials is in good order at the facility. Secondary containment is used throughout the site, and used oil is disposed of regularly by an off-site disposal company. There are two above ground storage tanks on-site, a 1,000 gallon gasoline tank, and a 2,000 gallon diesel tank. Overwater fueling of vessels and on-site fueling of vehicles are conducted at the facility. Spill procedures and kits are in place throughout the site and the site employees are trained in the proper procedures in the event of a spill.

Vessel washing occasionally takes place at the facility, both on land and in water for the larger vessels. Prior to the business inspection, vehicle washing was also occasionally taking place, but this practice has now been discontinued.

Harbor Patrol collects and discharges the majority of stormwater from it's facility via a private stormwater collection system. Runoff is conveyed from three catch basins on-site with PVC elbow outlet traps through an on-site coalescing plate oil/water separator, where it is passively treated before discharge through a private outfall to North Lake Union.

The outfall for Waterway #20 is located near the shoreline of this facility. This outfall is discussed in Section 4.2.2 of the JSCE and is not addressed in this Section.

Potential Discharges to North Lake Union

Fueling of vessels above water contains an inherent risk of causing a spill. This is a potential source of contamination to the water and sediment quality of the Lake. The effects of a spill can be minimized by proper equipment on-site and education of employees, both of which are in place at Harbor Patrol.

Wash water from vessel and vehicle washing at the site discharges to the lake. This is possible by both sheet flow of washwater off vehicles and direct runoff into the lake from the in-water washing of vessels.

Additional discharges to North Lake Union could occur from abandoned vessels and objects that are taken to the Harbor Patrol facility. Vessels brought to the facility that are sea-worthy are stored at the dock, before being scrapped or disposed of in other ways. Potential discharges from these vessels may occur, as the structural and mechanical integrity of the vessels is typically unknown. Proper equipment including: booms, used fuel and oil containers, and secondary storage equipment is kept on-site and should minimize potential negative effects of these occurrences.

National Pollutant Discharge Elimination System Status

This facility does not have a NPDES permit.

Identified Corrective Actions

Harbor Patrol is generally in compliance with City stormwater source pollution control requirements. Stormwater features were inspected during the BIP and were determined to be in compliance.

The BIP determined that the only corrective action required for this facility is to eliminate the discharge of washwater or process water to the storm drains and/or lake, including soapy washwater from vessels or vehicles washed on site. Vehicle washing has already been discontinued, per communication with the facility. The BIP identified several alternatives to in-water vessel washing, including removal of vessels to an off-site washing facility, and washing the vessels on site in a location where washwater can be discharged directly to the sanitary sewer.

A letter of the required corrective action was sent to Harbor Patrol representatives.

2.5 METRO LAKE UNION SOUTH YARD

The Metro Lake Union Facility, also known as King County Department of Transportation (DOT) Metro Transit Lake Union (Ecology ID #2217), and formerly known as the Chevron Bulk Fueling Terminal #100-1327 is listed on Ecology's Hazardous Sites and Confirmed and Suspected Contaminated Sites lists with a rank of 1. The facility is divided into the North and South Yards, which are separated by public roadways and by the former Northern Pacific Railroad right-of-way. The North Yard, 1602 North Northlake Way, consisted of the tank farm containment area. Buried fuel distribution pipes once connected the North Yard tanks to the South Yard. At the South Yard, 1445 North Northlake Way, the fuel distribution pipes were suspended beneath overwater dock structures and used for ship refueling.

Historical practices at the Metro Lake Union Facility have resulted in environmental contamination. King County Metro implemented independent remedial actions in the North and South Yards between 1988 and 1997. A MTCA CD (King County Superior Court No. 99-2-08651-1SEA) was executed in 1999. The Cleanup Action Plan called for two phases of cleanup activities. Removal of metals-contaminated soils from the North Yard and associated above-ground storage tank demolition was reported completed in December 1999. The second phase of cleanup activities focused on petroleum-contaminated soil and groundwater at the South Yard. Between 1999 and 2003, various remedial technologies (e.g., hydrogen peroxide injection, extraction, biosparging) were implemented to address petroleum contamination in soil and groundwater present in the South Yard. As of June 2004, pockets of contamination remain on the North Yard and in the public right-of-way to the northeast of the South Yard (Ecology 2004). Quarterly groundwater monitoring has been ongoing since approval of the Cleanup Action Plan in 1998.

In the same manner as for the Gas Works Uplands, the Metro Lake Union Facility site's MTCA CD does not address potential sediment contamination from the facility. The Metro Lake Union Facility CD provides that investigation and cleanup of any hazardous substances in the sediments in North Lake Union are not addressed in this CD and expressly states that, "any future action concerning or related in any way to the sediments in Lake Union shall be addressed in a document other than this Decree…"

King County has developed a Master Plan for its North Lake Union area properties including the Metro Lake Union Facility (King County Metro 2004). The Master Plan's recommendations for the South Yard include completion of a Metro Transit Waterborne Transportation study, followed by a feasibility study of potential future uses of the parcel. Additionally, Maritime Heritage Task Force identified it as a possible location for a working wooden boatyard.

This section of the JSCE will evaluate only the portion of the Metro Lake Union Facility that is located on the shoreline, the South Yard. The South Yard's current 1.29 acre site consists of a gravel lot and a warehouse building and two overwater dock structures. The warehouse was constructed in the 1930s. The condition of the docks is reported to be fair to poor (King County 2004). The South Yard is used for equipment storage and is leased to the Northwest Schooner Society, a nonprofit entity, for moorage and repair work on historic boats.

2.5.1 Northwest Schooner Society

Facility Description

The Northwest Schooner Society (NWSS) is the current tenant of the Metro Lake Union South Yard located at 1445 North Northlake Way, just to the east of Northlake Shipyard and west of Waterway #20 and Harbor Patrol. According to their website, the NWSS is a non-profit organization dedicated to the restoration and preservation of the nation's historic treasures. The facility is approximately 1.29 acres, with covered storage including: a warehouse and a temporary tent structure at the northeast corner of the property that houses NWSS's activities. There are also two docks at the facility with approximately 200 feet of moorage space. The remainder of the facility is unpaved and is primarily covered with gravel, except for some vegetated areas.

NWSS uses the facility for equipment storage and for moorage and repair work on historic vessels. Repair work is conducted on the boats while they are in water and in the covered areas on land. In the process of the repair and maintenance, NWSS uses a variety of liquids including: paints, solvents, fuels, oils, and marine related chemicals. These liquids are stored around the site, including in a container on the wooden dock. The uncovered gravel area next to the warehouse is used for storage of vessel parts (including engines), paints, and drums.

As noted above, the future use of the property is uncertain and it is subject to King County master planning. The Maritime Heritage Task Force identified it as a possible location for a working wooden boatyard.

Potential Discharges to North Lake Union

Sheet flow of stormwater runoff is the primary contributor to North Lake Union from the NWSS facility. There are not any catch basins on-site and the shoreline portion of the facility slopes down towards the lake. Potential risk of contamination by stormwater runoff could occur if good housekeeping practices and proper best management practices (BMPs) are not implemented and maintained at the site. Also, the possibility of a spill or leak from the products that are used at the site poses a potential concern for North Lake Union water and sediment quality.

The facility does not have a spill prevention plan in effect, nor does it have the measures to contain a spill if one were to occur. With the lack of a spill plan or a spill cleanup kit, the potential impact of a spill or leak that could occur is a significant threat.

National Pollutant Discharge Elimination System Status

The King County DOT Metro Transit Lake Union, specifically the South Yard, operates under NPDES Permit No. SO3005611A. The Metro Lake Union Facility's permit is a general industrial stormwater permit, which requires quarterly sampling for turbidity, pH, total zinc, and oil and grease.

Additional Inspections

An Ecology NPDES inspection was conducted in conjunction with the SPU BIP inspection. Ecology documented the presence of chemicals being stored on the pier without proper containment and inadequate spill kits. Ecology also documented extensive repair work being conducted on a boat moored at the pier in excess of allowable maintenance. A NWSS representative was notified that this work must be moved to an appropriate permitted upland facility in order to continue any extensive repairs. The Ecology report constitutes a warning that violations have been observed and must be corrected.

A follow up visit conducted by Ecology still identified improper chemical and paint storage on the dock and in the upland gravel yard. The inspection also noted that spill kits were still not at the site. These items must be immediately addressed and technical and financial assistance information was provided to NWSS.

Identified Corrective Actions

Required corrective actions were identified during the initial inspection including: the completion and posting of a written spill plan, obtaining spill containment and clean-up materials, educating employees about the spill plan and spill kit, and proper storage and labeling of the spill materials. The BIP also required the proper storage methods and storage locations for fuels and other hazardous materials, proper storage of engines, and parts that may contain oil. SPU also required the proper maintenance of boats and equipment and identified the possibility of the obtainment of a boatyard permit with Ecology.

A corrective action letter documenting these issues was transmitted to the facility. Information regarding technical assistance concerning the spill plan was also supplied to the marina.

NWSS has complied with the corrective actions required in the letter and is now considered to be in compliance with the stormwater pollutant source control requirements, as required under City code. NWSS is in the process of obtaining a boatyard permit with Ecology. This compliance status was based on the findings of two re-inspections conducted by the BIP. A letter identifying NWSS's compliance with the Stormwater code was transmitted to the facility.

2.6 NORTHLAKE SHIPYARD

The Northlake Shipyards site is a 30,000 square foot facility with 800 feet of waterfront located in North Lake Union directly to the east of Waterway #21 and the CSO #146 outfall. The Northlake Shipyards website states that the shipyard is a facility in which ship owners may lease space (including drydocks) to perform their own work, or have jobs performed by the yard. In addition to the shipyard operations, numerous tenants lease space and operate on the facility. The shipyard and tenants occupy the street addresses of 1441 and 1443 North Northlake Way.

In order to properly identify the responsible tenant and their potential contribution to North Lake Union water quality, each facility was independently inspected by the BIP. Each business is described in their own sections below.

2.6.1 Northlake Shipyards, Inc.

Facility Description

Northlake Shipyard, Inc. (NLSY) is an operational shipyard and marine cargo operation located at 1441 North Northlake Way directly to the east of Waterway #21. Shipbuilding and ship repair have been conducted at this site since approximately 1946. NLSY is a property management company that operates the facility as a self-service ship repair facility for vessel owners and contractors and as an overflow yard for other shipyards in the area (Northlake Shipyard Inc. 1996). The facility consists of offices and storage areas located along the shoreline, and overwater structures (a wharf, piers and two dry docks) that host the facilities' operational areas (Ecology 2000).

According to their website, categories of work conducted at NLSY include: hull and structural welding, propulsion systems, propellers, deck machinery, electrical and hydraulic system installation and repair, carpentry/joinery work, piping, an inside and outside machine shop, sand blasting, and painting. NLSY is also the operational base for the F/V Northwind, Inc., a fleet of fishing vessels owned by Peter and Richard Kelly, the owners of NLSY. Since 1993 these vessels have been leased for fishing and research.

The NLSY facility has historically been a significant contributor of contamination in North Lake Union sediments; it is listed as “Northlake Shipyard Inc.” (Ecology ID #23849623) on Ecology’s Hazardous Sites and Confirmed and Suspected Contaminated Sites lists with a rank of 4. In the 1980s, UNIMAR associates, the former owners, were charged with civil violations of the Clean Water Act. The U.S. Environmental Protection Agency (USEPA) began studying the sediments at the site in 1987. In 1988, a federal CD resolved the civil action by requiring UNIMAR, and all successors who acquired the property, to clean up discharged contaminants. Costs to comply with the federal CD were estimated at five million. A 1991 study conducted by GeoEngineers, for UNIMAR, estimates that 6,500 cubic yards of sandblasting material is present in sediments at the facility (GeoEngineers 1991).

NLSY purchased the site in 1994 under a MTCA Prospective Purchaser CD (King County Superior Court No. 94-2-20115-8SEA). The Prospective Purchaser CD limits NLSY 's liability for cleanup costs for historical operations to an initial $400,000 payment into a cleanup fund, and additional payments for 15 years of 15 percent of Northlake Shipyard's profit, up to a maximum of $1.1 million. Following the execution of the Prospective Purchaser CD, the 1988 federal CD was subsequently terminated (ABA 2003). The Prospective Purchaser CD states that discharges from historical operations at the property have included polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbon (PAHs), oils, metals, chlorinated and non-chlorinated solvents, pesticides, organo-tin and copper paints (WA No. 94-2-20115-8). Ecology’s Confirmed and Suspected Contaminated Sites list shows that priority metals have been confirmed in sediments and surface water of North Lake Union, and that groundwater contamination (metals, petroleum, and PAHs) and sediment PAH contamination is suspected. Ecology's priority metals are: antimony, arsenic, beryllium, cadmium, chromium, copper, ferrocyanide, lead, mercury, nickel, selenium, silver, thallium, and zinc.

Potential Discharges to North Lake Union

NLSY has a separated stormwater system; however, upon inspection of the facility, only two catch basins were identified on-site and it was not clear where the outfalls of the catch basins were. There is also a pipe that appeared to directly discharge to North Lake Union, but its source was unknown, as a result of the BIP, this pipe has been plugged.

Potential risk of contamination by stormwater runoff is compounded by the use of hazardous liquids on the facility and the general poor housekeeping. As an operational shipyard, NLSY uses paints, solvents, greases, oils, fuels, and other shipyard associated products. In general, (inside and outside) these items were poorly labeled and improperly stored, and there was evidence of spills and leaks in numerous areas at the facility. The BIP inspector was unable to identify the quantity of materials that were stored on-site due to the lack of labels, improper storage, and the abundance of materials on-site. Mobile vehicle fueling is also performed on site. NLSY has the potential to contribute contamination to North Lake Union if a spill or leak occurs from these products or if stormwater or washwater comes in contact with this material and is discharged to North Lake Union. Vessel parts and various pieces of machinery were located on-site and stored outside.

Discharges that could impact North Lake Union water and sediment quality could also occur via the submersion of the dry dock, if BMPs and good housekeeping practices are not enforced. Dry docks are obviously lowered and flooded with North Lake Union water for ship launching and docking operations, and any residual material left on the docks will be subject to resuspension and discharge to North Lake Union. Sandblast grit, particularly spent sandblast grit, contains very elevated metals concentrations. Residual grit left on the dry dock after cleaning poses a recontamination risk, as it incrementally accumulates in adjacent sediments over time. The dry docks have sumps and pumps that discharge water to a 4,000 gallon holding tank on-site, which is pumped out, as necessary, for off-site disposal, typically once per month. The dry docks are cleaned of grit with manual sweeping or with washing (if hydroblasting was used). It is unclear, without a review of shipyard BMPs, whether the holding tank is used for all dry dock operations or if spent grit is collected manually (which is highly likely). Furthermore, even if grit is cleaned from available surfaces, it is difficult to clean grit from keel blocks used to support vessels in dry dock, providing another source of residual grit discharge during dry dock submersion. Finally, discharge of paint or sandblast grit to North Lake Union could also occur if the dry docks are not properly tarped and secured during painting and sandblasting operations.

NLSY does have an industrial waste permit, which allows them to discharge washwater of vessels to the sanitary sewer system. However, it was reported to King County that they are requesting the elimination of this permit as they currently discharge the washwater to the holding tanks described above.

NLSY does have a spill plan, although it is insufficient, not appropriately posted, and the employees are not properly educated of the procedures. The facility does have a few absorbent booms on-site, but the quantity is insufficient for this type of operation. Currently, if a spill occurs, it is unlikely that NLSY would be able contain the material and control the impact to North Lake Union's water and sediment quality.

National Pollutant Discharge Elimination System Status

NLSY operates under an individual NPDES Shipyard Permit No. WA0030864C. Importantly, NLSY's NPDES permit expired in June 2002. NLSY submitted a permit renewal in November 2001; Ecology has not issued a new permit yet, so the existing permit has been administratively extended through June 30, 2007. The facility has historically monitored surface water discharges for turbidity, total suspended solids, oil and grease, zinc, lead, copper, and mercury. Its 2000-2002 permit, which has been administratively extended, requires quarterly dry dock submersion monitoring for oil and grease only. Stormwater and other process water discharges are prohibited. Multiple Notice of Violations and warning letters have been filed against NLSY, regarding the discharge of sandblast grit to the Lake and paint resin draining to the Lake.

More recently, in September 2006, an oil spill in the area of NLSY was investigated by Ecology and the U.S. Coast Guard.

Additional Inspections

An Ecology Water Compliance inspection was conducted in conjunction with the BIP inspection. Two complaints have been filed against NLSY in 2006, one in May, which accused the shipyard of inadequate tarping during sandblasting and one in August, which complained that tarping was not applied during a spray paint job. No further action was taken with respect to these complaints. The Ecology inspection noted debris around the site, including paint cans, sandblasting grit, old tires, etc. They also noticed wooden and metal parts, old oil booms, and equipment scraps in the water and requested NLSY to remove it. Ecology also noted improper labeling and storage of solvents and paints, and general poor housekeeping on-site. Ecology documented all the conditions and provided recommendations for NLSY to come into compliance. Ecology will conduct a follow up inspection to identify whether NLSY has complied with Ecology's recommendations.

Identified Corrective Actions

Numerous corrective actions were identified as necessary in order to reduce the amount of pollutants discharged to North Lake Union. The corrective actions for NLSY fall under three major categories: spill preparedness, housekeeping, and product/waste storage. Within the spill preparedness category, primary items SPU identified included updating the spill plan and posting at appropriate locations, obtaining the appropriate type and quantity of spill containment materials, and education of employees regarding the spill plan and spill kits.

Product and waste storage corrective actions were identified including: implementing proper location areas, containment, labeling and storage, and educating employees and facility users about the materials being stored. Housekeeping at the facility was determined to be generally poor and SPU identified corrective actions to be implemented, such as proper maintenance of boats and equipment, cleaning the crane tracks, removing debris from the water, sweeping of the piers and loading areas with collection of the sweepings, cleanup of leaks and spills as they occur, and disposing of excess and old equipment properly.

Additionally, SPU specified that NLSY shall keep the plates used to seal the dry dock off for the sump/pump system in place to contain spills, cap the unknown pipe that discharges from the I90 Pier and identify where the on-site catch basins drain to. A corrective action letter documenting these issues was transmitted to the facility. Information regarding technical and financial assistance was also supplied.

NLSY has complied with the corrective actions required in the letter and identified the discharge of the catch basins and is now considered to be in compliance with the stormwater pollutant source control requirements, as required under City code. This compliance status was based on the findings of a re-inspection conducted by the BIP. A letter identifying NLSY's compliance with the Stormwater Code was transmitted to the facility.

2.6.2 Jeff's Diesel Works

Facility Description

Jeff's Diesel Works (Jeff's) is a marine engine repair and sales facility specializing in Detroit Diesel 2 stroke engines; and according to their website, they also have the capability to service 4 stroke and electronic marine diesel engines. Jeff's is a tenant of Northlake Shipyards and is located at 1441 North Northlake Way. Jeff's business is primarily conducted indoors on concrete floors, except for the loading and unloading of materials and annual vehicle washing. Jeff's does not have a spill plan, but does have some spill containment materials on-site.

Jeff's uses numerous solvents and fuels in their business, including the operation of two dip tanks and a parts washer. Jeff's uses corrosive liquids in its jet wash and conducts spray painting of engines. They also use approximately 30 gallons of antifreeze and 55 gallons of petroleum and oil products per month. They dispose of the used liquids and sludges with an off-site disposal contractor in a method that is acceptable to SPU. Industrial wastewater is not discharged to the sanitary sewer.

They are also a medium quantity generator of hazardous waste due to the caustic contents of a dip tank that they have pumped out. Additionally, they do have a small sandblasting unit inside the building that is seldom used.

Potential Discharges to North Lake Union

Stormwater is managed through the NLSY's shared stormwater conveyance system. Potential polluting activities engaged in at Jeff's include: the washing of vehicles and buildings, the loading and unloading of liquid and solid materials, and vehicle and equipment maintenance and repair. In addition, non-containerized materials that are stored inside may affect stormwater runoff due to rainwater that enters the facility from under the building and water from a leaking fire pump outside the building that can flood the floor and storage area. Spills of hazardous liquids are another potential issue at the facility and can affect water quality. Absorbent pads and granular sorbent are on-site and are located in areas with high risk of spills.

National Pollutant Discharge Elimination System Status

This facility does not have a NPDES permit.

Additional Inspections

Ecology conducted an inspection of the facility in conjunction with the SPU BIP inspection. King County Hazardous Waste was also on-site during the inspection to provide technical assistance. Jeff's Diesel reported as a medium quantity generator in 2005 and 2006 for disposal of the caustic liquid in a dip tank. The Ecology inspection instructed Jeff's to conduct metals sampling on the sandblast grit the next time it is to be disposed of. The only compliance problems noted during the Ecology inspection were the improper labeling of used oil and spent antifreeze containers.

Identified Corrective Actions

Numerous required corrective actions were determined during the inspection including: completing and implementing a written spill plan, educating employees about the spill plan and spill kit, and posting signage near the spill materials. The BIP also recommended adding a neutralizer to the spill kit since Jeff's has a hot tank filled with corrosive material. The BIP identified the prohibition of washing vehicles on the property if untreated water is discharged to the public drainage control system or to a water body. In addition, the BIP requires that Jeff's containerize engine parts that may be exposed to rainwater, labeling all waste containers, and covering all outside materials that have the potential to leach or spill (or move them inside).

A corrective action letter documenting these issues was transmitted to the facility. Information regarding technical and financial assistance was also supplied to Jeff's.

2.6.3 Isotron

Facility Description

Isotron is a tenant of Northlake Shipyards and is located at 1443 North Northlake Way on the eastern edge of the Northlake Shipyards property. Isotron's website states that they are a research and development facility specializing in the development and commercialization of innovative coatings and decontamination technologies for high performance industrial coatings used in petroleum processing, petrochemical, civil infrastructure, homeland security, personal protective equipment and other extreme operational environments.

Isotron is primarily an indoor facility, but does store flammable material in two outside cabinets. The cabinets are locked and contain sample materials, including: xylene and methyl ethyl ketone. The research and development at Isotron uses numerous solvents, paints, hazardous liquids, and a 55-gallon waste drum. Disposal of the used solvents and liquids is conducted by an off-site disposal contractor, primarily Safety Kleen, in a method that is acceptable to SPU. Isotron does not have a spill plan, but spill kits and absorbent booms are on-site and general housekeeping at the site is considered good. Industrial wastewater is not discharged to the sewer.

Potential Discharges to North Lake Union

Isotron's business is primarily conducted indoors and solvents and hazardous liquids are properly disposed of. There are two floor drains at the facility that have both been plugged. Stormwater is managed through the NLSY's shared stormwater conveyance system. Potential discharges to North Lake Union from this facility are minimal.

National Pollutant Discharge Elimination System Status

This facility does not have a NPDES permit.

Additional Inspections

King County Hazardous Waste was on-site during the inspection to provide technical assistance.

Identified Corrective Actions

Several required corrective actions were identified during the inspection including: the development of a spill plan, the education of employees regarding the use of the spill plan and spill kits, and the proper labeling of all waste containers. A corrective action letter documenting these issues was transmitted to the facility. Isotron also was provided information regarding technical and financial assistance for developing the spill kit.

Isotron has complied with the corrective actions required in the letter and is now considered to be in compliance with the stormwater pollutant source control requirements, as required under City code. This compliance status was based on the findings of a re-inspection conducted by the BIP. A letter identifying Isotron's compliance with the Stormwater Code was transmitted to the facility.

2.6.4 Ehler Marine and Industrial Service Co.

Facility Description

Ehler Marine and Industrial Service Co. (Ehler Marine) is a marine consulting business that also sells and applies marine paints and coatings. Ehler Marine is a tenant of Northlake Shipyards and is located at 1443 North Northlake Way. Its facilities consist of indoor offices and a cargo container used for equipment storage. Some larger equipment and materials awaiting disposal or recycling are stored outside under cover.

Paint thinners used in the business activities are stored within a flammable material cabinet at the site and welding and cutting equipment is stored in the cargo container that is locked. According to the BIP report, most of the work (besides sales and consulting) is conducted off-site. Housekeeping practices at the facility are generally considered good. The facility does not have a spill plan, but does keep rags in case of a spill clean up on-site.

Potential Discharges to North Lake Union

Ehler Marine does not discharge any industrial wastewater to the sewer and work is primarily conducted inside. Stormwater is managed through the NLSY's shared stormwater conveyance system. Potential discharges to North Lake Union could occur from stormwater run-on coming into contact with equipment on the ground outside and flowing into the stormwater conveyance system.

National Pollutant Discharge Elimination System Status

This facility does not have a NPDES permit.

Additional Inspections

No additional inspection was conducted in conjunction with the BIP inspections.

Identified Corrective Actions

The BIP identified several required corrective actions that were required at the site, including: the completion and implementation of a written spill plan, obtaining the necessary spill containment and cleanup materials, and putting these in the appropriate location and educating the employees about the spill plan and spill kit.

A corrective action letter documenting these issues was transmitted to the facility. Information on technical and financial assistance was also included in the letter.

2.6.4 Western Industrial

BIP Inspection Report is not currently available for this facility. Western Industrial was the owner and operator of the dust collection system used at NLSY. The failure of a filter in this dust collection system in addition with improper tarping was claimed responsible by NLSY for the release of sandblast grit to the surface waters in November 1997. This release led to a Notice of Violation, No. DE 98WQ-N107.

2.6.7 All Ocean Service, LLC

Facility Description

All Ocean Services is a marine engineering and consulting company located at 1441 North Northlake Way and is a tenant of Northlake Shipyards. Business activities are limited to office use only, with no outdoor activities. Based on this absence of high risk pollution generating activities, a screening visit was conducted by the BIP. No corrective action was required and overall compliance has been considered achieved by the BIP.

2.7 LAKE UNION YACHT CENTER

Facility Description

LUYC is located at 1341 North Northlake Way, directly west of Northlake Shipyard, Waterway #21, and the CSO #146 outfall. According to their website, the LUYC facility encompasses over 50,000 square feet of shop and yard workspace, which includes over 500 feet of dock space and two floating boat sheds that can accommodate vessels up to 70 feet long.

LUYC is a full service boat repair facility with the ability to take boats out of the water and store boats outside in its yard. A portion of the facility is located on wooden piers directly above North Lake Union. Additional facility uses include a flammable liquid storage shed located in the northern portion of the parking lot and outdoor oil storage. Inside the facility there is a woodworking shop, offices, and chemical product storage. Business activities at the facility use a variety of paints, solvents, and associated liquids and they store batteries, engines, and various boat parts.

The facility does not have a spill plan or sufficient spill containment materials for the chemicals used on-site. Stormwater is collected and conveyed to a treatment system and reused as washwater and is described further below.

Potential Discharges to North Lake Union

Portions of the facility are located on a wooden pier and spills and leaks have the potential to directly enter North Lake Union if they are not properly contained. In addition to the boat repair and maintenance operations, high risk pollution generating activities at the facility include truck loading of liquid and solid materials, outside storage of liquids and non-containerized materials, outside manufacturing activity, and parking or storage of vehicles and equipment.

The facility uses a water treatment recycling system, a Delta Pollution Control System, to treat stormwater and possibly washwater runoff from the parking lot. This system is located inside the main building and treats runoff collected from three catch basins conveyed to a sump located in the parking lot. The runoff is treated and then recycled as pressure washing water. Additionally, there are two pipes—three and five inches in diameter—that discharge runoff to North Lake Union into Waterway #21.

Additional discharges to North Lake Union may occur through runoff directly to the lake, water from pressure washing, particulate and liquid discharge from boat repair and maintenance, spills through gaps in the wooden decking, and accidental spills. In-water washing of vessels may also occur at this facility. This activity could lead to the direct runoff of washwater into the lake.

National Pollutant Discharge Elimination System Status

LUYC operates under an individual NPDES Permit No. WAG030050C. Enforcement activity included four separate informal actions and warning letters to LUYC in 2004. Since then, two compliance inspections have been conducted in 2005 and 2006.

Additional Inspections

An Ecology inspection was conducted in conjunction with the BIP. The Ecology inspection identified several issues including the required submittal of discharge monitoring reports even if there is no discharge, improper tarping during upland vessel repair, and improper storage of chemicals and batteries. The Ecology inspection also noted inadequate BMPs during repair work and the requirement to develop and implement a spill plan immediately. The inspection identified that permit violations had been observed and must be corrected and notified LUYC of potential formal enforcement actions including monetary fines.

Identified Corrective Actions

Numerous required corrective actions were identified during the inspection, including the writing and implementation of a spill plan (with posting in appropriate locations). The BIP also requires LUYC to obtain additional spill kits, properly mark them, and educate the employees about the spill plan and the kits. The BIP also requires proper storage of materials including: fuels, hazardous materials, batteries and engines, usage of a tarp and wrap to prevent the discharge of chemicals and particulates to North Lake Union, and the need to properly characterize catch basin sediment.

Information on technical and financial assistance was also included in the letter. Information regarding technical and financial assistance was also supplied.

LUYC has complied with the corrective actions required in the letter and is now considered to be in compliance with the stormwater pollutant source control requirements, as required under City code. This compliance status was based on the findings of a re-inspection conducted by the BIP. A letter identifying LUYC's compliance with the Stormwater Code was transmitted to the facility.

2.8 HONDA MARINE CENTER

Facility Description

Honda Marine Center (HMC) is located at 1341 North Northlake Way, just west of Northlake Shipyard, and Waterway #21. The HMC is located in the same parcel as the LUYC. HMC's business is primarily composed of sales of marine parts, including engines and small vessels. In addition, they conduct repairs on marine engines and small marine parts. HMC occupies two spaces on the parcel, the first is a portion of the top floor of the larger building on the parcel and contains the offices, sales area, and storage. A second smaller building to the west houses parts and a repair shop. The facility uses a variety of paints, solvents, and associated liquids in its operation.

In the repair shop, oils and gases are drained from engines and stored in 5-gallon containers. This oil is then collected and brought to Ballard Oil for disposal. Old gasoline is kept on-site in small quantities and King County Hazardous Waste visited the facility to address this issue. Engines, batteries, and a variety of parts are stored on the floor in the shop. There is also an outside storage area where a water test tank is located, in addition to other empty containers and some scrap metal. HMC has adequate spill containment materials on-site.

Potential Discharges to North Lake Union

Spills from the oil, gas, and other liquids used at the facility have the possibility of entering North Lake Union. The facility does have absorbent pads on-site to address this possibility, but the quantities are not sufficient for the chemicals stored on-site and could lead to aggravated impacts of a spill or leak. In-water washing of vessels may also occur at this facility. This activity could lead to the direct runoff of washwater into the lake

There is not a stormwater conveyance system on-site and stormwater is directly discharged to North Lake Union via surface flow.

National Pollutant Discharge Elimination System Status

This facility does not have a NPDES permit.

Additional Inspections

No additional inspection was conducted in conjunction with the BIP inspections.

Identified Corrective Actions

The BIP identified corrective actions that are required for the facility to be in compliance during the inspection. These included the proper labeling of all waste containers and improvement of housekeeping (e.g., disposal of old equipment and proper item storage). Information on technical and financial assistance was also included in the letter.

Gas Works Sediment Area

Joint Source Control Evaluation

Appendix B
Oblique Photos of Facilities

Parcel	Tenant
A	Honda Marine Center
A	Lake Union Yacht Center

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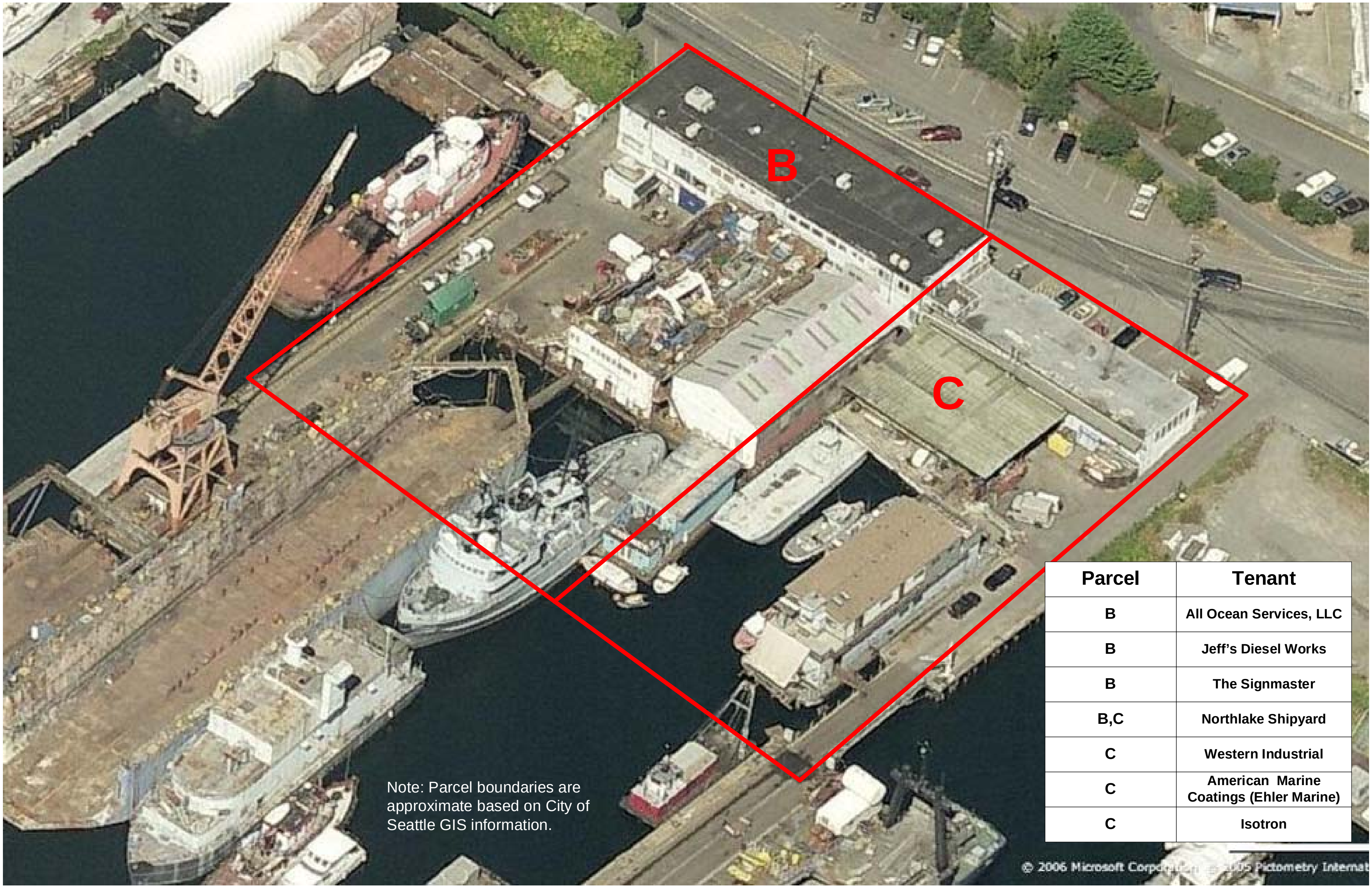
Joint Source Control Evaluation
Gas Works Sediment Area
City of Seattle

Figure B.1
Parcel A



Parcel	Tenant
B	All Ocean Services, LLC
B	Jeff's Diesel Works
B	The Signmaster
B,C	Northlake Shipyard
C	Western Industrial
C	American Marine Coatings (Ehler Marine)
C	Isotron

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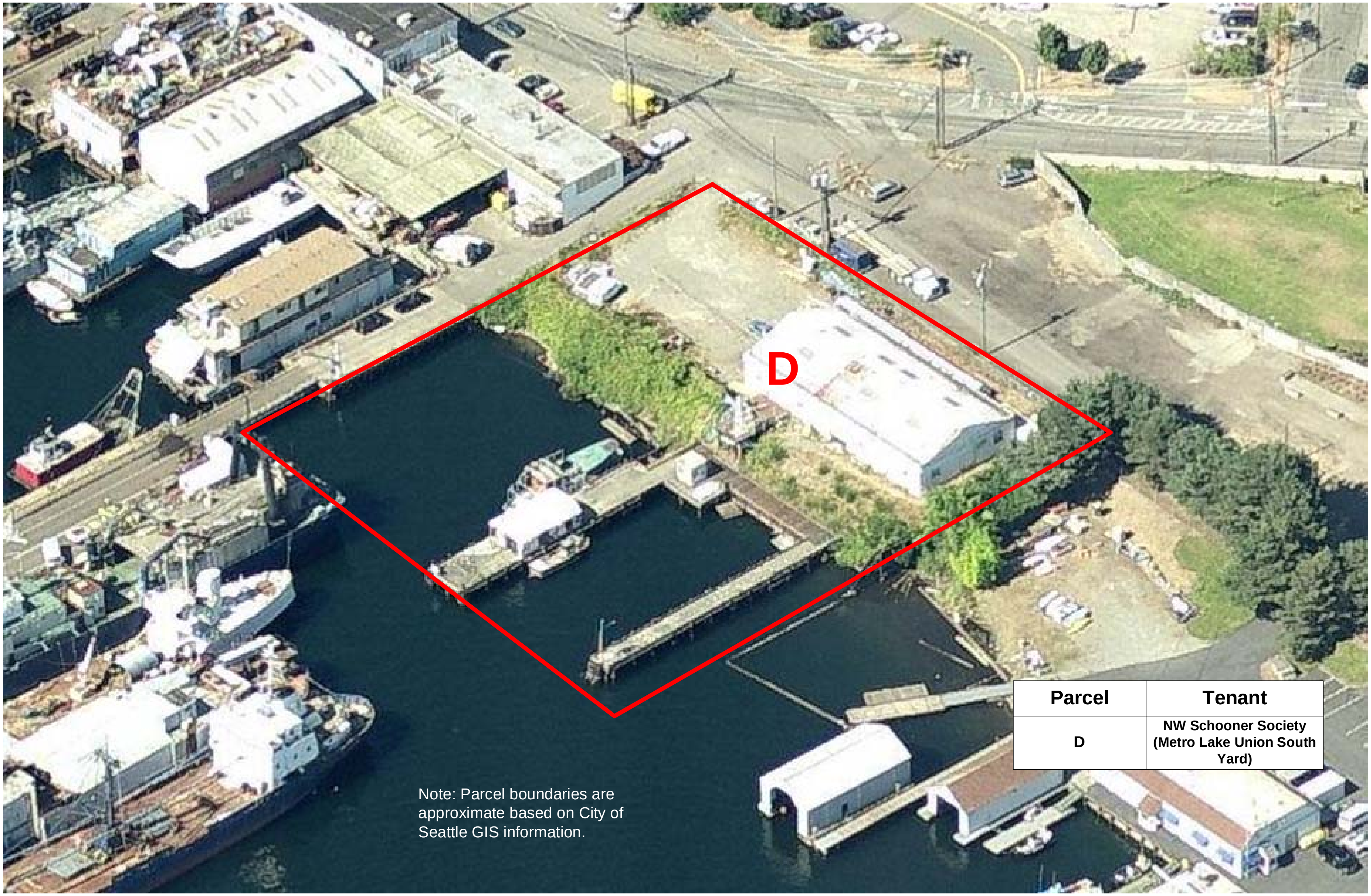
Joint Source Control Evaluation
Gas Works Sediment Area
City of Seattle

Figure B.2
Parcels B, C



Parcel	Tenant
D	NW Schooner Society (Metro Lake Union South Yard)

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Joint Source Control Evaluation
Gas Works Sediment Area
City of Seattle

Figure B.3
Parcel D

F:\projects\COS-GWSA\T4060 Joint S Control Eval Report Drafts\Ecology Review Draft\Appendices\Appendix B - Obliques\JSCE App B.3 022607.vsd

Parcel	Tenant
E	Seattle Police Harbor Patrol

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Figure B.4
Parcel E

Parcel	Tenant
F	Gas Works Park

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Figure B.5
Parcel F

Parcel	Tenant
G	Gasworks Park Marina

Note: Parcel boundaries are approximate based on City of Seattle GIS information.

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Gas Works Sediment Area
City of Seattle

Figure B.6
Parcel G

Parcel	Tenant
H	Seattle Shipwrights
H	Susan Neff
H	Tuckerman's Fine Woodwork
H	Bernstein Woodworking
H	Emerald Landing LLC
H	Seattle Canvas
H	Matt Pontius
H	Union Bay Fabrication
H	BlueView Technologies

Note: Parcel boundaries are approximate based on City of Seattle GIS information.

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Gas Works Sediment Area
City of Seattle

Figure B.7
Parcel H

Gas Works Sediment Area

Joint Source Control Evaluation

Appendix C
Selected Site Photos

Photo 1: Outfall A during a storm, November 2006.

Photo 2: Discharge from Outfall B during a storm, November 2006.

Photo 3: Outfall C during a storm, November 2006.

Photo 4: Inlet on Top of Kite Hill Sculpture, November 2006

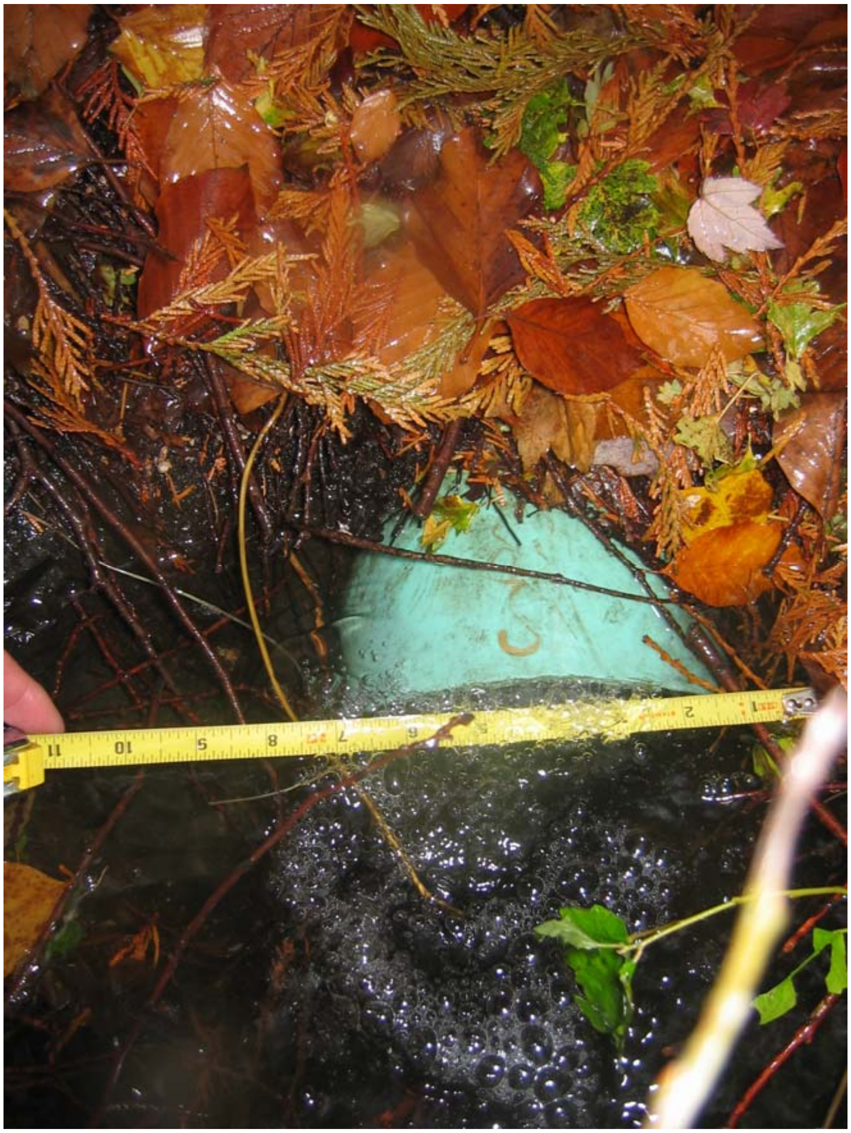


Photo 5: Waterway #19 Inland Outfall during a Storm, November 2006

Photo 6: Waterway #19 Outfall from Culvert near Shoreline during a Storm, November 2006

Gas Works Sediment Area

Joint Source Control Evaluation

Appendix D
Pattern of Bioassay Passes and Failures

0 150 300 Feet

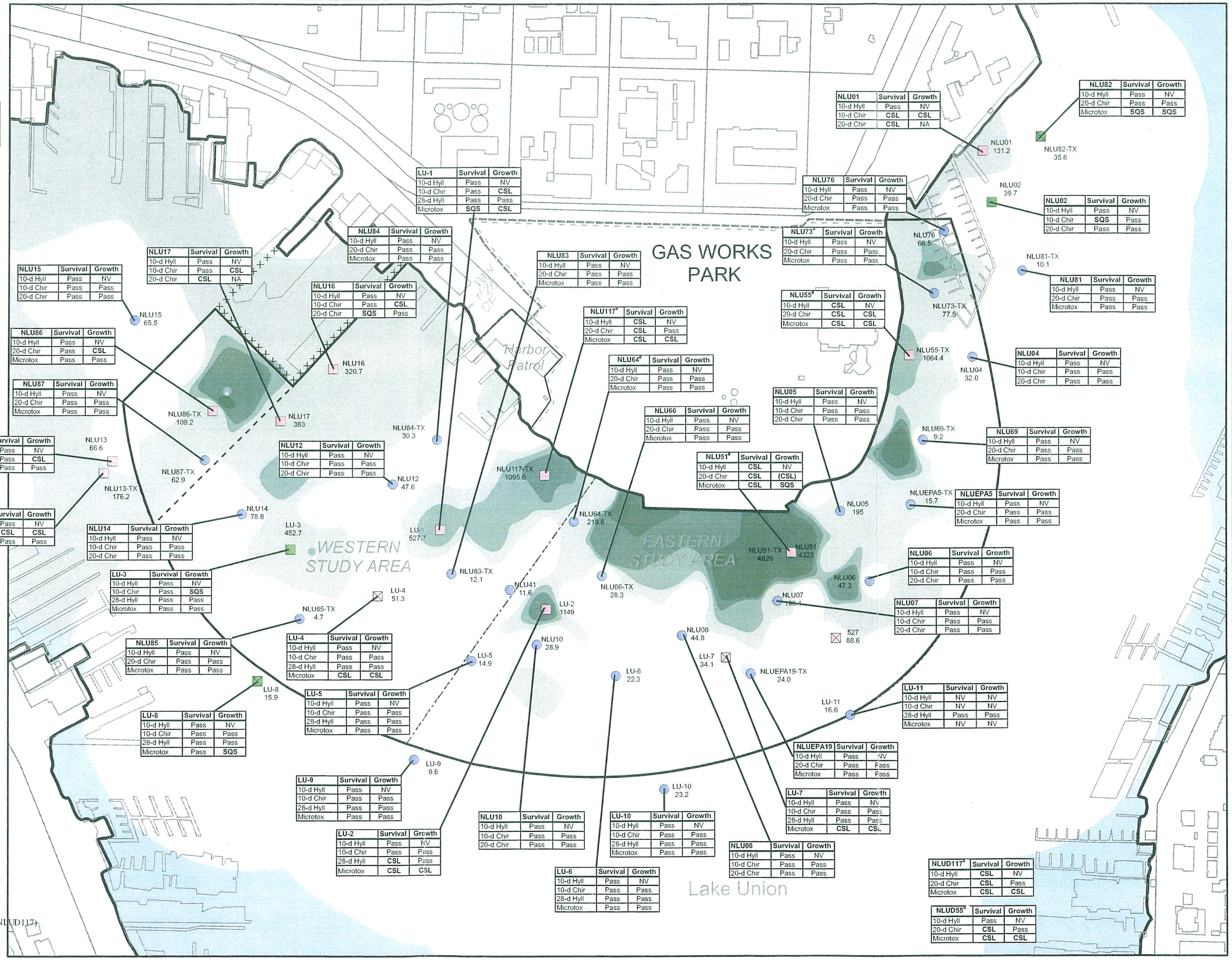
Phase 2 and Phase 3 (2002 and 2005)
Surface Sediment Bioassay Sampling Stations

- Pass
- SQS Failure
- Microtox Only SQS Failure
- CSL Failure
- Microtox Only CSL Failure
- Shipyard Consent Decree Boundary
- Uplands Boundary As Defined By The Consent Decree (December 1999)
- Division Between Eastern And Western Study Areas
- Harbor Patrol Boundary
- Gas Works Park Boundary
- Initial Area of Investigation

Interpolated TPAH Concentrations (mg/kg dry wt.) *

- < 100
- 100 - 500
- 500 - 1000
- 1000 - 2500
- >2500
- No data available, or, if data exists, interpolation not shown

* Western Study Area values are preliminary and not validated



NOTES:

1. Basemap generated in ArcGIS version 8.1 from Seattle Public Utilities Geographic Systems data, 9/28/99. Overwater structure data updated, 12/18/03. Projection in Washington State Plane Coordinates, North Zone, HARN 1983/1991.
2. Concentration contour map generated through interpolation using an Inverse Distance Weighted (IDW) scheme (power = 6) from 2004/05 grab samples and pre-2005 data. Maximum reach from each sampling location is equal to 500 feet. Contoured interval may differ from actual data shown due to influence by neighboring data values.
3. The number given below the sample name is the TPAH concentration (ppm), concentrations represent the total sum of 16 individual PAH compounds. In accordance with Ecology's Sediment Management Standards, individual PAH concentrations below the detection limit (DL) were not included when calculating the sum.
4. Data sets include King County 2000 (527), RETEC March 2002, TAMU July 2002, RETEC October 2002, and RETEC April 2005.
5. Results based on *H. azteca* 10-day mortality, *H. azteca* 28-day mortality and growth, *C. tentans* 10-day mortality, *C. Tentans* 20-day mortality and growth, and Microtox bioassay tests. The Microtox data presented for the 5 minute and 15 minute bioluminescence endpoints.
6. Bioassay pass/fail results based on Ecology's proposed freshwater bioassay decision criteria.
7. Data box footnotes: # = Diluted samples with 50% reference material (NLUD55 and NLUD117)
   NV= No value
   NA=Not analyzed

FILE: T:/LakeUnion_N83/Projects/NLU/TPAH/CleanUp_SD2005/BioassayPassFail_2_1.mxd

RETEC

CLEANUP STANDARD DETERMINATION GAS WORKS SEDIMENT AREA PSE10-18628-610	GWSA BIOASSAY PASS/FAIL RESULTS (THROUGH 2005)
DATE: 7/21/05 DWN. BY: KBL/ftc	FIGURE: 2-1

ATTACHMENT 6B-2
Initial Source Control Screening Investigations of Storm Drains

(Video files on DVD)

City of Seattle
Gregory J. Nickels, Mayor

Seattle Public Utilities
Ray Hoffman, Acting Director

April 6, 2009

John Keeling
Washington State Department of Ecology
Northwest Regional Office
3190 160th Avenue S.E.
Bellevue, WA 98008-5452

Re: Report: Initial Source Control Screening Investigation of Storm Drains
Gas Works Sediment Area Source Control Evaluation
Seattle, Washington

Dear John:

This letter transmits the attached report entitled: *Initial Source Control Screening Investigation of Storm Drains, Gas Works Sediment Area.* This report documents the results of the first phase of sediment source control investigation of storm drains located within and in the vicinity of Gas Works Park. Source control evaluation is part of the Remedial Investigation/Feasibility Study process for the Gas Works Sediment Area (GWSA) and is required by the Agreed Order for the site.

The City of Seattle is leading this portion of source control evaluation activities for the GWSA and is coordinating closely with Puget Sound Energy with oversight by the Washington State Department of Ecology. Before the field activities began, the City notified Ecology of the planned screening investigation in a letter to you dated September 9, 2008.

The source control investigation work presented in this report consists of:

- An initial screening investigation of accumulated solids in storm drain structures including chemical testing, and
- Video inspection of the condition of readily accessible portions of the storm drains.

The objectives of these investigative activities are to provide a screening-level understanding of the potential for the storm drains to be of concern regarding sediment recontamination and inform development of additional plans for further investigation of the storm drains, where necessary.

The City and Puget Sound Energy are currently working together to identify proposed next steps in the source control evaluation process and look forward to presenting these steps to Ecology. Please contact me if you have any questions.

Sincerely,

Peter D. Rude, Ph.D.
Strategic Advisor
Seattle Public Utilities
Office: 206-733-9179
Fax: 206-684-4631
Email: pete.rude@seattle.gov

Attachments

cc: Pete Adolphson, Department of Ecology
Grant Yang, Department of Ecology
Maura O'Brien, Department of Ecology
Judith Noble, Seattle Public Utilities
Steve Secrist, Puget Sound Energy
John Rork; Puget Sound Energy
Dan Baker, AECOM
Allison Geiselbrecht, Floyd|Snider
Kate Snider, Floyd|Snider
Kathy Gerla, Law Department, City of Seattle
David Graves, City of Seattle, Parks and Recreation
Marrell Livesay, City of Seattle, Parks and Recreation

Gas Works Sediment Area

Initial Source Control Screening Investigation of Storm Drains

Prepared for

City of Seattle

Seattle Public Utilities

Prepared by

FLOYD | SNIDER
Two Union Square
601 Union Street, Suite 600
Seattle, Washington 98101

April 2009

ECOLOGY FINAL

Table of Contents

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List of Acronyms and Abbreviations

Acronym/Abbreviation	Definition
City	City of Seattle
CSO	Combined Sewer Overflow
ECOLOGY	Washington State Department of Ecology
GWSA	Gas Works Sediment Area
JSCE	Joint Source Control Evaluation
PCB	Polychlorinated biphenyl
PE	Pipe end
PSE	Puget Sound Energy
QAPP	Quality Assurance Project Plan
SAP	Sampling and Analysis Plan
RI/FS	Remedial Investigation/Feasibility Study
SMS	Sediment Management Standards
SOP	Standard operating procedure
SPU	Seattle Public Utilities
SSQL	Site-specific sediment quality
SVOC	Semivolatile organic compound
TOC	Total organic compound
TPAH	Total polycyclic aromatic hydrocarbon

1.0 Introduction

This Initial Screening Investigation report documents the results of the first phase of sediment source control investigation of storm drains located within and in the vicinity of Gas Works Park (Figure 1.1). Source control evaluation is part of the Remedial Investigation/Feasibility Study (RI/FS) process for the Gas Works Sediment Area (GWSA) required by the Agreed Order (No. DE 2008; Ecology 2005) for the site. The City of Seattle (City) is the lead for this portion of source control evaluation activities for the GWSA and is coordinating closely with Puget Sound Energy (PSE) with oversight by the Washington State Department of Ecology (Ecology). Floyd|Snider is performing the work on behalf of the City.

The completed source control investigation work presented in this document consists of an initial screening investigation of accumulated solids in storm drain structures, and a video inspection of the condition of readily accessible portions of the storm drain pipes. The objectives of these investigative activities are to provide a screening-level understanding of the potential for the storm drains to be of concern regarding sediment recontamination and inform development of additional plans for further investigation of the storm drains, where necessary.

The scope of work for this investigation was documented in a work plan, which was prepared by Floyd|Snider and submitted to Seattle Public Utilities (SPU) on September 12, 2008 (the Work Plan). The Work Plan was also submitted to PSE and Ecology was notified of the work prior to mobilization. The storm drain solids sampling was conducted on September 19, 2008 and the sampling effort and related chemical testing results are described in Section 2.0. The video inspection of the storm drains was conducted on October 1 and 2, 2008 and the associated results are described in Section 3.0. Section 4.0 provides a discussion of the investigation results including identification of proposed next steps.

1.1 BACKGROUND AND APPROACH

The need for investigation of the storm drains is documented in the draft Joint Source Control Evaluation for the GWSA (JSCE; Floyd|Snider 2007). The JSCE investigated potential current and future sources of contamination, including storm drains, to the area of anticipated sediment remediation within the GWSA. Based on the presence of subsurface soil and groundwater contamination, the existence of perforated pipes in some areas of the Park, the age and unknown condition of subsurface storm drain piping, and unknown stormwater quality, the JSCE recommended that the storm drains be further evaluated regarding their potential to provide a contaminant pathway to sediments.

The JSCE recommended several possible approaches to further evaluate the potential for sediment recontamination from the storm drains including:

- Evaluation of the total polycyclic aromatic hydrocarbon (TPAH) concentrations in stormwater exiting the outfalls
- Evaluation of the TPAH concentrations of accumulated solids in the storm drains or exiting the outfall
- Evaluation (via video surveys or other methods) of the storm drain system integrity

- Evaluation of the TPAH concentrations of surface sediment samples immediately adjacent to the point of outfall discharges.

The overall source control work at the GWSA related to the storm drains will be accomplished in two phases. The approaches identified in the second and third bullets above were selected for implementation for the initial phase (Phase 1) source control activities followed by Phase 2 activities:

Phase 1—Initial Screening Investigation

- Collect initial field data to characterize available solids in the storm drains and better understand the condition of the existing piping.

Phase 2

- Where necessary, develop plans for additional investigation and source evaluation based on the results of Phase 1. Such plans may consist of brief memoranda identifying additional steps or more detailed sampling and analysis and quality assurance plans depending on the nature and schedule of the additional activities.
- Obtain Ecology approval of the additional plans and implement the additional activities.
- Evaluate the results to identify sediment recontamination potential.

This report describes the results of Phase 1—the Initial Screening Investigation.

1.2 REPORT ORGANIZATION

This Initial Investigation Screening Report is organized as follows:

- Section 1.0 provides information on the background of the site, the scope of work for the investigation, and the rationale for the investigation related to the JSCE.
- Section 2.0 provides the results of the catch basin solids sampling.
- Section 3.0 summarizes the results of the video inspection and describes the findings related to the City's available GIS information.
- Section 4.0 presents the next steps.
- Section 5.0 provides references.

2.0 Storm Drain Solids Sampling

In order to evaluate accumulated solids quality in the storm drains discharging to the Gas Works Sediment Area, samples were collected from selected structures and analyzed. The solids sampling was conducted using SPU's Standard Operating Procedure (SOP): *WQ&S S3300—Storm Drain Sediment Sampling: Catch basin and In-line Grab Sample Collection.*

Samples were collected by Floyd|Snider on September 19, 2008 with assistance from SPU staff. Samples were analyzed by Analytical Resources, Inc. (ARI) for semivolatile organic compounds (SVOCs), Sediment Management Standards (SMS) metals, PCB Aroclors, total organic carbon (TOC), and grain size. Samples were collected from the sample locations shown on Figures 2.1 and 2.2. Two locations, SL 1 and SL 6, did not contain enough solids to collect samples. Sample location SL 5 could not be located and therefore no sample was collected. It is important to note that the storm drain configurations shown on figures in this report have been adjusted to reflect conditions observed during the video inspection. The storm drain locations adjusted include those around sample locations SL 1, SL 2, SL 4, and SL 13. Additionally, structures were added to reflect field conditions at SL 10 and SL 11. Thus, Figures 2.1 and 2.2 show field-adjusted storm drain lines.

The accumulated solids present in the catch basins were sampled at several locations within each structure to provide a representative composite of the material present. All structures contained enough solids to collect the required sample volume. However, it is important to note that sample locations SL 7 and SL 8, the two catch basins in the northeast corner of the Park, did not contain any measurable solids based on probing with a rod. Nevertheless, by scraping the bottom of the structure, enough volume could be collected for analysis.

The chemical testing results for the samples are shown in Table 2.1 and sample locations are shown on Figures 2.1 and 2.2. The data were compared to the site-specific sediment quality (SSQL) level of 170 mg/kg TPAH for GWSA sediments. Using this criterion, the only location of potential concern is SL 7 with a TPAH value of 458,600 µg/kg or 458.6 mg/kg. All other samples had TPAH concentrations considerably less than 170 mg/kg and ranged from 1.0 mg/kg TPAH at location SL 12 to 52.3 mg/ kg TPAH at location SL 10.

2.1 DATA QUALITY REVIEW

A Compliance Screening, Tier I data quality review was performed on the data resulting from laboratory analysis. The analytical data was validated in accordance with the following:

- USEPA CLP National Functional Guidelines for Inorganic Data Review (2004)
- USEPA CLP National Functional Guidelines for Organic Data Review (1999)

The undetected Aroclors in sample SL13-DUP received a UJ indicating an estimated non-detect, as the surrogate recoveries for this sample were below the laboratory quality control limits.

No other qualifiers were added to the analytical results based on the data quality review. The data are determined to be of acceptable quality for use, as qualified.

3.0 Storm Drain Video Inspection

In order to more accurately evaluate the condition of the storm drains and identify areas of concern, a video inspection of selected lines was conducted on October 1 and 2, 2008 by Bravo Environmental. The inspection was conducted in accordance with the City's video inspection protocol. The video was recorded and narrated by the operator with distance markings and visual observations. These visual observations included blockages, laterals, cracks, and similar items. In addition to the video, a report was developed for each stretch of pipe inspected, which documented the observations including pictures of any items of interest. Storm drains were not cleaned prior to inspection. The video inspection reports and video inspections are included in Appendixes A and B, respectively.

As mentioned in Section 2.0 above, the figures included in this report were adjusted to show storm drain information as accurately as possible based on existing information and the information gathered during this inspection. Storm drains within the vicinity of the Park and Waterways #20 and #19 underwent video inspection. Storm drains that were inspected include those that are connected to Outfalls A through E within the Park and those associated with Waterways #20 and #19 Outfalls. Storm drains are shown along with the associated structure ID on the attached Figures 3.1 and 3.2. Several storm drains were inaccessible and were not inspected. These are called out on Figures 3.1 and 3.2. Key points from each area are summarized below. (Note that during the inspection, in accordance with video inspection protocol, the outfalls of storm drains were identified as pipe ends, or PE for short.)

3.1 WATERWAY #20 STORM DRAIN

Waterway #20 is located between Harbor Patrol and the South Yard of King County Metro, at the foot of Densmore Avenue North (see Figure 3.1). The Waterway #20 storm drain was built prior to 1919 and currently discharges stormwater into Waterway #20 at the western end of the Harbor Patrol facility via an 8-inch stormwater outfall located near the shoreline.

The drainage basin for this outfall contributes stormwater from approximately 7.0 acres, with inputs primarily from street right-of-ways, the Park, a condominium complex, and the majority of the Metro Lake Union North Yard. The location and size of this basin was developed using available maps and field verification conducted by SPU.

The Waterway #20 basin encompasses the majority of the North Yard of the King County Metro Lake Union Facility, but does not include the South Yard. Available information indicates that no piped drainage system exists currently in the South Yard. The remainder of the stormwater runoff from the North Yard discharges into Waterway #21 (west of Northlake Shipyard) along with stormwater collected in a series of catch basins and inlets within the public right-of-way.

Most of the inspected pipe segments for Waterway #20 appeared to be in good condition. However, the pipes did contain numerous blockages, pipe changes, and structures that limited the video inspection of this area. Figure 3.1 indicates, with yellow highlighting, areas that could not be inspected. Additionally, there are numerous sections that do not correspond with existing figures. In an attempt to clarify the pipe routing of the area, the figures in this report reflect the site conditions as discovered during this inspection.

Because of these structural limitations, there were a number of pipe segments in which the condition of the storm drain from SL 1 to the Waterway #20 outfall could not be inspected. Piping in the SL 1 to SL 4 segment (see Figure 3.1) included a connection that had a large offset and camera access was blocked. Additionally, the segment from SL 4 to the outfall could not be inspected due to a metal plate obscuring the majority of the outlet pipe in SL 4.

3.2 GAS WORKS PARK STORM DRAINS

There are seven active park storm drains that convey stormwater from small sub-basins within the park (including the parking lot) for discharge directly to the lake via piped outfall (see Figure 3.2). Six of the storm drains were inspected; areas inspected are indicated on Figure 3.2. These are described below followed by key observations about pipe conditions:

- The storm drain that discharges via Outfall A collects drainage from an approximately 5-acre area that includes the Park parking lot, a lawn area to the west of the restrooms, and the lawn and vegetated area located north of the play barn. The drainage basin contains approximately 14 catch basins, and contains a section of perforated piping, as shown in Figure 2.2. Outfall A is the northernmost park outfall that discharges into Waterway #19, and is 10 inches in diameter.
- The storm drain system that discharges via Outfall B drains a portion of the paved area west of the restrooms, the picnic area north of the play barn, and may also drain a portion of the main paved path that links the parking lot and the play barn/paved picnic area. As shown in Figure 2.2, it contains a section of perforated piping. Outfall B is located approximately 250-feet from the head of Waterway #19. According to available drawings, the diameter of Outfall B is 6 inches.
- The Outfall C system contains one catch basin which drains a portion of the paved pathway that is located west of the sand play area and adjacent unpaved areas. Outfall C also discharges stormwater that is collected through a network of perforated pipes located under the sand play area. Outfall C is located approximately 450-feet from the head of Waterway #19 and drawings indicate it discharges at the shoreline. The outfall is 10 inches in diameter.
- The Outfall D system is relatively small and appears to drain a portion of the paved pathway that is located west of the sand play area, adjacent unpaved areas, and a portion of the lawn to the south of the sand play area. Outfall D is located approximately 50-feet south of Outfall C and 500-feet from the head of Waterway #19.
- The Outfall E system is composed of a series of catch basins and a floor drain that collects runoff from the roofs and impervious areas of the play barn and picnic shelter; however, its full extent is unknown. Outfall E is located approximately 75-feet south of Outfall B and 325-feet from the head of Waterway #19. Drawings indicate that it discharges at the shoreline via a 6 inch-diameter outfall.
- Outfall F is located at the west end of the prow along the southern portion of the Park. It discharges runoff from a system that consists of a solid pipe which conveys runoff collected in an upgradient perforated pipe. The perforated pipe is 6 inches in diameter and is located in a low elevation area just north of a paved path and is

approximately 40-feet long. Stormwater runoff from a northern area of the Park that is between the main east-west path and the parking lot is conveyed to this area through an inlet and short pipe that conveys the runoff to the south underneath the paved path. This runoff then travels overland to the low area where the perforated pipe is located. Additional runoff from the eastern side of Kite Hill and the grassy area west of the cracking towers is also collected by the perforated pipe.

The storm drains connected to Outfalls A through E were video inspected within the Park. The video inspection did not include the storm drains within the parking lot or the Outfall F storm drain. Overall, the majority of the storm drains within the Park appeared to be in good shape without any significant cracks or staining with exceptions noted below.

The perforated pipe systems contributing to discharge at Outfalls A and B (PE A and PE B) could not be completely inspected due to blockages within the pipe or crushed pipe. The sections of pipe that could not be inspected are indicated on Figure 3.2. Also of note is the storm drain that discharges into Outfall E (PE E), which contained more laterals than anticipated. While the video inspection revealed multiple laterals, their origination points are unknown.

Additional details of the inspection results are in Appendix C.

3.3 WATERWAY #19

Within the Waterway #19 area, there is a 6-inch PVC pipe that discharges two-thirds up the slope (approximately 80-feet) from the shoreline (see “PE WW19” on Figure 3.2). The discharge from this pipe flows down a small partially armored channel into a depression near the shoreline, where it enters another 6-inch PVC culvert that discharges on the other side of a foot path near the shore and flows into Waterway #19.

The basin associated with this outfall is estimated to be 1.2 acres and is composed of a portion of Meridian Avenue North and North Northlake Way, the Burke Gilman Trail, a patio, a landscaped area, and a portion of roof drainage from a building complex, which includes condominiums and commercial facilities. The exact area of the roof that drains into this basin is unknown. The basin for this outfall is based on field observations, City GIS information, and City of Seattle Business Inspection Reports (BIP), where appropriate.

The storm drain that discharges into Waterway #19 was video inspected to identify the current conditions. However, due to a PVC elbow in manhole SL 13 and traffic conditions at a downstream manhole (called MH 13.1 for identification purposes) along the south side of North Northlake Way, only a limited portion of this system could be inspected. The segment inspected appeared to be in good shape.

Additional details of the inspection results are in Appendix C.

4.0 Next Steps

4.1 NEXT STEPS

The City anticipates working collaboratively with PSE and Ecology to develop plans for additional source control investigation, where necessary, based on the results contained in this report. Such plans may consist of brief memoranda identifying additional steps or more detailed sampling and analysis and quality assurance plans depending on the nature and schedule of the additional activities.

The City, in conjunction with PSE, intends to obtain Ecology approval of the additional plans prior to implementing additional investigations. The schedule for development of these plans is Summer 2009, prior to the onset of the fall wet season.

.

5.0 References

Floyd|Snider. 2007. *Gas Works Sediment Area Joint Source Control Evaluation.* Prepared for City of Seattle, Seattle Public Utilities. 27 February.

Washington State Department of Ecology (Ecology). 2005. Agreed Order No. DE 2008. Puget Sound Energy and the City of Seattle at the Gas Works Park Sediment Site. 18 March.

U.S. Environmental Protection Agency (EPA). 1999. *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review. EPA-540/R-99-008.* October.

_____. 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review OSWER 9240.1-45/EPA 540 R-04-004.* October.

Gas Works Sediment Area

Initial Source Control Screening Investigation of Storm Drains

Table

Table 2.1
Gas Works Vicinity Catch Basin Solids Analytical Results

		Waterway #20						Waterway #19														Lake Union	
								Outfall A				Outfall B		Outfall C		Outfall D		Waterway #19				Outfall F	
	Sampling Station	SL 2		SL 3		SL 4		SL 7		SL 8		SL 9		SL 10		SL 11		SL 13		SL 13 DUP		SL 12	
Analytes	Units	Conc.	Qual.	Conc.	Qual.	Conc.	Qual.	Conc.	Qual.	Conc.	Qual.	Conc.	Qual.	Conc.	Qual.	Conc.	Qual.	Conc.	Qual.	Conc.	Qual.	Conc.	Qual.
Conventionals (USEPA 160.3 Method)																							
Total Solids	%	34		57.3		33.6		30		45.5		33.3		53.3		42.6		54		52		43.1	
Total Organic Carbon[1]	%	13.3		10.8		18.1		15.6		7.05		8.77		6.17		4.14		7.13		6.8		8.49	
Grain Size (Sedigraph X-ray Diffraction Analysis)																							
Gravel (>2000 µm)	%	29.3		10.2		9.0		10.2		21.6		48.9		25.7		14.4		4.8		5.3		24.9	
Very Coarse Sand (2000 - 1000 µm)	%	12.4		11.9		7.1		11.9		3.0		11.2		15.4		2.4		10.3		9.5		11.2	
Coarse Sand (1000 - 500 µm)	%	10.2		14.4		5.6		14.4		2.2		10.5		16.4		1.5		23.6		22.8		16.0	
Medium Sand (500 - 250 µm)	%	10.3		19.9		6.5		19.9		2.6		11.5		18.0		1.8		30.8		32.6		24.8	
Fine Sand (250 - 125 µm)	%	10.9		16.6		4.2		16.6		1.9		8.3		9.3		4.1		19.1		19.9		13.7	
Very Fine Sand (125 - 63 µm)	%	7.3		11.5		3.6		11.6		0.8		4.5		4.5		3.7		7.4		5.9		4.2	
Fines (<63 µm)	%	19.6		15.5		64.0		15.4		67.9		5.1		10.7		72.1		4.0		4.0		5.2	
Metals (USEPA 6010B Method)																							
Arsenic	mg/kg	10	U	9	U	20		10	U	20	U	20	U	26		20		9	U	9	U	10	U
Cadmium	mg/kg	1.2		1.4		1.6		3.1		7.6		1.6		1.8		1.4		1.6		1.8		0.7	
Chromium	mg/kg	28		56.9		51		78		105		33		60.4		35		47.5		57.2		27	
Copper	mg/kg	117		191		184		90.1		143		112		102		148		75.9		74.2		27	
Lead	mg/kg	56		137		187		103		181		156		243		51		174		54		7	
Mercury[2]	mg/kg	0.1	U	0.11		0.3		0.6		1.4		0.2		0.43		0.15		0.06	U	0.08	U	0.08	U
Silver	mg/kg	0.8	U	0.5	U	0.8	U	5.4		10		1	U	2.8		0.7	U	0.5	U	0.5	U	0.6	U
Zinc	mg/kg	384		651		379		210		377		781		250		299		536		668		102	
PCBs (USEPA 8082 Method)																							
Aroclor 1016	µg/kg	32	U	33	U	33	U	33	U	32	U	32	U	32	U	63	U	31	U	32	UJ	33	U
Aroclor 1221	µg/kg	32	U	33	U	33	U	33	U	32	U	32	U	32	U	63	U	31	U	32	UJ	33	U
Aroclor 1232	µg/kg	32	U	33	U	33	U	33	U	32	U	32	U	32	U	63	U	31	U	32	UJ	33	U
Aroclor 1242	µg/kg	32	U	33	U	33	U	33	U	32	U	32	U	32	U	63	U	31	U	32	UJ	33	U
Aroclor 1248	µg/kg	32	U	33	U	33	U	82	U	48	U	32	U	32	U	63	U	31	U	32	UJ	33	U
Aroclor 1254	µg/kg	32	U	39		51		200		160		49		250		93		31	U	32	UJ	33	U
Aroclor 1260	µg/kg	32	U	33	U	33	U	130		120		32	U	150		63	U	31	U	32	UJ	33	U
PCBs (Total)	µg/kg	32	U	39		51		330		280		49		400		93		31	U	32	UJ	33	U
SVOCs (USEPA 8270D Method)																							
2,4,5-Trichlorophenol	µg/kg	1400	U	1300	U	960	U	980	U	920	U	970	U	900	U	980	U	990	U	950	U	320	U
2,4,6-Trichlorophenol	µg/kg	1400	U	1300	U	960	U	980	U	920	U	970	U	900	U	980	U	990	U	950	U	320	U
2,4-Dichlorophenol	µg/kg	1400	U	1300	U	960	U	980	U	920	U	970	U	900	U	980	U	990	U	950	U	320	U
2,4-Dimethylphenol	µg/kg	280	U	260	U	190	U	200	U	180	U	200	U	180	U	200	U	200	U	190	U	64	U
2,4-Dinitrophenol	µg/kg	2800	U	2600	U	1900	U	2000	U	1800	U	2000	U	1800	U	2000	U	2000	U	1900	U	640	U
2-Chloronaphthalene	µg/kg	280	U	260	U	190	U	200	U	180	U	200	U	180	U	200	U	200	U	190	U	64	U
2-Chlorophenol	µg/kg	280	U	260	U	190	U	200	U	180	U	200	U	180	U	200	U	200	U	190	U	64	U
2-Methylphenol	µg/kg	280	U	260	U	190	U	200	U	180	U	200	U	180	U	200	U	200	U	190	U	64	U
2-Nitrophenol	µg/kg	1400	U	1300	U	960	U	980	U	920	U	970	U	900	U	980	U	990	U	950	U	320	U
4,6-Dinitro-o-cresol	µg/kg	2800	U	2600	U	1900	U	2000	U	1800	U	2000	U	1800	U	2000	U	2000	U	1900	U	640	U
4-Chloro-3-methylphenol	µg/kg	1400	U	1300	U	960	U	980	U	920	U	970	U	900	U	980	U	990	U	950	U	320	U
4-Methylphenol	µg/kg	280	U	260	U	380		200	U	180	U	200	U	180	U	200	U	200	U	190	U	86	U
4-Nitrophenol	µg/kg	1400	U	1300	U	960	U	980	U	920	U	970	U	900	U	980	U	990	U	950	U	320	U
Benzoic acid	µg/kg	2800	U	2600	U	1900	U	2000	U	1800	U	2000	U	1800	U	2000	U	2000	U	1900	U	640	U
Benzyl alcohol	µg/kg	1400	U	1300	U	960	U	980	U	920	U	970	U	900	U	980	U	6400		950	U	320	U
bis(2-Chloroethoxy)methane	µg/kg	280	U	260	U	190	U	200	U	180	U	200	U	180	U	200	U	200	U	190	U	64	U
bis-Chloroisopropyl ether	µg/kg	280	U	260	U	190	U	200	U	180	U	200	U	180	U	200	U	200	U	190	U	64	U
Carbazole	µg/kg	280	U	260	U	190	U	680		180	U	200	U	270		200	U	200	U	190	U	64	U
Dibenzofuran	µg/kg	280	U	260	U	210		320		180	U	200	U	180	U	200	U	200	U	190	U	64	U
Hexachlorobutadiene	µg/kg	280	U	260	U	190	U	200	U	180	U	200	U	180	U	200	U	200	U	190	U	64	U
Hexachlorocyclopentadiene	µg/kg	1400	U	1300	U	960	U	980	U	920	U	970	U	900	U	980	U	990	U	950	U	320	U
Isophorone	µg/kg	280	U	260	U	190	U	200	U	180	U	200	U	180	U	200	U	200	U	190	U	64	U
N-Nitroso-di-n-propylamine	µg/kg	1400	U	1300	U	960	U	980	U	920	U	970	U	900	U	980	U	990	U	950	U	320	U
N-Nitrosodiphenylamine	µg/kg	280	U	260	U	190	U	200	U	180	U	200	U	180	U	200	U	200	U	190	U	64	U
Pentachlorophenol	µg/kg	1400	U	1300	U	960	U	980	U	920	U	970	U	900	U	980	U	990	U	950	U	320	U
Phenol	µg/kg	280	U	260	U	190	U	200	U	180	U	200	U	180	U	200	U	200	U	190	U	64	U
LPAHs																							
Naphthalene	µg/kg	280	U	260	U	430		2400		360		300		1400		200	U	200	U	190	U	64	U
Acenaphthylene	µg/kg	280	U	260	U	630		4900		960		410		1700		260		200	U	190	U	64	U
Acenaphthene	µg/kg	280	U	260	U	190	U	1800		180	U	200	U	180	U	200	U	200	U	190	U	64	U
Fluorene	µg/kg	280	U	260	U	210		3000		180	U	200	U	480		200	U	200	U	190	U	64	U
Phenanthrene	µg/kg	380		820		1700		33000		1300		1700		4800		690		220		190	U	76	
Anthracene	µg/kg	280	U	260	U	430		10000		480		220		840		200	U	200	U	190	U	64	U
1-Methylnaphthalene	µg/kg	280	U	260	U	340		870		180	U	200	U	300		200	U	200	U	190	U	64	U
2-Methylnaphthalene	µg/kg	280	U	260	U	420		1200		180	U	200	U	320		200	U	200	U	190	U	64	U

Table 2.1
Gas Works Vicinity Catch Basin Solids Analytical Results

		Waterway #20						Waterway #19														Lake Union	
								Outfall A				Outfall B		Outfall C		Outfall D		Waterway #19				Outfall F	
	Sampling Station	**SL 2**		**SL 3**		**SL 4**		**SL 7**		**SL 8**		**SL 9**		**SL 10**		**SL 11**		**SL 13**		**SL 13 DUP**		**SL 12**	
Analytes	**Units**	**Conc.**	**Qual.**	**Conc.**	**Qual.**	**Conc.**	**Qual.**	**Conc.**	**Qual.**	**Conc.**	**Qual.**	**Conc.**	**Qual.**	**Conc.**	**Qual.**	**Conc.**	**Qual.**	**Conc.**	**Qual.**	**Conc.**	**Qual.**	**Conc.**	**Qual.**
HPAHs																							
Fluoranthene	µg/kg	*780*		*1500*		*3000*		*93000*		*4200*		*2900*		*7200*		*1300*		*400*		*440*		*200*	
Pyrene	µg/kg	*620*		*1100*		*2800*		*140000*		*5700*		*3800*		*11000*		*1600*		*420*		*370*		*260*	
Benzo(a)anthracene	µg/kg	280	U	*470*		*1300*		*30000*		*2000*		*880*		*2800*		*410*		200	U	190	U	*84*	
Chrysene	µg/kg	*550*		*780*		*1700*		*37000*		*2800*		*1600*		*4100*		*640*		*320*		*320*		*96*	
Benzo(b)fluoranthene	µg/kg	280	U	*730*		*2000*		*27000*		*4600*		*1300*		*5800*		*590*		*370*		*420*		*110*	
Benzo(k)fluoranthene	µg/kg	*470*		*560*		*1200*		*22000*		*2800*		*1600*		*3900*		*910*		*320*		*290*		*91*	
Benzofluoranthenes (total)	µg/kg	*470*		*1290*		*3200*		*49000*		*7400*		*2900*		*9700*		*1500*		*690*		*710*		*201*	
Benzo(a)pyrene	µg/kg	280	U	*490*		*1600*		*38000*		*3700*		*1300*		*5000*		*710*		200	U	*230*		*87*	
Benzo(g,h,i)perylene	µg/kg	280	U	260	U	*620*		*14000*		*1800*		*670*		*3000*		*440*		200	U	190	U	64	U
Indeno(1,2,3-cd)pyrene	µg/kg	280	U	260	U	*540*		*12000*		*1400*		*540*		*2200*		*310*		200	U	190	U	64	U
Dibenzo(a,h)anthracene	µg/kg	280	U	260	U	190	U	*2500*		*310*		200	U	*240*		200	U	200	U	190	U	64	U
Total PAH	µg/kg	*2800*		*6450*		*17620*		*458600*		*31010*		*16680*		*52260*		*7550*		*2050*		*2070*		*1004*	
Phthalates																							
bis(2-Ethylhexyl)phthalate	µg/kg	*12000*		*7800*		*1500*		*350*		*260*		*18000*		*3900*		*2000*		*7800*		*12000*		*250*	
Butyl benzyl phthalate	µg/kg	280	U	260	U	190	U	200	U	180	U	200	U	180	U	200	U	*260*		190	U	64	U
Di-n-butyl phthalate	µg/kg	280	U	260	U	190	U	200	U	180	U	200	U	180	U	200	U	*210*		*280*		64	U
Di-n-octyl phthalate	µg/kg	*880*		260	U	190	U	200	U	180	U	200	U	180	U	200	U	*300*		*460*		64	U
Diethylphthalate	µg/kg	280	U	260	U	190	U	200	U	180	U	200	U	180	U	200	U	200	U	190	U	64	U
Dimethyl phthalate	µg/kg	280	U	260	U	190	U	200	U	180	U	200	U	180	U	200	U	200	U	190	U	64	U
VOCs (USEPA 8270D Method)																							
1,2,4-Trichlorobenzene	µg/kg	280	U	260	U	190	U	200	U	180	U	200	U	180	U	200	U	200	U	190	U	64	U
1,2-Dichlorobenzene	µg/kg	280	U	260	U	190	U	200	U	180	U	200	U	180	U	200	U	200	U	190	U	64	U
1,3-Dichlorobenzene	µg/kg	280	U	260	U	190	U	200	U	180	U	200	U	180	U	200	U	200	U	190	U	64	U
1,4-Dichlorobenzene	µg/kg	280	U	260	U	190	U	200	U	180	U	200	U	180	U	200	U	200	U	190	U	64	U
2,4-Dinitrotoluene	µg/kg	1400	U	1300	U	960	U	980	U	920	U	970	U	900	U	980	U	990	U	950	U	320	U
2,6-Dinitrotoluene	µg/kg	1400	U	1300	U	960	U	980	U	920	U	970	U	900	U	980	U	990	U	950	U	320	U
2-Nitroaniline	µg/kg	1400	U	1300	U	960	U	980	U	920	U	970	U	900	U	980	U	990	U	950	U	320	U
3,3'-Dichlorobenzidine	µg/kg	1400	U	1300	U	960	U	980	U	920	U	970	U	900	U	980	U	990	U	950	U	320	U
3-Nitroaniline	µg/kg	1400	U	1300	U	960	U	980	U	920	U	970	U	900	U	980	U	990	U	950	U	320	U
4-Bromophenyl phenyl ether	µg/kg	280	U	260	U	190	U	200	U	180	U	200	U	180	U	200	U	200	U	190	U	64	U
4-Chloroaniline	µg/kg	1400	U	1300	U	960	U	980	U	920	U	970	U	900	U	980	U	990	U	950	U	320	U
4-Chlorophenyl phenyl ether	µg/kg	280	U	260	U	190	U	200	U	180	U	200	U	180	U	200	U	200	U	190	U	64	U
4-Nitroaniline	µg/kg	1400	U	1300	U	960	U	980	U	920	U	970	U	900	U	980	U	990	U	950	U	320	U
bis(2-Chloroethyl)ether	µg/kg	280	U	260	U	190	U	200	U	180	U	200	U	180	U	200	U	200	U	190	U	64	U
Hexachlorobenzene	µg/kg	280	U	260	U	190	U	200	U	180	U	200	U	180	U	200	U	200	U	190	U	64	U
Hexachloroethane	µg/kg	280	U	260	U	190	U	200	U	180	U	200	U	180	U	200	U	200	U	190	U	64	U
Nitrobenzene	µg/kg	280	U	260	U	190	U	200	U	180	U	200	U	180	U	200	U	200	U	190	U	64	U

Notes:
Italics Indicate detected concentrations.
1 Plumb Method.
2 USEPA 7471A Method.

Abbreviations:
Conc. Concentration
HPAH High molecular weight polycyclic aromatic hydrocarbon
LPAH Low molecular weight polycyclic aromatic hydrocarbon
PCB Polychlorinated biphenyl
Qual. Qualifier
SVOC Semivolatile organic compound
USEPA U.S. Environmental Protection Agency
VOC Volatile organic compound

Qualifiers:
U Indicates the compound was undetected at the reported concentration.

Gas Works Sediment Area

Initial Source Control Screening Investigation of Storm Drains

Figures

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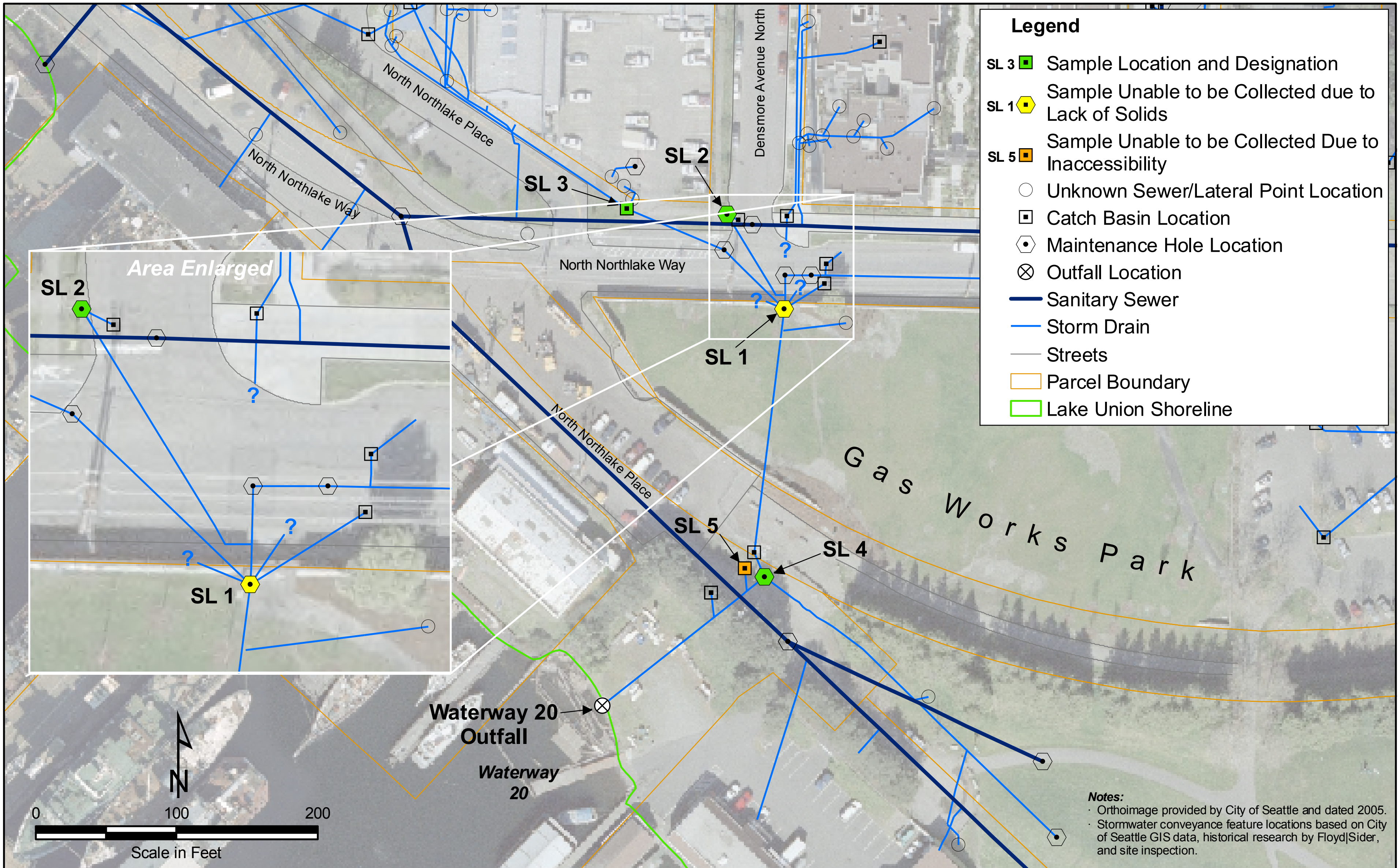
Initial Source Control Screening
Investigation of Storm Drains
Gas Works Park, Seattle, Washington

Figure 1.1
Vicinity Map

File: F:\projects\COS-GWSA\GIS\Task 06020\MXD\Ecology Review Draft March 2009\Figure 1.1 (Site Vicinity Map).mxd
3/24/2009



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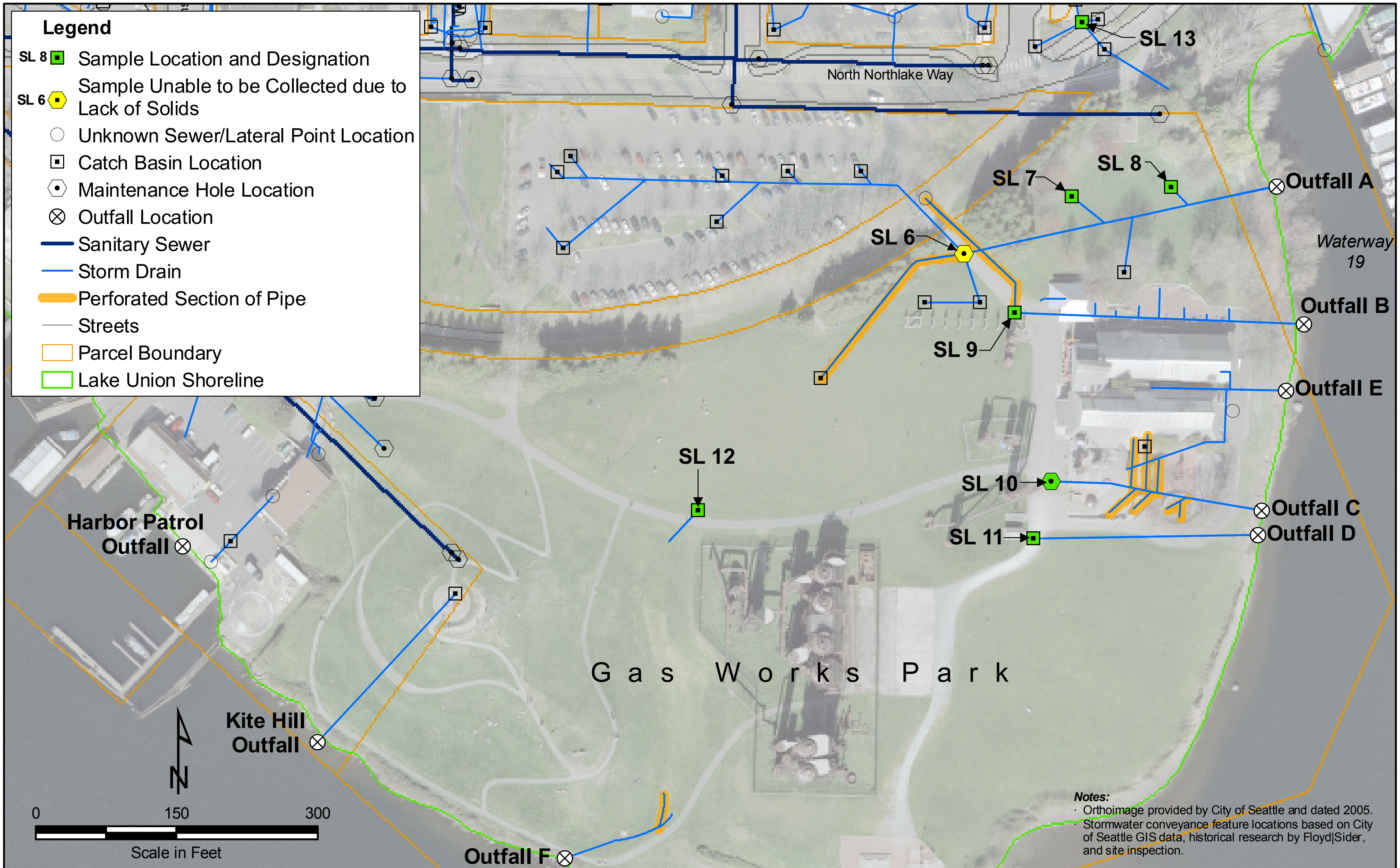
Initial Source Control Screening
Investigation of Storm Drains
Gas Works Park, Seattle, Washington

Figure 2.1
Solids Sample Locations - West Side

File: F:\projects\COS-GWSA\GIS\Task 06020\MXD\Ecology Review Draft March 2009\Figure 2.1 (Sediment Sample Locations - West Side).mxd
3/24/2009



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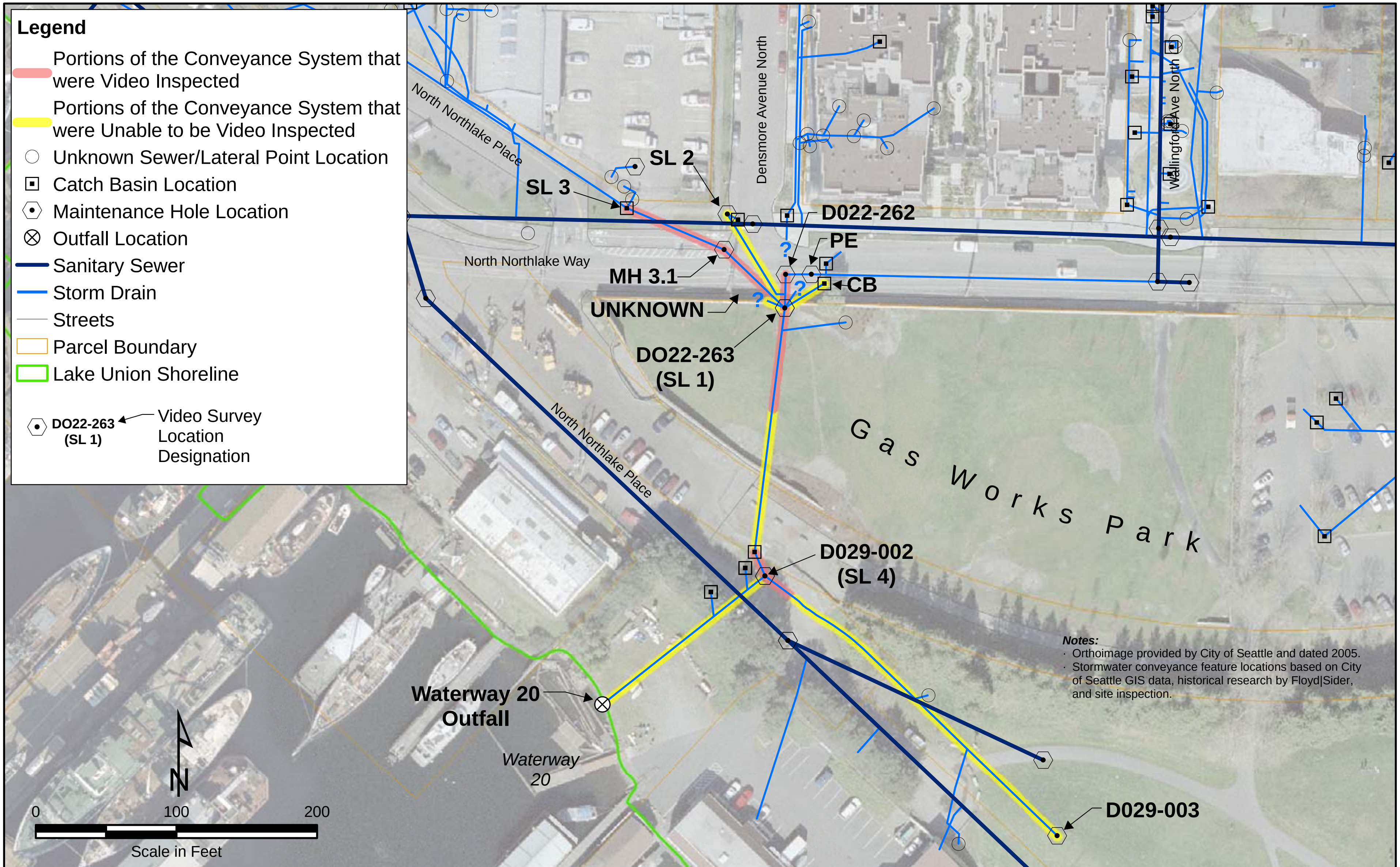
Initial Source Control Screening
Investigation of Storm Drains
Gas Works Park, Seattle, Washington

Figure 2.2
Solids Sample Locations -
East Side

File: F:\projects\COS-GWSA\GIS\Task 06020\MXD\Ecology Review Draft March 2009\Figure 2.2 (Sediment Sample Locations - East Side).mxd
3/24/2009



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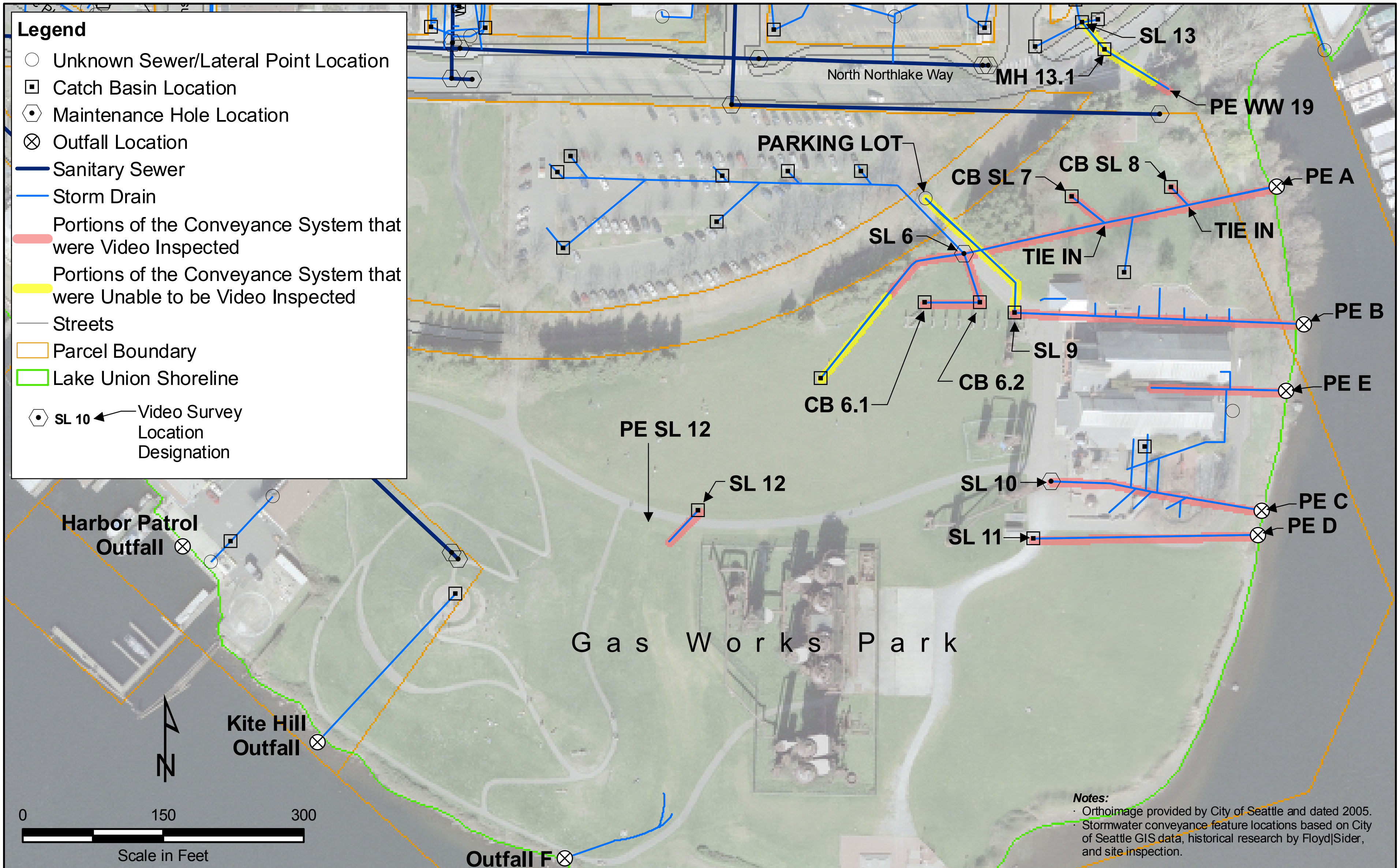
**Initial Source Control Screening
Investigation of Storm Drains
Gas Works Park, Seattle, Washington**

Figure 3.1
Video Inspection Locations - West Side

File: F:\projects\COS-GWSA\GIS\Task 06020\MXD\Ecology Review Draft March 2009\Figure 3.1 (Video Inspection Locations - West Side).mxd
3/27/2009



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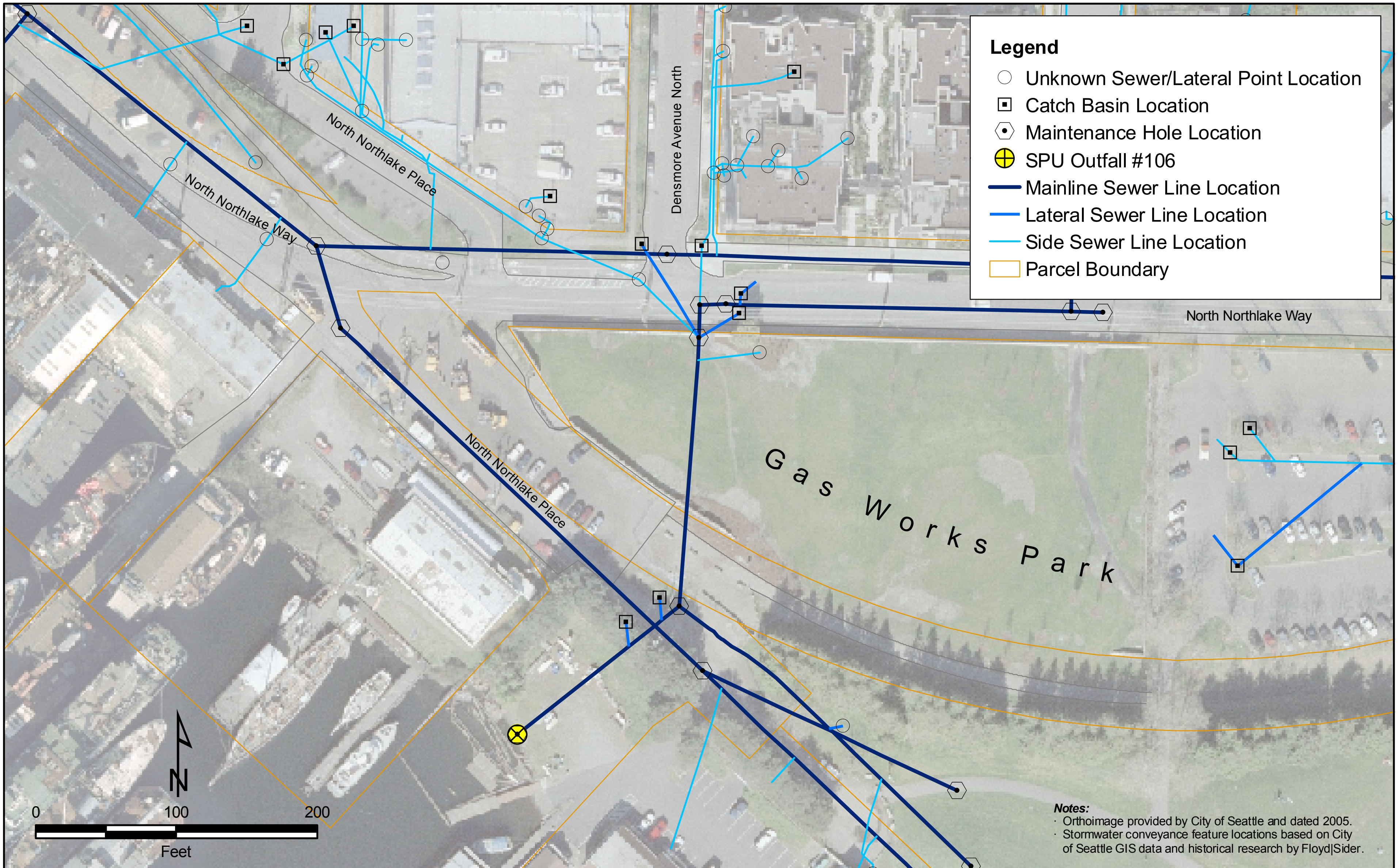
Initial Source Control Screening
Investigation of Storm Drains
Gas Works Park, Seattle, Washington

Figure 3.2
Video Inspection Locations - East Side

File: F:\projects\COS-GWSA\GIS\Task 06020\MXD\Ecology Review Draft March 2009\Figure 3.2 (Video Inspection Locations - East Side).mxd
3/24/2009



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Initial Source Control Screening
Investigation of Storm Drains
Gas Works Park, Seattle, Washington

Figure 3.3
Waterway #20 Drainage
Based on Inspection

File: F:\projects\COS-GWSA\GIS\Task 06020\MXD\Ecology Review Draft March 2009\Figure 3.3 (Waterway 20 Drainage Based on Inspection).mxd
3/24/2009

Gas Works Sediment Area

Initial Source Control Screening Investigation of Storm Drains

Appendix A
Video Inspection Reports

Bravo Environmental
6705 NE 175th St
Kenmore, WA 98028
Tel: 425-424-9000
Fax: 425-424-9002
E-mail: Al@Bravoenvironmental.com

Inspection Report / Inspection: COS-GWSA.06020

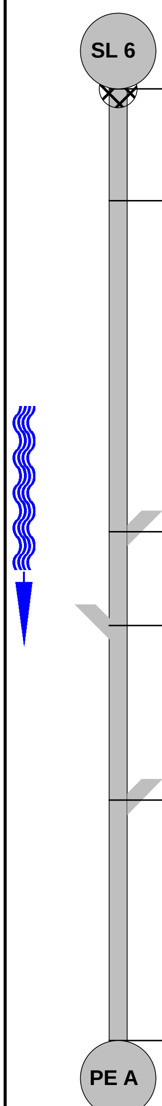
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
10/1/2008		**Dry**	**Al**		**1**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
T-007-083		**Seattle Parks**		**No Pre-Cleaning**	

Street123	**Gasworks Park**	Use of Sewer	**Stormwater**	Upstream MH	**SL 6**
City	**Seattle**	Drainage Area		Dowstream MH	**PE A**
Loc. details		Flow Control		Dir. of Survey	**Downstream**
Location Code		Length surveyed	**361.49 ft**	Section Length	**361.49 ft**

Purpose of Survey	**Routine Assessment**	Joint Length	
Year Laid		Dia./Height	**10 inch**
Year Rehabilitated		Material	**Concrete Segments (unbolted)**
Tape / Media No.	**GS-10.1.08**	Lining Method	

Add. Information :

1:875 **Position** **Observation** **Photo**



Position	Observation	Photo
0.00	Manhole, REMARK: SL 6	
42.50	Infiltration Stain, from 04 to 05 o'clock, within 8 inches of joint: YES	
168.10	Tap Factory Made, at 09 o'clock, 6", within 8 inches of joint: NO, REMARK: SL 7	
203.76	Tap Factory Made, at 03 o'clock, 6", within 8 inches of joint: NO	
270.24	Tap Factory Made, at 09 o'clock, 6", within 8 inches of joint: NO, REMARK: SL 8	
361.49	End of Pipe, REMARK: PE A	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**0000**	**0**	**0**	**0**	**0**	**0**	**0**

Bravo Environmental
6705 NE 175th St
Kenmore, WA 98028
Tel: 425-424-9000
Fax: 425-424-9002
E-mail: Al@Bravoenvironmental.com

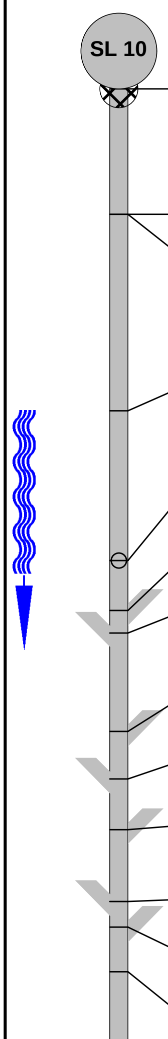
Inspection Report / Inspection: COS-GWSA.06020

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
10/1/2008		**Dry**	**Al**		**2**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
T-007-083		**Seattle Parks**		**No Pre-Cleaning**	

Street123	**Gasworks Park**	Use of Sewer	**Stormwater**	Upstream MH	**SL 10**
City	**Seattle**	Drainage Area		Dowstream MH	**PE C**
Loc. details	**Under sandy play area**	Flow Control		Dir. of Survey	**Downstream**
Location Code		Length surveyed	**249.79 ft**	Section Length	**249.79 ft**

Purpose of Survey	**Routine Assessment**	Joint Length	
Year Laid		Dia./Height	**10 inch**
Year Rehabilitated		Material	**Concrete Segments (unbolted)**
Tape / Media No.	**GS-10.1.08**	Lining Method	

Add. Information :



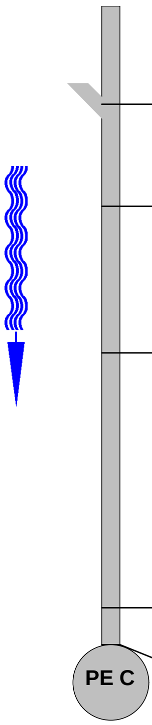
1:360 Position	Observation	Photo
0.00	Manhole, REMARK: SL 10	
19.54	Fracture Longitudinal, at 10 o'clock, within 8 inches of joint: YES	SL 10_PE C_100108_103546_A.JPG
19.64	Crack Multiple, from 09 to 01 o'clock, within 8 inches of joint: YES	SL 10_PE C_100108_103638_A.JPG
50.26	Surface Spalling, at 10 o'clock, within 8 inches of joint: NO	
73.73	Tap Factory Made Capped, at 12 o'clock, 6", within 8 inches of joint: NO	
81.48	Tap Factory Made Capped, at 09 o'clock, 6", within 8 inches of joint: NO	
85.01	Tap Factory Made Capped, at 03 o'clock, 6", within 8 inches of joint: NO	
100.42	Tap Factory Made, at 09 o'clock, 6", within 8 inches of joint: NO, REMARK: perf	
107.87	Tap Break-In, at 03 o'clock, 6", within 8 inches of joint: NO, REMARK: perf	
115.73	Tap Factory Made, at 09 o'clock, 6", within 8 inches of joint: NO, REMARK: perf	
127.01	Tap Factory Made, at 03 o'clock, 6", within 8 inches of joint: NO, REMARK: perf	
131.04	Tap Factory Made, at 09 o'clock, 6", within 8 inches of joint: NO, REMARK: perf	SL 10_PE C_100108_102203_A.JPG
137.99	Deposits Settled Gravel, 5 %of cross sectional area, from 05 to 07 o'clock, within 8 inches of joint: YES	

City : Seattle

Bravo Environmental
6705 NE 175th St
City : Kenmore, WA 98028
Tel: 425-424-9000
Fax: 425-424-9002
Email: Al@Bravoenvironmental.com

Inspection Report / Inspection: COS-GWSA.06020

Date :	Job number :	Weather :	Operator :	Counter :	Section name :
		Dry	**Al**	**2**	
Present :	**Vehicle :**	**Camera :**	**Preset :**	**Cleaned :**	**Rate :**
				No Pre-Cleaning	



1:360	Position	Observation	Photo
	165.39	Tap Factory Made, at 03 o'clock, 6", within 8 inches of joint: NO, REMARK: perf	
	181.30	Deposits Settled Gravel, 5 %of cross sectional area, from 05 to 07 o'clock, within 8 inches of joint: YES	
	204.26	Water Level, Sag in pipe, 5 %of cross sectional area	
	243.95	Deposits Settled Gravel, 10 %of cross sectional area, from 05 to 07 o'clock, within 8 inches of joint: YES, REMARK: at PE	
	249.79	End of Pipe, REMARK: 1 foot short	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
3200	**2400**	**6**	**8**	**14**	**3**	**2**	**2.33**

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Inspection photos / Inspection: COS-GWSA.06020

City :	Street :	Date :	Pipe Segment Reference :	Section No :
Seattle	**Gasworks Park**			**2**

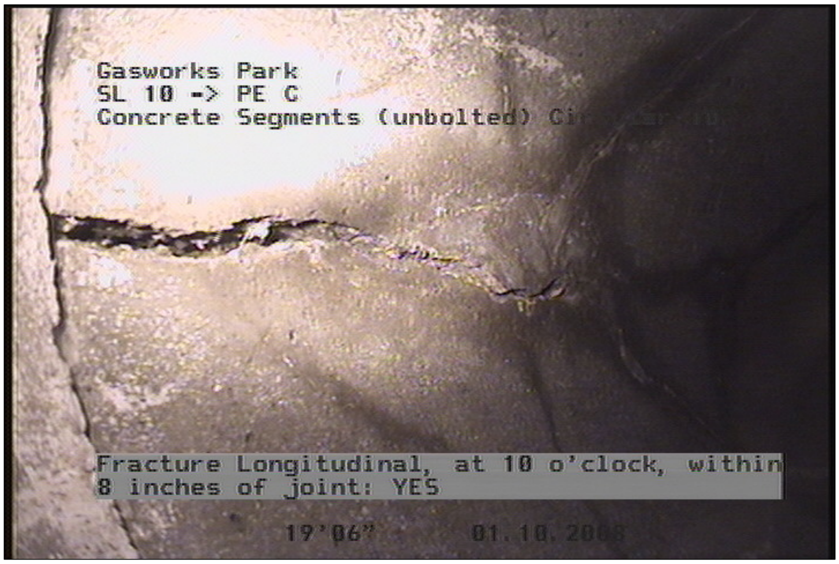

Photo: SL 10_PE C_100108_103546_A.JPG, VCR #: GS-10.1.08
19.54FT, Fracture Longitudinal, at 10 o'clock, within 8 inches of joint: YES

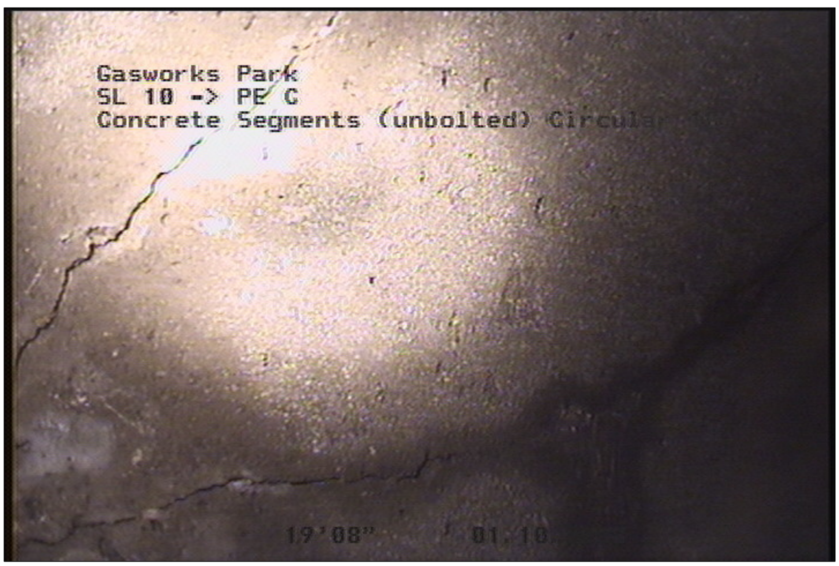

Photo: SL 10_PE C_100108_103638_A.JPG, VCR #: GS-10.1.08
19.64FT, Crack Multiple, from 09 to 01 o'clock, within 8 inches of joint: YES

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City :	Street :	Date :	Pipe Segment Reference :	Section No :
Seattle	**Gasworks Park**			**2**

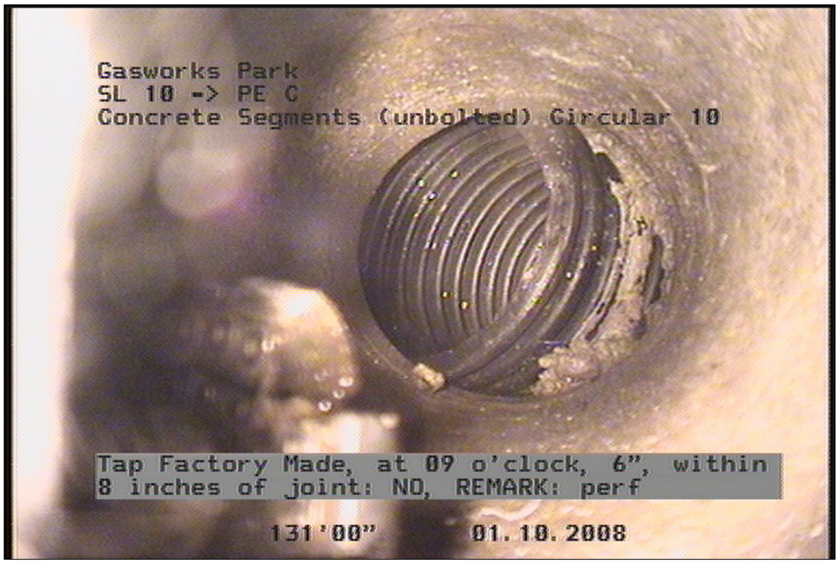

Photo: SL 10_PE C_100108_102203_A.JPG, VCR #: GS-10.1.08
131.04FT, Tap Factory Made, at 09 o'clock, 6", within 8 inches of joint: NO, REMARK: perf

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Inspection Report / Inspection: COS-GWSA.06020

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
10/1/2008		**Dry**	**Al**		**3**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
T-007-083		**Seattle Parks**		**No Pre-Cleaning**	

Street123	**Gasworks Park**	Use of Sewer	**Stormwater**	Upstream MH	**SL 11**
City	**Seattle**	Drainage Area		Dowstream MH	**PE D**
Loc. details		Flow Control		Dir. of Survey	**Downstream**
Location Code		Length surveyed	**258.45 ft**	Section Length	**258.45 ft**

Purpose of Survey	**Routine Assessment**	Joint Length	
Year Laid		Dia./Height	**6 inch**
Year Rehabilitated		Material	**Ductile Iron Pipe**
Tape / Media No.	**GS-10.1.08**	Lining Method	

Add. Information :

1:624	Position	Observation	Photo
SL 11	0.00	Catch Basin, REMARK: SL 11	
	16.22	Deposits Settled Fine, 5 %of cross sectional area, from 05 to 07 o'clock, within 8 inches of joint: NO, Start	
	36.16	Material Change, Polyvinyl Chloride (PVC), REMARK: PVC	
	36.66	Alignment Right, 25 %, REMARK: 22 degree	
	59.63	Deposits Settled Fine, 5 %of cross sectional area, from 05 to 07 o'clock, within 8 inches of joint: NO, Finish	
PE D	258.45	End of Pipe, REMARK: PE D	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**4122**	**0**	**8**	**8**	**0**	**2.67**	**2.67**

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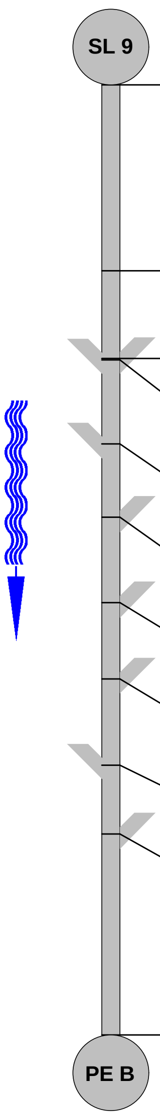
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
10/1/2008		**Dry**	**Al**		**4**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
T-007-083		**Seattle Parks**		**No Pre-Cleaning**	

Street123	**Gasworks Park**	Use of Sewer	**Stormwater**	Upstream MH	**SL 9**
City	**Seattle**	Drainage Area		Dowstream MH	**PE B**
Loc. details		Flow Control		Dir. of Survey	**Downstream**
Location Code		Length surveyed	**303.47 ft**	Section Length	**303.47 ft**

Purpose of Survey	**Routine Assessment**	Joint Length	
Year Laid		Dia./Height	**6 inch**
Year Rehabilitated		Material	**Concrete Segments (unbolted)**
Tape / Media No.	**GS-10.1.08**	Lining Method	

Add. Information :

1:736	Position	Observation	Photo
	0.00	Catch Basin, REMARK: SL 9	
	59.53	Water Level, Sag in pipe, 10 %of cross sectional area	
	87.53	Tap Factory Made, at 09 o'clock, 4", within 8 inches of joint: NO	
	87.83	Tap Factory Made, at 03 o'clock, 4", within 8 inches of joint: NO	
	114.72	Tap Factory Made, at 03 o'clock, 6", within 8 inches of joint: NO	
	138.19	Tap Factory Made, at 10 o'clock, 4", within 8 inches of joint: NO	
	165.49	Tap Factory Made, at 10 o'clock, 6", within 8 inches of joint: NO	
	189.76	Tap Factory Made, at 10 o'clock, 6", within 8 inches of joint: NO	
	217.26	Tap Factory Made, at 03 o'clock, 6", within 8 inches of joint: NO	
	239.32	Tap Factory Made, at 10 o'clock, 4", within 8 inches of joint: NO	
	303.47	End of Pipe, REMARK: PE B	



QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**2100**	**0**	**2**	**2**	**0**	**2**	**2**

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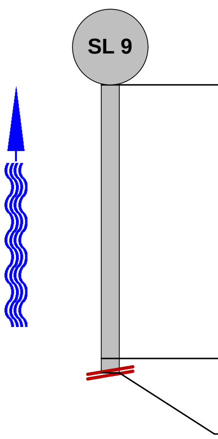
Inspection Report / Inspection: COS-GWSA.06020

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
10/1/2008		**Dry**	**Al**		**5**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
T-007-083		**Seattle Parks**		**No Pre-Cleaning**	

Street123	**Gasworks Park**	Use of Sewer	**Stormwater**	Upstream MH	**SL 9**
City	**Seattle**	Drainage Area		Dowstream MH	**Parking lot**
Loc. details	**Perf along side walk**	Flow Control		Dir. of Survey	**Upstream**
Location Code		Length surveyed	**2.00 ft**	Section Length	**2.00 ft**

Purpose of Survey	**Routine Assessment**	Joint Length	
Year Laid		Dia./Height	**6 inch**
Year Rehabilitated		Material	**Polyethylene**
Tape / Media No.	**GS-10.1.08**	Lining Method	

Add. Information :



1:16	Position	Observation	Photo
	0.00	Catch Basin, REMARK: SL 9	
	1.91	Broken Soil Visible, from 12 to 12 o'clock, within 8 inches of joint: NO	SL 9_Parking lot_100108_120211_A.JPG
	2.00	Survey Abandoned, REMARK:	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
5100	0000	5	0	5	5	0	5

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Inspection photos / Inspection: COS-GWSA.06020

City :	Street :	Date :	Pipe Segment Reference :	Section No :
Seattle	**Gasworks Park**			**5**

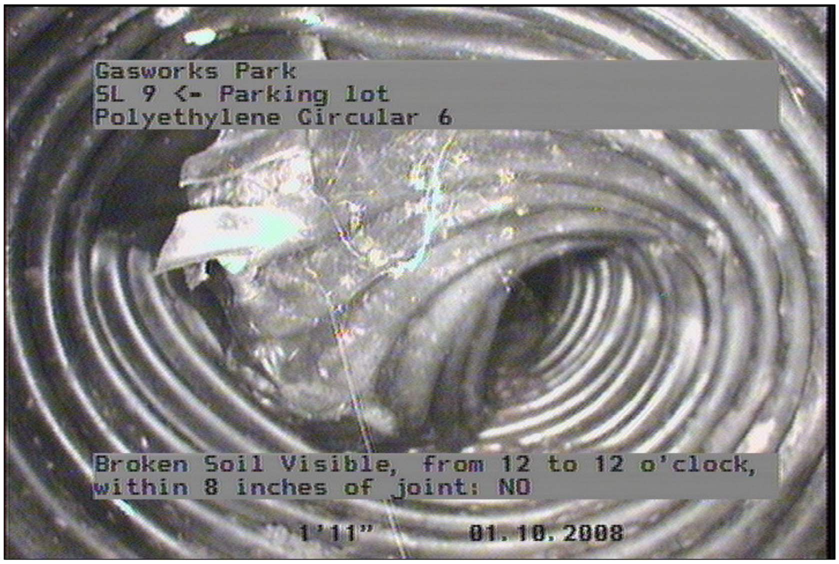

Photo: SL 9_Parking lot_100108_120211_A.JPG, VCR #: GS-10.1.08
1.91FT, Broken Soil Visible, from 12 to 12 o'clock, within 8 inches
of joint: NO

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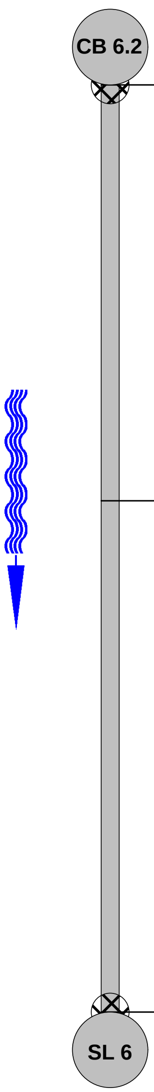
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
10/1/2008		**Dry**	**Al**		**6**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
T-007-083		**Seattle Parks**		**No Pre-Cleaning**	

Street123	**Gasworks Park**	Use of Sewer	**Stormwater**	Upstream MH	**CB 6.2**
City	**Seattle**	Drainage Area		Dowstream MH	**SL 6**
Loc. details		Flow Control		Dir. of Survey	**Downstream**
Location Code		Length surveyed	**57.92 ft**	Section Length	**57.92 ft**

Purpose of Survey	**Routine Assessment**	Joint Length	
Year Laid		Dia./Height	**6 inch**
Year Rehabilitated		Material	**Concrete Segments (unbolted)**
Tape / Media No.	**GS-10.1.08**	Lining Method	

Add. Information :

1:144	Position	Observation	Photo
	0.00	Manhole, REMARK: CB 6.2	
	25.99	Water Level, 10 %of cross sectional area, REMARK:	
	57.92	Manhole, REMARK: SL 6	



QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**2100**	**0**	**2**	**2**	**0**	**2**	**2**

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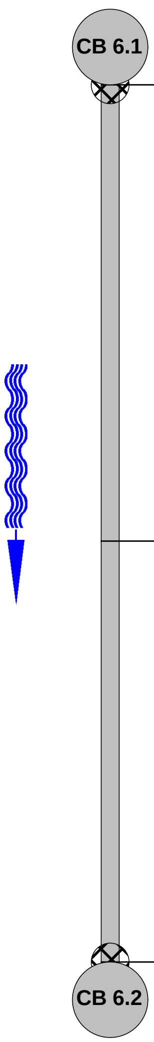
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
10/1/2008		**Dry**	**Al**		**7**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
T-007-083		**Seattle Parks**		**No Pre-Cleaning**	

Street123	**Gasworks Park**	Use of Sewer	**Stormwater**	Upstream MH	**CB 6.1**
City	**Seattle**	Drainage Area		Dowstream MH	**CB 6.2**
Loc. details		Flow Control		Dir. of Survey	**Downstream**
Location Code		Length surveyed	**60.94 ft**	Section Length	**60.94 ft**

Purpose of Survey	**Routine Assessment**	Joint Length	
Year Laid		Dia./Height	**6 inch**
Year Rehabilitated		Material	**Concrete Segments (unbolted)**
Tape / Media No.	**GS-10.1.08**	Lining Method	

Add. Information :

1:160	Position	Observation	Photo
	0.00	Manhole, REMARK: CB 6.1	
	31.73	Water Level, 10 %of cross sectional area	
	60.94	Manhole, REMARK: CB 6.2	



QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**2100**	**0**	**2**	**2**	**0**	**2**	**2**

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Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
10/1/2008		**Dry**	**Al**		**8**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
T-007-083		**Seattle Parks**		**No Pre-Cleaning**	

Street123	**Gasworks Park**	Use of Sewer	**Stormwater**	Upstream MH	**SL 6**
City	**Seattle**	Drainage Area		Dowstream MH	**Perf pipe**
Loc. details		Flow Control		Dir. of Survey	**Upstream**
Location Code		Length surveyed	**104.95 ft**	Section Length	**104.95 ft**

Purpose of Survey	**Routine Assessment**	Joint Length	
Year Laid		Dia./Height	**6 inch**
Year Rehabilitated		Material	**Polyethylene**
Tape / Media No.	**GS-10.1.08**	Lining Method	

Add. Information :

1:256	Position	Observation	Photo
SL 6	0.00	Manhole, REMARK: CL 6	
	4.94	Camera Underwater	
	9.37	Obstacles Rocks, 20 %of cross sectional area, from 05 to 07 o'clock, REMARK: Rock	
	89.94	Roots Fine Barrell, from 08 to 04 o'clock, within 8 inches of joint: NO	
	104.95	Roots Fine Barrell, from 12 to 12 o'clock, within 8 inches of joint: YES	SL 6_Perf pipe_100108_141203_A.JPG
	104.95	Roots Medium Barrell, from 12 to 12 o'clock, 45 %, within 8 inches of joint: YES	
	104.95	Survey Abandoned, REMARK: roots	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**4231**	**0**	**15**	**15**	**0**	**3**	**3**

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City :	Street :	Date :	Pipe Segment Reference :	Section No :
Seattle	**Gasworks Park**			**8**

Photo: SL 6_Perf pipe_100108_141203_A.JPG, VCR #: GS-10.1.08
104.95FT, Roots Fine Barrell, from 12 to 12 o'clock, within 8
inches of joint: YES

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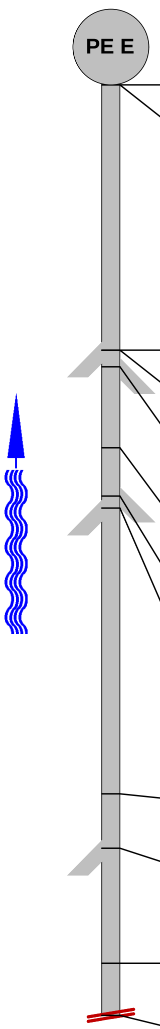
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
10/1/2008		**Dry**	**Al**		**9**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
T-007-083		**Seattle Parks**		**No Pre-Cleaning**	

Street123	**Gasworks Park**	Use of Sewer	**Stormwater**	Upstream MH	**PE E**
City	**Seattle**	Drainage Area		Dowstream MH	**Play barn**
Loc. details		Flow Control		Dir. of Survey	**Upstream**
Location Code		Length surveyed	**155.11 ft**	Section Length	**155.11 ft**

Purpose of Survey	**Routine Assessment**	Joint Length	
Year Laid		Dia./Height	**6 inch**
Year Rehabilitated		Material	**Concrete Segments (unbolted)**
Tape / Media No.	**GS-10.1.08**	Lining Method	

Add. Information :



1:384 Position	Observation	Photo
0.00	End of Pipe, REMARK: PE E	
0.00	Deposits Settled Fine, 10 %of cross sectional area, from 05 to 07 o'clock, within 8 inches of joint: YES, Start	
44.22	Deposits Settled Fine, 10 %of cross sectional area, from 05 to 07 o'clock, within 8 inches of joint: YES, Finish	
44.22	Tap Factory Made, at 03 o'clock, 6", within 8 inches of joint: YES	
47.04	Tap Factory Made, at 09 o'clock, 6", within 8 inches of joint: NO	
60.43	Deposits Attached Encrustation, 5 %of cross sectional area, from 08 to 10 o'clock, within 8 inches of joint: YES	
68.49	Tap Factory Made, at 10 o'clock, 6", within 8 inches of joint: NO, REMARK: possible capped	
70.61	Tap Break-In Intruding, at 03 o'clock, 4", 1", within 8 inches of joint: NO	
118.15	Deposits Settled Fine, 10 %of cross sectional area, from 05 to 07 o'clock, within 8 inches of joint: YES	
127.31	Tap Factory Made, at 02 o'clock, 4", within 8 inches of joint: NO	
146.45	Obstacles Pipe Material, 40 %of cross sectional area, from 03 to 09 o'clock	PE E_Play barn_100108_151106_A.JPG
155.11	Survey Abandoned, REMARK: pipe material in invert	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**5125**	**0**	**15**	**15**	**0**	**2.5**	**2.5**

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Inspection photos / Inspection: COS-GWSA.06020

City :	Street :	Date :	Pipe Segment Reference :	Section No :
Seattle	**Gasworks Park**			**9**

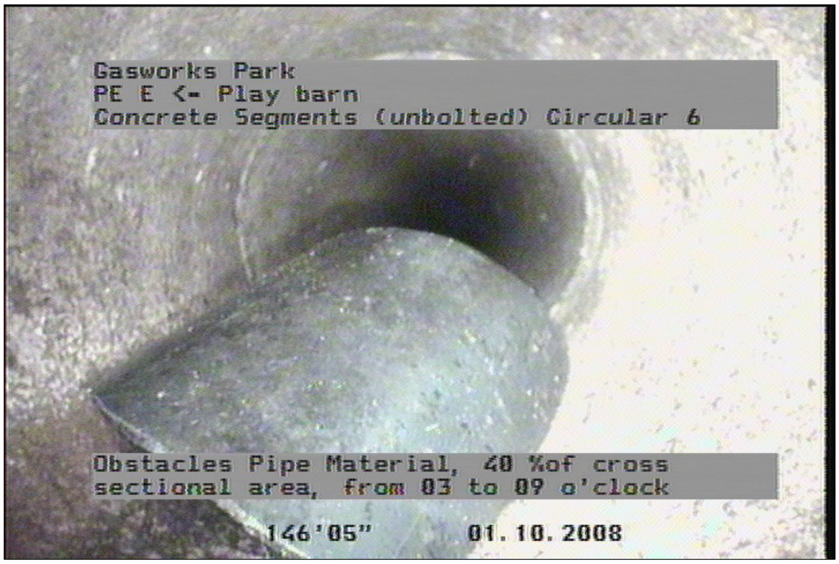

Photo: PE E_Play barn_100108_151106_A.JPG, VCR #: GS-10.1.08
146.45FT, Obstacles Pipe Material, 40 %of cross sectional area, from 03 to 09 o'clock

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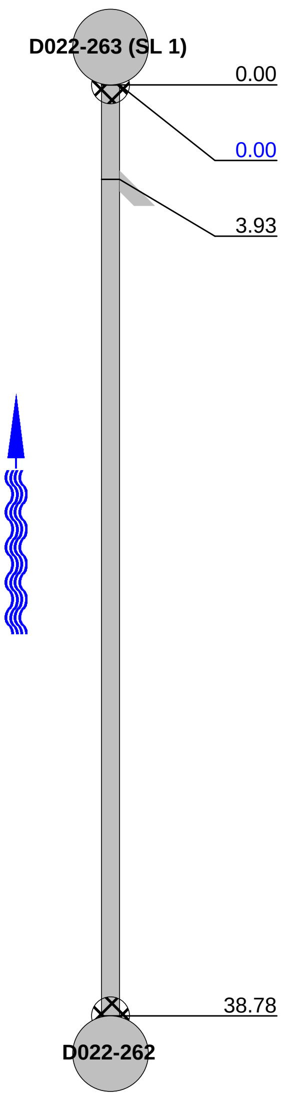
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
10/2/2008		**Dry**	**Al**		**10**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
T-007-083		**Seattle Parks**		**No Pre-Cleaning**	

Street123	**Gasworks Park**	Use of Sewer	**Stormwater**	Upstream MH	**D022-263 (SL 1)**
City	**Seattle**	Drainage Area		Dowstream MH	**D022-262**
Loc. details		Flow Control		Dir. of Survey	**Upstream**
Location Code		Length surveyed	**38.78 ft**	Section Length	**38.78 ft**

Purpose of Survey	**Routine Assessment**	Joint Length	
Year Laid		Dia./Height	**12 inch**
Year Rehabilitated		Material	**Ductile Iron Pipe**
Tape / Media No.	**GS-10.1.08**	Lining Method	

Add. Information :

1:96	Position	Observation	Photo
D022-263 (SL 1)	0.00	Manhole, REMARK: D022-263	
	0.00	Deposits Settled Other, 5 %of cross sectional area, from 10 to 02 o'clock, within 8 inches of joint: YES, REMARK: evidence of surcharge	
	3.93	Tap Factory Made Active, at 09 o'clock, 6", within 8 inches of joint: NO	
	38.78	Manhole, REMARK: D022-262	
D022-262			



QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**2100**	**0**	**2**	**2**	**0**	**2**	**2**

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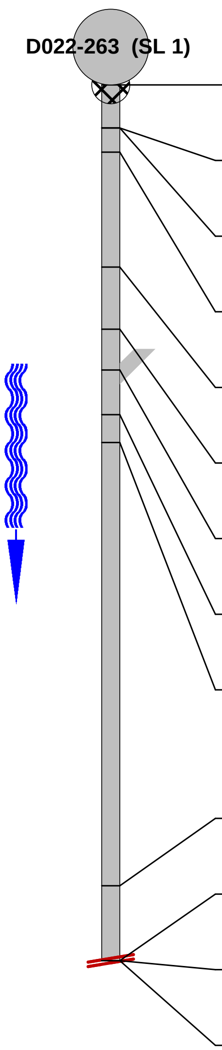
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
10/2/2008		**Light Rain**	**Al**		**11**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
T-007-083		**Seattle Parks**		**No Pre-Cleaning**	

Street123	**Gasworks Park**	Use of Sewer	**Stormwater**	Upstream MH	**D022-263 (SL 1)**
City	**Seattle**	Drainage Area		Dowstream MH	**D029-002 (SL 4)**
Loc. details		Flow Control		Dir. of Survey	**Downstream**
Location Code		Length surveyed	**66.88 ft**	Section Length	**66.88 ft**

Purpose of Survey	**Routine Assessment**	Joint Length	
Year Laid		Dia./Height	**8 inch**
Year Rehabilitated		Material	**Vitrified Clay Pipe**
Tape / Media No.	**GS-10.1.08**	Lining Method	

Add. Information :



1:176	Position	Observation	Photo
D022-263 (SL 1)	0.00	Manhole, REMARK: D022-623	
	3.32	Deposits Settled Other, 5 %of cross sectional area, from 11 to 01 o'clock, within 8 inches of joint: YES, REMARK: evidence of surcharge	
	3.32	Infiltration Stain, from 07 to 09 o'clock, within 8 inches of joint: NO	
	5.14	Infiltration Stain, from 07 to 09 o'clock, within 8 inches of joint: YES	
	13.90	Material Change, Polyvinyl Chloride (PVC), REMARK:	
	18.63	Material Change, Vitrified clay pipe, REMARK:	
	21.76	Tap Factory Made Defective, at 09 o'clock, 6", within 8 inches of joint: NO, REMARK: Debris	D022-263 (SL 1)_D029-002 (SL 4)_100208_092533_A.JPG
	25.18	Infiltration Stain, from 07 to 09 o'clock, within 8 inches of joint: NO	
	27.30	Infiltration Stain, from 03 to 06 o'clock, within 8 inches of joint: NO	
	61.14	Crack Circumferential, from 02 to 05 o'clock, within 8 inches of joint: YES	
	66.88	Material Change, Steel pipe, REMARK:	D022-263 (SL 1)_D029-002 (SL 4)_100208_093301_A.JPG
	66.88	Joint Offset Medium, REMARK:	
	66.88	Survey Abandoned, REMARK: at change/offset	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
1200	**2200**	**2**	**4**	**6**	**1**	**2**	**1.5**

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Inspection photos / Inspection: COS-GWSA.06020

City :	Street :	Date :	Pipe Segment Reference :	Section No :
Seattle	**Gasworks Park**			**11**

Photo: D022-263 (SL 1)_D029-002 (SL 4)_100208_092533_A.JPG,
VCR #: GS-10.1.08
21.76FT, Tap Factory Made Defective, at 09 o'clock, 6", within 8 inches of joint: NO, REMARK: Debris

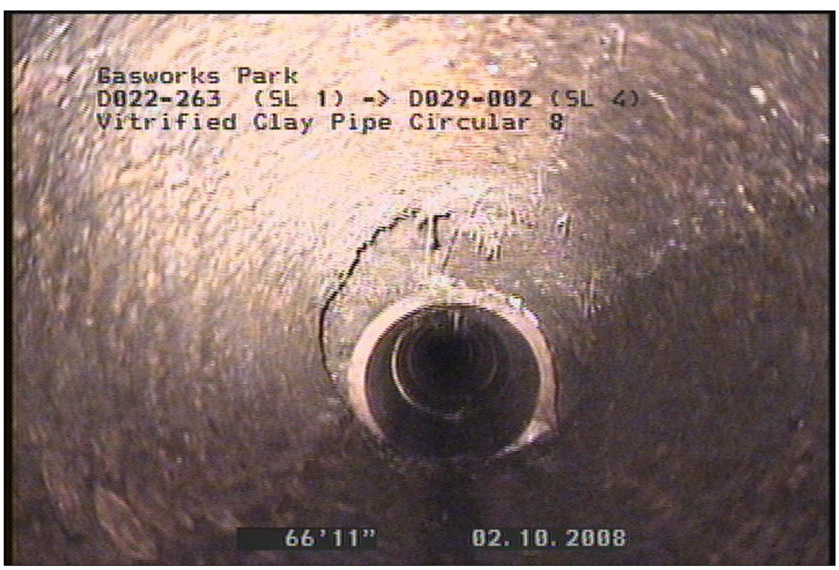

Photo: D022-263 (SL 1)_D029-002 (SL 4)_100208_093301_A.JPG,
VCR #: GS-10.1.08
66.88FT, Material Change, Steel pipe, REMARK:

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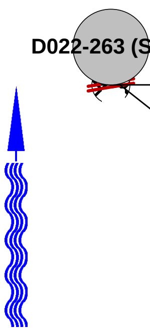
Inspection Report / Inspection: COS-GWSA.06020

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
10/2/2008		**Light Rain**	**Al**		**12**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
T-007-083		**Seattle Parks**		**No Pre-Cleaning**	

Street123	**Gasworks Park**	Use of Sewer	**Stormwater**	Upstream MH	**D022-263 (SL1)**
City	**Seattle**	Drainage Area		Dowstream MH	**SL 3**
Loc. details		Flow Control		Dir. of Survey	**Upstream**
Location Code		Length surveyed	**0.00 ft**	Section Length	**0.00 ft**

Purpose of Survey	**Routine Assessment**	Joint Length	
Year Laid		Dia./Height	**6 inch**
Year Rehabilitated		Material	**Vitrified Clay Pipe**
Tape / Media No.	**GS-10.1.08**	Lining Method	

Add. Information :



1:16	Position	Observation	Photo
D022-263 (SL1)			
	0.00	Manhole, REMARK:	
	0.00	Survey Abandoned, REMARK: Debris	D022-263 (SL1)_SL 3_100208_095549_A.JPG

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**0000**	**0**	**0**	**0**	**0**	**0**	**0**

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Inspection photos / Inspection: COS-GWSA.06020

City :	Street :	Date :	Pipe Segment Reference :	Section No :
Seattle	**Gasworks Park**			**12**

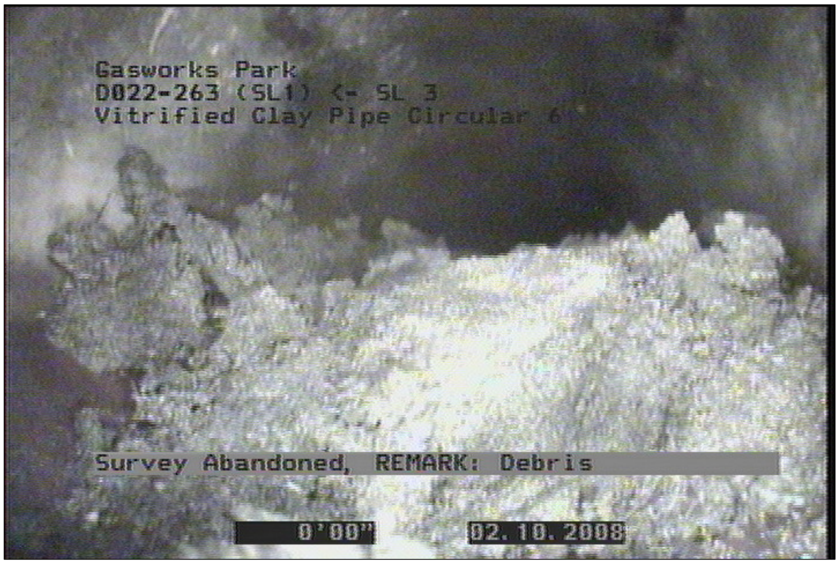

Photo: D022-263 (SL1)_SL 3_100208_095549_A.JPG, VCR #: GS-10.1.08
0FT, Survey Abandoned, REMARK: Debris

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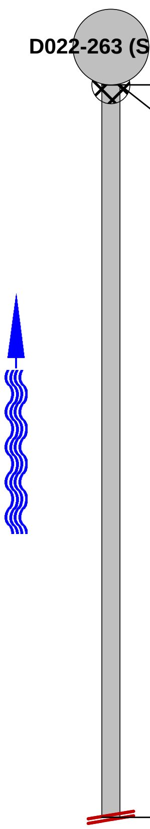
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
10/2/2008		**Light Rain**	**Al**		**13**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
T-007-083		**Seattle Parks**		**No Pre-Cleaning**	

Street123	**Gasworks Park**	Use of Sewer	**Stormwater**	Upstream MH	**D022-263 (SL 1)**
City	**Seattle**	Drainage Area		Dowstream MH	**CB**
Loc. details		Flow Control		Dir. of Survey	**Upstream**
Location Code		Length surveyed	**10.17 ft**	Section Length	**10.17 ft**

Purpose of Survey	**Routine Assessment**	Joint Length	
Year Laid		Dia./Height	**6 inch**
Year Rehabilitated		Material	**Vitrified Clay Pipe**
Tape / Media No.	**GS-10.1.08**	Lining Method	

Add. Information :

1:32	Position	Observation	Photo
	0.00	Manhole, REMARK: D022-263	
	0.00	Deposits Settled Fine, 10 %of cross sectional area, from 05 to 07 o'clock, within 8 inches of joint: YES	
	10.17	Survey Abandoned, REMARK: Debris	



QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**2100**	**0**	**2**	**2**	**0**	**2**	**2**

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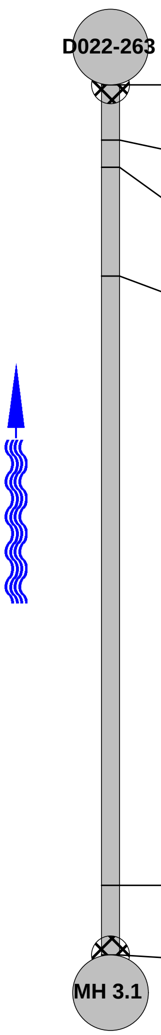
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
10/2/2008		**Light Rain**	**Al**		**14**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
T-007-083		**Seattle Parks**		**No Pre-Cleaning**	

Street123	**Gasworks Park**	Use of Sewer	**Stormwater**	Upstream MH	**D022-263**
City	**Seattle**	Drainage Area		Dowstream MH	**MH 3.1**
Loc. details		Flow Control		Dir. of Survey	**Upstream**
Location Code		Length surveyed	**60.43 ft**	Section Length	**60.43 ft**

Purpose of Survey	**Routine Assessment**	Joint Length	
Year Laid		Dia./Height	**8 inch**
Year Rehabilitated		Material	**Concrete Segments (unbolted)**
Tape / Media No.	**GS-10.1.08**	Lining Method	

Add. Information : **Overlay says SL 2 should be MH 3.1**



1:160 Position	Observation	Photo
0.00	Manhole, REMARK: D022-263	
3.83	Deposits Attached Other, 5 %of cross sectional area, from 11 to 01 o'clock, within 8 inches of joint: YES, REMARK: evidence of surchargeing	
5.74	Crack Longitudinal, at 06 o'clock, within 8 inches of joint: YES, Start	
13.30	Crack Circumferential, from 06 to 12 o'clock, within 8 inches of joint: YES	
55.60	Crack Longitudinal, at 06 o'clock, within 8 inches of joint: YES, Finish	
60.43	Manhole, REMARK: SL 2	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
2211	2100	5	2	7	1.67	2	1.75

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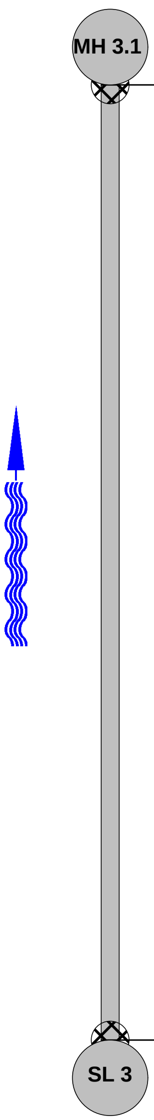
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
10/2/2008		**Light Rain**	**Al**		**15**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
T-007-083		**Seattle Parks**		**No Pre-Cleaning**	

Street123	**Gasworks Park**	Use of Sewer	**Stormwater**	Upstream MH	**MH 3.1**
City	**Seattle**	Drainage Area		Dowstream MH	**SL 3**
Loc. details		Flow Control		Dir. of Survey	**Upstream**
Location Code		Length surveyed	**79.57 ft**	Section Length	**79.57 ft**

Purpose of Survey	**Routine Assessment**	Joint Length	
Year Laid		Dia./Height	**8 inch**
Year Rehabilitated		Material	**Concrete Segments (unbolted)**
Tape / Media No.	**GS-10.1.08**	Lining Method	

Add. Information :



1:192	Position	Observation	Photo
	0.00	Manhole, REMARK: MH 3.1	
	79.57	Manhole, REMARK: SL 3	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**0000**	**0**	**0**	**0**	**0**	**0**	**0**

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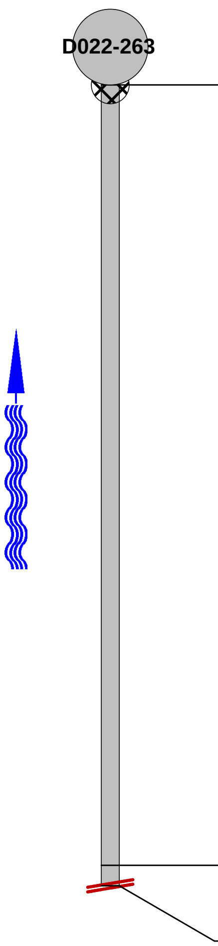
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
10/2/2008		**Light Rain**	**Al**		**16**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
T-007-083		**Seattle Parks**		**No Pre-Cleaning**	

Street123	**Gasworks Park**	Use of Sewer	**Stormwater**	Upstream MH	**D022-263**
City	**Seattle**	Drainage Area		Dowstream MH	**PE**
Loc. details	**NE**	Flow Control		Dir. of Survey	**Upstream**
Location Code		Length surveyed	**27.80 ft**	Section Length	**27.80 ft**

Purpose of Survey	**Routine Assessment**	Joint Length	
Year Laid		Dia./Height	**6 inch**
Year Rehabilitated		Material	**Vitrified Clay Pipe**
Tape / Media No.	**GS-10.1.08**	Lining Method	

Add. Information :



1:80	Position	Observation	Photo
	0.00	Manhole, REMARK: D022-263	
	27.09	Material Change, Steel pipe, REMARK:	
	27.80	Survey Abandoned, REMARK:	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**0000**	**0**	**0**	**0**	**0**	**0**	**0**

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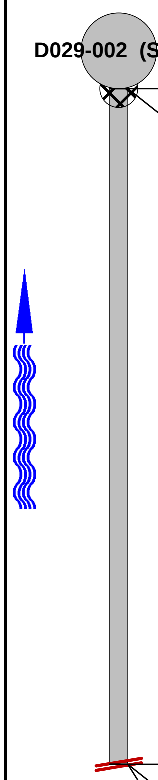
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
10/2/2008		**Light Rain**	**Al**		**17**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
T-007-083		**Seattle Parks**		**No Pre-Cleaning**	

Street123	**Gasworks Park**	Use of Sewer	**Stormwater**	Upstream MH	**D029-002 (SL 4)**
City	**Seattle**	Drainage Area		Dowstream MH	**D022-263 (SL 1)**
Loc. details		Flow Control		Dir. of Survey	**Upstream**
Location Code		Length surveyed	**9.37 ft**	Section Length	**9.37 ft**

Purpose of Survey	**Routine Assessment**	Joint Length	
Year Laid		Dia./Height	**6 inch**
Year Rehabilitated		Material	**Vitrified Clay Pipe**
Tape / Media No.	**GS-10.1.08**	Lining Method	

Add. Information :



1:32	Position	Observation	Photo
	0.00	Manhole, REMARK: D029-002	
	0.00	Deposits Settled Fine, 10 %of cross sectional area, from 05 to 07 o'clock, within 8 inches of joint: YES	
	9.37	Deposits Settled Fine, 25 %of cross sectional area, from 04 to 08 o'clock, within 8 inches of joint: YES	
	9.37	General Observation, within 8 inches of joint: YES, REMARK: grate?	
	9.37	Survey Abandoned, REMARK: debris	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**4121**	**0**	**6**	**6**	**0**	**3**	**3**

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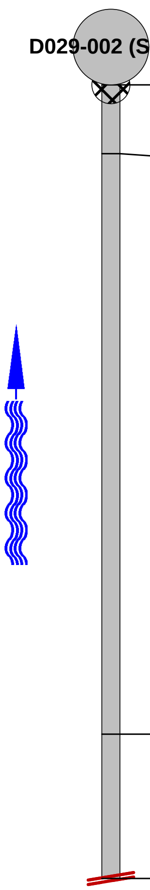
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
10/2/2008		**Light Rain**	**Al**		**18**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
T-007-083		**Seattle Parks**		**No Pre-Cleaning**	

Street123	**Gasworks Park**	Use of Sewer	**Stormwater**	Upstream MH	**D029-002 (SL 4)**
City	**Seattle**	Drainage Area		Dowstream MH	**D029-003**
Loc. details		Flow Control		Dir. of Survey	**Upstream**
Location Code		Length surveyed	**22.06 ft**	Section Length	**22.06 ft**

Purpose of Survey	**Routine Assessment**	Joint Length	
Year Laid		Dia./Height	**6 inch**
Year Rehabilitated		Material	**Vitrified Clay Pipe**
Tape / Media No.	**GS-10.1.08**	Lining Method	

Add. Information :

1:64	Position	Observation	Photo
D029-002 (SL 4)	0.00	Manhole, REMARK: D029-002	
	1.91	Deposits Settled Fine, 5 %of cross sectional area, from 05 to 07 o'clock, within 8 inches of joint: YES	
	18.03	Deposits Settled Gravel, 20 %of cross sectional area, from 04 to 08 o'clock, within 8 inches of joint: YES	
	22.06	Survey Abandoned, REMARK: due to debris	



QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**3121**	**0**	**5**	**5**	**0**	**2.5**	**2.5**

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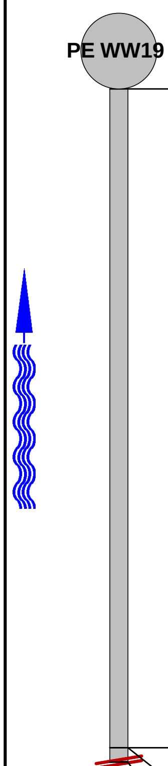
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
10/2/2008		**Light Rain**	**Al**		**19**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
T-007-083		**Seattle Parks**		**No Pre-Cleaning**	

Street123	**Gasworks Park**	Use of Sewer	**Stormwater**	Upstream MH	**PE WW19**
City	**Seattle**	Drainage Area		Dowstream MH	**MH 13.1**
Loc. details		Flow Control		Dir. of Survey	**Upstream**
Location Code		Length surveyed	**14.00 ft**	Section Length	**14.00 ft**

Purpose of Survey	**Routine Assessment**	Joint Length	
Year Laid		Dia./Height	**6 inch**
Year Rehabilitated		Material	**Polyvinyl Chloride**
Tape / Media No.	**GS-10.1.08**	Lining Method	

Add. Information :



1:48	Position	Observation	Photo
	0.00	End of Pipe, REMARK: WW19	
	13.70	Joint Offset Large	
	13.70	Material Change, Concrete segments (unbolted), REMARK:	
	14.00	Survey Abandoned, REMARK: at off set	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
2100	**0000**	**2**	**0**	**2**	**2**	**0**	**2**

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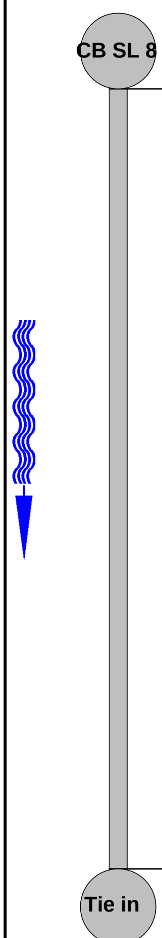
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
10/2/2008		**Light Rain**	**Al**		**20**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
T-007-083		**Seattle Parks**		**No Pre-Cleaning**	

Street123	**Gasworks Park**	Use of Sewer	**Stormwater**	Upstream MH	**CB SL 8**
City	**Seattle**	Drainage Area		Dowstream MH	**Tie in**
Loc. details		Flow Control		Dir. of Survey	**Downstream**
Location Code		Length surveyed	**27.09 ft**	Section Length	**27.09 ft**

Purpose of Survey	**Routine Assessment**	Joint Length	
Year Laid		Dia./Height	**6 inch**
Year Rehabilitated		Material	**Concrete Segments (unbolted)**
Tape / Media No.	**GS-10.1.08**	Lining Method	

Add. Information :



1:80	Position	Observation	Photo
	0.00	Catch Basin, REMARK: SL 8	
	27.09	Discharge Point REMARK:	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**0000**	**0**	**0**	**0**	**0**	**0**	**0**

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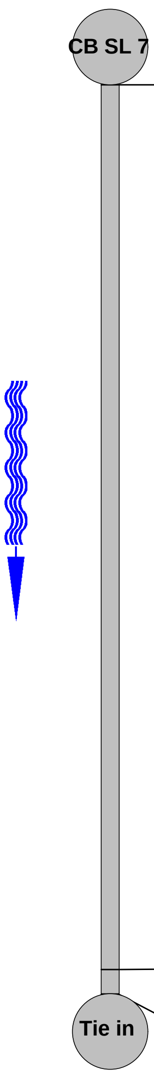
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
10/2/2008		**Light Rain**	**Al**		**21**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
T-007-083		**Seattle Parks**		**No Pre-Cleaning**	

Street123	**Gasworks Park**	Use of Sewer	**Stormwater**	Upstream MH	**CB SL 7**
City	**Seattle**	Drainage Area		Dowstream MH	**Tie in**
Loc. details		Flow Control		Dir. of Survey	**Downstream**
Location Code		Length surveyed	**44.22 ft**	Section Length	**44.22 ft**

Purpose of Survey	**Routine Assessment**	Joint Length	
Year Laid		Dia./Height	**6 inch**
Year Rehabilitated		Material	**Concrete Segments (unbolted)**
Tape / Media No.	**GS-10.1.08**	Lining Method	

Add. Information :

1:112	Position	Observation	Photo
	0.00	Catch Basin, REMARK: SL 7	
	43.01	Infiltration Stain, from 12 to 12 o'clock, within 8 inches of joint: YES	
	44.22	Discharge Point REMARK:	



QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**0000**	**0**	**0**	**0**	**0**	**0**	**0**

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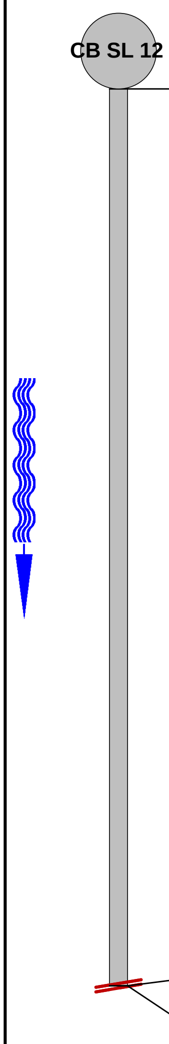
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
10/2/2008		**Light Rain**	**Al**		**22**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
T-007-083		**Seattle Parks**		**No Pre-Cleaning**	

Street123	**Gasworks Park**	Use of Sewer	**Stormwater**	Upstream MH	**CB SL 12**
City	**Seattle**	Drainage Area		Dowstream MH	**PE SL 12**
Loc. details		Flow Control		Dir. of Survey	**Downstream**
Location Code		Length surveyed	**37.37 ft**	Section Length	**37.37 ft**

Purpose of Survey	**Routine Assessment**	Joint Length	
Year Laid		Dia./Height	**8 inch**
Year Rehabilitated		Material	**Ductile Iron Pipe**
Tape / Media No.	**GS-10.1.08**	Lining Method	

Add. Information :



1:96	Position	Observation	Photo
	0.00	Catch Basin, REMARK: SL 12	
	37.37	Obstacles Rocks, 15 %of cross sectional area, at 05 o'clock, REMARK: rip rap	
	37.37	Survey Abandoned, REMARK: at rocks	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**3100**	**0**	**3**	**3**	**0**	**3**	**3**

Gas Works Sediment Area

Initial Source Control Screening Investigation of Storm Drains

Appendix B
Video Inspections
(Provided on DVD)

Gas Works Sediment Area

Initial Source Control Screening Investigation of Storm Drains

Appendix C
Video Inspection Summary

APPENDIX C – VIDEO INSPECTION SUMMARY

In order to more accurately evaluate the condition of the storm drains and identify concerns, a video inspection of selected lines was conducted on October 1 and 2, 2008 by Bravo Environmental. The inspection was conducted in accordance with the City's video inspection protocol. The video was recorded and narrated by the operator with distance markings and visual observations, which included blockages, laterals, cracks, etc. In addition to the video, a report was developed for each stretch of pipe inspected which identifies any laterals, blockages, cracks, and similar observations, and includes pictures of any items of interest. Cleaning of the storm drains was not done prior to inspection. The video is included in Appendix B.

The video survey was conducted on storm drains within the vicinity of the Park and Waterways #20 and #19. Storm drains that were inspected include those that are connected to Outfalls A through E within the Park and the storm drains associated with Waterways #20 and #19 Outfalls, and are shown along with the associated structure ID on the attached Figures 3.1 and 3.2. Several storm drains were inaccessible and were not able to be inspected and are called out on Figures 3.1 and 3.2. Note that during the inspection, in accordance with video inspection protocol, the outfalls of storm drains were identified as pipe ends, or PE for short.

This appendix provides a description of all the inspected storm drains.

1.0 WATERWAY #20

The conveyance system for Waterway #20 contained numerous blockages, pipe changes, and structures that limited the video inspection of this area. Additionally, there are numerous sections that do not correspond with existing figures. In an attempt to clarify the pipe routing of the area, the figures in this report reflect the site conditions as discovered in this inspection. Each area of inspection is described in further detail below beginning at the downgradient end and moving upgradient.

1.1 SL 4 Conveyance

SL 4 is the manhole located near Harbor Patrol on North Northlake Place and is identified as Structure D029-002 by SPU. This manhole has three pipes connected to it. One is believed to be the outlet to Waterway #20; one is the pipe which collects roof runoff from Harbor Patrol and is plugged at location D029-003. The third pipe was believed to be connected to manhole SL 1 near the intersection of Densmore Avenue North and North Northlake Place; however, based on the condition of this pipe, as noted below, it is unclear if this is the case.

1.1.1 SL 4 to Waterway #20

This stretch was unable to be inspected due to a metal outlet structure within the manhole SL 4 that was unable to be opened, and the inability to locate the discharge pipe within the Waterway. The discharge pipe is cracked at the shoreline and submerged, and a camera was unable to be placed within the pipe. The condition of this pipe is unknown.

1.1.2 SL 4 to D029-003

The first portion of this pipe (Section D029-002 [SL 4] to D029-003) appeared to be in good shape, but the survey had to be abandoned due to debris approximately 22 feet from SL 4. An above-ground locate was conducted on the camera and it was in the position indicated by SPU utility maps.

1.1.3 SL 4 to SL 1

This pipe was believed to connect directly to manhole SL 1, which would convey the majority of runoff that discharged into Waterway #20. However, upon inspection of this pipe, it was over 25 percent filled with debris and did not appear to currently be able to convey any significant amount of flow.

At approximately 9 feet from SL 4, the deposits became too thick to continue any further. Slightly beyond this point, what appeared to be a grate was seen on the video camera; it was suspected that this may be a catch basin grate. Unfortunately, this grate is approximately 5-feet below ground surface due to grade changes in the area and was unable to be inspected. Based on this, it is unclear if the flow from SL 1 passes through this manhole. A field visit was recently conducted during a large storm event to verify the flow patterns, but the rain event was too large and both manholes SL 1 and SL 4 were filled with water.

1.2 SL 1 Conveyance

SL 1 is the manhole located within the northwest area of Gas Works Park near the intersection of Densmore Avenue North and North Northlake Way; this manhole is identified as Structure D022-263 by SPU. This manhole has six pipes connected to it. One is believed to be the outlet to SL 4. The other five are influent pipes that are described in detail below. The contributing areas of these five influent pipes do not correspond to existing figures and an attempt has been made to clarify the pipe routing in this area (refer to Figure 3). The five influent pipes are described in a clockwise direction beginning at the western most pipe in Section 1.2.2.

1.2.1 SL 1 to SL 4

This pipe (Section D022-263 [SL 1] to D029-002 [SL-4]) is the outlet pipe from SL 1 and conveys the runoff in this manhole to Waterway #20. Indications of infiltration were present at several of the joints, but were minor and within the acceptable condition for a pipe of this age. This pipe contained evidence of surcharge (i.e., debris near the crown of the pipe) near SL 1 indicating that blockages or capacity issues may occur here. This was confirmed during the recent inspection when SL 1 was filled with approximately 5 feet of water. This pipe appeared to be in decent shape with a non-operational lateral tap at approximately 21 feet; this is consistent with SPU figures. The pipe was unable to be inspected any further at approximately 68 feet due to a material change in the pipe. Likely a rupture in the clay pipe occurred and a steel pipe was placed over the rupture at some point. Due to the offset in pipes, the inspection was unable to go any further.

1.2.2 SL 1 to Unknown Pipe

This is the first (westernmost) influent pipe of a series of five that enter manhole SL 1. Existing SPU figures show this pipe going to catch basin SL 3. However, upon inspection, this pipe (Section D022-263 [SL 1] to SL 3) was filled with approximately 50 percent debris at the beginning of the pipe and further inspection was unable to be conducted. It was determined that this pipe does not go to catch basin SL 3 since another pipe makes that connection. It is unclear where this pipe goes to and it is not clear if this pipe conveys any flow due to the amount of debris and its unknown upgradient configuration.

1.2.3 SL 1 to SL 3

This is the second influent pipe of a series of five that enter manhole SL 1. Evidence of surcharging was evident in this pipe. Existing SPU figures show this pipe going to manhole SL 2. However, upon inspection, this pipe (Section D022-263 [SL 1] to MH 3.1) goes to a manhole near the northwest corner of the Densmore Avenue North and North Northlake Way intersection. This manhole connects catch basin SL 3 with the manhole SL 1 and was called MH 3.1 for identification purposes. The pipe that runs from MH 3.1 to catch basin SL 3 was also inspected (Section MH 3.1 to SL 3) and was in good shape.

1.2.4 SL 1 to D022-262

This is the third influent pipe of a series of five that enter manhole SL 1 and comes from directly north. This pipe (D022-263 [SL 1] to D022-262) appeared in good shape to the manhole. An unknown lateral to the west was identified approximately 4 feet from SL 1. This lateral may go to manhole SL 2 which would be consistent with Side Sewer Card No. 3866.

Also of note is that manhole D022-262 only has one inlet instead of two as shown on SPU GIS figures. The pipe that exists is an influent pipe that comes from another manhole directly to the east of manhole D022-262. The pipe shown on SPU figures either does not exist or was submerged.

1.2.5 SL 1 to PE

This is the fourth influent pipe of a series of five that enter manhole SL 1. This pipe (D022-263 [SL 1] to PE) does not appear on existing figures and it is unclear where this pipe goes. It was called PE (Pipe End) for identification purposes. The inspection was only able to go approximately 27 feet before encountering a pipe material change and coming to a point where it appeared to drop off; the field team was unable to see the bottom of the drop off. There was also a pipe coming in from the other side which appeared clogged. It is unclear where this pipe goes.

1.2.6 SL 1 to CB

This is the fifth (easternmost) influent pipe of a series of five that enter manhole SL 1. This pipe (D022-263 [SL 1] to CB) is shown on existing figures as going to a catch basin along the southern side of North Northlake Way. This pipe was partially clogged with sandy debris at approximately 10 feet and the inspection was unable to be completed.

1.3 SL 2 Conveyance

A video inspection was conducted on SL 2; however, this video was not recorded and is not on the attached DVD. This pipe appeared to drop steeply into another line; it is unclear whether this line contributes to Waterway #20 through manhole SL 1 or if it enters the Combined Sewer Overflow (CSO) line that runs east to west along the north side of North Northlake Way. Based on Side Sewer Card No. 3866, it appears that this pipe may connect to the pipe that runs from manhole D022-263 (SL 1) to manhole D022-262.

2.0 GAS WORKS PARK

The conveyance systems that discharge to Waterway #19, including Outfalls A through F were inspected within the Park. The video inspection did not include the conveyance system within the parking lot. Overall, the majority of the conveyance systems within the Park appeared to be in good condition without any significant cracks or staining with the exceptions noted below. Additional notes are made below where discrepancies from existing conveyance system maps exist.

2.1 Outfall A

The perforated pipe section that runs upgradient from manhole SL 6 to the center of the Park (Section SL 6 to Perf Pipe) contains a dip in the pipe approximately 5 feet from the manhole where water has accumulated indicating that the pipe does not have a consistent grade. Additionally, this pipe contains roots coming from the top of the pipe and debris in the bottom of the pipe. Due to the root and debris presence, the survey was only able to extend approximately 105 feet in the pipe before it had to be abandoned.

2.2 Outfall B

The perforated pipe section that runs upgradient from catch basin SL 9 towards the parking lot (Section SL 9 to Parking Lot) was crushed approximately 2 feet in from the catch basin and was unable to be inspected.

The run from catch basin SL 9 to Outfall B (Section SL 9 to PE B) had multiple laterals to the south and north that were not shown on existing maps. These are likely floor drains from the picnic area north of the play barn.

2.3 Outfall C

The run from catch basin SL 10 to Outfall C (Section SL 10 to PE C) had three laterals that were capped. The capped laterals were the three that are closest to catch basin SL 10. Two of these laterals are shown on existing figures and one is not. The laterals were likely planned to be installed but were never completed. This area drains the sandy play area to the south of the play barn. Additionally, this run contained a small fracture at the upgradient end of the pipe.

2.4 Outfall D

Catch basin SL 11 shows evidence of deterioration with large cracks and evidence of water draining to levels below the effluent pipe level. To the south there is a patched section in the catch basin; it is unclear whether this is a repair patch or a cover where another pipe previously entered the catch basin.

2.5 Outfall E

The video inspection of this line was conducted from the downgradient end, Outfall E, since there was not an upgradient location available for inserting the camera. This section (PE E to play barn) contained significant fine deposits near the outfall, possibly due the intrusion of Lake Union water at high level variations and/or via storms. After passing through the deposits area, the inspection was able to continue to 155 feet where a piece of broken pipe obstructed any further inspection. However, in the area that was inspected, numerous unknown laterals were discovered. It is unknown where these laterals come from and what drainage areas contribute to this Outfall.

2.6 SL 12 Conveyance/Outfall F

The SL 12 conveyance system is not shown on SPU GIS or any existing figures. This conveyance discharges to the depressed valley in between Kite Hill and the cracking towers where it sheet flows towards Lake Union. Prior to crossing the lakeside path, the flow infiltrates into the ground and enters a perforated pipe which then discharges into Lake Union through Outfall F. Of this system, only the section from CB SL 12 to PE SL 12 was inspected and was in good shape.

3.0 WATERWAY #19

The conveyance system that discharges into Waterway #19 was video inspected to identify the current conditions. However, due to a PVC elbow in manhole SL 13 and traffic conditions at a downstream manhole (called MH 13.1 for identification purposes) along the south side of North Northlake Way, only a limited amount of this system could be inspected.

The pipe from the outlet of this conveyance system to MH 13.1 (Section PE WW19 to MH 13.1) was inspected, but was only able to be advanced approximately 14 feet before encountering a pipe change and an offset that made the camera unable to advance further.

Attachment 6B-3
Northeast Corner Source Control Data Report

City of Seattle
Seattle Public Utilities

March 19, 2010

John Keeling
Washington State Department of Ecology
Northwest Regional Office
3190 160th Avenue S.E.
Bellevue, WA 98008-5452

Re: Gas Works Sediment Area
Gas Works Park Northeast Corner
Source Control Data Report

Dear John:

This letter transmits the attached data report entitled: *Gas Works Sediment Area, Gas Works Park Northeast Corner, Source Control Evaluation.* The report provides the results of the Outfall A Storm Drain and Northeast Corner (NE Corner) Source Control Investigation that was conducted within Gas Works Park. The work was conducted to further characterize the quality of solids entering the storm drain within the NE Corner of Gas Works Park as part of the Storm Drain Source Control Evaluation and evaluate the possibility of post-remedial sediment recontamination.

The data presented in this report document the quality of:

- Storm drain solids in filter fabric inserts from Catch Basins SL7 and SL8
- Storm drain solids in Catch Basin SL14
- Surface soils surrounding Catch Basins SL7, SL8, and SL14.

The filter fabric sampling was conducted between March and June 2009 and the solids sampling was conducted on October 13 and 14, 2009.

Bound into the attached report is a technical memorandum from the City to The Washington State Department of Ecology (Ecology). This memorandum summarizes the source control evaluation results for the Outfall A Storm Drain and NE Corner including the technical basis and objectives that support the stepwise progression of investigative activities. The memorandum also identifies planned next steps.

The City of Seattle (City) has taken the lead for this portion of source control activities for the Gas Works Sediment Area (GWSA) and coordinates closely with Puget Sound Energy (PSE) with oversight by Ecology. Floyd|Snider is performing the technical work on behalf of the City. The City and PSE have worked together to identify proposed next steps in the source control

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City of Seattle
Seattle Public Utilities

TECHNICAL MEMORANDUM

Date: March 19, 2010

To: John Keeling, Washington State Department of Ecology

From: Pete Rude and Judith Noble

Re: **Summary of Source Control Evaluation Results**
Outfall A Storm Drain and Northeast Corner
Gas Works Sediment Area RI/FS

The attached *Gas Works Sediment Area, Gas Works Park Northeast Corner, Source Control Data Report* (NE Corner Data Report) prepared by Floyd|Snider and the previously submitted *Initial Source Control Screening Investigation of Storm Drains, Gas Works Sediment Area* (Screening Investigation Data Report; Floyd|Snider 2009) include the detailed results to date of the City's source control evaluation data gathering efforts related to the Gas Works Park Outfall A storm drain and the NE Corner. The purpose of this memorandum is to summarize these results and identify planned next steps. The Outfall A storm drain is shown on Figure 2 of the NE Corner Data Report and conveys runoff from the park parking lot and from vegetated portions of the park including a portion of the park's NE Corner.

The City is the lead for this portion of the Gas Works Sediment Area (GWSA) source control evaluation activities and is coordinating closely with Puget Sound Energy (PSE) with oversight by the Washington State Department of Ecology (Ecology). Floyd|Snider is performing the work on behalf of the City. The need for storm drain investigation is documented in the draft Joint Source Control Evaluation for the GWSA (Floyd|Snider 2007) and discussed further in the NE Corner Data Report.

It is important to understand that the source control efforts discussed in this memorandum and the reports identified above only address potential storm drain sources and pathways in the context of the potential for sediment recontamination. Other potential sources and pathways to sediment from the uplands (e.g., groundwater and non-aqueous phase liquids) are being addressed in the Western Study Area and Eastern Study Area RI/FSs.

Although this memorandum focuses on Outfall A and the NE Corner, the City is leading additional storm drain source control evaluations for other Gas Works Park and SPU storm drains. Most of data generated to date for these other drains, including testing of storm drain solids and closed circuit TV inspection of drain lines, is documented in the Screening

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sample of the solids currently entering the storm drain. These solids could be analyzed for TPAH, and evaluated relative to the site-specific cleanup standard. The inserts, in theory, capture solids directly from storm water entering the catch basins. The goal was to obtain enough material to evaluate current materials entering the structure relative to the initial catch basin solids TPAH results without having to wait for enough material to re-accumulate in the catch basin structure itself.

During the March to June deployment, the filter inserts accumulated a limited amount of solids and required analysis by non-standard methods to estimate the TPAH concentration in the solids. The estimated TPAH concentration in the solids captured by the filter inserts was significantly higher than the site-specific standard and also higher than what was measured in Catch Basin SL7 solids. Given these inconsistencies, questions remained regarding whether the solids captured by the filter inserts were representative of the solids that enter these NE Corner catch basins. Filter inserts were reinstalled in Catch Basins SL7 and SL8 on September 28, 2009 with the hopes that more sample volume may be collected through longer deployment. The current plan is for the inserts to be inspected at the end of the 2009/2010 wet season to see if enough material is present for analysis by standard methods, which would allow for a better understanding of the initial filter insert TPAH results.

- **Surface Soil Sampling and Analysis (Fall 2009)** – Based on the catch basin and filter inserts solids TPAH data, NE Corner surface soils underwent sampling and analysis to evaluate current conditions because these soils are the most likely source of TPAH. The fall 2009 soil TPAH concentrations were much lower than the TPAH results for the filter insert solids. The TPAH concentrations in surface soil samples were generally consistent with and provide a possible explanation for the TPAH levels detected in NE Corner catch basins.

Additional Data Needs

Additional data gathering activities are necessary to better evaluate and understand the potential for the Outfall A storm drain to pose a risk of sediment recontamination. These activities consist of:

- At the end of the wet season, inspect the filter inserts installed in Catch Basins SL7 and SL8. If adequate material is present, sample and analyze the material via standard methods.
- Collect additional storm drain solids samples (where present) from Outfall A storm drain structures, which haven't been sampled before, and inspect these structures. These structures consist of (see Figure 2):
    - Parking lot catch basins and inlets
    - The perforated pipe that discharges into SL6
    - The SL6 structure
    - The two Outfall A catch basin/inlets on the southern line that drains to SL6.

The City has begun drafting a sampling and analysis plan describing these activities, which it will submit to Ecology for review and approval.

Gas Works Sediment Area

Gas Works Park Northeast Corner Source Control Data Report

Prepared for

City of Seattle
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Prepared by

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March 19, 2010

List of Figures

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List of Abbreviations and Acronyms

Abbreviation/ Acronym	Definition
AO	Agreed Order
ARI	Analytical Resources, Inc.
CD	Consent Decree
City	City of Seattle
DQO	Data Quality Objective
Ecology	Washington State Department of Ecology
ESA	Eastern Study Area
GWSA	Gas Works Sediment Area
GWS-WSA	Gas Works Sediment–Western Study Area
HPAH	High molecular weight polycyclic aromatic hydrocarbon
JCSE	Joint Source Control Evaluation
LCS	Laboratory control sample
LPAH	Low molecular weight polycyclic aromatic hydrocarbon
mg	Microgram
MS	Matrix spike
MSD	Matrix spike duplicate
NE	Northeast

1.0 Introduction

This report provides the results of the Northeast Corner (NE Corner) Source Control Investigation that was conducted within Gas Works Park (Figure 1). The work was conducted to further characterize the quality of solids entering storm drains within the NE Corner of Gas Works Park as part of the Storm Drain Source Control Evaluation. This investigation evaluated accumulated solids in filter fabrics from Catch Basins SL7 and SL8, accumulated solids in Catch Basin SL14, and surface soil quality surrounding Catch Basins SL7 and SL8.

The City of Seattle (City) has taken the lead for this portion of source control activities for the Gas Works Sediment Area (GWSA) and coordinates closely with Puget Sound Energy (PSE) with oversight by Ecology. Floyd|Snider is performing the work on behalf of the City.

The work was conducted in accordance with the Work Plan submitted to the Seattle Public Utilities (SPU) on September 9, 2009. The Work Plan was also submitted to PSE and the Washington State Department of Ecology (Ecology) was notified of the work prior to mobilization. The filter fabric sampling was conducted between March and June 2009 and the solids sampling was conducted on October 13 and 14, 2009. Results are described in Sections 2.0 to 4.0.

1.2 BACKGROUND

Gas Works Park is situated on the northern shore of Lake Union, a heavily-developed urban lake located north of downtown Seattle, Washington (refer to Figure 1). Historical operations at the property have resulted in environmental contamination. A 1999 Consent Decree (CD) between Ecology, the City, and PSE (Ecology 1999) and related documents addressed site environmental cleanup pursuant to the Model Toxics Control Act (MTCA; Chapter 70.105D RCW). The "Site" was described in the CD to include only the terrestrial areas of Gas Works Park (and the Harbor Patrol property) and did not include areas that are submerged or seasonally submerged by the waters of Lake Union. Remediation actions at the Site as described in the CD have been implemented.

The Cleanup Action Plan (CAP) associated with the CD stated that sediment remediation is not addressed under the CAP and would take place under a separate decree or order at a later date. In addition, the CAP stated that full analysis of any Gas Works Park upland to sediment pathways (including groundwater and shoreline erosion pathways) will be reserved for the next phase of cleanup analysis and action, under a separate decree or order.

In 2005, Ecology, the City, and PSE entered into an Agreed Order (AO; Ecology 2005) that referred to the Site, as defined in the 1999 CD, as the "Uplands." The Statement of Work (SOW) in the AO included tasks to determine the nature and extent of submerged shoreland and lakebed sediments in the area of Lake Union adjacent to the Uplands that are impacted by hazardous substances released from historical manufactured gas plant or tar refining or other activities on the Uplands. The SOW described how the Remedial Investigation and Feasibility Study (RI/FS) activities for the sediments would be managed as two side-by-side study areas, referred to as the Eastern Study Area (ESA; PSE-lead) and Western Study Area (WSA; City-lead) and collectively known as the Gas Works Sediment Area (GWSA). Both the ESA and WSA RI/FS reports are required by the SOW to include "evaluation of the possibility of post-

Plan/Quality Assurance Project Plan for SL7 and SL8 Drainage Basin Sampling (Floyd|Snider 2009b), and are consistent with procedures specified in the Gas Works Sediment–Western Study Area (GWS-WSA) RI/FS Quality Assurance Project Plan (QAPP). All activities were conducted in accordance with the site-specific Health and Safety Plan for the GWS-WSA in the Current Situation Report and RI/FS Work Plan (Appendices C and D, respectively, of the GWS-WSA RI/FS Work Plan; Floyd|Snider 2005). Floyd|Snider prepared this NE Corner Source Control Data Report on behalf of the City to document the results of the sampling and analysis activities conducted by the City.

1.3 FIELD INVESTIGATION OBJECTIVES

The City conducted the NE Corner Source Control Investigation activities to assess the possibility that solids transported from Gas Works Park through the storm drain will recontaminate Lake Union sediments, and to potentially identify the source of elevated TPAHs in solids collected from Catch Basin SL7. This investigation collected solids from Catch Basins SL7 and SL8 in filters, solids from the base of Catch Basin SL14, and surface soil samples in the areas surrounding the catch basins in the NE Corner. Figure 2 shows all sampling locations. The objectives of the surface soil investigation are presented below:

- The collection by filter fabric of solids entering Catch Basins SL7 and SL8 and the collection of surface soil from areas surrounding Catch Basins SL7, SL8, and SL14 were conducted to investigate the quality of soils entering the structures via stormwater runoff.
- While collecting surface soil samples surrounding Catch Basin SL14, a storm drain solids sample was collected from within the catch basin in order to identify potential contamination transported through the storm drain to Lake Union from this drainage structure. This catch basin was not sampled in the previous sampling event.

In order to determine the chemical concentrations of the solids on the filter fabric, extraction solvent was placed directly onto the sections of the filter fabric. The extraction solvent passed through the filter fabric, effectively extracting organics and any solids bound to the filter fabric, directly into the solvent phase.

2.3 ANALYTICAL METHODS AND DATA QUALITY

Laboratory samples were submitted to ARI in Tukwila, Washington for analysis of the following analytes:

- Volatile organic compounds and SVOCs by USEPA 8270D
- PCB Aroclors by USEPA 8082

All laboratory reports are included in Appendix C.

One filter bag blank was analyzed as a blank quality control sample. Phenol and bis(2-ethylhexyl)phthalate were detected in this blank. Phenol was not detected in the field samples. Bis(2-ethylhexyl)phthalate was detected in Samples SL7 and SL8, but results were less than the action level of 10 times the blank amount and were therefore qualified as not detected (refer to the Data Validation Report in Appendix D). Additionally, a positive result for Aroclor 1254 was reported in the initial analysis of the filter bag blank.

The following data quality requirements were reviewed relative to quality criteria specified for the analytical methods, analytical laboratory data quality objectives (DQOs), and the DQOs identified in the QAPP (Floyd|Snider 2009b):

- Sample and quality control analysis frequencies
- Extraction and analysis holding times
- Blank contamination
- Surrogate recoveries
- Laboratory control sample (LCS) recoveries
- Matrix spike (MS) and MS duplicate (MSD) recoveries
- MS/MSD relative percent differences (RPDs)

Overall, the accuracy was acceptable, but precision could not be assessed. Data for the majority of SVOCs (excluding PAHs), some phthalates, and PCBs were qualified as not detected at elevated reporting limits and tentatively identified due to matrix interferences. Preliminary data for all analytes were rejected in order to report the most appropriate result from multiple dilutions. All other data, as qualified, are acceptable for use.

2.4 RESULTS

Elevated levels of TPAHs were observed in filter fabric samples from Catch Basins SL7 and SL8. The dry weight TPAH results for samples from Catch Basins SL7 and SL8 were reported as 6,471 micrograms (mg) and 2,129 mg respectively. These results are for the mass, not the concentration, of TPAHs present in the solids. These values thus represent the total amount of

3.0 Surface Soil Sampling

3.1 SCOPE

To characterize the quality of surface soil in the drainage basins surrounding Catch Basins SL7, SL8, and SL14, a field investigation was conducted to collect surface soil samples from the locations identified in Figure 2. Surface soil locations were selected to provide coverage of the majority of the drainage basins surrounding Catch Basins SL7, SL8, SL14, and additional locations were field-selected visually where bare soils were present. The topography of the drainage basins slopes down to the shore line, with the basins likely capturing drainage from areas to the north, south, and west (refer to Figure 3 for site topography).

Samples were collected in accordance with the *Sampling and Analysis Plan/Quality Assurance Project Plan (SAP/QAPP) for SL-7 and SL-8 Drainage Basin Sampling* approved by Ecology in a letter dated October 5, 2009. A total of 30 surface soil samples were collected at the site on October 13, 2009, including a blind field duplicate at one sampling location.

3.2 SAMPLE COLLECTION METHODS

Sampling locations were selected at distances of approximately 2, 20, and 50 feet from Catch Basins SL7 and SL8. These locations were spaced to effectively cover a substantial portion of the drainage basin expected to contribute runoff to the catch basins of interest, with an optimized number of samples. Sample locations were placed in approximately three rings, radiating out from each catch basin, at the distances stated above. The second ring of samples was offset from the first and third ring to provide greater coverage of the entire basin. Two additional samples were collected at locations 28 feet east of SL7 (SL7-28-E-101309) and 70 feet northwest of SL8 (SL8-70-NW-101309) based on visual observations of poorly vegetated, disturbed, or exposed soils. A total of 13 samples were collected surrounding each catch basin.

An additional four samples were collected in the area surrounding Catch Basin SL14, as it is in close proximity to the other basins (refer to Figure 2). Sample locations were established on a ring approximately 4 to 5 feet from Catch Basin SL14. Samples were not placed at a distance of 2 feet as with SL7 and SL8 because SL14 is located in a paved footpath; therefore soil samples were collected as close to the catch basin as possible on the grassy area surrounding the footpath.

Samples were identified with the following nomenclature: catch basin name–distance from catch basin–direction from catch basin–date of sampling. For example, the sample collected 2 feet north of Catch Basin SL7 was named SL7–2–N–101309.

Prior to sampling, each location was cleared of grass (if grass was present) by clipping down to the soil surface with grass shears. Surface soil samples were collected using a 3-inch diameter direct-push sampler (garden bulb planter; Field Photograph 2 in Appendix B). The outside of the sampler was marked to indicate a 2-inch depth. The sampler was driven 2-inches into the ground, then extracted and placed directly into laboratory-supplied glassware. Samples were collected from the top 2 inches of soil (including grass roots) from the locations indicated in Figure 2. Approximately 4 to 5 adjacent aliquots were collected from each location, yielding sufficient volume to fill two 16-oz sample jars. Soils were placed directly into the jars without homogenization—it was assumed that the aliquots collected directly adjacent to each other

One blind field duplicate and one equipment rinse sample were collected as quality control samples. Analytical results for the equipment rinse sample were less than laboratory detection limits, and the field duplicate results were within an average relative percent difference (RPD) value of 30 percent of the original field sample. The greater value between the original sample and the duplicate is assumed to be the chemical concentration at this location. The equipment rinse sample was collected by pouring laboratory deionized water over the non-disposable sampling equipment, the direct push sampler, following standard decontamination procedures.

A data quality review was performed on the laboratory analytical results in accordance with the SAP/QAPP (Floyd|Snider 2009b). The following data quality requirements were reviewed relative to quality criteria specified for the USEPA methods, analytical laboratory DQOs, and the DQOs identified in the QAPP:

- Sample and quality control analysis frequencies
- Extraction and analysis holding times
- Blank contamination
- Surrogate recoveries
- LCS recoveries
- MS and MSD recoveries
- MS/MSD RPDs

The data quality review determined that all data were of useable quality, and no data qualifications were required. All data are of acceptable quality for use.

3.5 RESULTS

3.5.1 Catch Basin SL7

A total of 13 samples were collected within the drainage basin surrounding SL7. Samples within a 2-foot radius of SL7 generally reported TPAH levels greater than the site-specific sediment cleanup level for TPAH (170 ppm), ranging from 845 mg/kg in Sample SL7-2-N-101309 to 1,228 mg/kg in Sample SL7-2-W-101309. The majority of TPAHs were identified as HPAHs in all samples. Other analyzed SVOCs were generally reported at low levels or were not detected.

Concentrations of TPAHs generally decreased at greater distances from SL7, with samples at 20 feet ranging in concentrations from 38 mg/kg in Sample SL7-20-NW-101309 to 736 mg/kg in Sample SL7-20-SE-101309. The concentration of TPAH from the sample of exposed soil located 28 feet east of SL7 was 241 mg/kg (SL7-28-E-101309). This concentration was consistent with the range of TPAH concentrations encountered in the SL7 drainage basin. At 50 feet from SL7, TPAH concentrations ranged from 42 mg/kg in Sample SL7-50-N-101309 to 169 mg/kg in Sample SL7-50-S-101309. Low concentrations of bis(2-ethylhexyl)phthalate, ranging from 0.14 mg/kg (SL7-20-NW-101309) to 0.59 mg/kg (SL7-28-E-101309), were reported for several samples. Sample results are summarized in Table 2.

4.0 Storm Drain Solids Sampling

4.1 SCOPE AND METHODS

To evaluate accumulated solids quality in the Catch Basin SL14 discharging to the GWSA via Outfall A, a catch basin solids sample was collected from Catch Basin SL14 (refer to Figure 2). The solids sampling was conducted using SPU's Standard Operating Procedure, *WQ&S S3300—Storm Drain Sediment Sampling: Catch basin and In-line Grab Sample Collection*, and was consistent with the sampling methods and protocols used during the Phase 1 Source Control Investigation (Floyd|Snider 2009a). Catch basin solids were not collected from SL14 during the Phase 1 Source Control Investigation. However, after evaluating the filter fabric results from Catch Basins SL7 and SL8, it was decided to sample solids from Catch Basin SL14 because it is in close proximity to the other basins and the NE Corner meadow and drainage area.

The sample was collected from the SL14 structure by Floyd|Snider on October 14, 2009 and analyzed by ARI for SVOCs, Sediment Management Standards metals, PCB Aroclors, total organic carbon, and grain size. Laboratory analytical methods were consistent with methods described in the Phase 1 Source Control Investigation. The thickness of the accumulated solids in the catch basin was approximately 1 inch. Solids were collected from several locations within the structure to provide a representative composite of the material present. Solids were collected from the catch basin base using a stainless steel spoon, plastic scoop, or similar device, and homogenized in a stainless steel bowl prior to placement in laboratory supplied glassware. There was sufficient volume of solid present in the structure to collect the required sample volume for analysis of all analytes listed above. Further details regarding sampling and analytical methods can be found in *Initial Source Control Screening Investigation of Storm Drains* submitted to Ecology in April 2009 (Floyd|Snider 2009a).

4.2 RESULTS

The chemical testing results for the sample from Catch Basin SL14 are shown in Table 3. The TPAH result of 47 mg/kg was less than the site-specific sediment quality level of 170 mg/kg for TPAH. In addition to PAHs, bis(2-ethylhexyl)phthalate, 4-methylphenol, and low levels of metals were detected in this sample. PCBs were not detected in this sample. All laboratory reports are included in Appendix C.

6.0 References

Floyd|Snider. 2005. *Gas Works Sediment Western Study Area Current Situation Report and RI/FS Work Plan*. Prepared for City of Seattle, Seattle Public Utilities. 21 March.

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Gas Works Sediment Area

Gas Works Park Northeast Corner Source Control Data Report

Tables

Table 1
Filter Fabric Analytical Results

	Outfall A		
Sampling Station	SL 7	SL 8	Trip Blank
Sampling Date	6/15/2009	6/15/2009	6/15/2009
Analytes	µg	µg	µg
Polychlorinated Biphenyls (USEPA Method 8082)			
Aroclor 1016	5 U	5 U	0.5 U
Aroclor 1221	5 U	5 U	0.5 U
Aroclor 1232	5 U	5 U	0.5 U
Aroclor 1242	5 U	5 U	0.5 U
Aroclor 1248	8 UY	5 U	0.5 U
Aroclor 1254	*21*	*12*	*0.6*
Aroclor 1260	*28*	*12*	0.5 U
PCBs (Total)	*49*	*24*	*0.6*
Semivolatile Organic Compounds (USEPA Method 8270D)			
2,4,5-Trichlorophenol	25,000 U	25,000 U	5,000 U
2,4,6-Trichlorophenol	25,000 U	25,000 U	5,000 U
2,4-Dichlorophenol	25,000 U	25,000 U	5,000 U
2,4-Dimethylphenol	5,000 U	5,000 U	1,000 U
2,4-Dinitrophenol	50,000 U	50,000 U	10,000 U
2-Chloronaphthalene	5,000 U	5,000 U	1,000 U
2-Chlorophenol	5,000 U	5,000 U	1,000 U
2-Methylphenol	5,000 U	5,000 U	1,000 U
2-Nitrophenol	25,000 U	25,000 U	5,000 U
4,6-Dinitro-o-cresol	50,000 U	50,000 U	10,000 U
4-Chloro-3-methylphenol	25,000 U	25,000 U	5,000 U
4-Methylphenol	5,000 U	5,000 U	1,000 U
4-Nitrophenol	25,000 U	25,000 U	5,000 U
Benzoic Acid	50,000 U	50,000 U	10,000 U
Benzyl Alcohol	25,000 U	25,000 U	5,000 U
bis(2-Chloroethoxy)methane	5,000 U	5,000 U	1,000 U
bis-Chloroisopropyl ether	5,000 U	5,000 U	1,000 U
Carbazole	*8,600*	5,000 U	1,000 U
Dibenzofuran	6,000 UY	5,000 U	1,000 U
Hexachlorobutadiene	5,000 U	5,000 U	1,000 U
Hexachlorocyclopentadiene	25,000 U	25,000 U	5,000 U
Isophorone	5,000 U	5,000 U	1,000 U
N-Nitroso-di-b-propylamine	25,000 U	25,000 U	5,000 U
N-Nitrosodiphenylamine	5,000 U	5,000 U	1,000 U
Pentachlorophenol	25,000 U	25,000 U	5,000 U
Phenol	5,000 U	5,000 U	*1,900*
Low Molecular Weight Polycyclic Aromatic Hydrocarbons			
Naphthalene	*72,000*	*26,000*	1,000 U
Acenaphthylene	*65,000*	*29,000*	1,000 U
Acenaphthene	5,000 U	5,000 U	1,000 U
Fluorene	*21,000*	5,000 U	1,000 U
Phenanthrene	*210,000*	*66,000*	1,000 UY
Anthracene	*55,000*	*27,000*	1,000 U
1-Methylnaphthalene	*8,000*	5,000 U	1,000 U
2-Methylnaphthalene	*17,000*	*6,900*	1,000 U
Total LPAH[1]	*423,000*	*148,000*	1,000 UY
High Molecular Weight Polycyclic Aromatic Hydrocarbons			
Fluoranthene	*1,000,000*	*310,000*	1,000 U
Pyrene	*1,100,000*	*310,000*	1,000 U
Benzo(a)anthracene	*300,000*	*110,000*	1,000 U
Chrysene	*530,000*	*190,000*	1,000 U
Benzo(b)fluoranthene	*840,000*	*200,000*	1,000 U
High Molecular Weight Polycyclic Aromatic Hydrocarbons (continued)			

Table 1
Filter Fabric Analytical Results

	Outfall A		
Sampling Station	**SL 7**	**SL 8**	**Trip Blank**
Sampling Date	**6/15/2009**	**6/15/2009**	**6/15/2009**
Analytes	µg	µg	µg
Benzo(k)fluoranthene	*610,000*	*200,000*	1,000 U
Benzofluoranthenes (total)	*1,450,000*	*400,000*	1,000 U
Benzo(a)pyrene	*770,000*	*290,000*	1,000 U
Benzo(g,h,i)perylene	*450,000*	*190,000*	1,000 U
Indeno(1,2,3-cd)pyrene	*390,000*	*160,000*	1,000 U
Dibenz(a,h)anthracene	*58,000*	*21,000*	1,000 U
Total HPAH[2]	*6,048,000*	*1,981,000*	1,000 U
Total PAH	*6,471,000*	*2,129,000*	1,000 UY
Phthalates			
bis(2-Ethylhexyl)phthalate	*24,000* U	*53,000* U	*45,000*
Butyl benzyl phthalate	5,000 U	5,000 U	1,000 U
Di-n-butyl phthalate	*5,200*	*7,100*	15,000 UY
Di-n-octyl phthalate	5,000 U	5,000 U	1,000 U
Diethylphthalate	5,000 U	5,000 U	1,000 U
Dimethyl phthalate	5,000 U	5,000 U	1,000 U
Volatile Organic Compounds (USEPA Method 8270D)			
1,2,4-Trichlorobenzene	5,000 U	5,000 U	1,000 U
1,2-Dichlorobenzene	5,000 U	5,000 U	1,000 U
1,3-Dichlorobenzene	5,000 U	5,000 U	1,000 U
1,4-Dichlorobenzene	5,000 U	5,000 U	1,000 U
2,4-Dinitrotoluene	25,000 U	25,000 U	5,000 U
2,6-Dinitrotoluene	25,000 U	25,000 U	5,000 U
2-Nitroaniline	25,000 U	25,000 U	5,000 U
3,3'-Dichlorobenzidine	25,000 U	25,000 U	5,000 U
3-Nitroaniline	25,000 U	25,000 U	5,000 U
4-Bromophenyl phenyl ether	5,000 U	5,000 U	1,000 U
4-Chloroaniline	25,000 U	25,000 U	5,000 U
4-Chlorophenyl phenyl ether	5,000 U	5,000 U	1,000 U
4-Nitroaniline	25,000 U	25,000 U	5,000 U
bis(2-Chloroethyl)ether	5,000 U	5,000 U	1,000 U
Hexachlorobenzene	5,000 U	5,000 U	1,000 U
Hexachloroethane	5,000 U	5,000 U	1,000 U
Nitrobenzene	5,000 U	5,000 U	1,000 U

Notes:

Italics Indicate detected concentrations.

1 The total LPAH represents the sum of the following low molecular weight polynuclear aromatic compounds: naphthalene, acenapthylene, acenaphthene,

2 The total HPAH represents the sum of the following high molecular weight polynuclear aromatic compounds: fluroanthene, pyrene, benz(a)anthracene, chrysene, total benzofluroanthenes, benzo(a)pyrene, indeno(1,2,3,-c,d)pyrene,

Abbreviations:

Conc. Concentration
HPAH High molecular weight polycyclic aromatic hydrocarbon
LPAH Low molecular weight polycyclic aromatic hydrocarbon
PCB Polychlorinated biphenyl
Qual. Qualifier
SVOC Semivolatile organic compound
USEPA U.S. Environmental Protection Agency
VOC Volatile organic compound

Lab Qualifiers:

U Indicates the compound was undetected at the given reporting limit.
UY Indicates the compound was undeteced at the raised reporting limit.

Table 2
Surface Soil Analytical Results
Semivolatile Organic Compounds by USEPA Method 8270D[1]

Sample ID	SL14-4.9-N-101309	SL14-4-NE-101309	SL14-5-SW-101309	SL14-5-W-101309	SL7-2-N-101309	SL7-2-E-101309	SL7-2-S-101309	SL7-2-W-101309	SL7-20-NE-101309	SL7-20-SE-101309
Units	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Low Molecular Weight Polycyclic Aromatic Hydrocarbons										
Acenaphthylene	270	250	330	260	8400	13000	8100	11000	2400	6700
Acenaphthene	60 U	60 U	62 U	61 U	390 U	500 U	410 U	510 U	200 U	340 U
Anthracene	230	190	260	190	7800	9100	7000	10000	1500	5000
Fluorene	79	60 U	87	61 U	2700	2000	2300	2900	410	950
Naphthalene	730	430	440	350	6500	11000	7100	7800	3900	6500
Phenanthrene	1000	840	1300	780	36000	31000	30000	31000	6200	16000
2-Methylnaphthalene	190	140	160	120	2100	2600	2100	2400	850	1600
Total LPAH	2309	1710	2417	1580	61400	66100	54500	62700	14410	35150
High Molecular Weight Polycyclic Aromatic Hydrocarbons										
Benzo(a)anthracene	1100	910	1200	1200	45000	76000	48000	76000	10000	44000
Benzo(b)fluoranthene	1400	1200	1400	1300	49000	93000	48000	82000	15000	48000
Benzo(k)fluoranthene	1400	1200	1400	1300	49000	93000	48000	82000	15000	48000
Benzofluoranthenes (total)	2800	2400	2800	2600	98000	186000	96000	164000	30000	96000
Benzo(a)pyrene	1800	1500	1900	1800	85000	130000	84000	130000	22000	74000
Benzo(g,h,i)perylene	960	920	970	730	110000	85000	100000	130000	21000	100000
Chrysene	1400	1200	1500	1400	58000	87000	58000	87000	14000	50000
Dibenzo(a,h)anthracene	240	240	280	210	9400	15000	10000	18000	3500	13000
Fluoranthene	2400	2100	2600	2600	120000	200000	140000	210000	23000	100000
Indeno(1,2,3-cd)pyrene	940	910	970	740	88000	77000	84000	100000	17000	84000
Pyrene	2800	2400	3100	3000	170000	230000	180000	250000	34000	140000
Total HPAH	14440	12580	15320	14280	783400	1086000	800000	1165000	174500	701000
Total PAH	16749	14290	17737	15860	844800	1152100	854500	1227700	188910	736150
Phthalates										
bis(2-ethylhexyl)phthalate	1600	1400	1100	1200	390 U	500 U	410 U	510 U	290	480
Butyl benzyl phthalate	60 U	60 U	62 U	61 U	390 U	500 U	410 U	510 U	200 U	340 U
Di-n-butyl phthalate	60 U	60 U	62 U	61 U	390 U	500 U	410 U	510 U	200 U	340 U
Di-n-octyl phthalate	60 U	94	62 U	61 U	390 U	500 U	410 U	510 U	200 U	340 U
Diethylphthalate	60 U	290	100	61 U	390 U	500 U	410 U	510 U	200 U	340 U
Dimethyl phthalate	60 U	60 U	62 U	61 U	390 U	500 U	410 U	510 U	200 U	340 U
Miscellaneous Semivolatile Organic Compounds										
1,2,4-Trichlorobenzene	60 U	60 U	62 U	61 U	390 U	500 U	410 U	510 U	200 U	340 U
1,2-Dichlorobenzene	60 U	60 U	62 U	61 U	390 U	500 U	410 U	510 U	200 U	340 U
1,3-Dichlorobenzene	60 U	60 U	62 U	61 U	390 U	500 U	410 U	510 U	200 U	340 U
1,4-Dichlorobenzene	60 U	60 U	62 U	61 U	390 U	500 U	410 U	510 U	200 U	340 U
1-Methylnaphthalene	120	83	100	69	1100	920	900	1100	410	460
2,4,5-Trichlorophenol	300 U	300 U	310 U	300 U	2000 U	2500 U	2000 U	2600 U	980 U	1700 U
2,4,6-Trichlorophenol	300 U	300 U	310 U	300 U	2000 U	2500 U	2000 U	2600 U	980 U	1700 U
2,4-Dichlorophenol	300 U	300 U	310 U	300 U	2000 U	2500 U	2000 U	2600 U	980 U	1700 U
2,4-Dimethylphenol	60 U	60 U	62 U	61 U	390 U	500 U	410 U	510 U	200 U	340 U
2,4-Dinitrophenol	600 U	600 U	620 U	610 U	3900 U	5000 U	4100 U	5100 U	2000 U	3400 U
2,4-Dinitrotoluene	300 U	300 U	310 U	300 U	2000 U	2500 U	2000 U	2600 U	980 U	1700 U
2,6-Dinitrotoluene	300 U	300 U	310 U	300 U	2000 U	2500 U	2000 U	2600 U	980 U	1700 U
2-Chloronaphthalene	60 U	60 U	62 U	61 U	390 U	500 U	410 U	510 U	200 U	340 U
2-Chlorophenol	60 U	60 U	62 U	61 U	390 U	500 U	410 U	510 U	200 U	340 U
2-Methylphenol	60 U	60 U	62 U	61 U	390 U	500 U	410 U	510 U	200 U	340 U
2-Nitroaniline	300 U	300 U	310 U	300 U	2000 U	2500 U	2000 U	2600 U	980 U	1700 U
2-Nitrophenol	60 U	60 U	62 U	61 U	390 U	500 U	410 U	510 U	200 U	340 U
3,3'-Dichlorobenzidine	300 U	300 U	310 U	300 U	2000 U	2500 U	2000 U	2600 U	980 U	1700 U
3-Nitroaniline	300 U	300 U	310 U	300 U	2000 U	2500 U	2000 U	2600 U	980 U	1700 U
4,6-Dinitro-o-cresol	600 U	600 U	620 U	610 U	3900 U	5000 U	4100 U	5100 U	2000 U	3400 U
4-Bromophenyl phenyl ether	60 U	60 U	62 U	61 U	390 U	500 U	410 U	510 U	200 U	340 U

Table 2
Surface Soil Analytical Results
Semivolatile Organic Compounds by USEPA Method 8270D[1]

Sample ID	SL7-20-NW-101309	SL7-20-SW-101309	SL7-28-E-101309	SL7-50-N-101309	SL7-50-E-101309	SL7-50-S-101309	SL7-50-W-101309	SL8-2-N-101309	SL8-2-N-101309D	SL8-2-E-101309
Units	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Low Molecular Weight Polycyclic Aromatic Hydrocarbons										
Acenaphthylene	460	2300	3800	550	1100	1600	620	1300	700	670
Acenaphthene	61 U	190 U	190 U	62 U	63 U	180 U	62 U	140	61 U	64 U
Anthracene	370	2000	3200	400	620	1600	450	1300	520	510
Fluorene	92	420	590	110	200	360	150	870	140	170
Naphthalene	640	2600	5700	590	980	2200	1400	1400	1200	1100
Phenanthrene	1500	7200	8600	2000	2600	7000	3000	7500	2000	2300
2-Methylnaphthalene	180	670	1500	190	310	590	300	680	480	500
Total LPAH	3062	14520	21890	3650	5500	12760	5620	12510	4560	4750
High Molecular Weight Polycyclic Aromatic Hydrocarbons										
Benzo(a)anthracene	2100	15000	15000	2300	4400	10000	2100	3000	1700	1900
Benzo(b)fluoranthene	3200	14000	22000	3800	5200	15000	3600	3000	2300	2200
Benzo(k)fluoranthene	3200	14000	22000	3800	5200	15000	3600	3000	2300	2200
Benzofluoranthenes (total)	6400	28000	44000	7600	10400	30000	7200	6000	4600	4400
Benzo(a)pyrene	4100	22000	33000	4700	7500	16000	4500	4200	3000	3100
Benzo(g,h,i)perylene	4100	17000	12000	4600	12000	14000	4400	1600	1200	1100
Chrysene	2600	15000	22000	2900	5200	13000	3000	3400	2200	2300
Dibenzo(a,h)anthracene	450	2600	3000	530	1100	1800	510	480	340	370
Fluoranthene	4900	31000	35000	5000	7600	25000	5500	8400	3300	3600
Indeno(1,2,3-cd)pyrene	3400	16000	11000	3900	9200	14000	4300	1500	1200	1200
Pyrene	6500	41000	44000	6500	11000	32000	7200	8300	3800	4000
Total HPAH	34550	187600	219000	38030	68400	155800	38710	36880	21340	21970
Total PAH	37612	202120	240890	41680	73900	168560	44330	49390	25900	26720
Phthalates										
bis(2-ethylhexyl)phthalate	140	300	590	150	310	370	150	260	260	300
Butyl benzyl phthalate	61 U	190 U	190 U	62 U	63 U	180 U	62 U	61 U	61 U	64 U
Di-n-butyl phthalate	61 U	190 U	190 U	62 U	63 U	180 U	62 U	61 U	61 U	64 U
Di-n-octyl phthalate	61 U	190 U	190 U	62 U	63 U	180 U	62 U	61 U	61 U	64 U
Diethylphthalate	61 U	190 U	190 U	62 U	63 U	180 U	62 U	61 U	61 U	64 U
Dimethyl phthalate	61 U	190 U	190 U	62 U	63 U	180 U	62 U	61 U	61 U	64 U
Miscellaneous Semivolatile Organic Compounds										
1,2,4-Trichlorobenzene	61 U	190 U	190 U	62 U	63 U	180 U	62 U	61 U	61 U	64 U
1,2-Dichlorobenzene	61 U	190 U	190 U	62 U	63 U	180 U	62 U	61 U	61 U	64 U
1,3-Dichlorobenzene	61 U	190 U	190 U	62 U	63 U	180 U	62 U	61 U	61 U	64 U
1,4-Dichlorobenzene	61 U	190 U	190 U	62 U	63 U	180 U	62 U	61 U	61 U	64 U
1-Methylnaphthalene	100	310	540	110	160	280	200	500	270	310
2,4,5-Trichlorophenol	310 U	960 U	950 U	310 U	310 U	920 U	310 U	300 U	310 U	320 U
2,4,6-Trichlorophenol	310 U	960 U	950 U	310 U	310 U	920 U	310 U	300 U	310 U	320 U
2,4-Dichlorophenol	310 U	960 U	950 U	310 U	310 U	920 U	310 U	300 U	310 U	320 U
2,4-Dimethylphenol	61 U	190 U	190 U	62 U	63 U	180 U	62 U	61 U	61 U	64 U
2,4-Dinitrophenol	610 U	1900 U	1900 U	620 U	630 U	1800 U	620 U	610 U	610 U	640 U
2,4-Dinitrotoluene	310 U	960 U	950 U	310 U	310 U	920 U	310 U	300 U	310 U	320 U
2,6-Dinitrotoluene	310 U	960 U	950 U	310 U	310 U	920 U	310 U	300 U	310 U	320 U
2-Chloronaphthalene	61 U	190 U	190 U	62 U	63 U	180 U	62 U	61 U	61 U	64 U
2-Chlorophenol	61 U	190 U	190 U	62 U	63 U	180 U	62 U	61 U	61 U	64 U
2-Methylphenol	61 U	190 U	190 U	62 U	63 U	180 U	62 U	61 U	61 U	64 U
2-Nitroaniline	310 U	960 U	950 U	310 U	310 U	920 U	310 U	300 U	310 U	320 U
2-Nitrophenol	61 U	190 U	190 U	62 U	63 U	180 U	62 U	61 U	61 U	64 U
3,3'-Dichlorobenzidine	310 U	960 U	950 U	310 U	310 U	920 U	310 U	300 U	310 U	320 U
3-Nitroaniline	310 U	960 U	950 U	310 U	310 U	920 U	310 U	300 U	310 U	320 U
4,6-Dinitro-o-cresol	610 U	1900 U	1900 U	620 U	630 U	1800 U	620 U	610 U	610 U	640 U
4-Bromophenyl phenyl ether	61 U	190 U	190 U	62 U	63 U	180 U	62 U	61 U	61 U	64 U

Table 2
Surface Soil Analytical Results
Semivolatile Organic Compounds by USEPA Method 8270D[1]

Sample ID	SL7-20-NW-101309	SL7-20-SW-101309	SL7-28-E-101309	SL7-50-N-101309	SL7-50-E-101309	SL7-50-S-101309	SL7-50-W-101309	SL8-2-N-101309	SL8-2-N-101309D	SL8-2-E-101309
Units	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Miscellaneous Semivolatile Organic Compounds (continued)										
4-Chloro-3-methylphenol	310 U	960 U	950 U	310 U	310 U	920 U	310 U	300 U	310 U	320 U
4-Chloroaniline	310 U	960 U	950 U	310 U	310 U	920 U	310 U	300 U	310 U	320 U
4-Chlorophenyl phenyl ether	61 U	190 U	190 U	62 U	63 U	180 U	62 U	61 U	61 U	64 U
4-Methylphenol	61 U	190 U	190 U	62 U	63 U	180 U	62 U	61 U	61 U	64 U
4-Nitroaniline	310 U	960 U	950 U	310 U	310 U	920 U	310 U	300 U	310 U	320 U
4-Nitrophenol	310 U	960 U	950 U	310 U	310 U	920 U	310 U	300 U	310 U	320 U
Benzoic acid	610 U	1900 U	1900 U	620 U	630 U	1800 U	620 U	610 U	610 U	640 U
Benzyl alcohol	310 U	960 U	950 U	310 U	310 U	920 U	310 U	300 U	310 U	320 U
bis(2-chloroethoxy)methane	61 U	190 U	190 U	62 U	63 U	180 U	62 U	61 U	61 U	64 U
bis(2-chloroethyl)ether	61 U	190 U	190 U	62 U	63 U	180 U	62 U	61 U	61 U	64 U
bis-chloroisopropyl ether	61 U	190 U	190 U	62 U	63 U	180 U	62 U	61 U	61 U	64 U
Carbazole	*71*	*270*	*530*	*97*	*110*	*220*	*89*	*560*	*100*	*100*
Dibenzofuran	61 U	190 U	*360*	62 U	63 U	180 U	62 U	*360*	*96*	*96*
Hexachlorobenzene	61 U	190 U	190 U	62 U	63 U	180 U	62 U	61 U	61 U	64 U
Hexachlorobutadiene	61 U	190 U	190 U	62 U	63 U	180 U	62 U	61 U	61 U	64 U
Hexachlorocyclopentadiene	310 U	960 U	950 U	310 U	310 U	920 U	310 U	300 U	310 U	320 U
Hexachloroethane	61 U	190 U	190 U	62 U	63 U	180 U	62 U	61 U	61 U	64 U
Isophorone	61 U	190 U	190 U	62 U	63 U	180 U	62 U	61 U	61 U	64 U
Nitrobenzene	61 U	190 U	190 U	62 U	63 U	180 U	62 U	61 U	61 U	64 U
N-Nitroso-di-n-propylamine	310 U	960 U	950 U	310 U	310 U	920 U	310 U	300 U	310 U	320 U
N-Nitrosodiphenylamine	61 U	190 U	190 U	62 U	63 U	180 U	62 U	61 U	61 U	64 U
Pentachlorophenol	310 U	960 U	950 U	310 U	310 U	920 U	310 U	300 U	*5900*	320 U
Phenol	61 U	190 U	190 U	62 U	63 U	180 U	62 U	61 U	61 U	64 U

Notes:

Italics Indicates detected concentrations.

1 All samples were collected on 10/13/2009 at a depth of 0 to 2 inches.

Abbreviations:

HPAH High molecular weight polycyclic aromatic hydrocarbons
LPAH Low molecular weight polycyclic aromatic hydrocarbons
SVOC Semivolatile organic compound
USEPA U.S. Environmental Protection Agency

Lab Qualifier:

U Indicates the compound was undetected at the reported concentration.

Table 2
Surface Soil Analytical Results
Semivolatile Organic Compounds by USEPA Method 8270D[1]

Sample ID	SL8-2-S-101309	SL8-2-W-101309	SL8-20-NE-101309	SL8-20-NW-101309	SL8-20-SE-101309	SL8-20-SW-101309	SL8-50-N-101309	SL8-50-E-101309	SL8-70-NW-101309
Units	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Low Molecular Weight Polycyclic Aromatic Hydrocarbons									
Acenaphthylene	500	700	1300	1100	370	1200	370	5000	840
Acenaphthene	64 U	66 U	62 U	63 U	61 U	64 U	62 U	190 U	62 U
Anthracene	440	520	680	640	250	770	260	4300	550
Fluorene	140	180	290	200	100	280	100	2100	200
Naphthalene	770	1100	1100	1100	410	1700	390	2800	690
Phenanthrene	1800	2300	4600	3200	1300	4200	1400	24000	3400
2-Methylnaphthalene	380	480	680	390	230	860	140	1700	260
Total LPAH	3650	4800	7970	6240	2430	8150	2520	38200	5680
High Molecular Weight Polycyclic Aromatic Hydrocarbons									
Benzo(a)anthracene	1900	2100	3000	4300	1300	4000	1200	12000	3800
Benzo(b)fluoranthene	2100	2500	3800	4200	1200	3800	1200	9800	4300
Benzo(k)fluoranthene	2100	2500	3800	4200	1200	3800	1200	9800	4300
Benzofluoranthenes (total)	4200	5000	7600	8400	2400	7600	2400	19600	8600
Benzo(a)pyrene	3100	3400	5100	6000	2100	6200	2300	16000	6700
Benzo(g,h,i)perylene	1500	1500	3400	6600	1200	4500	1600	14000	8200
Chrysene	2300	2600	3900	4500	1400	5200	1600	16000	4900
Dibenzo(a,h)anthracene	510	520	550	720	230	1100	200	2000	880
Fluoranthene	3500	3900	6000	7000	2400	7800	2900	26000	8600
Indeno(1,2,3-cd)pyrene	1600	1600	3100	5300	1200	4200	1400	13000	4400
Pyrene	4100	4500	9000	8000	3100	10000	3500	32000	11000
Total HPAH	22710	25120	41650	50820	15330	50600	17100	150600	57080
Total PAH	26360	29920	49620	57060	17760	58750	19620	188800	62760
Phthalates									
bis(2-ethylhexyl)phthalate	630	240	250	340	140	690	150	680	330
Butyl benzyl phthalate	64 U	66 U	62 U	63 U	61 U	64 U	62 U	190 U	62 U
Di-n-butyl phthalate	64 U	66 U	62 U	63 U	61 U	64 U	62 U	190 U	62 U
Di-n-octyl phthalate	64 U	66 U	62 U	63 U	61 U	64 U	62 U	190 U	62 U
Diethylphthalate	64 U	66 U	62 U	63 U	61 U	64 U	62 U	190 U	62 U
Dimethyl phthalate	64 U	66 U	62 U	63 U	61 U	64 U	62 U	190 U	62 U
Miscellaneous Semivolatile Organic Compounds									
1,2,4-Trichlorobenzene	64 U	66 U	62 U	63 U	61 U	64 U	62 U	190 U	62 U
1,2-Dichlorobenzene	64 U	66 U	62 U	63 U	61 U	64 U	62 U	190 U	62 U
1,3-Dichlorobenzene	64 U	66 U	62 U	63 U	61 U	64 U	62 U	190 U	62 U
1,4-Dichlorobenzene	64 U	66 U	62 U	63 U	61 U	64 U	62 U	190 U	62 U
1-Methylnaphthalene	250	300	530	220	140	530	88	1400	150
2,4,5-Trichlorophenol	320 U	330 U	310 U	310 U	300 U	320 U	310 U	960 U	310 U
2,4,6-Trichlorophenol	320 U	330 U	310 U	310 U	300 U	320 U	310 U	960 U	310 U
2,4-Dichlorophenol	320 U	330 U	310 U	310 U	300 U	320 U	310 U	960 U	310 U
2,4-Dimethylphenol	64 U	66 U	62 U	63 U	61 U	64 U	62 U	190 U	62 U
2,4-Dinitrophenol	640 U	660 U	620 U	630 U	610 U	640 U	620 U	1900 U	620 U
2,4-Dinitrotoluene	320 U	330 U	310 U	310 U	300 U	320 U	310 U	960 U	310 U
2,6-Dinitrotoluene	320 U	330 U	310 U	310 U	300 U	320 U	310 U	960 U	310 U
2-Chloronaphthalene	64 U	66 U	62 U	63 U	61 U	64 U	62 U	190 U	62 U
2-Chlorophenol	64 U	66 U	62 U	63 U	61 U	64 U	62 U	190 U	62 U
2-Methylphenol	64 U	66 U	62 U	63 U	61 U	64 U	62 U	190 U	62 U
2-Nitroaniline	320 U	330 U	310 U	310 U	300 U	320 U	310 U	960 U	310 U
2-Nitrophenol	64 U	66 U	62 U	63 U	61 U	64 U	62 U	190 U	62 U
3,3'-Dichlorobenzidine	320 U	330 U	310 U	310 U	300 U	320 U	310 U	960 U	310 U
3-Nitroaniline	320 U	330 U	310 U	310 U	300 U	320 U	310 U	960 U	310 U
4,6-Dinitro-o-cresol	640 U	660 U	620 U	630 U	610 U	640 U	620 U	1900 U	620 U
4-Bromophenyl phenyl ether	64 U	66 U	62 U	63 U	61 U	64 U	62 U	190 U	62 U

Table 2
Surface Soil Analytical Results
Semivolatile Organic Compounds by USEPA Method 8270D[1]

Sample ID	SL8-2-S-101309	SL8-2-W-101309	SL8-20-NE-101309	SL8-20-NW-101309	SL8-20-SE-101309	SL8-20-SW-101309	SL8-50-N-101309	SL8-50-E-101309	SL8-70-NW-101309
Units	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Miscellaneous Semivolatile Organic Compounds (continued)									
4-Chloro-3-methylphenol	320 U	330 U	310 U	310 U	300 U	320 U	310 U	960 U	310 U
4-Chloroaniline	320 U	330 U	310 U	310 U	300 U	320 U	310 U	960 U	310 U
4-Chlorophenyl phenyl ether	64 U	66 U	62 U	63 U	61 U	64 U	62 U	190 U	62 U
4-Methylphenol	64 U	66 U	62 U	63 U	61 U	64 U	62 U	190 U	62 U
4-Nitroaniline	320 U	330 U	310 U	310 U	300 U	320 U	310 U	960 U	310 U
4-Nitrophenol	320 U	330 U	310 U	310 U	300 U	320 U	310 U	960 U	310 U
Benzoic acid	640 U	660 U	620 U	630 U	610 U	640 U	620 U	1900 U	620 U
Benzyl alcohol	320 U	330 U	310 U	310 U	300 U	320 U	310 U	960 U	310 U
bis(2-chloroethoxy)methane	64 U	66 U	62 U	63 U	61 U	64 U	62 U	190 U	62 U
bis(2-chloroethyl)ether	64 U	66 U	62 U	63 U	61 U	64 U	62 U	190 U	62 U
bis-chloroisopropyl ether	64 U	66 U	62 U	63 U	61 U	64 U	62 U	190 U	62 U
Carbazole	83	100	100	140	61 U	200	62 U	1300	140
Dibenzofuran	81	99	75	83	61 U	140	62 U	480	62 U
Hexachlorobenzene	64 U	66 U	62 U	63 U	61 U	64 U	62 U	190 U	62 U
Hexachlorobutadiene	64 U	66 U	62 U	63 U	61 U	64 U	62 U	190 U	62 U
Hexachlorocyclopentadiene	320 U	330 U	310 U	310 U	300 U	320 U	310 U	960 U	310 U
Hexachloroethane	64 U	66 U	62 U	63 U	61 U	64 U	62 U	190 U	62 U
Isophorone	64 U	66 U	62 U	63 U	61 U	64 U	62 U	190 U	62 U
Nitrobenzene	64 U	66 U	62 U	63 U	61 U	64 U	62 U	190 U	62 U
N-Nitroso-di-n-propylamine	320 U	330 U	310 U	310 U	300 U	320 U	310 U	960 U	310 U
N-Nitrosodiphenylamine	64 U	66 U	62 U	63 U	61 U	64 U	62 U	190 U	62 U
Pentachlorophenol	320 U	330 U	310 U	310 U	300 U	320 U	310 U	960 U	310 U
Phenol	64 U	66 U	62 U	63 U	61 U	64 U	62 U	190 U	62 U

Notes:

Italics Indicates detected concentrations.

1 All samples were collected on 10/13/2009 at a depth of 0 to 2 inches.

Abbreviations:

HPAH High molecular weight polycyclic aromatic hydrocarbons
LPAH Low molecular weight polycyclic aromatic hydrocarbons
SVOC Semivolatile organic compound
USEPA U.S. Environmental Protection Agency

Lab Qualifier:

U Indicates the compound was undetected at the reported concentration.

Table 3
Catch Basin Solids Analytical Results

Analytes	SL14-101409
Metals (USEPA Method 6010B)	**mg/kg**
Arsenic	10 U
Cadmium	*0.9*
Chromium	*47*
Copper	*73.9*
Lead	*68*
Mercury[1]	*0.25*
Silver	0.8 U
Zinc	*428*
Polychlorinated Biphenyls (USEPA Method 8082)	**µg/kg**
Aroclor 1016	33 U
Aroclor 1221	33 U
Aroclor 1232	33 U
Aroclor 1242	33 U
Aroclor 1248	33 U
Aroclor 1254	33 U
Aroclor 1260	33 U
Semivolatile Organic Compounds (USEPA Method 8270D)	**µg/kg**
2,4,5-Trichlorophenol	640 U
2,4,6-Trichlorophenol	640 U
2,4-Dichlorophenol	640 U
2,4-Dimethylphenol	130 U
2,4-Dinitrophenol	1300 U
2-Chloronaphthalene	130 U
2-Chlorophenol	130 U
2-Methylphenol	130 U
2-Nitrophenol	640 U
4,6-Dinitro-o-cresol	1300 U
4-Chloro-3-methylphenol	640 U
4-Methylphenol	*1400*
4-Nitrophenol	640 U
Benzoic Acid	1300 U
Benzyl Alcohol	640 U
bis(2-Chloroethoxy)methane	130 U
bis-Chloroisopropyl ether	130 U
Carbazole	130 U
Dibenzofuran	130 U
Hexachlorobutadiene	130 U
Hexachlorocyclopentadiene	640 U
Isophorone	130 U
N-Nitroso-di-b-propylamine	640 U
N-Nitrosodiphenylamine	130 U
Pentachlorophenol	640 U
Phenol	130 U
LPAHs	**µg/kg**
Naphthalene	*480*
Acenaphthylene	*510*
Acenaphthene	130 U
Fluorene	*190*
Phenanthrene	*2100*
Anthracene	*430*
1-Methylnaphthalene	*150*
2-Methylnaphthalene	*200*
Total LPAH[2]	*3710*

Table 3
Catch Basin Solids Analytical Results

Analytes	SL14-101409
HPAHs	**µg/kg**
Fluoranthene	*7300*
Pyrene	*8400*
Benzo(a)anthracene	*2600*
Chrysene	*3600*
Benzo(b)fluoranthene	*3200*
Benzo(k)fluoranthene	*3200*
Benzofluoranthenes (total)	*6400*
Benzo(a)pyrene	*5100*
Benzo(g,h,i)perylene	*5400*
Indeno(1,2,3-cd)pyrene	*3500*
Dibenz(a,h)anthracene	*270*
Total HPAH[3]	*42570*
Total PAH	*46280*
Phthalates	**µg/kg**
bis(2-Ethylhexyl)phthalate	*6000*
Butyl benzyl phthalate	130 U
Di-n-butyl phthalate	130 U
Di-n-octyl phthalate	130 U
Diethylphthalate	130 U
Dimethyl phthalate	130 U
Volatile Organic Compounds (USEPA Method 8270D)	**µg/kg**
1,2,4-Trichlorobenzene	130 U
1,2-Dichlorobenzene	130 U
1,3-Dichlorobenzene	130 U
1,4-Dichlorobenzene	130 U
2,4-Dinitrotoluene	640 U
2,6-Dinitrotoluene	640 U
2-Nitroaniline	640 U
3,3'-Dichlorobenzidine	640 U
3-Nitroaniline	640 U
4-Bromophenyl phenyl ether	130 U
4-Chloroaniline	640 U
4-Chlorophenyl phenyl ether	130 U
4-Nitroaniline	640 U
bis(2-Chloroethyl)ether	130 U
Hexachlorobenzene	130 U
Hexachloroethane	130 U
Nitrobenzene	130 U

Notes:

Italics Indicate detected concentrations.

1 USEPA Method 7471A .

2 The total LPAH represents the sum of the following low molecular weight polynuclear aromatic compounds: naphthalene, acenapthylene, acenaphthene, fluorene, phenanthrene, and anthracene.

3 The total HPAH represents the sum of the following high molecular weight polynuclear aromatic compounds: fluroanthene, pyrene, benz(a)anthracene, chrysene, total benzofluroanthenes, benzo(a)pyrene, indeno(1,2,3,-c,d)pyrene, dibenzo(a,h)anthracene, and benzo(g,h,i)perylene.

Abbreviations:

Conc. Concentration
HPAH High molecular weight polycyclic aromatic hydrocarbon
LPAH Low molecular weight polycyclic aromatic hydrocarbon
PCB Polychlorinated biphenyl
Qual. Qualifier
USEPA U.S. Environmental Protection Agency

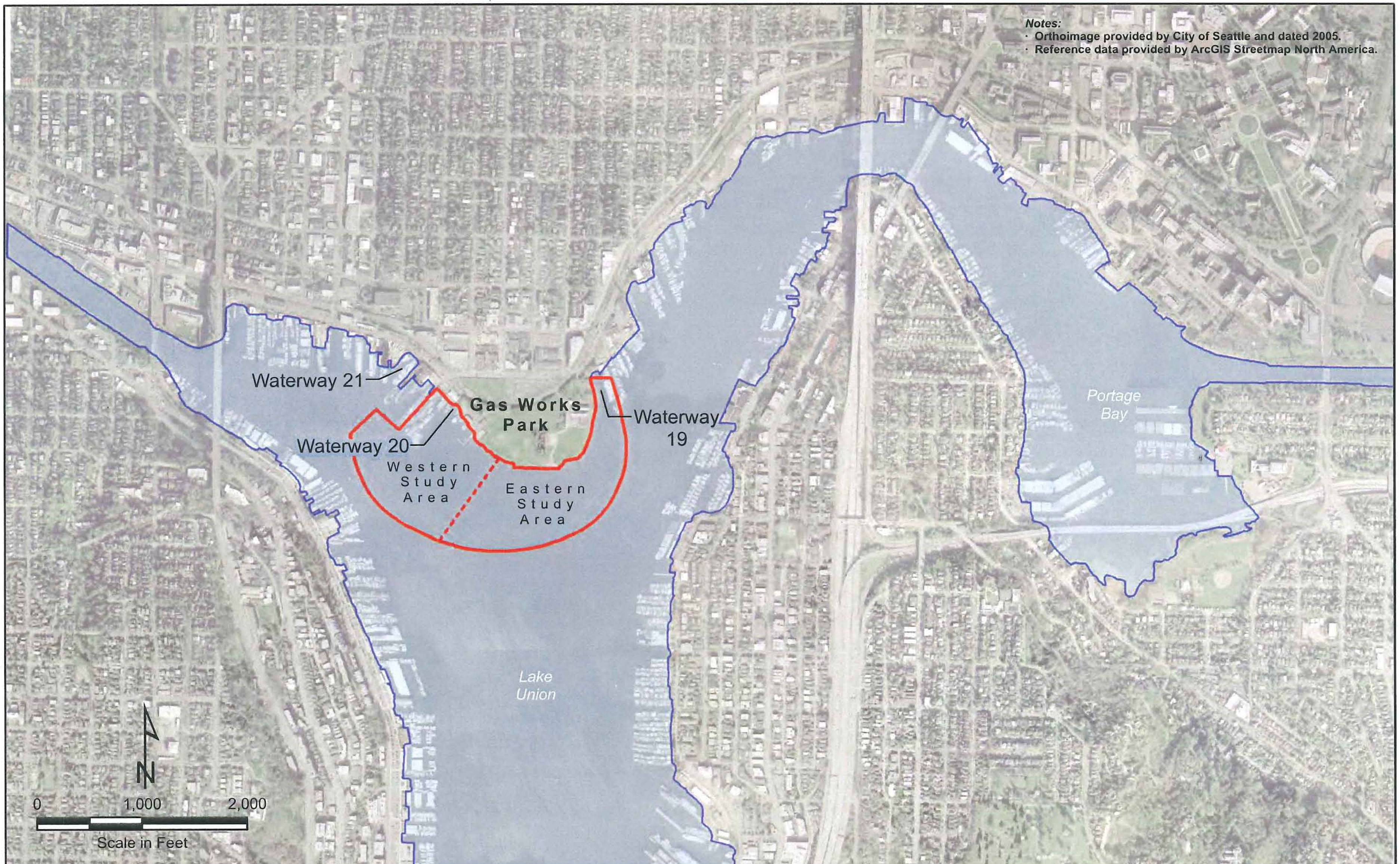
Lab Qualifier:

U Indicates the compound was undetected at the given reporting limit.

Gas Works Sediment Area

Gas Works Park Northeast Corner Source Control Data Report

Figures



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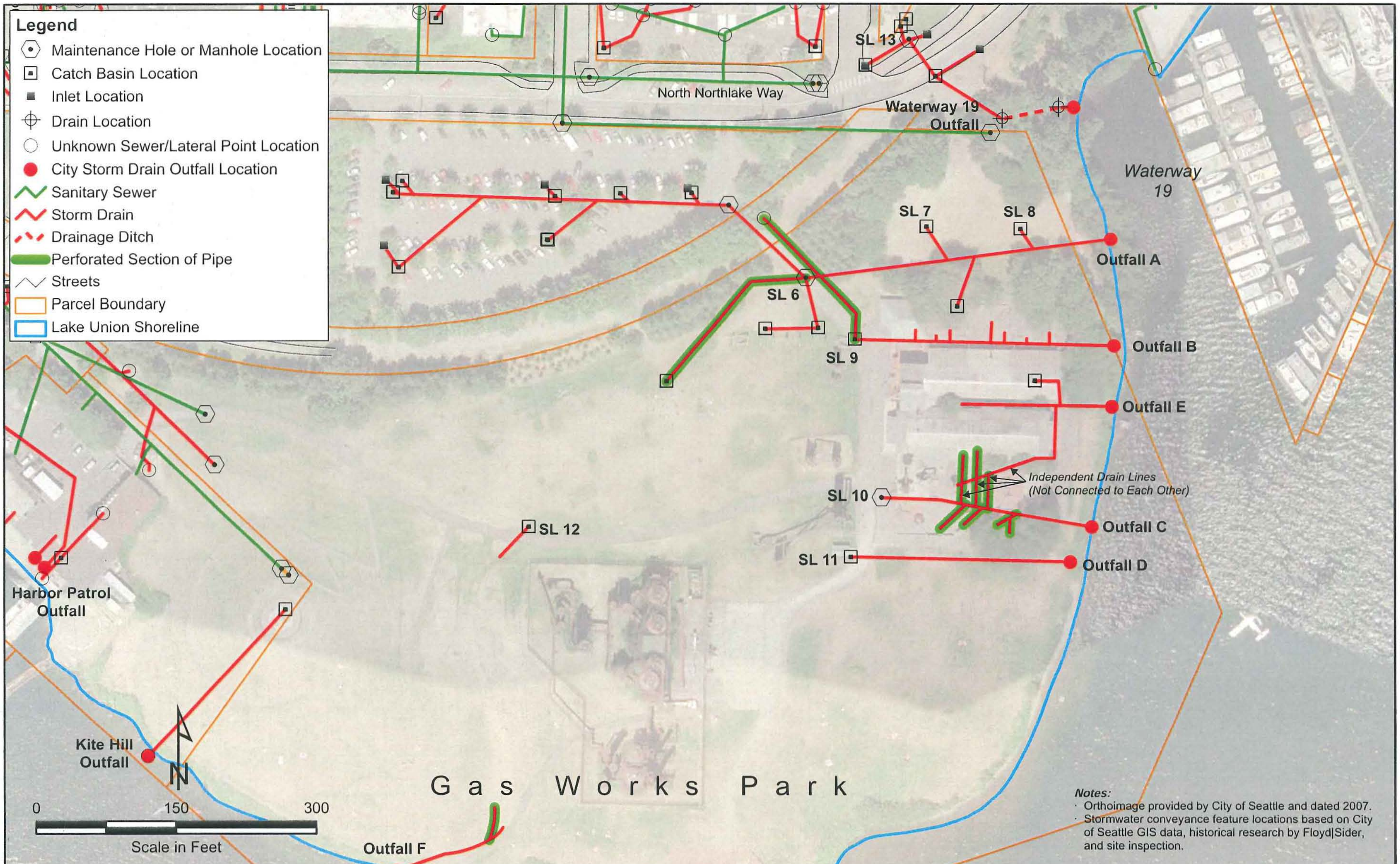
Gas Works Park Northeast Corner
Source Control Data Report
Gas Works Sediment Area
Seattle, Washington

Figure 1
Vicinity Map

File: F:\projects\COS-GWSA\GIS\Task 06020\MXD\NE Corner Data Report Jan 2010\Figure 1 (Site Vicinity Map).mxd
Date: 3/19/2010



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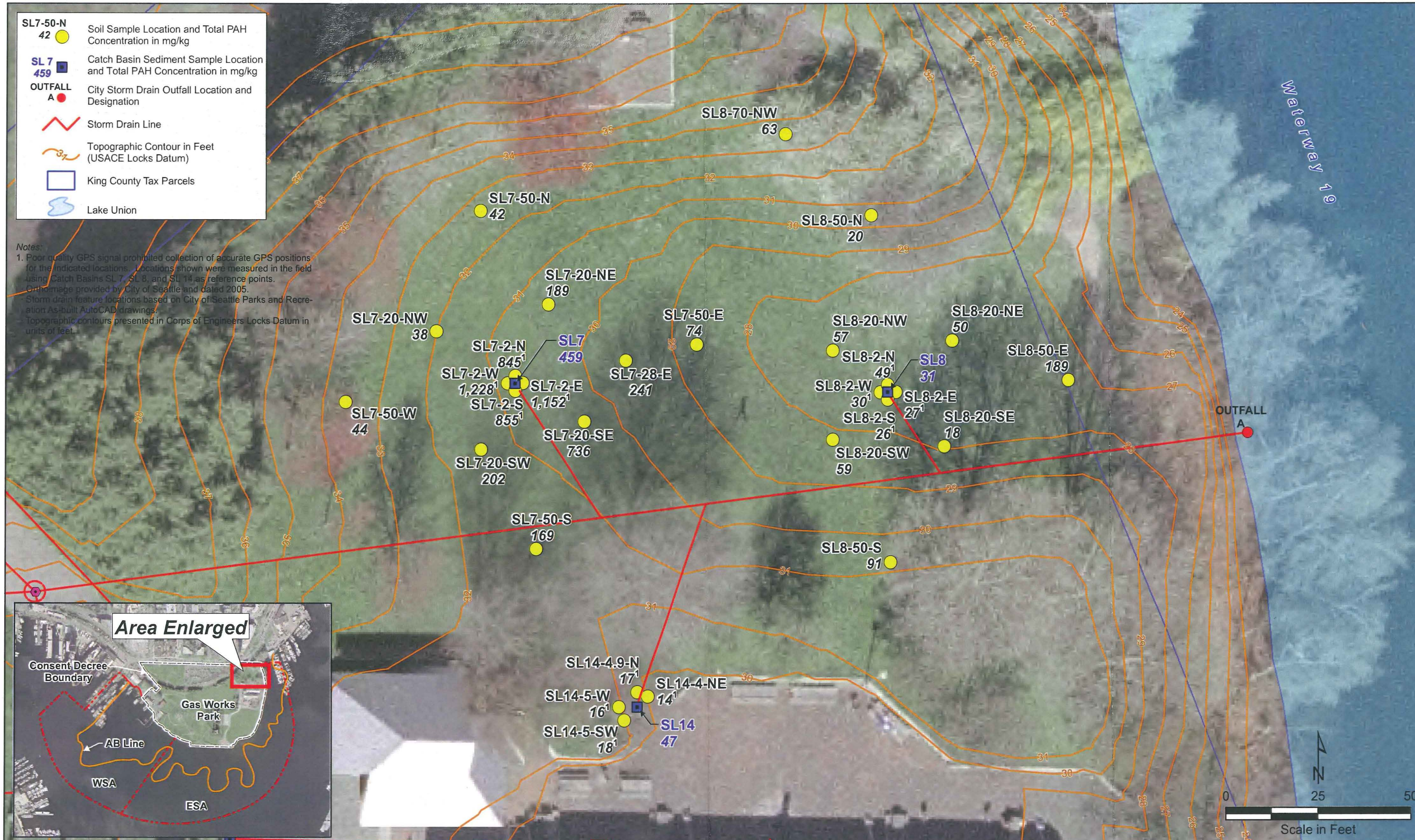
Gas Works Park Northeast Corner
Source Control Data Report
Gas Works Sediment Area
Seattle, Washington

Figure 2
Stormwater Conveyance System
East Side

File: F:\projects\COS-GWSA\GIS\Task 06020\MXD\NE Corner Data Report Jan 2010\Figure 2 (Stormwater Conveyance System -East Side - Ltr Landscape Format).mxd
Date: 3/19/2010



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Gas Works Park Northeast Corner
Source Control Data Report
Gas Works Sediment Area
Seattle, Washington

Figure 3
Total PAH Concentrations in Surface Soil and Catch Basin Sampling Locations and Results in the Vicinity of SL7, SL8, and SL14

File: F:\projects\COS-GWSA\GIS\Task 06020\MXD\NE Corner Data Report Jan 2010\Figure 3 (Oct 2009 GPS TPAH Sample Locations).mxd
Date: 3/19/2010

Gas Works Sediment Area

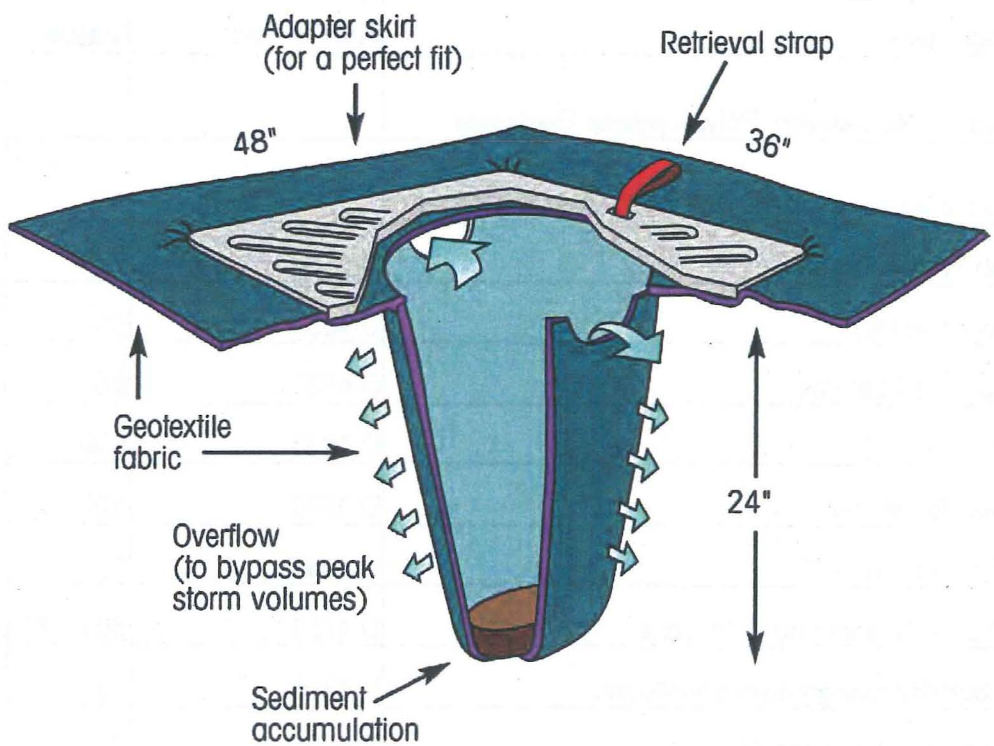
Gas Works Park Northeast Corner Source Control Data Report

Appendix A
Filter Fabric Specifications

BOWHEAD
environmental & safety

StreamGuard™ Sediment Catch Basin Insert

- Made of geotextile fabric and intended only for sediment removal
- Collects sediment and allows water to pass through freely
- Will not cause ponding
- Best for construction sites and areas prone to sediment build-up
- Capable of repeated use
- Fits catch basins up to 30" x 40"



1420 NW Gilman Blvd #2145 ~ Issaquah, WA 98027
Phone: 800.909.3677 ~ Fax: 888.234.3677
Web: shopbowhead.com

Gas Works Sediment Area

Gas Works Park Northeast Corner Source Control Data Report

Appendix B
Photographs

Field Photograph 3. Sampling locations flagged around Catch Basin SL7.

Field Photograph 4. Sample SL7-50-W.

FLOYD | SNIDER strategy • science • engineering	**Gas Works Park Northeast Corner** **Source Control Data Report** **Gas Works Park** **Seattle, Washington**	Appendix B Field Photographs 3 and 4

BOWHEAD
environmental & safety

StreamGuard™ Sediment Catch Basin Insert

- Made of geotextile fabric and intended only for sediment removal
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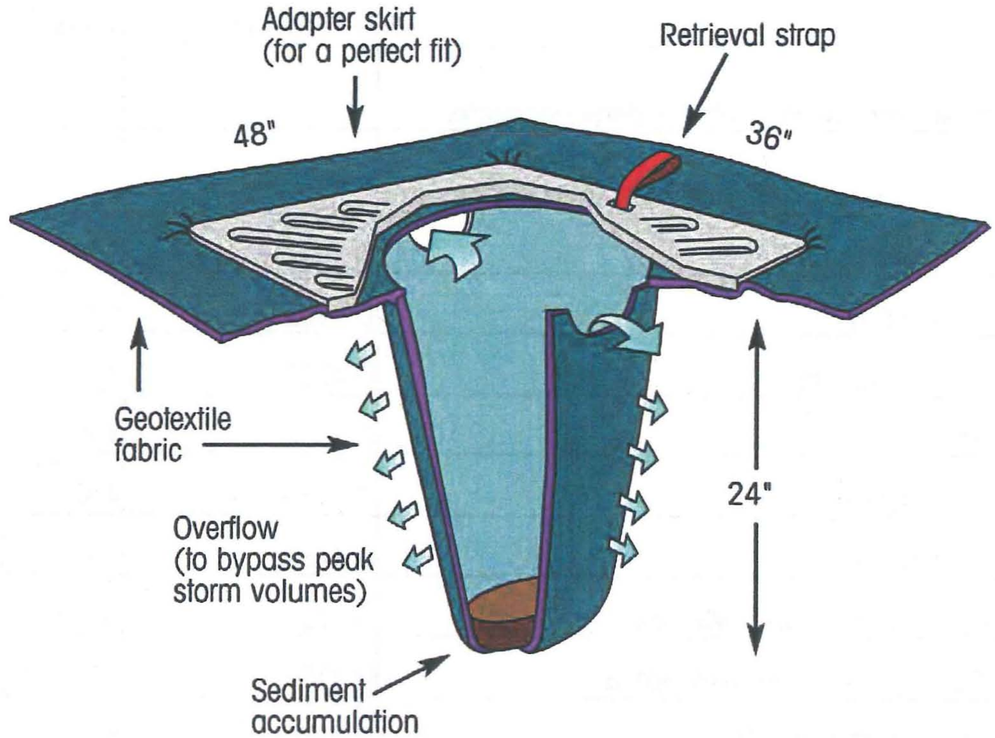
- Fits catch basins up to 30" x 40"



Gas Works Sediment Area

Gas Works Park Northeast Corner
Source Control Data Report

Appendix C
Laboratory Reports

Gas Works Sediment Area

Gas Works Park Northeast Corner Source Control Data Report

Appendix C
Laboratory Reports

Gas Works Sediment Area

Gas Works Park Northeast Corner Source Control Data Report

Appendix D
Data Validation Report

EcoChem, INC.
Environmental Data Quality

DATA VALIDATION REPORT

Gasworks COS-GWSA-05060

Prepared for:

Floyd Snider
601 Union Street, Suite 600
Seattle, WA 98101

Prepared by:

EcoChem, Inc.
710 Second Avenue, Suite 660
Seattle, Washington 98104

EcoChem Project: C15208-1

August 12, 2009

Approved for Release:

Christine Ransom
Project Manager
EcoChem, Inc.

Sample Index
Floyd/Snider - Gasworks Park

Sample ID	Laboratory ID	SVOC	PCB
SL7	09-14077-PD37A	✓	✓
SL8	09-14078-PD37B	✓	✓
Filter Bag Blank	09-14079-PD37C	✓	✓

Continuing Calibration

All values for the relative response factor (RRF) were greater than the 0.05 minimum control limit. The continuing calibration (CCAL) percent difference (%D) values were within the +/- 25% control limits, with the exceptions noted below. For outliers indicative of a high bias, positive results in the associated samples were estimated (J-5B). No action was taken for non-detects. For outliers indicative of a low bias, positive results and reporting limits were estimated (J/UJ-5B). The following outliers were noted:

CCAL 7/2/09 16:18:	nitrobenzene, 3-nitroaniline – high bias; no positive results 2,4-dinitrotoluene, indeno(123-cd)pyrene – low bias (J/UJ-5B)

Blanks

A method blank was analyzed at the proper frequency. No target analytes were detected.

One Filter Bag Blank was analyzed. Phenol and bis(2-ethylhexyl)phthalate were detected in this blank. Phenol was not detected in the field samples. The bis(2-ethylhexyl)phthalate results for samples SL7 and SL8 were less than the action level of 10 times the blank amount and were qualified as not-detected (U-6).

Surrogate Compounds

The percent recovery (%R) values for the surrogates nitrobenzene-d10 and 2-chlorophenol-d4 were less than the lower control limit in the method blank. The %R values for the surrogates nitrobenzene-d10, 2-chlorophenol-d4, 1,2-dichlorobenzene and 2-fluorophenol were less than the lower control limit in the laboratory control sample. Qualifiers are not assigned to QC samples; therefore no action was necessary.

Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) samples were not analyzed. Laboratory accuracy was evaluated using the surrogate and laboratory control sample (LCS) recoveries. Precision could not be assessed.

Internal Standards

The recoveries for the following internal standards were greater than the upper control limit of 200%:

Samples SL7, SL8: chrysene-d12, perylene-d12, di-n-octylphthalate-d4
Sample Filter Bag Blank: chrysene-d12, perylene-d12, di-octylphthalate-d4, phenanthrene-d10

The samples were re-analyzed at higher dilutions, with the result of the re-analyses supporting the original results. Both sets of data were reported. In order to report the lowest possible reporting

DATA VALIDATION REPORT
Gasworks, COS-GWSA-0560
PCB Aroclors by SW846 Method 8082
SDG: PD37

This report documents the review of analytical data from the analyses of filter bag samples and the associated laboratory quality control (QC) samples. Samples were analyzed by Analytical Resources, Inc., Tukwila, Washington. All data received a full (Level IV) validation. See the **Sample Index** for a complete list of samples for which data were reviewed.

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. EDD VERIFICATION

The electronic data deliverables were verified by comparison to the hardcopy data package. All sample results were verified. No transcription errors were found.

III. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

1	Holding Times and Sample Preservation		Internal Standards
	Initial Calibration (ICAL)		Target Analyte list
	Continuing Calibration (CCAL)	2	Reporting Limits
1	Blanks	2	Compound Identification
1	Surrogate Compounds	1	Reported Results
	Laboratory Control Samples (LCS/LCSD)	1	Calculation Verification
1	Matrix Spikes/Matrix Spike Duplicate (MS/MSD)		

[1] *Quality control results are discussed below, but no data were qualified.*
[2] *Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.*

Holding Times and Sample Preservation

The cooler was received at the laboratory with the temperature outside the recommended temperature range of 4°C ± 2°C. The temperature outlier (14.8°C) did not impact data quality; therefore no data were qualified.

Reported Results

Samples are reported as total ug for the sample size of ¼ of the filter bag. Results must be multiplied by four in order to determine the total ug in the entire bag.

Calculation Verification

Several results were verified by recalculation from the raw data. No calculation or transcription errors were noted.

IV. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory performed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate and laboratory control sample percent recovery values. Precision could not be assessed.

Data were qualified as not detected at elevated reporting limits and tentatively identified due to matrix interferences.

Data were rejected in order to report the most appropriate result from multiple analyses. Completeness is not affected as a usable result remains for all analytes in all samples.

Data that have been rejected should not be used for any purpose. All other data, as qualified, are acceptable for use.

DATA VALIDATION QUALIFIER CODES
Based on National Functional Guidelines

The following definitions provide brief explanations of the qualifiers assigned to results in the data review process.

U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
NJ	The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents the approximate concentration.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

The following is an EcoChem qualifier that may also be assigned during the data review process:

DNR	Do not report; a more appropriate result is reported from another analysis or dilution.

EcoChem Validation Guidelines for Semivolatile Analysis by GC/MS (Based on Organic NFG 1999)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature	4°C ±2°	J(+)/UJ(-) if greater than 6 deg. C (EcoChem PJ)	1
Holding Time	Water: 7 days from collection Soil: 14 days from collection Analysis: 40 days from extraction	Water: J(+)/UJ(-) if ext. > 7 and < 21 days J(+)/R(-) if ext > 21 days (EcoChem PJ) Solids/Wastes: J(+)/UJ(-) if ext. > 14 and < 42 days J(+)/R(-) if ext. > 42 days (EcoChem PJ) J(+)/UJ(-) if analysis >40 days	1
Tuning	DFTPP Beginning of each 12 hour period Method acceptance criteria	R(+/-) all analytes in all samples associated with the tune	5A
Initial Calibration (Minimum 5 stds.)	RRF > 0.05	(EcoChem PJ, see TM-06) If MDL= reporting limit: J(+)/R(-) if RRF < 0.05 If reporting limit > MDL: note in worksheet if RRF <0.05	5A
	%RSD < 30%	(EcoChem PJ, see TM-06) J(+) if %RSD > 30%	5A
Continuing Calibration (Prior to each 12 hr. shift)	RRF > 0.05	(EcoChem PJ, see TM-06) If MDL= reporting limit: J(+)/R(-) if RRF < 0.05 If reporting limit > MDL: note in worksheet if RRF ≤0.05	5B
	%D <25%	(EcoChem PJ, see TM-06) If > +/-90%: J+/R- If -90% to -26%: J+ (high bias) If 26% to 90%: J+/UJ- (low bias)	5B
Method Blank	One per matrix per batch No results > CRQL	U(+) if sample (+) result is less than CRQL and less than appropriate 5X or 10X rule (raise sample value to CRQL)	7
		U(+) if sample (+) result is greater than or equal to CRQL and less than appropriate 5X and 10X rule (at reported sample value)	7
	No TICs present	R(+) TICs using 10X rule	7
Field Blanks (Not Required)	No results > CRQL	Apply 5X/10X rule; U(+) < action level	6

EcoChem Validation Guidelines for Pesticides/PCBs by GC/ECD (Based on Organic NFG 1999 & EPA SW-846 Method 8081/8082)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature	4°C ±2°	J(+)/UJ(-) if greater than 6 deg. C (EcoChem PJ)	1
Holding Time	Water: 7 days from collection Soil: 14 days from collection Analysis: 40 days from extraction	J(+)/UJ(-) if ext/analyzed > HT J(+)/R(-) if ext/analyzed > 3X HT (EcoChem PJ)	1
Resolution Check	Beginning of ICAL Sequence Within RTW Resolution >90%	Narrate (Use Professional Judgement to qualify)	14
Instrument Performance (Breakdown)	DDT Breakdown: < 20% Endrin Breakdown: <20% Combined Breakdown: <30% Compounds within RTW	J(+) DDT NJ(+) DDD and/or DDE R(-) DDT - If (+) for either DDE or DDD J(+) Endrin NJ(+) EK and/or EA R(-) Endrin - If (+) for either EK or EA	5A
Retention Times	Surrogates: TCX (+/- 0.05); DCB (+/- 0.10) Target compounds: elute before heptachlor epoxide (+/- 0.05) elute after heptachlor epoxide (+/- 0.07)	NJ(+)/R(-) results for analytes with RT shifts For full DV, use PJ based on examination of raw data	5B
Initial Calibration	Pesticides: Low=CRQL, Mid=4X, High=16X Multiresponse - one point Calibration %RSD<20% %RSD<30% for surr; two comp. may exceed if <30% Resolution in Mix A and Mix B >90%	J(+)/UJ(-)	5A
Continuing Calibration	Alternating PEM standard and INDA/INDB standards every 12 hours (each preceeded by an inst. Blank) %D < 25% Resolution >90% in IND mixes; 100% for PEM	J(+)/UJ(-) J(+)R(-) if %D > 90% PJ for resolution	5B
Method Blank	One per matrix per batch No results > CRQL	U(+) if sample result is < CRQL and < 5X rule (raise sample value to CRQL) U(+) if sample result is > or equal to CRQL and < 5X rule (at reported sample value)	7
Instrument Blanks	Analyzed at the beginning of every 12 hour sequence No analyte > 1/2 CRQL	Same as Method Blank	7
Field Blanks	Not addressed by NFG No results > CRQL	Apply 5X rule; U(+) < action level	6

EcoChem, INC.
Environmental Data Quality

APPENDIX B
QUALIFIED DATA SUMMARY TABLE

Qualified Data Summary Table
Floyd/Snider - Gasworks Park

Sample ID	Laboratory ID	Method	Analyte	Result	Units	Lab Qualifier	DV Qualifier	DV Reason
SL7	09-14077-PD37ADL	SW8270D	4-Methylphenol	30000	ug	U	R	11
SL7	09-14077-PD37ADL	SW8270D	4-Nitroaniline	150000	ug	U	R	11
SL7	09-14077-PD37ADL	SW8270D	4-Nitrophenol	150000	ug	U	R	11
SL7	09-14077-PD37ADL	SW8270D	Acenaphthene	30000	ug	U	R	11
SL7	09-14077-PD37ADL	SW8270D	Acenaphthylene	79000	ug		R	11
SL7	09-14077-PD37ADL	SW8270D	Anthracene	72000	ug		R	11
SL7	09-14077-PD37ADL	SW8270D	Benzo(a)anthracene	400000	ug		R	11
SL7	09-14077-PD37ADL	SW8270D	Benzoic Acid	300000	ug	U	R	11
SL7	09-14077-PD37ADL	SW8270D	Benzyl Alcohol	150000	ug	U	R	11
SL7	09-14077-PD37ADL	SW8270D	bis(2-Chloroethoxy) Methane	30000	ug	U	R	11
SL7	09-14077-PD37ADL	SW8270D	Bis-(2-Chloroethyl) Ether	30000	ug	U	R	11
SL7	09-14077-PD37ADL	SW8270D	bis(2-Ethylhexyl)phthalate	30000	ug	U	R	11
SL7	09-14077-PD37ADL	SW8270D	Butylbenzylphthalate	30000	ug	U	R	11
SL7	09-14077-PD37ADL	SW8270D	Carbazole	30000	ug	U	R	11
SL7	09-14077-PD37ADL	SW8270D	Dibenz(a,h)anthracene	70000	ug		R	11
SL7	09-14077-PD37ADL	SW8270D	Dibenzofuran	30000	ug	U	R	11
SL7	09-14077-PD37ADL	SW8270D	Diethylphthalate	30000	ug	U	R	11
SL7	09-14077-PD37ADL	SW8270D	Dimethylphthalate	30000	ug	U	R	11
SL7	09-14077-PD37ADL	SW8270D	Di-n-Butylphthalate	30000	ug	U	R	11
SL7	09-14077-PD37ADL	SW8270D	Di-n-Octyl phthalate	30000	ug	U	R	11
SL7	09-14077-PD37ADL	SW8270D	Fluorene	30000	ug	U	R	11
SL7	09-14077-PD37ADL	SW8270D	Hexachlorobenzene	30000	ug	U	R	11
SL7	09-14077-PD37ADL	SW8270D	Hexachlorobutadiene	30000	ug	U	R	11
SL7	09-14077-PD37ADL	SW8270D	Hexachlorocyclopentadiene	150000	ug	U	R	11
SL7	09-14077-PD37ADL	SW8270D	Hexachloroethane	30000	ug	U	R	11
SL7	09-14077-PD37ADL	SW8270D	Isophorone	30000	ug	U	R	11
SL7	09-14077-PD37ADL	SW8270D	Naphthalene	68000	ug		R	11
SL7	09-14077-PD37ADL	SW8270D	Nitrobenzene	30000	ug	U	R	11
SL7	09-14077-PD37ADL	SW8270D	N-Nitroso-Di-N-Propylamine	150000	ug	U	R	11
SL7	09-14077-PD37ADL	SW8270D	N-Nitrosodiphenylamine	30000	ug	U	R	11
SL7	09-14077-PD37ADL	SW8270D	Pentachlorophenol	150000	ug	U	R	11
SL7	09-14077-PD37ADL	SW8270D	Phenanthrene	240000	ug		R	11
SL7	09-14077-PD37ADL	SW8270D	Phenol	30000	ug	U	R	11
SL8	09-14078-PD37B	SW8270D	2,4-Dinitrophenol	50000	ug	U	UJ	5B
SL8	09-14078-PD37B	SW8270D	Benzo(a)anthracene	110000	ug		J	19
SL8	09-14078-PD37B	SW8270D	Benzo(a)pyrene	290000	ug		J	19
SL8	09-14078-PD37B	SW8270D	Benzo(b)fluoranthene	200000	ug		J	19
SL8	09-14078-PD37B	SW8270D	Benzo(g,h,i)perylene	190000	ug		J	19
SL8	09-14078-PD37B	SW8270D	Benzo(k)fluoranthene	200000	ug		J	19
SL8	09-14078-PD37B	SW8270D	bis(2-Ethylhexyl)phthalate	53000	ug		U	6
SL8	09-14078-PD37B	SW8270D	Chrysene	190000	ug		J	19
SL8	09-14078-PD37B	SW8270D	Dibenz(a,h)anthracene	21000	ug		J	19
SL8	09-14078-PD37B	SW8270D	Indeno(1,2,3-cd)pyrene	160000	ug		J	5B,19
SL8	09-14078-PD37B	SW8270D	Pyrene	310000	ug		J	19
SL8	09-14078-PD37BDL	SW8270D	1,2,4-Trichlorobenzene	15000	ug	U	R	11
SL8	09-14078-PD37BDL	SW8270D	1,2-Dichlorobenzene	15000	ug	U	R	11
SL8	09-14078-PD37BDL	SW8270D	1,3-Dichlorobenzene	15000	ug	U	R	11
SL8	09-14078-PD37BDL	SW8270D	1,4-Dichlorobenzene	15000	ug	U	R	11
SL8	09-14078-PD37BDL	SW8270D	1-Methylnaphthalene	15000	ug	U	R	11

Qualified Data Summary Table
Floyd/Snider - Gasworks Park

Sample ID	Laboratory ID	Method	Analyte	Result	Units	Lab Qualifier	DV Qualifier	DV Reason
SL8	09-14078-PD37BDL	SW8270D	Hexachlorobutadiene	15000	ug	U	R	11
SL8	09-14078-PD37BDL	SW8270D	Hexachlorocyclopentadiene	75000	ug	U	R	11
SL8	09-14078-PD37BDL	SW8270D	Hexachloroethane	15000	ug	U	R	11
SL8	09-14078-PD37BDL	SW8270D	Indeno(1,2,3-cd)pyrene	140000	ug		R	11
SL8	09-14078-PD37BDL	SW8270D	Isophorone	15000	ug	U	R	11
SL8	09-14078-PD37BDL	SW8270D	Naphthalene	22000	ug		R	11
SL8	09-14078-PD37BDL	SW8270D	Nitrobenzene	15000	ug	U	R	11
SL8	09-14078-PD37BDL	SW8270D	N-Nitroso-Di-N-Propylamine	75000	ug	U	R	11
SL8	09-14078-PD37BDL	SW8270D	N-Nitrosodiphenylamine	15000	ug	U	R	11
SL8	09-14078-PD37BDL	SW8270D	Pentachlorophenol	75000	ug	U	R	11
SL8	09-14078-PD37BDL	SW8270D	Phenanthrene	75000	ug		R	11
SL8	09-14078-PD37BDL	SW8270D	Phenol	15000	ug	U	R	11
SL8	09-14078-PD37BDL	SW8270D	Pyrene	320000	ug		R	11
Filter Bag Blank	09-14079-PD37C	SW8270D	2,4-Dinitrophenol	10000	ug	U	UJ	5B
Filter Bag Blank	09-14079-PD37C	SW8270D	Di-n-Butylphthalate	15000	ug	Y	U	22
Filter Bag Blank	09-14079-PD37C	SW8270D	Indeno(1,2,3-cd)pyrene	1000	ug	U	UJ	5B
Filter Bag Blank	09-14079-PD37C	SW8270D	Phenanthrene	1000	ug	Y	U	22
Filter Bag Blank	09-14079-PD37CDL	SW8270D	1,2,4-Trichlorobenzene	15000	ug	U	R	11
Filter Bag Blank	09-14079-PD37CDL	SW8270D	1,2-Dichlorobenzene	15000	ug	U	R	11
Filter Bag Blank	09-14079-PD37CDL	SW8270D	1,3-Dichlorobenzene	15000	ug	U	R	11
Filter Bag Blank	09-14079-PD37CDL	SW8270D	1,4-Dichlorobenzene	15000	ug	U	R	11
Filter Bag Blank	09-14079-PD37CDL	SW8270D	1-Methylnaphthalene	15000	ug	U	R	11
Filter Bag Blank	09-14079-PD37CDL	SW8270D	2,2'-Oxybis(1-Chloropropane)	15000	ug	U	R	11
Filter Bag Blank	09-14079-PD37CDL	SW8270D	2,4,5-Trichlorophenol	75000	ug	U	R	11
Filter Bag Blank	09-14079-PD37CDL	SW8270D	2,4,6-Trichlorophenol	75000	ug	U	R	11
Filter Bag Blank	09-14079-PD37CDL	SW8270D	2,4-Dichlorophenol	75000	ug	U	R	11
Filter Bag Blank	09-14079-PD37CDL	SW8270D	2,4-Dimethylphenol	15000	ug	U	R	11
Filter Bag Blank	09-14079-PD37CDL	SW8270D	2,4-Dinitrophenol	150000	ug	U	R	11
Filter Bag Blank	09-14079-PD37CDL	SW8270D	2,4-Dinitrotoluene	75000	ug	U	R	11
Filter Bag Blank	09-14079-PD37CDL	SW8270D	2,6-Dinitrotoluene	75000	ug	U	R	11
Filter Bag Blank	09-14079-PD37CDL	SW8270D	2-Chloronaphthalene	15000	ug	U	R	11
Filter Bag Blank	09-14079-PD37CDL	SW8270D	2-Chlorophenol	15000	ug	U	R	11
Filter Bag Blank	09-14079-PD37CDL	SW8270D	2-Methylnaphthalene	15000	ug	U	R	11
Filter Bag Blank	09-14079-PD37CDL	SW8270D	2-Methylphenol	15000	ug	U	R	11
Filter Bag Blank	09-14079-PD37CDL	SW8270D	2-Nitroaniline	75000	ug	U	R	11
Filter Bag Blank	09-14079-PD37CDL	SW8270D	2-Nitrophenol	75000	ug	U	R	11
Filter Bag Blank	09-14079-PD37CDL	SW8270D	3,3'-Dichlorobenzidine	75000	ug	U	R	11
Filter Bag Blank	09-14079-PD37CDL	SW8270D	3-Nitroaniline	75000	ug	U	R	11
Filter Bag Blank	09-14079-PD37CDL	SW8270D	4,6-Dinitro-2-Methylphenol	150000	ug	U	R	11
Filter Bag Blank	09-14079-PD37CDL	SW8270D	4-Bromophenyl-phenylether	15000	ug	U	R	11
Filter Bag Blank	09-14079-PD37CDL	SW8270D	4-Chloro-3-methylphenol	75000	ug	U	R	11
Filter Bag Blank	09-14079-PD37CDL	SW8270D	4-Chloroaniline	75000	ug	U	R	11
Filter Bag Blank	09-14079-PD37CDL	SW8270D	4-Chlorophenyl-phenylether	15000	ug	U	R	11
Filter Bag Blank	09-14079-PD37CDL	SW8270D	4-Methylphenol	15000	ug	U	R	11
Filter Bag Blank	09-14079-PD37CDL	SW8270D	4-Nitroaniline	75000	ug	U	R	11
Filter Bag Blank	09-14079-PD37CDL	SW8270D	4-Nitrophenol	75000	ug	U	R	11
Filter Bag Blank	09-14079-PD37CDL	SW8270D	Acenaphthene	15000	ug	U	R	11
Filter Bag Blank	09-14079-PD37CDL	SW8270D	Acenaphthylene	15000	ug	U	R	11
Filter Bag Blank	09-14079-PD37CDL	SW8270D	Anthracene	15000	ug	U	R	11

Gas Works Sediment Area

Gas Works Park Northeast Corner Source Control Data Report

Appendix E
Field Sampling Logs

FLOYD | SNIDER

Soil Sample Collection Form

Sample ID: SL7-2-N-101309

Date: 10/13/09

Project Name: SL7 & SL8 Drainage Basin Sampling

Time: 11:20

Client: Seattle Public Utilities

Weather: overcast

Collected By: M. McCullough / A. McKay

GPS Coordinates:

Location Description (catch basin, direction, distance):
2' N of SL-7.

Ground Surface Description: heavily vegetated w/ Clover + grass.

Sample Description (color, grain size, density, moisture, odor, etc.):
med. grey fine sand w/ silt, mod. dense, dry to damp. No odor. larger roots.

Analytical Sample Information

Jars Filled (type, size): 1x 16 oz plastic 1x16 oz WMG

Analyses: SVOA, PCBs Metals GS

Archive?: Y – PCBs Metals GS

FLOYD | SNIDER

Soil Sample Collection Form

Sample ID: SL7-2-S-101309

Date: 10/13/09

Project Name: SL7 & SL8 Drainage Basin Sampling

Time: 10:56

Client: Seattle Public Utilities

Weather: overcast

Collected By: M. McCullough / A. McKay

GPS Coordinates:

Location Description (catch basin, direction, distance): 2-ft S. of catchbasin SL-7.

Ground Surface Description: heavily vegetated, no bare spots

Sample Description (color, grain size, density, moisture, odor, etc.):
Med. to dark grey silty fine SAND, loose, damp to moist, no odor.

Analytical Sample Information

Jars Filled (type, size): 1x16oz plastic 1x16oz WMG

Analyses: PCBs, Metals, SVOA, GS

Archive?: Yes- PCB, Metal, GS.

FLOYD | SNIDER

Soil Sample Collection Form

Sample ID: SL7-2-E-101309

Date: 10/13/09

Project Name: SL7 & SL8 Drainage Basin Sampling

Time: 11:25

Client: Seattle Public Utilities

Weather: overcast

Collected By: M. McCullough / A. McKay

GPS Coordinates:

Location Description (catch basin, direction, distance): 2-ft E. of SL7.

Ground Surface Description: Heavily vegetated w/ clover + grass.

Sample Description (color, grain size, density, moisture, odor, etc.): med. to dark gry, fine SAND w/ silt + clay. damp, loose, worms, No odor. Material at surface plastic - CLAY. Same color, no odor. washes off w/ water. roots + worms.

Analytical Sample Information

Jars Filled (type, size): 1 x 16 oz plastic 1x 16oz WMG

Analyses: SVOA, PCB, Metal, GS

Archive?: Y - PCB, Metal, GS.

FLOYD | SNIDER

Soil Sample Collection Form

Sample ID: SL7-2-W-101309

Date: 10/13/09

Project Name: SL7 & SL8 Drainage Basin Sampling

Time: 11:05

Client: Seattle Public Utilities

Weather: overcast.

Collected By: M. McCullough / A. McKay

GPS Coordinates:

Location Description (catch basin, direction, distance): 2' west of catch basin SL-7.

Ground Surface Description: heavily vegetated, grass + clover

Sample Description (color, grain size, density, moisture, odor, etc.): med. to dark gray fine silty sand. roots, loose, damp. no odor

Analytical Sample Information

Jars Filled (type, size): 1x 16 oz plastic 1x 16oz WMG

Analyses: SVOA, PCBs, Metals, GS

Archive?: PCBs, Metals, GS.

FLOYD | SNIDER

Soil Sample Collection Form

Sample ID: SL7-20-NE-101309

Date: 10/13/09

Project Name: SL7 & SL8 Drainage Basin Sampling

Time: 10:28

Client: Seattle Public Utilities

Weather: overcast

Collected By: M. McCullough / A. McKay

GPS Coordinates: on trimble

Location Description (catch basin, direction, distance): 20-ft NE of SL-7, in open field.

Ground Surface Description: well vegetated, grass + clover, few small semi-bare spots surrounding.

Sample Description (color, grain size, density, moisture, odor, etc.): med. brownish grey, fine sand w/ silt. Grass roots, dense, damp, no odor.

Analytical Sample Information

Jars Filled (type, size): 1 x 16oz plastic, 1x 16 oz. WMG

Analyses: SVOA, PCBs, Metals, Grain Size

Archive?: Yes - Grain Size, PCBs, Metals

FLOYD | SNIDER

Soil Sample Collection Form

Sample ID: SL7-20-NW-101309

Date: 10/13/09

Project Name: SL7 & SL8 Drainage Basin Sampling

Time: 1010

Client: Seattle Public Utilities

Weather: cloudy, cold

Collected By: M. McCullough / A. McKay

GPS Coordinates:

Location Description (catch basin, direction, distance): SL7, 20 ft, North west uphill

Ground Surface Description: grassy - 100% vegetated, some leaves and twigs

Sample Description (color, grain size, density, moisture, odor, etc.): light brown, fine sand, loose, dry, no odor, fine grass roots, some large grass roots, w some fine silt

Analytical Sample Information

Jars Filled (type, size): 1 16oz plastic, 1 16oz glass

Analyses: SVOA, PCB, metals, grain size

Archive?: PCB, metals, grain size

FLOYD | SNIDER

Soil Sample Collection Form

Sample ID: SL7-20-SE-101309

Date: 10/13/09

Project Name: SL7 & SL8 Drainage Basin Sampling

Time: 10:46

Client: Seattle Public Utilities

Weather: overcast

Collected By: M. McCullough / A. McKay

GPS Coordinates:

Location Description (catch basin, direction, distance): 20' SE of SL7 - in meadow.

Ground Surface Description: 90% vegetated w/ small bare spots. Sample from bare spot.

Sample Description (color, grain size, density, moisture, odor, etc.): med. grey fine SILTY SAND. med. dense, damp to moist, worms, no odor.

Analytical Sample Information

Jars Filled (type, size): 1x16 oz plastic, 1x16 oz. glass

Analyses: SVOA, PCB, Metals, GS

Archive?: Y - GS, PCBs, Metals.

FLOYD | SNIDER

Soil Sample Collection Form

Sample ID: SL7-20-SW-101309

Date: 10/13/09

Project Name: SL7 & SL8 Drainage Basin Sampling

Time:

Client: Seattle Public Utilities

Weather: cloudy, cold

Collected By: M. McCullough / A. McKay

GPS Coordinates:

Location Description (catch basin, direction, distance): SL7, 20 ft Southwest, uphill.

Ground Surface Description: grassy - all vegetated, some leaves

Sample Description (color, grain size, density, moisture, odor, etc.): dark brown, fine sand w/ some fine silt, dense, moist, no odor fat worm, some grass roots ending at 2 in depth

Analytical Sample Information

Jars Filled (type, size): 1 16 oz plastic, 1 16oz glass

Analyses: SVOA, PCB, Metals, grain size

Archive?: PCB, Metals, grain size

FLOYD | SNIDER

Soil Sample Collection Form

Sample ID: SL7-28-E-101309

Date: 10/13/09

Project Name: SL7 & SL8 Drainage Basin Sampling

Time: 16:00

Client: Seattle Public Utilities

Weather: partly cloudy

Collected By: M. McCullough / A. McKay

GPS Coordinates:

Location Description (catch basin, direction, distance): 28' E. of SL7

Ground Surface Description: in stripe of bare soil running SW to NE Shoreline bare.

Sample Description (color, grain size, density, moisture, odor, etc.): dark gray fine sand, damp, moderately dense. No odor.

Analytical Sample Information

Jars Filled (type, size): 2 x 16 oz.

Analyses: SVOA, PCBs, Metals, GS.

Archive?: * PCBs, Metals, GS.

FLOYD | SNIDER

Soil Sample Collection Form

Sample ID: SL7-50-N-101309

Date: 10/13/09

Project Name: SL7 & SL8 Drainage Basin Sampling

Time: 1020

Client: Seattle Public Utilities

Weather: cloudy, Mild

Collected By: M. McCullough / A. McKay

GPS Coordinates:

Location Description (catch basin, direction, distance): SL7, 50 ft North, under tree branches

Ground Surface Description: grass, mostly vegetated, leaves, twigs, some bare ground

Sample Description (color, grain size, density, moisture, odor, etc.): light brown, fine sand, splotches of dark gray, more fines compared to south side, some fine silt

Analytical Sample Information

Jars Filled (type, size): 1 16oz plastic, 1 16oz glass

Analyses: SVOA, PCB, metals, grainsize

Archive?: PCB, metals, grainsize

FLOYD | SNIDER

Soil Sample Collection Form

Sample ID: SL7-50-S-101309

Date: 10/13/09 Project Name: SL7 & SL8 Drainage Basin Sampling

Time: 952 Client: Seattle Public Utilities

Weather: cloudy, cold Collected By: M. McCullough / A. McKay

GPS Coordinates:

Location Description (catch basin, direction, distance): SL7, 50 ft, South uphill underneath tree

Ground Surface Description: ~50% vegetated, grassy, leaves, twigs

Sample Description (color, grain size, density, moisture, odor, etc.): Medium brown, fine sand, dry, no odor, some roots, w some fine silt

Analytical Sample Information

Jars Filled (type, size): 1 16 oz plastic, 1 16 oz glass

Analyses: SVOA, PCB, grain size, Metals

Archive?: PCB, grainsize, metals

FLOYD | SNIDER

Soil Sample Collection Form

Sample ID: SL7-50-E

Date: 10/13/09

Project Name: SL7 & SL8 Drainage Basin Sampling

Time: 10:37

Client: Seattle Public Utilities

Weather: overcast

Collected By: M. McCullough / A. McKay

GPS Coordinates:

Location Description (catch basin, direction, distance): center of meadow, in bare spot ~5' x 10' ~50% vegetated

Ground Surface Description: bare, patchy ~50% vegetated w/ clover + grass.

Sample Description (color, grain size, density, moisture, odor, etc.): light brown, fine silty sand, dry, loose, no odor.

Analytical Sample Information

Jars Filled (type, size): 1 x 16 oz plastic 1 x 16 oz WMG

Analyses: SVOA, PCBs, Metals, GS

Archive?: Yes - GS, PCBs, Metals

FLOYD | SNIDER

Soil Sample Collection Form

Sample ID: SL7-50-W-101309

Date: 10/13/09

Project Name: SL7 & SL8 Drainage Basin Sampling

Time: 943

Client: Seattle Public Utilities

Weather: cloudy, cold

Collected By: M. McCullough / A. McKay

GPS Coordinates:

Location Description (catch basin, direction, distance): SL7, 50ft west uphill from CB

Ground Surface Description: grassy, leaves, twigs, some bare soil, mostly vegetated

Sample Description (color, grain size, density, moisture, odor, etc.): brown, fine sand, dry, no odor, some grass roots

Analytical Sample Information

Jars Filled (type, size): 1 16 oz plastic, 1 16 oz glass

Analyses: SVOA, PCB, metals, grain size

Archive?: archive for PCB; metals, grain size

FLOYD | SNIDER

Soil Sample Collection Form

Sample ID: SL8-2-N-101309, SL8-2-N-101309D

Date: 10/13/09

Project Name: SL7 & SL8 Drainage Basin Sampling

Time: ~~[illegible]~~ 1445

Client: Seattle Public Utilities

Weather: cloudy, mild

Collected By: M. McCullough / A. McKay

GPS Coordinates:

Location Description (catch basin, direction, distance): 2 feet north of SL8, center of meadow

Ground Surface Description: appox half bare, half grass

Sample Description (color, grain size, density, moisture, odor, etc.): light-medium brown, silty fine sand, small grass roots, moderate to lose, damp, small 1/8" gravel and antropogenic solids at depth of 1 1/2".

Analytical Sample Information

Jars Filled (type, size): 2 16 oz plastic, 2 16 oz glass

Analyses: SVOA, PCB, metals, grain size

Archive?: PCB, metals, grain size

FLOYD | SNIDER

Soil Sample Collection Form

Sample ID: SL8-2-S-101309

Date: 10/13/09

Project Name: SL7 & SL8 Drainage Basin Sampling

Time: 1410

Client: Seattle Public Utilities

Weather: cloudy, mild

Collected By: M. McCullough / A. McKay

GPS Coordinates:

Location Description (catch basin, direction, distance): 2ft South of SL8, center of meadow

Ground Surface Description: nearly all grass, some small bare spots

Sample Description (color, grain size, density, moisture, odor, etc.): Medium brown, silty fine sand, no odor, slightly damp, moderately dense

Analytical Sample Information

Jars Filled (type, size): 1 16oz plastic, 1 16 oz glass

Analyses: SVOA, PCB, metals, grain size

Archive?: PCB, metals, grain size

FLOYD | SNIDER

Soil Sample Collection Form

Sample ID: SL8-2-E-101309

Date: 10/13/09

Project Name: SL7 & SL8 Drainage Basin Sampling

Time: 1455

Client: Seattle Public Utilities

Weather: cloudy, mild

Collected By: M. McCullough / A. McKay

GPS Coordinates:

Location Description (catch basin, direction, distance): 2 feet east of SL8, center of meadow

Ground Surface Description: approx half grassy and half bare

Sample Description (color, grain size, density, moisture, odor, etc.): light-medium brown, silty fine sand, damp, small grass roots soft, moderately dense

Analytical Sample Information

Jars Filled (type, size): 1 16oz plastic, 1 16oz glass

Analyses: SVOA, PCB, metals, grain size

Archive?: PCB, metals, grain size

ER sample @ 15:10. Lab DI rinsed over auger.
Sample ID = SL8-2~~E~~-ER.

FLOYD | SNIDER

Soil Sample Collection Form

Sample ID: SL8-2-W-101309

Date: 10/13/09

Project Name: SL7 & SL8 Drainage Basin Sampling

Time: 1415

Client: Seattle Public Utilities

Weather: cloudy, mild

Collected By: M. McCullough / A. McKay

GPS Coordinates:

Location Description (catch basin, direction, distance): ~~@~~ 2ft West of SL8, center of meadow

Ground Surface Description: about half grassy / half bare

Sample Description (color, grain size, density, moisture, odor, etc.): medium brown, silty fine sand, soft, damp, no odor, some gravel, angular anthropogenic material at ~1½" depth, light mixed w/ gravel

Analytical Sample Information

Jars Filled (type, size): 1 16 oz plastic, 1 16oz glass

Analyses: SVOA, PCB, metals, grain size

Archive?: PCB, metals, grain size

FLOYD | SNIDER

Soil Sample Collection Form

Sample ID: SL8-20-NE-101319

Date: 10/13/09 Project Name: SL7 & SL8 Drainage Basin Sampling

Time: 1315 Client: Seattle Public Utilities

Weather: light rain Collected By: M. McCullough / A. McKay

GPS Coordinates:

Location Description (catch basin, direction, distance): 20 ft from SL8 Northeast, Center of meadow

Ground Surface Description: mostly bare, some grass, leaves,

Sample Description (color, grain size, density, moisture, odor, etc.): light brown, silty fine sand, some roots, moderately dense, dry, a few small ^small rocks, no odor

Analytical Sample Information

Jars Filled (type, size): 1 16oz plastic, 1 16 oz glass

Analyses: PCB, SVOA, metals, grain size

Archive?: PCB, metals, grain size

FLOYD | SNIDER

Soil Sample Collection Form

Sample ID: SL8-20-NW-101309

Date: 10/13/09

Project Name: SL7 & SL8 Drainage Basin Sampling

Time: 1250

Client: Seattle Public Utilities

Weather: rainy

Collected By: M. McCullough / A. McKay

GPS Coordinates:

Location Description (catch basin, direction, distance): SL8, 20ft Northwest, center of meadow

Ground Surface Description: Mostly bare, some grass, leaves

Sample Description (color, grain size, density, moisture, odor, etc.): light brown, very fine silty sand, very dry, some grass roots, no odor, dense

Analytical Sample Information

Jars Filled (type, size): 1 16 oz plastic, 1 16oz glass

Analyses: SVOA, PCB, metals, grain size

Archive?: PCB, metals, grain size

FLOYD | SNIDER

Soil Sample Collection Form

Sample ID: SL8-20-SE-101309

Date: 10/13/09

Project Name: SL7 & SL8 Drainage Basin Sampling

Time: 1335

Client: Seattle Public Utilities

Weather: light rain

Collected By: M. McCullough / A. McKay

GPS Coordinates:

Location Description (catch basin, direction, distance): 20 ft ~~S~~ SE of SL8, center of meadow

Ground Surface Description: all grass, leaves, twigs

Sample Description (color, grain size, density, moisture, odor, etc.): medium brown, fine silty sand, moist, more fines than other samples, small roots, worms, no odor, damp to 2"

Analytical Sample Information

Jars Filled (type, size): 1 16 oz plastic, 1 16 oz glass

Analyses: SVOA, PCB, metals, grain size

Archive?: PCB, metals, grain size

FLOYD | SNIDER

Soil Sample Collection Form

Sample ID: SL8-20-SW-101309

Date: 10/13/09 Project Name: SL7 & SL8 Drainage Basin Sampling

Time: 1400 Client: Seattle Public Utilities

Weather: cloudy, sprinkles Collected By: M. McCullough / A. McKay

GPS Coordinates:

Location Description (catch basin, direction, distance): 20 ft south ~~ea~~ west of SL8, center of meadow

Ground Surface Description: almost all grass, very small bare spots

Sample Description (color, grain size, density, moisture, odor, etc.): medium brown, silty fine sand, ~~dam~~ dry, dense, no odor

Analytical Sample Information

Jars Filled (type, size): 1 16oz plastic, 1 16 oz glass

Analyses: SVOA, PCB, metals, grain size

Archive?: PCB, metals, grain size

Soil Sample Collection Form

Sample ID: SL8-50-N-101309

Date: 10/13/09

Project Name: SL7 & SL8 Drainage Basin Sampling

Time: 1300

Client: Seattle Public Utilities

Weather: light rain

Collected By: M. McCullough / A. McKay

GPS Coordinates:

Location Description (catch basin, direction, distance): at roots of large tree on hillside, 50ft N of SL8

Ground Surface Description: mostly bare, some grass and weeds, twigs

Sample Description (color, grain size, density, moisture, odor, etc.): light brown, loose, dry, silty fine sand, no odor
no roots

Analytical Sample Information

Jars Filled (type, size): 1 16oz plastic, 1 16oz glass

Analyses: SVOA, PCB, metals, grain size

Archive?: PCB, metals, grain size

FLOYD | SNIDER

Soil Sample Collection Form

Call David about fence

Sample ID: SL8-50-S-101309

Date: 10/13/09

Project Name: SL7 & SL8 Drainage Basin Sampling

Time: 1345

Client: Seattle Public Utilities

Weather: light rain

Collected By: M. McCullough / A. McKay

GPS Coordinates:

Location Description (catch basin, direction, distance): uphill 30ft S of catch basin SL8, under tree near roots

Ground Surface Description: some grass, bare patches

Sample Description (color, grain size, density, moisture, odor, etc.): light brown, silty fine sand, some small roots, dry, no odor moderately dense

Analytical Sample Information

Jars Filled (type, size): 1 16oz plastic, 1 16oz glass

Analyses: SVOA, PCB, metals, grain size

Archive?: PCB, metals, grain size

FLOYD | SNIDER

Soil Sample Collection Form

Sample ID: SL8-50-E-101309

Date: 10/13/09 Project Name: SL7 & SL8 Drainage Basin Sampling

Time: 1325 Client: Seattle Public Utilities

Weather: light rain Collected By: M. McCullough / A. McKay

GPS Coordinates:

Location Description (catch basin, direction, distance): SL8 50 ft west near gravel footpath

Ground Surface Description: mostly grass ~ 90%, leaves

Sample Description (color, grain size, density, moisture, odor, etc.): light brown, silty fine sand, no odor, dry, moderately dense, w/ rocks and bones/debris
large piece of anthropogenic solid, lightweight, 1" deep, appox. 1" diameter

Analytical Sample Information

Jars Filled (type, size): 1 16 oz plastic, 1 16oz glass

Analyses: SVOA, PCB, metals, grain size

Archive?: PCB, metals, grain size

F:\projects\COS-GWSA\T6020 Storm Drain investigations\SL7 SL8\Soil Sample Collection Form.docx
mk 10/12/09

Soil Sample Collection Form

Sample ID: SL8-70-NW-101309

Date: 10/13/09

Project Name: SL7 & SL8 Drainage Basin Sampling

Time: 1310

Client: Seattle Public Utilities

Weather: light rain

Collected By: M. McCullough / A. McKay

GPS Coordinates:

Location Description (catch basin, direction, distance): approx 70 ft NW of SL 8, up hillside, NW of disturbed ground where tree was removed

Ground Surface Description: Mostly bare, some grass patches, leaves

Sample Description (color, grain size, density, moisture, odor, etc.): light brown, moderately dense, silty fine sand, ~~moist~~ top 1/4", dry below, few roots, slight chlorinated odor

Analytical Sample Information

Jars Filled (type, size): 1 16 oz plastic, 1 16 oz glass

Analyses: SVOA, PCB, metals, grain size

Archive?: PCB, metals, grain size

Soil Sample Collection Form

Sample ID: SL14-4.5-N

Date: 10/13/09

Project Name: SL7 & SL8 Drainage Basin Sampling

Time: 15:25

Client: Seattle Public Utilities

Weather: P. Sunny

Collected By: M. McCullough / A. McKay

GPS Coordinates:

Location Description (catch basin, direction, distance): 4.5 ft N. of SL14, next to path ~.5' into grass.

Ground Surface Description: Short ragged grass - under tree

Sample Description (color, grain size, density, moisture, odor, etc.): med. brown medium SAND. loose, dry. Glass debris, no odor.

Analytical Sample Information

Jars Filled (type, size): Same 2 16 oz

Analyses: SVOC PCB Metal GS

Archive?: " " "

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Soil Sample Collection Form

Sample ID: SL14-4-NE-101309

Date: 10/13/09

Project Name: SL7 & SL8 Drainage Basin Sampling

Time: 15:35

Client: Seattle Public Utilities

Weather: part sun

Collected By: M. McCullough / A. McKay

GPS Coordinates:

Location Description (catch basin, direction, distance): 4' NE of SL14, 6 inches from paved path

Ground Surface Description: bare patch, area under tree, ~50% vegetated, leaf litter.

Sample Description (color, grain size, density, moisture, odor, etc.): gray brown medium SAND. Dry, loose, small rocks + glass. No roots. No odor.

Analytical Sample Information

Jars Filled (type, size): 2 x 16 oz

Analyses: SVOA PCB Metals GS

Archive?: " " "

FLOYD | SNIDER

Soil Sample Collection Form

Sample ID: SL14-S-W-101309

Date: 10/13/09

Project Name: SL7 & SL8 Drainage Basin Sampling

Time: 15:50

Client: Seattle Public Utilities

Weather: cloudy.

Collected By: M. McCullough / A. McKay

GPS Coordinates:

Location Description (catch basin, direction, distance): 5' W of SL14, ~6" from edge of paved path.

Ground Surface Description: ~90% vegetated w/ dry grass. Leaf matter

Sample Description (color, grain size, density, moisture, odor, etc.): med. brownish gray med. SAND. loose, dry to damp, lots of grass roots, no odor. some gravels.

Analytical Sample Information

Jars Filled (type, size): 2 x 16. oz.

Analyses: SVOA, PCB, Metals, GS

Archive?: " , " , "

Soil Sample Collection Form

Sample ID: SL14-S-SW-101309

Date: 10/13/09

Project Name: SL7 & SL8 Drainage Basin Sampling

Time: 15:40

Client: Seattle Public Utilities

Weather: p. sunny

Collected By: M. McCullough / A. McKay

GPS Coordinates:

Location Description (catch basin, direction, distance): 5' SE of SL14, ~1 ft from paved path.

Ground Surface Description: under tree ~50% vegetated, dry grass + leaf matter.

Sample Description (color, grain size, density, moisture, odor, etc.): med. brownish gray coarse dry SAND. Loose, roots, glass + gravel. 2-inch rocks. No odor.

Analytical Sample Information

Jars Filled (type, size): 2 x 16 oz

Analyses: SVOA PCB Metal GS

Archive?: " " "

ATTACHMENT 6B-4
Storm Drain Source Control Evaluation
Phase 3 Data Report

(Video files on DVD)

Gas Works Park

Storm Drain Source Control Evaluation
Phase 3 Data Report

Prepared for

City of Seattle

Seattle Public Utilities

Prepared by

FLOYD | SNIDER
601 Union Street
Suite 600
Seattle, Washington 98101

December 2010

FINAL

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List of Abbreviations and Acronyms

Abbreviation/ Acronym	**Definition**
AO	Agreed Order
ARI	Analytical Resources, Inc.
CD	Consent Decree
City	City of Seattle
DQO	Data Quality Objective
Ecology	Washington State Department of Ecology
ESA	Eastern Study Area
GWSA	Gas Works Sediment Area
GWS-WSA	Gas Works Sediment–Western Study Area
HPAH	High molecular weight polycyclic aromatic hydrocarbon
JCSE	Joint Source Control Evaluation
LCS	Laboratory control sample
LPAH	Low molecular weight polycyclic aromatic hydrocarbon
mg	Microgram
MS	Matrix spike
MSD	Matrix spike duplicate

Abbreviation/ Acronym	Definition
NE	Northeast
PAH	Polycyclic aromatic hydrocarbon
PCB	Polychlorinated biphenyl
PSE	Puget Sound Energy
QAPP	Quality Assurance Project Plan
RI/FS	Remedial Investigation/Feasibility Study
RPD	Relative percent difference
SAP	Sampling and Analysis Plan
SOW	Statement of Work
SPU	Seattle Public Utilities
SSQL	Site-specific sediment quality level
SVOC	Semivolatile organic compound
TPAH	Total polycyclic aromatic hydrocarbon
USEPA	U.S. Environmental Protection Agency
VOC	Volatile organic compounds
WSA	Western Study Area
WW No. 19	Waterway Number 19

1.0 Introduction

This data report provides the results of the Phase 3 Source Control Investigation (Phase 3) that was conducted within Gas Works Park, at the City of Seattle Police Harbor Patrol Facility, and on the upland portion of Waterway Number 19 (WW No. 19) and adjacent right-of-way as part of an overall Storm Drain Source Control Evaluation (Figure 1.1). To date, the Storm Drain Source Control Evaluation has evaluated accumulated solids in storm drains, video inspected and evaluated the majority of the drainage system, and evaluated surface soil conditions in drainage basins where accumulated solids contained elevated concentrations of total polycyclic aromatic hydrocarbons (TPAHs) relative to the site-specific sediment cleanup standards. The next phase of investigation, described in this report, was performed to evaluate: (1) the quality of storm drain solids in the Harbor Patrol Area, (2) the quality of storm drain solids in reaches of the Gas Works Park drainage system not included in previous investigations (such as the Gas Works Park parking area and a limited area within Gas Works Park), (3) the quality of solids entering Catch Basins SL7 and SL8 using filter fabric inserts, (4) the quality of surface soil in the stormwater drainage ditch located within the upland portion of WW No. 19 and adjacent right-of-way, and (5) the condition of the storm drain systems within Harbor Patrol, the Gas Works Park parking area, and the southern portion of the park (Kite Hill Outfall and Outfall F) by video inspection.

The City of Seattle (City) has taken the lead for this portion of source control activities for the Gas Works Sediment Area (GWSA) and coordinates closely with Puget Sound Energy (PSE) with oversight by the Washington State Department of Ecology (Ecology). Floyd|Snider is performing the work on behalf of the City.

The work was conducted in accordance with the Sampling and Analysis Plan/Quality Assurance Project Plan (SAP/QAPP) for Phase 3 Storm Drain Source Control Evaluation, which was approved by Ecology on June 18, 2010 (Floyd|Snider 2010b). The filter fabric sampling was conducted between September 2009 and May 2010, the catch basin solids sampling was conducted on June 23, 2010, the WW No. 19 sampling was conducted on June 30 and August 23, 2010, and the video inspection was conducted on June 24, 2010. The results are discussed in Sections 2.0 to 5.0 of this report.

1.2 BACKGROUND

Gas Works Park is situated on the northern shore of Lake Union, a heavily-developed urban lake located north of downtown Seattle, Washington (refer to Figure 1.1). Historical operations at the property resulted in environmental contamination. In 2005, Ecology, the City, and PSE entered into an Agreed Order (AO; Ecology 2005) that included tasks to determine the nature and extent of submerged shoreland and lakebed sediments in the area of Lake Union adjacent to the uplands that are impacted by hazardous substances released from the historical manufactured gas plant, tar refining, or other activities on the Uplands. The Statement of Work (SOW) described how the Remedial Investigation and Feasibility Study (RI/FS) activities for the sediments would be managed as two side-by-side study areas, referred to as the Eastern Study Area (ESA; PSE-lead) and Western Study Area (WSA; City-lead) and collectively known as the Gas Works Sediment Area (GWSA). Both the ESA and WSA RI/FS reports are required by the SOW to include “evaluation of the possibility of post-remedial sediment recontamination (e.g., source control) from both uplands and in-water sources.”

To address the requirement to evaluate source control as defined in the SOW, the City and PSE are performing a Joint Source Control Evaluation (JSCE; Floyd|Snider 2007). The JSCE investigated potential current and future sources of contamination, including storm drains, to the area of anticipated sediment remediation within the GWSA. Based on the presence of subsurface soil and groundwater contamination, the existence of perforated pipes in some areas of the park, the age and unknown condition of subsurface storm drain piping, and unknown stormwater quality, the JSCE recommended that the storm drains be further evaluated regarding their potential to provide a contaminant pathway to sediments. Based on the recommendations in the JSCE and subsequent investigation, the storm drains to be evaluated included:

- Gas Works Park storm drains A, B, C, D, E, and F
- The Kite Hill storm drain
- The Waterway Number 20 storm drain
- The Harbor Patrol storm drain
- The WW No. 19 drainage ditch

As part of this storm drain source control evaluation, accumulated solids from catch basin structures were analyzed from various areas of the park and surrounding streets. Results from this investigation were reported in *Gas Works Sediment Area Initial Source Control Screening Investigation of Storm Drains* submitted to Ecology in April 2009 (Phase 1 Investigation Report; Floyd|Snider 2009a). These samples were analyzed for a variety of contaminants, including TPAHs. In the northeast (NE) corner of the park, elevated concentrations of TPAHs were detected in solids collected from Catch Basin SL7 at a concentration (470.6 ppm) greater than the site-specific sediment cleanup level for TPAHs (170 ppm).

In response to the elevated TPAHs in the solids from Catch Basin SL7, the City conducted further investigation of the catch basins and surface soils in the NE corner of the park. Results from this investigation were reported in *Gas Works Park Northeast Corner Source Control Data Report* submitted to Ecology in March 2010 (Phase 2 Investigation Report; Floyd|Snider 2010a).

Phase 3, which is the subject of this report, collected field data to fill data gaps that remained from the Phases 1 and 2 investigations, including collecting additional field data to characterize the quality of solids in the storm drain catch basins not investigated during the previous phases. Catch basin solids were collected at the Harbor Patrol Area, the parking area of Gas Works Park, Maintenance Hole SL6, and two catch basins draining into SL6 (SL6.1 and SL6.2). Additionally, filter fabric samples were collected to determine if the elevated TPAH concentrations observed in the previous filter fabric sampling event were anomalous (Floyd|Snider 2010b). Filter fabric samples from redeployed clean filter fabrics were collected from Catch Basins SL7 and SL8 in the NE corner of Gas Works Park. Surface soil quality in the WW No. 19 storm drain ditch in Gas Works Park was investigated, because this area lacks conventional storm drain structures and thus catch basin solids are not available. Additional activities included video surveys to evaluate the storm drain system integrity at the Harbor Patrol Area, within the parking area of Gas Works Park, the Kite Hill Outfall, and Outfall F.

Catch basin, filter fabric, and surface soil sampling and analysis activities completed by the City were performed according to the procedures specified in the approved SAP/QAPP (Floyd|Snider 2010b), and are consistent with procedures specified in the Gas Works Sediment–Western Study Area (GWS-WSA) RI/FS Quality Assurance Project Plan (QAPP) found in the Current Situation Report and RI/FS Work Plan (Floyd|Snider 2005). Floyd|Snider prepared this Phase 3 Storm Drain Source Control Evaluation Data Report on behalf of the City to document the results of the sampling and analysis activities conducted by the City.

1.3 FIELD INVESTIGATION OBJECTIVES

The purpose of the Phase 3 activities described in this report was to collect the remaining information necessary to perform an evaluation of the potential for recontamination of the GWSA sediments offshore of Gas Works Park from storm drains. The specific objectives of the Phase 3 investigation include the following:

- Collect additional catch basin solids for chemical analysis from the stormwater structures (including three catch basins and an oil-water separator) within the Harbor Patrol Area, the Gas Works Park parking area, Maintenance Hole SL6, and Catch Basins SL6.1 and SL6.2 within Gas Works Park.
- Inspect filter fabrics currently deployed in Catch Basins SL7 and SL8, with sampling and chemical analysis if sufficient solids for analysis were available on the fabrics.
- Collect six surface soil samples from the WW No.19 storm drain ditch.
- Evaluate (via video survey) the storm drain system integrity in the Harbor Patrol, Gas Works Park parking areas, Kite Hill Outfall, and Outfall F (where possible).

2.0 Catch Basin Solids Sampling

2.1 SCOPE

The field activities described in this section include the collection of the three catch basin and two oil-water separator (OWS) solids samples from the Harbor Patrol Area, seven catch basin solids samples from the Gas Works Park parking area, and solids samples from Maintenance Hole SL6 and Catch Basins SL6.1 and SL6.2 located within the park. Sample locations are shown in Figures 2.1 through 2.3.

2.2 SAMPLE COLLECTION METHODS

Solids sampling from catch basins and other storm drain structures was conducted following Seattle Public Utilities' (SPU's) Standard Operating Procedure (SOP), *WQ&S S3300—Storm Drain Sediment Sampling: Catch Basin and In-line Grab Sample Collection* (Appendix A of Floyd|Snider 2010b). As stated in the SOP, solids samples were collected following Puget Sound Estuary Program (PSEP) guidelines for solids sample collection (PSEP 1997). Samples were collected by Floyd|Snider on June 23, 2010 with assistance from SPU staff.

Solids were collected from the base of the structures and from several locations within the structure to provide a representative composite of the material present. The thickness of the accumulated solids in the catch basin ranged from negligible solids (Maintenance Hole SL6) to 6 inches (HP-CB-03), with thickness generally around 1 to 3 inches. Solids were collected from the catch basin base using a stainless steel scoop, or similar device, and homogenized in a stainless steel bowl prior to placement in laboratory supplied glassware. Select photographs of the sampling can be found in Appendix A (Photos 1 through 8).

There was sufficient volume of solids present in the structures with the exception of Maintenance Hole SL6 to collect the required sample volume for analysis of all analytes listed below in Section 2.3; however, several structures required scraping at the bottom of the structure including PA-CB-06, PA-CB-07, SL6.1, and SL6.2, HP-OWS-Inlet, and HP-OWS-Outlet. Maintenance Hole SL6 was analyzed for polycyclic aromatic hydrocarbons (PAHs) only because of the small amount of sample collected. Further details regarding sampling and analytical methods can be found in the SAP/QAPP (Floyd|Snider 2010b).

Sample containers were filled, tightly capped, labeled, and immediately placed in a cooler maintained at a temperature of approximately 4º C using crushed ice. Samples were delivered to Analytical Resources, Inc. (ARI) in Tukwila, Washington by Floyd|Snider staff under standard chain-of-custody procedures.

2.3 ANALYTICAL METHODS AND DATA QUALITY

Samples were submitted to ARI for the analysis of the following analytes:

- Semivolatile organic compounds (SVOCs) by U.S. Environmental Protection Agency (USEPA) Method 8270
- Total organic carbon (TOC) by USEPA Method 415.1
- Grain size analysis by ASTM D-421/422
- Metals by USEPA Method 6010/7471

- Polychlorinated biphenyl (PCB) Aroclors by USEPA Method 8082
- PAHs by USEPA Method 8270-SIM

All laboratory reports are included in Appendix B.

All samples were analyzed initially for SVOCs by USEPA Method 8270 with the exception of Maintenance Hole SL6 due to insufficient sample volume. The majority of these samples resulted in elevated detection limits for PAHs (up to 2,300 µg/kg) due to matrix interference. To confirm more accurately the presence or absence of PAHs in these samples, all samples with the exceptions of SL6.1 and SL6.2 were re-analyzed for PAHs by Selected Ion Monitoring (USEPA Method 8270-SIM). Samples SL6.1 and SL6.2 were not re-analyzed as all PAHs were detected in these samples. Re-analysis was also completed for HP-OWS-Outlet and HP-OWS-Inlet for metals only to confirm elevated zinc results. For the re-analyzed samples, both original and re-analysis results are reported in Table 2.1.

One blind field duplicate and one equipment rinse sample were collected as quality control samples. Analytical results for the equipment rinse sample were less than laboratory detection limits, and the field duplicate results were within an average relative percent difference (RPD) value of 30 percent of the original field sample. The greater value between the original sample and the duplicate is assumed to be the chemical concentration at this location. The equipment rinse sample was collected by pouring laboratory deionized water over the non-disposable sampling equipment (the stainless steel scoop) following standard decontamination procedures.

The following data quality requirements were reviewed relative to quality criteria specified for the analytical methods, analytical laboratory data quality objectives (DQOs), and the DQOs identified in the SAP/QAPP (Floyd|Snider 2010b):

- Sample and quality control analysis frequencies
- Extraction and analysis holding times
- Blank contamination
- Surrogate recoveries
- Laboratory control sample (LCS) recoveries
- Matrix spike (MS) and MS duplicate (MSD) recoveries
- MS/MSD (RPDs)

The data quality review determined that several data required qualification, detailed in the Data Validation Report in Appendix C.

The data were determined to be of acceptable quality for use as qualified.

2.4 RESULTS

2.4.1 Harbor Patrol Area

The chemical testing results for the Harbor Patrol Area samples are shown in Table 2.1 and sample locations are shown on Figure 2.1. The TPAH data were compared to the site-specific sediment quality level (SSQL) of 170 mg/kg TPAH for GWSA sediments. None of the locations resulted in concentrations greater than 170 mg/kg TPAH. Sample results ranged from 8.2 mg/kg

TPAH at location HP-CB-03 to a maximum of 22.5 mg/ kg TPAH at location HP-OWS-Outlet, significantly less than the SSQL.

Zinc was detected in samples collected in the Harbor Patrol oil-water separator inlet and outlet (HP-OWS-Inlet and HP-OWS-Outlet). Results were reported as 14,400 mg/kg for the inlet, and 6,920 mg/kg for the outlet. A re-analysis of these samples for metals yielded a lower result for zinc for the inlet (6,930 mg/kg) and a similar result for the outlet (6,410 mg/kg), indicating some heterogeneity in the samples (both original and re-analysis results are reported in Table 2.1). In contrast, Harbor Patrol Area catch basin samples had much lower zinc concentrations, with results ranging from 899 to 1,020 mg/kg. Although all Harbor Patrol Area catch basin solids are routed into the oil water separator, the solids present in the oil-water separator were found to be finer grained silts compared to much coarser, sandier solids in the catch basins.

The remaining metals were reported at detected concentrations in all samples with the exceptions of arsenic (detected in all but H-CB-03) and silver (detected in HP-CB-01 only). Maximum concentrations detected include 20 mg/kg for arsenic (HP-OWS-Inlet, HP-OWS-Outlet), 346 mg/kg for lead (HP-OWS-Inlet), and 0.44 mg/kg for mercury (HP-CB-02). Refer to Table 2.1 for all metals results.

Additionally, positive results were not reported for other SVOCs with the exceptions of bis(2-ethylhexyl)phthalate (maximum concentration 90 mg/kg) and di-n-octylphthalate (maximum concentration 11 mg/kg). PCBs were detected at low levels in all samples, with total PCBs results ranging from 36 µg/kg in HP-CB-01 to 125 µg/kg in HP-CB-02.

2.4.2 Gas Works Park

The chemical testing results for the Gas Works Park catch basin samples are shown in Table 2.1 and sample locations are shown on Figure 2.2. The TPAH data were compared to the SSQL level of 170 mg/kg TPAH for GWSA sediments. None of the locations resulted in concentrations greater than 170 mg/kg TPAH. Sample results ranged from 2.9 mg/kg TPAH at location PA-CB-05 to a maximum of 114 mg/ kg TPAH at location SL6.1, considerably less than the SSQL. Generally, LPAHs were not detected or detected in low concentrations in all samples with the exception of catch basin samples within the park: SL6.1, SL6.2, and Maintenance Hole SL6. The highest concentrations of HPAHs were also observed within the catch basin park samples, with fluoranthene and pyrene reporting the highest concentrations in all three samples.

Chromium, copper, lead, and zinc were detected in all samples collected. Cadmium was detected in all samples except two, PA-CB-05 and PA-CB-06. Arsenic, silver, and mercury were detected in Samples SL6.1 and SL6.2 only. Maximum concentrations detected include 60 mg/kg for arsenic (SL6.2), 120 mg/kg for lead (PA-CB-06, PA-CB-07), 0.31 mg/kg for mercury (SL6.1), and 449 mg/kg for zinc (PA-CB-02). Refer to Table 2.1 for all metals results.

Additionally, detected concentrations were reported for other SVOCs analyzed including bis(2-ethylhexyl)phthalate, dimethylphthalate, di-n-octylphthalate, 4-methylphenol, 1 methylnaphthalene, carbazole, and dibenzofuran. All SVOC concentrations were less than 2.2 mg/kg (and most significantly less than 1 mg/kg) with the exception of bis(2-ethylhexyl)phthalate with concentrations ranging from 0.5 mg/kg in SL6.2 to 28 in PA-CB-05. Total PCB concentrations ranged from non-detect in the majority of samples to a maximum concentration of 520 µg/kg in SL6.1.

3.0 Filter Fabric Sampling

3.1 SCOPE

On September 28, 2009, filter fabrics were deployed by SPU staff in Catch Basins SL7 and SL8, located in the NE corner of the park as shown on Figure 2.2. Filters had been deployed previously at these locations for 3 months, but insufficient solids were collected for direct chemical analysis and therefore a non-standard analytical methodology was required involving extractions performed on the filter fabric (Floyd|Snider 2010b). Filters in this investigation were re-deployed for a longer time period (6 months) to attempt to collect sufficient solids for direct chemical analysis. Solids were collected in the filters until May 19, 2010 and were retrieved by Floyd|Snider with assistance from SPU staff.

3.2 SAMPLE COLLECTION METHODS

Filter fabric sampling was conducted as previously described in the Northeast Corner Data Report (Floyd|Snider 2010b). The filter fabric used is the StreamGuard Sediment Model Part No. 3003. The filter is made of a non-woven polypropylene felt geotextile fabric. The filter fabric is conical and held in place by a "collar" that sits below the catch basin lid. The filter fabric hangs beneath the catch basin grate, trapping solids. Retrieval straps allow the filter fabric to be held while the catch basin insert is removed. They are rated for up to 40 pounds of sediment. Based on the material specifications, the filter fabric is analogous to a No. 80 US Sieve Size, with the most common opening size of roughly 0.180 µm (180 microns).

At the time of removal, the filters were inspected to determine if they had come in contact with the sides or base of the catch basin and if solids/debris were present in the filter fabric. The retrieval straps allowed for a straight-forward removal, and there was no evidence that the filter fabric had come in contact with the sides of the catch basin. Due to the depth of the catch basins, there was no opportunity for the inserts to come in contact with the bottom of the catch basin. At the time the filter fabric was removed, debris such as sticks and trash were noted within the inserts. The material encountered at each location was photo-documented.

The filters were then placed in large plastic bags, sealed, labeled, and immediately placed in a cooler maintained at a temperature of approximately 4° C using crushed ice. Samples were delivered to ARI by Floyd|Snider staff under standard chain-of-custody procedures.

Filters were opened in the laboratory by ARI staff and inspected visually by Floyd|Snider, SPU, and ARI staff. The visual inspection determined that there was sufficient solid accumulation for direct sampling and analysis. The filter fabric of Catch Basin SL7 had accumulated 184.2 g of solids, while 17.7 g had accumulated in the filter fabric of Catch Basin SL8. Solids were removed from the filter fabric by ARI using a clean stainless steel sampling device (such as a spoon or knife) and analyzed.

3.3 ANALYTICAL METHODS AND DATA QUALITY

Laboratory samples were submitted for analysis of the analytes summarized in Section 2.3 with the exception of PAHs by USEPA Method 8270-SIM. The laboratory reports are included in Appendix B.

One filter bag blank was analyzed as a blank quality control sample. The lab performed a Synthetic Precipitation Leaching Procedure (SPLP) on 200 grams of filter material, which had been cut into squares approximately 10 cm by 10 cm in size. The resulting extract of the filter material was used for the analysis.

Zinc, phenol, benzoic acid, diethylphthalate, and di-n-butylphthalate were detected in the filter bag blank at levels significantly less than those observed in the solids collected in the filter bags. However, it is important to note that for the actual sample analysis only solids removed from the bags were analyzed, not the filter bags themselves, and therefore the blank results are not directly comparable to the filter bag sample results. Therefore, although some contaminants were detected in the blank, the overall data quality of the filter bag samples is not expected to be affected. Refer to the Data Validation Report in Appendix C for further details.

Data quality requirements (summarized in Section 2.3) were reviewed relative to quality criteria specified for the analytical methods, analytical laboratory DQOs, and the DQOs identified in the SAP/QAPP (Floyd|Snider 2009b).

The data quality review determined that all data were of useable quality, and no data qualifications were required.

3.4 RESULTS

An elevated level of TPAHs was observed in the filter fabric sample from Catch Basin SL7, with a result of 508 mg/kg. The TPAH result for the sample from Catch Basin SL8 was lower and reported as 84 mg/kg. Therefore, the GWSA SSQL level of 170 mg/kg TPAH was exceeded in Catch Basin SL7 but not Catch Basin SL8. The individual PAH with the highest concentration was pyrene for both samples, with results of 110 mg/kg and 14 mg/kg for Catch Basins SL7 and SL8, respectively. Total high molecular weight polycyclic aromatic hydrocarbons (HPAHs) were much greater in concentration than low molecular weight polycyclic aromatic hydrocarbons (LPAHs) in both samples.

All metals, excluding arsenic, were also detected in samples from both catch basins. Detected concentrations for Aroclor 1248, Aroclor 1254, Aroclor 1260 and total Aroclors were reported for Catch Basin SL7, with a result of 500 µg/kg for total Aroclors reported. PCB Aroclors were not analyzed for Catch Basin SL8 due to insufficient sample mass. A limited presence of phthalates was noted, with a result of 37 mg/kg reported for diethylphthalate in Catch Basin SL8.

Analytical results for samples from Catch Basins SL7 and SL8 and the filter fabric blank are summarized in Table 3.1. Laboratory reports are included in Appendix B.

4.0 Surface Soil Sampling

4.1 SCOPE

The quality of surface soils in the drainage ditch associated with the WW No. 19 storm drain has not been characterized to date. To characterize the WW No. 19 drainage ditch area, six surface soil (0- to 2-inch) grab samples were collected from the base and side slopes of the ditch. Four of the six samples were collected above the drainage area from the side slopes of the drainage ditch, two from each side of the ditch. These samples are anticipated to be representative of soil quality in the immediate area that could most readily be transported into the WW No. 19 drainage ditch. The remaining two samples were collected at the base of the drainage ditch to characterize the soil quality directly within the outfall discharge area, where surface water flows to Lake Union.

Samples were collected by Floyd|Snider on June 30, 2010 (Samples WW19-01, WW-03, WW19-05, and WW19-06) and August 23, 2010 (Samples WW19-02 and WW19-04) with assistance from SPU staff (refer to Figure 2.3). Samples were collected on separate days, as they were located on portions of property owned by the City of Seattle (right-of-way managed by Seattle Department of Transportation) and the State of Washington (managed by the State Department of Natural Resources), requiring separate agreements to complete the sampling effort.

4.2 SAMPLE COLLECTION METHODS

Prior to sampling, each location was cleared of grass or debris. Surface soil samples were collected using a stainless steel spoon. Any particles greater than 2 cm in size (e.g., sticks, leaves, refuse, miscellaneous pieces of plastic and metal, stones, and gravel) were removed from the sample and discarded. Samples were homogenized in the stainless steel bowls and placed into laboratory-provided glass jars.

All soil sampling locations were documented by a Floyd|Snider scientist in accordance with standard geologic practices for the environmental industry. Geologic description of the samples collected included the Unified Soil Classification System (ASTM D-2488-93) classification and description, moisture content, color, and the presence of any anthropogenic materials (i.e., debris), odors, sheens, or other substances. The material encountered at each location was recorded on a sampling log and photo-documented. The soil was generally a brown, silty fine sand with occasional medium to large gravel and organic debris such as roots, leaves, and wood chips. No odors or sheens were noted. Select photographs of the sampling can be found in Appendix A (Photos 7 and 8).

Sample containers were filled, tightly capped, labeled, and immediately placed in a cooler maintained at a temperature of approximately 4° C using crushed ice. ARI picked up the samples from the Floyd|Snider office in Seattle, Washington under standard chain-of-custody procedures.

4.3 ANALYTICAL METHODS AND DATA QUALITY

Laboratory samples were submitted for analysis of the analytes summarized in Section 2.3 with the exception of PAHs by USEPA Method 8270-SIM. All laboratory reports are included in Appendix B.

One blind field duplicate and one equipment rinse sample were collected as quality control samples. Analytical results for the equipment rinse sample were less than laboratory detection limits, and the field duplicate results were within an average RPD value of 30 percent of the original field sample. The greater value between the original sample and the duplicate is assumed to be the chemical concentration at this location. The equipment rinse sample was collected by pouring laboratory deionized water over the non-disposable sampling equipment (the stainless steel scoop) following standard decontamination procedures.

Data quality requirements (summarized in Section 2.3) were reviewed relative to quality criteria specified for the USEPA methods, analytical laboratory DQOs, and the DQOs identified in the QAPP.

The data quality review determined that several data required qualification, detailed in the Data Validation Report in Appendix C. The data were determined to be of acceptable quality for use, as qualified.

4.4 RESULTS

The chemical testing results for the WW No. 19 samples are shown in Table 4.2 and sample locations are shown on Figure 2.3. The TPAH data were compared to the SSQL level of 170 mg/kg TPAH for GWSA sediments. None of the locations resulted in concentrations greater than 170 mg/kg TPAH. Sample results ranged from 1.8 mg/kg TPAH at location WW19-05 to a maximum of 93.2 mg/ kg TPAH at location WW19-04, significantly less than the SSQL. LPAHs were detected in the majority of samples at low concentrations, with the exception of acenaphthene, which was not detected in any sample. HPAHs were detected in greater concentrations than LPAHs, with fluoranthene and pyrene generally reporting the highest concentrations in the WW19 samples.

All metals analyzed were detected in all samples collected, with the exceptions of arsenic (detected in all samples but WW19-01) and silver (detected in WW19-01, WW19-02, WW19-04). Concentrations were generally low, with slightly elevated zinc results observed in Samples WW19-01 and WW19-02 (1,340 mg/kg and 1,490 mg/kg respectively).

Additionally, detected concentrations were reported for other SVOCs, including bis(2-ethylhexylphthalate), butylbenzylphthalate, dimethylphthalate, di-n-butylphthalate, di-n-octylphthalate, 1-methylnaphthalene, carbazole, and dibenzofuran. All other SVOC concentrations were less than 1 mg/kg with the exception of butylbenzylphthalate with concentrations ranging from non-detect to 12 mg/kg in WW19-01. Total PCB concentrations ranged from non-detect in half of the samples to a maximum concentration of 390 µg/kg in WW19-04.

5.0 Storm Drain Video Inspection

In order to more accurately evaluate the condition of the storm drains and identify areas of concern, a video inspection of selected lines was conducted on June 25, 2010 by Bravo Environmental. Storm drains were not cleaned prior to inspection. Oversight of the storm drain system investigation was conducted by Floyd|Snider field staff. Field staff documented activities with photographs and field notes. During the video inspections, field staff documented the start and end time of each video inspection, and noted any observations of interest including type of observation, location along pipe, etc. Field staff were responsible for ensuring that video crews attempted to investigate all proposed storm drain lines and conducted the video survey according to the City protocols.

The video inspection of the storm drains consisted of those drains not previously inspected including those in the Gas Works Park parking lot and from the parking lot to Maintenance Hole SL6, Harbor Patrol Area, the Kite Hill Outfall, and Outfall F. The video was recorded and narrated by the operator with distance markings and visual observations. These visual observations included blockages, laterals, cracks, and similar items. In addition to the video, a report was developed for each stretch of pipe inspected, which documented the observations including pictures of any items of interest. The video inspection reports and video inspections are included in Appendices C and D, respectively.

Storm drains are shown along with the associated structure ID on Figures 5.1 and 5.2. Note that during the inspection, in accordance with video inspection protocol, the outfalls of storm drains were identified as pipe ends, or PE. Several storm drains were inaccessible and were not inspected and are noted below. Key points from each area are summarized below.

5.1 GAS WORKS PARK PARKING LOT STORM DRAINS

Within the Gas Works Park parking lot, all accessible storm drains were inspected from the inlets/catch basins to Maintenance Hole SL6 (a storm manhole) within the Park. All the storm drains within the parking lot drain to this manhole. The drainage basin for this area is effectively the parking lot including the paved areas and several landscaped areas within the parking lot. Within the parking lot, there are numerous inlets and catch basins that discharge into a mainline that runs east and south towards the park and then discharges into Maintenance Hole SL6 as shown on Figure 5.1.

Most of the inspected pipe segments appeared to be in good condition. However, several pipes did contain blockages and structures that limited the video inspection of this area, or were inaccessible. Figure 5.1 indicates with yellow highlighting the pipe segments that could not be inspected; these segments are described below. The video inspection report is provided in Appendix D.

- **Mainline Segment: PA-CB-01 to 10 feet west of where the pipe from PA-CB-04 junctions with the mainline.** This segment of pipe was unable to be inspected because of a large, dense root ball that filled about 50 percent of the pipe at approximately 10 feet west of where the pipe from PA-CB-04 junctions with the mainline. This obstruction blocked the inspection from manhole Mainline MH-2. This run is identified as Sections No. 6 and No. 15 in the inspection report. At Catch Basin PA-CB-01 the field staff were unable to remove the inverted elbow pipe (outlet cover) to access the mainline. Due to these obstructions, this segment of pipe was unable to be inspected.

- **PA-CB-02 to Mainline.** A car was parked on the catch basin and was there all day. Because of this obstruction, inspection of this pipe segment was not possible.
- **PA-CB-06 to Mainline.** The outlet pipe of the catch basin was on the other side of the catch basin from the manhole cover. As a result, field staff were unable to remove the outlet cover and could not access the pipe; therefore this pipe segment was not inspected.
- **Inlet-PA-CB-01 to Mainline.** Roots and debris occupied over 20 percent of the pipe at 8 feet from the inlet and the camera was unable to go any further. This pipe segment was unable to be inspected. This run is identified as Section No. 12 in the inspection report.

All other pipes within the parking lot were inspected and are described below:

- **Mainline.** The mainline is the main storm drain pipe that collects stormwater from the parking lot and conveys it to manhole SL6 within the park, which then conveys it to Outfall A. Because of the length of the mainline it was inspected in several segments.
  - *Mainline MH-1 to Mainline MH-2.* The 10-inch concrete pipe that runs from Mainline MH-1 to Catch Basin PA-CB-01 was inspected to 40 feet. At approximately 40 feet, the pipe had an offset joint that the camera was unable to get past. Up to this point the pipe appeared to be in good condition. This run is identified as Section No. 3 in the inspection report.
  - *Mainline MH-2 to Mainline MH-1.* In order to inspect the remainder of the 10-inch concrete pipe that was unable to be inspected as noted above, the camera was placed inside Mainline MH-2 and directed downstream towards Mainline MH-1. At approximately 5 feet and 29 feet from Mainline MH-2, sags were noted where water had collected. Fine roots were noted in the pipe at 39 feet from Mainline MH-2 and small cracks were noted at approximately 20 feet from Mainline MH-2. At approximately 103 feet, the offset joint noted above was encountered. This run is identified as Section No. 5 in the inspection report.
  - *Mainline MH-2 to PA-CB-01.* The 8-inch concrete pipe that runs from Mainline MH-2 to Catch Basin PA-CB-01 was inspected to 38 feet. Fine roots were noted in the pipe from 34 to 37 feet from Mainline MH-2 and at 38 feet roots filled over 50 percent of the pipe and the camera was unable to go any further. Up to this point, the pipe appeared to be in good condition. This run is identified as Section No. 6 in the inspection report. A second attempt was made using a push camera, which was able to go 42 feet before root obstructions prevented the camera from going any further. This run is identified as Section No. 15 in the inspection report.
  - *Mainline MH-1 to SL6.* The 10-inch concrete pipe that runs from Mainline MH-1 to Maintenance Hole SL6 within the park was inspected. This pipe is approximately 110 feet long and conveys all the parking lot runoff to the storm drain system that discharges to Outfall A. Minor fine roots were noted at the outlet from Mainline MH-1, but otherwise the pipe appeared to be in good condition. This run is identified as Section No. 4 in the inspection report.
- **Inlet-PA-CB-03 to PA-CB-03.** The 6-inch concrete pipe that runs from inlet Inlet-PA-CB-03 to the Catch Basin PA-CB-03 was inspected. The pipe is approximately 29 feet long and contained some debris. Fine roots were noted in the pipe at several locations approximately 20 feet from the inlet. A crack was also noted

at the crown of the pipe at 24 feet from the inlet. This run is identified as Section No. 11 in the inspection report.

- **PA-CB-03 to Mainline.** The 8-inch concrete pipe that runs from Catch Basin PA-CB-03 to the mainline was inspected. The pipe is approximately 113 feet long, and several low points in the line where water collects (sags) were identified at approximately 47 feet from Catch Basin PA-CB-03. Overall, the pipe was in good condition. This run is identified as Section No. 1 in the inspection report.
- **Inlet-PA-CB-04 to PA-CB-04.** The 6-inch concrete pipe that runs from Inlet-PA-CB-04 to Catch Basin PA-CB-04 was inspected. The pipe is approximately 18 feet long and was approximately 10 percent full of debris in some areas. Fine roots were noted in the pipe at approximately 6 feet and 15 feet from the inlet. Overall, the pipe was in good condition. This run is identified as Section No. 13 in the inspection report.
- **Inlet-PA-CB-04 to Mainline.** The 6-inch concrete pipe that runs from Catch Basin Inlet-PA-CB-04 to the Mainline was inspected. The pipe is approximately 4 feet long and was in good condition. This run is identified as Section No. 7 in the inspection report.
- **Mainline MH2 to PA-CB-05.** The 8-inch concrete pipe that runs from Mainline MH-2 to Catch Basin PA-CB-05 was inspected. The camera went approximately 38 feet before hitting a root ball and was unable to go any further. Up to this point, the pipe appeared to be in good condition. This run is identified as Section No. 8 in the inspection report. A second attempt was made using a push camera and the camera was able to reach Catch Basin PA-CB-05. This run is identified as Section No. 16 in the inspection report.
- **Inlet-PA-CB-07 to PA-CB-07.** The 6-inch concrete pipe that runs from Inlet-PA-CB-07 to Catch Basin PA-CB-07 was inspected. The pipe is approximately 4 feet long and was in good condition. This run is identified as Section No. 14 in the inspection report.
- **PA-CB-07 to Mainline.** The 8-inch concrete pipe that runs from Catch Basin PA-CB-07 to the Mainline was inspected. The pipe is approximately 13 feet long and contained minor cracks at 8 feet and 11 feet from the catch basin. The pipe also contained fine roots at 11 feet and 12 feet from the catch basin. Overall the pipe was in good condition. This run is identified as Section No. 3 in the inspection report.

5.2 GAS WORKS PARK STORM DRAINS

Within the park, two storm drain systems had not been previously inspected: the storm drain system from Outfall F and the storm drain system from Kite Hill. Each of these systems is described in more detail below.

5.2.1 Outfall F

Outfall F is a 6-inch perforated pipe that discharges into Lake Union on the south side of the park and is located at the west end of the prow along the southern portion of the park as shown on Figure 5.2. It discharges runoff from a system that consists of a solid pipe that conveys runoff collected in an upgradient perforated pipe. The perforated pipe is located in a low elevation area just north of a paved path and is approximately 40 feet long. Stormwater runoff from a northern area of the park that is between the main east-west path and the parking lot is conveyed to this area through an inlet and short pipe that conveys the runoff to the south underneath the paved path. This runoff then travels overland to the low area where the perforated pipe is located. Additional runoff from the eastern side of Kite Hill and the grassy area west of the cracking towers is also collected by the perforated pipe.

Because of the high level of water in Lake Union, this pipe was unable to be accessed safely and was therefore not inspected.

5.2.2 Kite Hill Outfall

Kite Hill Outfall is a 6-inch pipe that conveys runoff collected from four inlets located around the perimeter of the sculpture on top of Kite Hill to Lake Union. The runoff from the four inlets is conveyed to a manhole located on the south side of the sculpture at which point the runoff enters the 6-inch pipe.

Upon inspection of the manhole, it was noted that the water level in the manhole was higher than the outlet pipe, indicating that the pipe was clogged and was not able to drain freely. The camera was placed in the manhole and was unable to go more than 1 foot because of deposits occupying approximately 75 percent of the pipe. The outlet of this pipe was unable to be accessed safely and may be underwater; therefore, this pipe was unable to be inspected. This run is identified as Section No. 17 in the inspection report (Appendix D).

It is important to note that flooding has not been previously identified on Kite Hill so this may be a new or temporary situation.

5.3 HARBOR PATROL STORM DRAINS

Within the Harbor Patrol facility located just west of Gas Works Park, there is a storm drain system that collects runoff from the Harbor Patrol facility, which has not been previously inspected.

Most of the inspected pipe segments appeared to be in good condition. However, several pipes did contain blockages and structures that limited the video inspection of this area or that were inaccessible. Figure 5.2 indicates with yellow highlighting the pipe segments that could not be inspected; these segments are described below. The video inspection report is provided in Appendix D.

- **HP-CB-01 to HP-CB-02.** This pipe was filled with water so it could not be inspected for integrity. The water in the pipe is due to the outlet elevation of Catch Basin HP-CB-01 being higher than the outlet elevation of Catch Basin HP-CB-02; therefore, this pipe will always contain water. However, the camera was pushed from HP-CB-01 to HP-CB-02 and it was confirmed that these two structures are connected. The pipe was approximately 6 feet long and was in good condition. This run is identified as Section No. 18 in the inspection report.
- **45 feet from HP-CB-02 to HP-CB-03.** The inspection began at Catch Basin HP-CB-02 and went approximately 45 feet before encountering two 45 degree bends that the camera was unable to get past. A truck was parked on Catch Basin HP-CB-03 all day so access was not possible from that catch basin.

All other pipes within the parking lot were inspected and are described below:

- **HP-CB-02 to 45 feet from HP-CB-02 towards HP-CB-03.** The inspection of the 8-inch PVC pipe from Catch Basin HP-CB-02 towards Catch Basin HP-CB-03 showed sags and standing water at approximately 3 feet, 22 feet, and 38 feet from HP-CB-02. An unidentified 4-inch pipe entered this segment at approximately 15 feet from HP-CB-02, this pipe may come from the Harbor Patrol building. At 42 feet, there were two 45 degree bends in the pipe and the inspection was unable to continue. Up to this point, the pipe appeared to be in good condition. This run is identified as Section No. 9 in the inspection report.
- **HP-CB-01 to Harbor Patrol Overflow Outfall.** The 8-inch PVC pipe that runs from Catch Basin HP-CB-01 to the Harbor Patrol Overflow Outfall was inspected. This pipe serves as an overflow outfall for storms that produce too much water volume to enter the oil-water separator. There was significant debris in this pipe including a plastic bag at 6 feet from HP-CB-01 and a small board at 32 feet from HP-CB-01. At 32 feet from Catch Basin HP-CB-01, the survey was abandoned due to debris; however, because of the distance it appeared that the end of the pipe had been reached, but this could not be visually verified due to the camera being in the water. This run is identified as Section No. 19 in the inspection report.
- **HP-0WS-01 to HP-CB-01.** The inspection of the 8-inch PVC pipe from the oil-water separator (HP-OWS-01) to Catch Basin HP-CB-01 showed that the pipe is approximately 6 feet long and in good condition. This run is identified as Section No. 10 in the inspection report.
- **HP-0WS-01 to Harbor Patrol Outfall.** The 8-inch PVC pipe that runs from the oil-water separator (HP-OWS-01) to the Harbor Patrol Outfall was inspected. At approximately 16 feet from HP-OWS-01 the camera became submerged due to water in the pipe and remained that way until the end of the pipe at approximately 36 feet from HP-OWS-01. The camera was visible at the outfall. Up to the point when the camera became submerged, the pipe appeared to be in good condition. This run is identified as Section No. 20 in the inspection report.

6.0 Next Steps

Video inspection of Outfall F was not possible during the summer because of the water level of Lake Union. A video inspection will be attempted when the lake level is at the lowest point for the year (December through early January). Furthermore, the City is currently evaluating options to complete an inspection of the Kite Hill storm drain, including possibly cleaning the line to allow for a second video inspection attempt. These additional actions will be taken in the December through February time frame. The results of these additional video inspections will be provided to Ecology as an addendum to this Phase 3 data report.

An evaluation of the results of all storm drain source control investigations performed for the site is underway as required by the AO and will be documented in a data evaluation report, which will accompany the GWSA RI/FS documents. The City and PSE will continue to coordinate with Ecology as the results of this evaluation become available.

7.0 References

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Gas Works Park

Storm Drain Source Control Evaluation
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Tables

FINAL

Table 2.1
Catch Basin Solids Analytical Results

Parameters	Sample ID / Date Time / Units	HP-CB-01	HP-CB-02	HP-CB-03	HP-OWS-Inlet[1]		HP-OWS-Outlet[1]		PA-CB-01	PA-CB-02	PA-CB-03
	Date Time	6/23/2010 1:45:00 PM	6/23/2010 1:30:00 PM	6/23/2010 12:56:00 PM	6/23/2010 1:55:00 PM		6/23/2010 2:07:00 PM		6/23/2010	6/23/2010 8:10:00 AM	6/23/2010 9:00:00 AM
	Units										
Conventionals											
Total Solids	%	51.7	39.1	37.3	25.1		22.7		15	26	20.1
Total Organic Carbon	%	12	14.7	16.8	19.4		25.5		23	14.8	16.2
Grain Size											
Percent passing < 1.3 micron sieve	%	1.2	0.7	0.6	2.3		2.3		2.9	2.4	4.5
Percent retained 1.3 micron sieve	%	1.9	4	2.6	6.2		6		1.5	1.2	4.5
Percent retained 3.2 micron sieve	%	2.5	4.7	3.2	8.5		10.6		2.9	3.5	5.9
Percent retained 7 micron sieve	%	3.1	4	3.8	7.7		9.8		1.5	2.4	5.9
Percent retained 9 micron sieve	%	3.1	4.7	5.1	10		9		4.4	4.1	8.2
Percent retained 13 micron sieve	%	7.4	6.1	3.8	10.8		13.6		5.9	4.1	6.7
Percent retained 22 micron sieve	%	3.7	7.4	5.8	13.1		11.3		10.3	6.5	10.4
Percent retained 32 micron sieve	%	8.5	16.4	10.4	26		19.3		5.2	7.4	12
Percent retained 75 micron sieve	%	6.8	11.9	9.6	4.6		3.9		6.4	5.6	4.7
Percent retained 150 micron sieve	%	8.8	11	12.8	3		3.3		7.5	7.8	6.3
Percent retained 250 micron sieve	%	15.5	13.5	16.8	3.2		4.5		12.2	14.6	10.8
Percent retained 425 micron sieve	%	17.3	9.9	14	2.8		4		15.9	16.6	12.3
Percent retained 850 micron sieve	%	9.1	3.6	7.2	1.3		1.8		12.6	12.4	6.3
Percent retained 2000 micron sieve	%	4.3	1.3	2.4	0.4		0.7		5.5	9	1.4
Percent retained 4750 micron sieve	%	4.8	0.8	0.6	0.1 U		0.1		0.7	2.1	0.2
Percent retained 9500 micron sieve	%	1.8	0.1 U	1.2	0.1		0.1 U		0.2	0.1	0.1 U
Percent retained 12500 micron sieve	%	0.1 U	0.1 U	0.1 U	0.1 U		0.1 U		4.1	0.2	0.1 U
Percent retained 19000 micron sieve	%	0.1 U	0.1 U	0.1 U	0.1 U		0.1 U		0.3	0.1 U	0.1 U
Percent retained 25K micron sieve	%	0.1 U	0.1 U	0.1 U	0.1 U		0.1 U		0.1 U	0.1 U	0.1 U
Percent retained 37.5K micron sieve	%	0.1 U	0.1 U	0.1 U	0.1 U		0.1 U		0.1 U	0.1 U	0.1 U
Percent retained 50K micron sieve	%	0.1 U	0.1 U	0.1 U	0.1 U		0.1 U		0.1 U	0.1 U	0.1 U
Percent retained 75K micron sieve	%	0.1 U	0.1 U	0.1 U	0.1 U		0.1 U		0.1 U	0.1 U	0.1 U
Metals											
Arsenic	mg/kg	13	10	10 U	20 U	20	20	20	30 U	20 U	20 U
Cadmium	mg/kg	3.2	5.7	2	7.9	9.3	7.9	7.1	1	1.3	1.2
Chromium	mg/kg	65.2	99	65	96	91	175	80	38	46	38
Copper	mg/kg	281	327	321	551	648	605	584	165	152	105
Lead	mg/kg	148	179	204	346	320	319	303	120	112	80
Silver	mg/kg	0.6	0.7 U	0.8 U	1 U	0.8 U	1 U	0.7 U	2 U	1 U	1 U
Zinc	mg/kg	934	1020	899	14400	6930	6920	6410	446	449	325
Mercury	mg/kg	0.1	0.44	0.11	0.24	0.37	0.34	0.39	0.1 U	0.1 U	0.12
Polychlorinated Biphenyls											
Aroclor 1016	µg/kg	32 U	32 U	32 U	65 U		65 U		33 U	33 U	33 U
Aroclor 1221	µg/kg	32 U	32 U	32 U	65 U		65 U		33 U	33 U	33 U
Aroclor 1232	µg/kg	32 U	32 U	32 U	65 U		65 U		33 U	33 U	33 U
Aroclor 1242	µg/kg	32 U	32 U	32 U	65 U		65 U		33 U	33 U	33 U
Aroclor 1248	µg/kg	32 U	41 UY	32 U	65 U		65 U		33 U	33 U	33 U
Aroclor 1254	µg/kg	36	88	41	110		100		33 U	41	33 U
Aroclor 1260	µg/kg	32 U	37	32 U	65 U		65 U		34	44	33 U
Total PCBs	µg/kg	36	125	41	110		100		34	85	33 U

Table 2.1
Catch Basin Solids Analytical Results

Parameters	Sample ID / Date / Time / Units	HP-CB-01	HP-CB-02	HP-CB-03	HP-OWS-Inlet[1]	HP-OWS-Outlet[1]	PA-CB-01	PA-CB-02	PA-CB-03
	Date Time	6/23/2010 1:45:00 PM	6/23/2010 1:30:00 PM	6/23/2010 12:56:00 PM	6/23/2010 1:55:00 PM	6/23/2010 2:07:00 PM	6/23/2010	6/23/2010 8:10:00 AM	6/23/2010 9:00:00 AM
Parameters	Units								
Semivolatile Organic Compounds									
LPAHs[2]									
Naphthalene	µg/kg	240 J	660 J	640 UJ	1400 J	1300 UJ	200 UJ	190 UJ	190 UJ
Acenaphthylene	µg/kg	190 UJ	190 UJ	640 UJ	390 UJ	1300 UJ	200 UJ	190 UJ	190 UJ
Acenaphthene	µg/kg	190 UJ	190 UJ	640 UJ	390 UJ	1300 UJ	200 UJ	190 UJ	190 UJ
Fluorene	µg/kg	200 J	300 J	640 UJ	440 J	1300 UJ	200 UJ	190 UJ	190 UJ
Phenanthrene	µg/kg	1200 J	2000 J	1500 J	2500 J	3000 J	590 J	460 J	680 J
Anthracene	µg/kg	240 J	270 J	640 UJ	390 UJ	1300 UJ	200 UJ	190 UJ	190 UJ
2-Methylnaphthalene	µg/kg	350 J	690 J	640 UJ	2300 J	1300 UJ	200 UJ	190 UJ	190 UJ
Total LPAH	µg/kg	1880 J	3230 J	1500 J	4340 J	3000 J	590 J	460 J	680 J
HPAHs[3]	µg/kg								
Fluoranthene	µg/kg	1800 J	2500 J	1800 J	3200 J	4300 J	850 J	710 J	1000 J
Pyrene	µg/kg	2300 J	3300 J	2100 J	3600 J	5200 J	1000 J	780 J	1300 J
Benzo(a)anthracene	µg/kg	620 J	810 J	640 UJ	1100 J	1300 J	240 J	210 J	300 J
Chrysene	µg/kg	1000 J	1400 J	1100 J	2300 J	2800 J	670 J	540 J	700 J
Total Benzofluoranthenes[4]	µg/kg	1500 J	2000 J	1700 J	2900 J	4300 J	750 J	680 J	910 J
Benzo(a)pyrene	µg/kg	700 J	910 J	640 UJ	1400 J	1600 J	370 J	290 J	380 J
Indeno(1,2,3-cd)pyrene	µg/kg	260 J	370 J	640 UJ	500 J	1300 UJ	220 J	190 UJ	200 J
Dibenz(a,h)anthracene	µg/kg	190 UJ	190 UJ	640 UJ	390 UJ	1300 UJ	200 UJ	190 UJ	190 UJ
Benzo(g,h,i)perylene	µg/kg	380 J	550 J	640 UJ	730 J	1300 UJ	320 J	240 J	310 J
Total HPAH	µg/kg	8560 J	11840 J	6700 J	15730 J	19500 J	4420 J	3450 J	5100 J
Total PAH	µg/kg	10440 J	15070 J	8200 J	20070 J	22500 J	5010 J	3910 J	5780 J
Miscellaneous									
1,2,4-Trichlorobenzene	µg/kg	370 U	950 U	190 U	2300 U	2000 U	440 U	750 U	400 U
1,2-Dichlorobenzene	µg/kg	370 U	950 U	190 U	2300 U	2000 U	440 U	750 U	400 U
1,3-Dichlorobenzene	µg/kg	370 U	950 U	190 U	2300 U	2000 U	440 U	750 U	400 U
1,4-Dichlorobenzene	µg/kg	370 U	950 U	190 U	2300 U	2000 U	440 U	750 U	400 U
1-Methylnaphthalene	µg/kg	260 J	540 J	640 UJ	1400 J	1300 UJ	200 UJ	190 UJ	190 UJ
2,2'-Oxybis(1-Chloropropane)	µg/kg	370 U	950 U	190 U	2300 U	2000 U	440 U	750 U	400 U
2,4,5-Trichlorophenol	µg/kg	1900 U	4800 U	950 U	12000 U	10000 U	2200 U	3800 U	2000 U
2,4,6-Trichlorophenol	µg/kg	1900 U	4800 U	950 U	12000 U	10000 U	2200 U	3800 U	2000 U
2,4-Dichlorophenol	µg/kg	1900 U	4800 U	950 U	12000 U	10000 U	2200 U	3800 U	2000 U
2,4-Dimethylphenol	µg/kg	370 U	950 U	190 U	2300 U	2000 U	440 U	750 U	400 U
2,4-Dinitrophenol	µg/kg	3700 U	9500 U	1900 U	23000 U	20000 U	4400 U	7500 U	4000 U
2,4-Dinitrotoluene	µg/kg	1900 U	4800 U	950 U	12000 U	10000 U	2200 U	3800 U	2000 U
2,6-Dinitrotoluene	µg/kg	1900 U	4800 U	950 U	12000 U	10000 U	2200 U	3800 U	2000 U
2-Chloronaphthalene	µg/kg	370 U	950 U	190 U	2300 U	2000 U	440 U	750 U	400 U
2-Chlorophenol	µg/kg	370 U	950 U	190 U	2300 U	2000 U	440 U	750 U	400 U
2-Methylphenol	µg/kg	370 U	950 U	190 U	2300 U	2000 U	440 U	750 U	400 U
2-Nitrophenol	µg/kg	1900 U	4800 U	950 U	12000 U	10000 U	2200 U	3800 U	2000 U
2-Nitroaniline	µg/kg	1900 U	4800 U	950 U	12000 U	10000 U	2200 U	3800 U	2000 U
3,3'-Dichlorobenzidine	µg/kg	1900 U	4800 U	950 U	12000 U	10000 U	2200 U	3800 U	2000 U
3-Nitroaniline	µg/kg	1900 U	4800 U	950 U	12000 U	10000 U	2200 U	3800 U	2000 U
4,6-Dinitro-2-Methylphenol	µg/kg	3700 U	9500 U	1900 U	23000 U	20000 U	4400 U	7500 U	4000 U
4-Bromophenyl-phenylether	µg/kg	370 U	950 U	190 U	2300 U	2000 U	440 U	750 U	400 U
4-Chloroaniline	µg/kg	1900 U	4800 U	950 U	12000 U	10000 U	2200 U	3800 U	2000 U

Table 2.1
Catch Basin Solids Analytical Results

Parameters	Sample ID / Date Time / Units	HP-CB-01	HP-CB-02	HP-CB-03	HP-OWS-Inlet[1]		HP-OWS-Outlet[1]		PA-CB-01	PA-CB-02	PA-CB-03
	Date Time	6/23/2010 1:45:00 PM	6/23/2010 1:30:00 PM	6/23/2010 12:56:00 PM	6/23/2010 1:55:00 PM		6/23/2010 2:07:00 PM		6/23/2010	6/23/2010 8:10:00 AM	6/23/2010 9:00:00 AM
Semivolatile Organic Compounds (continued)											
Miscellaneous (continued)											
4-Chloro-3-methylphenol	µg/kg	1900 U	4800 U	950 U	12000 U		10000 U		2200 U	3800 U	2000 U
4-Chlorophenyl-phenylether	µg/kg	370 U	950 U	190 U	2300 U		2000 U		440 U	750 U	400 U
4-Methylphenol	µg/kg	370 U	950 U	810	2300 U		2000 U		440 U	750 U	400 U
4-Nitroaniline	µg/kg	1900 U	4800 U	950 U	12000 U		10000 U		2200 U	3800 U	2000 U
4-Nitrophenol	µg/kg	1900 U	4800 U	950 U	12000 U		10000 U		2200 U	3800 U	2000 U
Benzoic Acid	µg/kg	3700 U	9500 U	1900 U	23000 U		20000 U		4400 U	7500 U	4000 U
Benzyl Alcohol	µg/kg	1900 U	4800 U	950 U	12000 U		10000 U		2200 U	3800 U	2000 U
Bis-(2-Chloroethyl) Ether	µg/kg	370 U	950 U	190 U	2300 U		2000 U		440 U	750 U	400 U
bis(2-Chloroethoxy) Methane	µg/kg	370 U	950 U	190 U	2300 U		2000 U		440 U	750 U	400 U
bis(2-Ethylhexyl)phthalate	µg/kg	57000	48000	29000	90000		79000		17000	20000	20000
Butylbenzylphthalate	µg/kg	370 U	950 U	190 U	2300 U		2000 U		440 U	750 U	400 U
Carbazole	µg/kg	370 U	950 U	190 U	2300 U		2000 U		440 U	750 U	400 U
Dibenzofuran	µg/kg	190 UJ	240 UJ	640 UJ	390 UJ		1300 UJ		200 UJ	190 UJ	190 UJ
Diethylphthalate	µg/kg	370 U	950 U	190 U	2300 U		2000 U		440 U	750 U	400 U
Dimethylphthalate	µg/kg	370 U	950 U	240	2300 U		2000 U		440 U	750 U	400 U
Di-n-Butylphthalate	µg/kg	370 U	950 U	190 U	2300 U		2000 U		440 U	750 U	400 U
Di-n-Octyl phthalate	µg/kg	2300	950 U	1300	11000		7500		770	1200	530
Hexachlorobutadiene	µg/kg	370 U	950 U	190 U	2300 U		2000 U		440 U	750 U	400 U
Hexachlorocyclopentadiene	µg/kg	1900 U	4800 U	950 U	12000 U		10000 U		2200 U	3800 U	2000 U
Hexachlorobenzene	µg/kg	370 U	950 U	190 U	2300 U		2000 U		440 U	750 U	400 U
Hexachloroethane	µg/kg	370 U	950 U	190 U	2300 U		2000 U		440 U	750 U	400 U
Isophorone	µg/kg	370 U	950 U	190 U	2300 U		2000 U		440 U	750 U	400 U
Nitrobenzene	µg/kg	370 U	950 U	190 U	2300 U		2000 U		440 U	750 U	400 U
N-Nitroso-Di-N-Propylamine	µg/kg	1900 U	4800 U	950 U	12000 U		10000 U		2200 U	3800 U	2000 U
N-Nitrosodiphenylamine	µg/kg	370 U	950 U	190 U	2300 U		2000 U		440 U	750 U	400 U
Pentachlorophenol	µg/kg	1900 U	4800 U	950 U	12000 U		10000 U		2200 U	3800 U	2000 U
Phenol	µg/kg	370 U	950 U	190 U	2300 U		2000 U		440 U	750 U	400 U

Notes:

1 Metals were re-analyzed, both results presented for completeness.
2 LPAH is the sum of detected values for naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, and anthracene, 2-methylnaphthalene is not included in the LPAH sum.
3 HPAH is the sum of detected values for fluoranthene, pyrene, benzo(a)anthracene, chrysene, total benzofluoranthenes, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, dibenz(a,h)anthracene, and benzo(g,h,i)perylene.
4 Total Benzofluoranthes is the sum of the b, j, and k isomers of benzofluoranthene.

Abbreviations:

HPAH High molecular weight polycyclic aromatic hydrocarbon
LPAH Low molecular weight polycyclic aromatic hydrocarbon
PAH Polycyclic aromatic hydrocarbon
PCB Polychlorinated biphenyl

Qualifiers:

J Analyte was detected, the reported concentration is an estimate.
U Analyte was not detected, the concentration is the reporting limit.
UJ Analyte was not detected, the concentration is the reporting limit, which is an estimate.
UY Analyte was not detected, the concentration is the reporting limit, which is elevated.

Table 2.1
Catch Basin Solids Analytical Results

Parameters	Sample ID / Date Time / Units	PA-CB-04	PA-CB-05	PA-CB-06	PA-CB-07	PA-CB-DUP	SL6.1	SL6.2	SL6-BASE
	Date Time	6/23/2010 9:45:00 AM	6/23/2010 9:25:00 AM	6/23/2010 10:10:00 AM	6/23/2010 10:25:00 AM	6/23/2010 9:25:00 AM	6/23/2010 11:50:00 AM	6/23/2010 11:20:00 AM	6/23/2010 11:00:00 AM
	Units								
Conventionals									
Total Solids	%	38.3	20.3	9.8	19.7	26.8	34.5	28.9	
Total Organic Carbon	%	15.4	17.6	26.9	25.5	14.4	6.3	19.9	
Grain Size									
Percent passing < 1.3 micron sieve	%	3	2.6	4	2.3	0.7	0.7	4.5	
Percent retained 1.3 micron sieve	%	0.6	1.3	0.1 U	0.8	1.3	4.1	6.4	
Percent retained 3.2 micron sieve	%	2.4	2.6	0.1 U	1.5	2	6.8	11.8	
Percent retained 7 micron sieve	%	2.4	3.9	9	2.3	2	6.8	5.4	
Percent retained 9 micron sieve	%	4.8	2.6	4	3.8	5.4	6.1	8.9	
Percent retained 13 micron sieve	%	4.2	3.9	4	7.7	4	8.2	14.2	
Percent retained 22 micron sieve	%	4.2	8.5	12	6.9	8.7	6.1	9.8	
Percent retained 32 micron sieve	%	1.4	3.2	6.6	4.4	1.9	11.6	17.7	
Percent retained 75 micron sieve	%	5.3	5	6.7	6.4	5.8	12.4	11.9	
Percent retained 150 micron sieve	%	9.7	8	8.6	9.8	8.9	10.8	8.1	
Percent retained 250 micron sieve	%	17	15.3	13	16.2	16.7	8.8	1.4	
Percent retained 425 micron sieve	%	14.5	18.6	14.9	14.6	19.2	4.6	0.1 U	
Percent retained 850 micron sieve	%	8.3	15.5	11.6	7.4	17.4	6.6	0.1 U	
Percent retained 2000 micron sieve	%	4.6	5.1	3.9	2.6	4.6	2	0.1 U	
Percent retained 4750 micron sieve	%	3.7	1.7	0.6	0.5	0.6	2.2	0.1 U	
Percent retained 9500 micron sieve	%	0.1 U	1.8	0.2	0.1 U	0.5	2.3	0.1 U	
Percent retained 12500 micron sieve	%	5.9	0.4	0.5	0.1 U	0.3	0.1 U	0.1 U	
Percent retained 19000 micron sieve	%	8.2	0.1	0.6	12.7	0.1 U	0.1 U	0.1 U	
Percent retained 25K micron sieve	%	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	
Percent retained 37.5K micron sieve	%	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	
Percent retained 50K micron sieve	%	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	
Percent retained 75K micron sieve	%	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	
Metals									
Arsenic	mg/kg	10 U	20 U	50 U	20 U	20 U	40	60	
Cadmium	mg/kg	0.5	0.9 U	2 U	1	0.7 U	3.8	4.4	
Chromium	mg/kg	21	66	35	41	24	42	34	
Copper	mg/kg	48.6	97.4	122	131	65.1	68.1	69.5	
Lead	mg/kg	38	65	120	120	50	59	44	
Silver	mg/kg	0.7 U	1 U	3 U	1 U	1 U	2	0.9 U	
Zinc	mg/kg	152	279	420	416	199	308	334	
Mercury	mg/kg	0.06 U	0.1 U	0.2 U	0.1 U	0.09 U	0.31	0.18	
Polychlorinated Biphenyls									
Aroclor 1016	µg/kg	32 U	33 U	33 U	33 U	33 U	32 U	33 U	
Aroclor 1221	µg/kg	32 U	33 U	33 U	33 U	33 U	32 U	33 U	
Aroclor 1232	µg/kg	32 U	33 U	33 U	33 U	33 U	32 U	33 U	
Aroclor 1242	µg/kg	32 U	33 U	33 U	33 U	33 U	32 U	33 U	
Aroclor 1248	µg/kg	32 U	33 U	33 U	33 U	33 U	170	33 U	
Aroclor 1254	µg/kg	32 U	33 U	33 U	36	33 U	210	53	
Aroclor 1260	µg/kg	32 U	33 U	33 U	33 U	33 U	140	33 U	
Total PCBs	µg/kg	32 U	33 U	33 U	36	33 U	520	53	

Table 2.1
Catch Basin Solids Analytical Results

Parameters	Sample ID / Date Time / Units	PA-CB-04	PA-CB-05	PA-CB-06	PA-CB-07	PA-CB-DUP	SL6.1	SL6.2	SL6-BASE
	Date Time	6/23/2010 9:45:00 AM	6/23/2010 9:25:00 AM	6/23/2010 10:10:00 AM	6/23/2010 10:25:00 AM	6/23/2010 9:25:00 AM	6/23/2010 11:50:00 AM	6/23/2010 11:20:00 AM	6/23/2010 11:00:00 AM
Semivolatile Organic Compounds									
LPAHs[2]									
Naphthalene	µg/kg	190 UJ	200 UJ	200 UJ	390 UJ	200 UJ	1900	520	81
Acenaphthylene	µg/kg	190 UJ	200 UJ	200 UJ	390 UJ	200 UJ	1400	470	97
Acenaphthene	µg/kg	190 UJ	200 UJ	200 UJ	390 UJ	200 UJ	1300	140	63 U
Fluorene	µg/kg	190 UJ	200 UJ	200 UJ	390 UJ	200 UJ	2600	490	63 U
Phenanthrene	µg/kg	440 J	390 J	470 J	840 J	680 J	13000	3600	510
Anthracene	µg/kg	190 UJ	200 UJ	200 UJ	390 UJ	200 UJ	3200	900	91
2-Methylnaphthalene	µg/kg	190 UJ	200 UJ	200 UJ	390 UJ	200 UJ	1700	370	63 U
Total LPAH	µg/kg	440 J	390 J	470 J	840 J	680 J	23400	6120	779
HPAHs[3]									
Fluoranthene	µg/kg	960 J	580 J	740 J	1400 J	820 J	21000	9400	1400
Pyrene	µg/kg	910 J	710 J	1200 J	1800 J	1100 J	25000	11000	2200
Benzo(a)anthracene	µg/kg	400 J	200 UJ	220 J	500 J	260 J	6100	3100	660
Chrysene	µg/kg	570 J	420 J	560 J	1000 J	550 J	7600	3500	820
Total Benzofluoranthenes[4]	µg/kg	920 J	600 J	790 J	1500 J	840 J	10400	5400	1300
Benzo(a)pyrene	µg/kg	440 J	230 J	310 J	670 J	340 J	8800	4800	1000
Indeno(1,2,3-cd)pyrene	µg/kg	190 UJ	200 UJ	200 J	390 UJ	200 UJ	4800	250	680
Dibenz(a,h)anthracene	µg/kg	190 UJ	200 UJ	200 UJ	390 UJ	200 UJ	1000	520	78
Benzo(g,h,i)perylene	µg/kg	220 J	200 UJ	300 J	450 J	250 J	6200	2700	1000
Total HPAH	µg/kg	4420 J	2540 J	4320 J	7320 J	4160 J	90900	40670	9138
Total PAH	µg/kg	4860 J	2930 J	4790 J	8160 J	4840 J	114300	46790	9917
Miscellaneous									
1,2,4-Trichlorobenzene	µg/kg	380 U	380 U	590 U	450 U	390 U	180 U	65 U	
1,2-Dichlorobenzene	µg/kg	380 U	380 U	590 U	450 U	390 U	180 U	65 U	
1,3-Dichlorobenzene	µg/kg	380 U	380 U	590 U	450 U	390 U	180 U	65 U	
1,4-Dichlorobenzene	µg/kg	380 U	380 U	590 U	450 U	390 U	180 U	65 U	
1-Methylnaphthalene	µg/kg	190 UJ	200 UJ	200 UJ	390 UJ	200 UJ	2200	290	63 U
2,2'-Oxybis(1-Chloropropane)	µg/kg	380 U	380 U	590 U	450 U	390 U	180 U	65 U	
2,4,5-Trichlorophenol	µg/kg	1900 U	1900 U	3000 U	2200 U	2000 U	930 U	330 U	
2,4,6-Trichlorophenol	µg/kg	1900 U	1900 U	3000 U	2200 U	2000 U	930 U	330 U	
2,4-Dichlorophenol	µg/kg	1900 U	1900 U	3000 U	2200 U	2000 U	930 U	330 U	
2,4-Dimethylphenol	µg/kg	380 U	380 U	590 U	450 U	390 U	180 U	65 U	
2,4-Dinitrophenol	µg/kg	3800 U	3800 U	5900 U	4500 U	3900 U	1800 U	650 U	
2,4-Dinitrotoluene	µg/kg	1900 U	1900 U	3000 U	2200 U	2000 U	930 U	330 U	
2,6-Dinitrotoluene	µg/kg	1900 U	1900 U	3000 U	2200 U	2000 U	930 U	330 U	
2-Chloronaphthalene	µg/kg	380 U	380 U	590 U	450 U	390 U	180 U	65 U	
2-Chlorophenol	µg/kg	380 U	380 U	590 U	450 U	390 U	180 U	65 U	
2-Methylphenol	µg/kg	380 U	380 U	590 U	450 U	390 U	180 U	65 U	
2-Nitrophenol	µg/kg	1900 U	1900 U	3000 U	2200 U	2000 U	930 U	330 U	
2-Nitroaniline	µg/kg	1900 U	1900 U	3000 U	2200 U	2000 U	930 U	330 U	
3,3'-Dichlorobenzidine	µg/kg	1900 U	1900 U	3000 U	2200 U	2000 U	930 U	330 U	
3-Nitroaniline	µg/kg	1900 U	1900 U	3000 U	2200 U	2000 U	930 U	330 U	
4,6-Dinitro-2-Methylphenol	µg/kg	3800 U	3800 U	5900 U	4500 U	3900 U	1800 U	650 U	
4-Bromophenyl-phenylether	µg/kg	380 U	380 U	590 U	450 U	390 U	180 U	65 U	
4-Chloroaniline	µg/kg	1900 U	1900 U	3000 U	2200 U	2000 U	930 U	330 U	

Table 2.1
Catch Basin Solids Analytical Results

Parameters	Sample ID / Date Time / Units	PA-CB-04	PA-CB-05	PA-CB-06	PA-CB-07	PA-CB-DUP	SL6.1	SL6.2	SL6-BASE
	Date Time	6/23/2010 9:45:00 AM	6/23/2010 9:25:00 AM	6/23/2010 10:10:00 AM	6/23/2010 10:25:00 AM	6/23/2010 9:25:00 AM	6/23/2010 11:50:00 AM	6/23/2010 11:20:00 AM	6/23/2010 11:00:00 AM
Semivolatile Organic Compounds (continued)									
Miscellaneous (continued)									
4-Chloro-3-methylphenol	µg/kg	1900 U	1900 U	3000 U	2200 U	2000 U	930 U	330 U	
4-Chlorophenyl-phenylether	µg/kg	380 U	380 U	590 U	450 U	390 U	180 U	65 U	
4-Methylphenol	µg/kg	380 U	380 U	590 U	450 U	420	180 U	520	
4-Nitroaniline	µg/kg	1900 U	1900 U	3000 U	2200 U	2000 U	930 U	330 U	
4-Nitrophenol	µg/kg	1900 U	1900 U	3000 U	2200 U	2000 U	930 U	330 U	
Benzoic Acid	µg/kg	3800 U	3800 U	5900 U	4500 U	3900 U	1800 U	650 U	
Benzyl Alcohol	µg/kg	1900 U	1900 U	3000 U	2200 U	2000 U	930 U	330 U	
Bis-(2-Chloroethyl) Ether	µg/kg	380 U	380 U	590 U	450 U	390 U	180 U	65 U	
bis(2-Chloroethoxy) Methane	µg/kg	380 U	380 U	590 U	450 U	390 U	180 U	65 U	
bis(2-Ethylhexyl)phthalate	µg/kg	7400	28000	18000	19000	7500	580	540	
Butylbenzylphthalate	µg/kg	380 U	380 U	590 U	450 U	390 U	180 U	65 U	
Carbazole	µg/kg	380 U	380 U	590 U	450 U	390 U	340	130	
Dibenzofuran	µg/kg	190 UJ	200 UJ	200 UJ	390 UJ	200 UJ	650	79	63 U
Diethylphthalate	µg/kg	380 U	380 U	590 U	450 U	390 U	180 U	65 U	
Dimethylphthalate	µg/kg	380 U	380 U	590 U	510	390 U	180 U	65 U	
Di-n-Butylphthalate	µg/kg	380 U	380 U	590 U	450 U	390 U	180 U	65 U	
Di-n-Octyl phthalate	µg/kg	380 U	650	900	900	850	180 U	65 U	
Hexachlorobutadiene	µg/kg	380 U	380 U	590 U	450 U	390 U	180 U	65 U	
Hexachlorocyclopentadiene	µg/kg	1900 U	1900 U	3000 U	2200 U	2000 U	930 U	330 U	
Hexachlorobenzene	µg/kg	380 U	380 U	590 U	450 U	390 U	180 U	65 U	
Hexachloroethane	µg/kg	380 U	380 U	590 U	450 U	390 U	180 U	65 U	
Isophorone	µg/kg	380 U	380 U	590 U	450 U	390 U	180 U	65 U	
Nitrobenzene	µg/kg	380 U	380 U	590 U	450 U	390 U	180 U	65 U	
N-Nitroso-Di-N-Propylamine	µg/kg	1900 U	1900 U	3000 U	2200 U	2000 U	930 U	330 U	
N-Nitrosodiphenylamine	µg/kg	380 U	380 U	590 U	450 U	390 U	180 U	65 U	
Pentachlorophenol	µg/kg	1900 U	1900 U	3000 U	2200 U	2000 U	930 U	330 U	
Phenol	µg/kg	380 U	380 U	590 U	450 U	390 U	180 U	65 U	

Notes:
1 Metals were re-analyzed, both results presented for completeness.
2 LPAH is the sum of detected values for naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, and anthracene, 2-methylnaphthalene is not included in the LPAH sum.
3 HPAH is the sum of detected values for fluoranthene, pyrene, benzo(a)anthracene, chrysene, total benzofluoranthenes, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, dibenz(a,h)anthracene, and benzo(g,h,i)perylene.
4 Total Benzofluoranthes is the sum of the b, j, and k isomers of benzofluoranthene.

Abbreviations:
HPAH High molecular weight polycyclic aromatic hydrocarbon
LPAH Low molecular weight polycyclic aromatic hydrocarbon
PAH Polycyclic aromatic hydrocarbon
PCB Polychlorinated biphenyl

Qualifiers:
J Analyte was detected, the reported concentration is an estimate.
U Analyte was not detected, the concentration is the reporting limit.
UJ Analyte was not detected, the concentration is the reporting limit, which is an estimate.
UY Analyte was not detected, the concentration is the reporting limit, which is elevated.

Table 3.1
Filter Fabric Analytical Results

Parameter	Filter Blank 5/19/2010 11:20:00 AM		SL7-051910 5/19/2010 10:00:00 AM		SL8-051910 5/19/2010 10:10:00 AM	
Conventionals						
Total Organic Carbon	170	mg/L	40.8	%		
Total Solids			34.8	%		
Metals						
Arsenic	0.05 U	mg/L	10 U	mg/kg	10 U	mg/kg
Cadmium	0.002 U	mg/L	3.9	mg/kg	9.5	mg/kg
Chromium	0.005 U	mg/L	77	mg/kg	138	mg/kg
Copper	0.002 U	mg/L	116	mg/kg	159	mg/kg
Lead	0.02 U	mg/L	111	mg/kg	246	mg/kg
Mercury	0.0001 U	mg/L	0.65	mg/kg	1.58	mg/kg
Silver	0.003 U	mg/L	5.6	mg/kg	11.8	mg/kg
Zinc	0.01	mg/L	265	mg/kg	449	mg/kg
Polychlorinated Biphenyls						
PCB Aroclor 1016	1 UR	µg/L	33 U	µg/kg		
PCB Aroclor 1221	1 UR	µg/L	33 U	µg/kg		
PCB Aroclor 1232	1 UR	µg/L	33 U	µg/kg		
PCB Aroclor 1242	1 UR	µg/L	33 U	µg/kg		
PCB Aroclor 1248	1 UR	µg/L	120	µg/kg		
PCB Aroclor 1254	1 UR	µg/L	220	µg/kg		
PCB Aroclor 1260	1 UR	µg/L	160	µg/kg		
PCBs (Total, Aroclors)	1 UR	µg/L	500	µg/kg		
Semivolatile Organic Compounds						
LPAHs						
Acenaphthene	1 U	µg/L	810 U	µg/kg	790 U	µg/kg
Acenaphthylene	1 U	µg/L	5100	µg/kg	2100	µg/kg
Anthracene	1 U	µg/L	4500	µg/kg	950	µg/kg
Fluorene	1 U	µg/L	1200	µg/kg	790 U	µg/kg
Naphthalene	1 U	µg/L	2000	µg/kg	790 U	µg/kg
Phenanthrene	1 U	µg/L	16000	µg/kg	2500	µg/kg
Total HPAH	1 U	µg/L	479000	µg/kg	78600	µg/kg
HPAHs						
Benzo(a)anthracene	1 U	µg/L	30000	µg/kg	4900	µg/kg
Benzo(a)pyrene	1 U	µg/L	52000	µg/kg	9200	µg/kg
Benzo(b)fluoranthene	1 U	µg/L	34000	µg/kg	8200	µg/kg
Benzo(k)fluoranthene	1 U	µg/L	34000	µg/kg	8200	µg/kg
Benzofluoranthenes (total)	1 U	µg/L	68000	µg/kg	16400	µg/kg
Benzo(g,h,i)perylene	1 U	µg/L	59000	µg/kg	10000	µg/kg
Chrysene	1 U	µg/L	37000	µg/kg	6900	µg/kg
Dibenzo(a,h)anthracene	1 U	µg/L	11000	µg/kg	1500	µg/kg
Fluoranthene	1 U	µg/L	71000	µg/kg	8500	µg/kg
Indeno(1,2,3-cd)pyrene	1 U	µg/L	41000	µg/kg	7200	µg/kg
Pyrene	1 U	µg/L	110000	µg/kg	14000	µg/kg
Total LPAH	1 U	µg/L	28800	µg/kg	5550	µg/kg
Total PAH	1 U	µg/L	507800	µg/kg	84150	µg/kg
Miscellaneous						
1,2,4-Trichlorobenzene	1 U	µg/L	810 U	µg/kg	790 U	µg/kg
1,2-Dichlorobenzene	1 U	µg/L	810 U	µg/kg	790 U	µg/kg
1,3-Dichlorobenzene	1 U	µg/L	810 U	µg/kg	790 U	µg/kg
1,4-Dichlorobenzene	1 U	µg/L	810 U	µg/kg	790 U	µg/kg
1-Methylnaphthalene	1 U	µg/L	810 U	µg/kg	790 U	µg/kg
2,4,5-Trichlorophenol	5 U	µg/L	4000 U	µg/kg	4000 U	µg/kg
2,4,6-Trichlorophenol	5 U	µg/L	4000 U	µg/kg	4000 U	µg/kg
2,4-Dichlorophenol	5 U	µg/L	4000 U	µg/kg	4000 U	µg/kg
2,4-Dimethylphenol	1 U	µg/L	810 U	µg/kg	790 U	µg/kg
2,4-Dinitrophenol	10 U	µg/L	8100 U	µg/kg	7900 U	µg/kg

Table 3.1
Filter Fabric Analytical Results

Parameter	Filter Blank 5/19/2010 11:20:00 AM		SL7-051910 5/19/2010 10:00:00 AM		SL8-051910 5/19/2010 10:10:00 AM	
Semivolatile Organic Compounds (continued)						
Miscellaneous (continued)						
2,4-Dinitrotoluene	5 U	µg/L	4000 U	µg/kg	4000 U	µg/kg
2,6-Dinitrotoluene	5 U	µg/L	4000 U	µg/kg	4000 U	µg/kg
2-Chloronaphthalene	1 U	µg/L	810 U	µg/kg	790 U	µg/kg
2-Chlorophenol	1 U	µg/L	810 U	µg/kg	790 U	µg/kg
2-Methylnaphthalene	1 U	µg/L	810 U	µg/kg	790 U	µg/kg
2-Methylphenol	1 U	µg/L	810 U	µg/kg	790 U	µg/kg
2-Nitroaniline	5 U	µg/L	4000 U	µg/kg	4000 U	µg/kg
2-Nitrophenol	5 U	µg/L	4000 U	µg/kg	4000 U	µg/kg
3,3'-Dichlorobenzidine	5 U	µg/L	4000 U	µg/kg	4000 U	µg/kg
3-Nitroaniline	5 U	µg/L	4000 U	µg/kg	4000 U	µg/kg
4,6-Dinitro-o-cresol	10 U	µg/L	8100 U	µg/kg	7900 U	µg/kg
4-Bromophenyl phenyl ether	1 U	µg/L	810 U	µg/kg	790 U	µg/kg
4-Chloroaniline	5 U	µg/L	4000 U	µg/kg	4000 U	µg/kg
4-Chlorophenyl phenyl ether	1 U	µg/L	810 U	µg/kg	790 U	µg/kg
4-Chloro-3-methylphenol	5 U	µg/L	4000 U	µg/kg	4000 U	µg/kg
4-Methylphenol	1 U	µg/L	810 U	µg/kg	790 U	µg/kg
4-Nitroaniline	5 U	µg/L	4000 U	µg/kg	4000 U	µg/kg
4-Nitrophenol	5 U	µg/L	4000 U	µg/kg	4000 U	µg/kg
Benzoic acid	11	µg/L	8100 U	µg/kg	7900 U	µg/kg
Benzyl alcohol	5 U	µg/L	4000 U	µg/kg	4000 U	µg/kg
bis(2-chloroethyl)ether	1 U	µg/L	810 U	µg/kg	790 U	µg/kg
bis(2-chloroethoxy)methane	1 U	µg/L	810 U	µg/kg	790 U	µg/kg
bis(2-ethylhexyl)phthalate	1 U	µg/L	2900	µg/kg	790 U	µg/kg
bis-chloroisopropyl ether	1 U	µg/L	810 U	µg/kg	790 U	µg/kg
Butyl benzyl phthalate	1 U	µg/L	810 U	µg/kg	790 U	µg/kg
Carbazole	1 U	µg/L	810 U	µg/kg	790 U	µg/kg
Dibenzofuran	1 U	µg/L	810 U	µg/kg	790 U	µg/kg
Diethylphthalate	1.9	µg/L	810 U	µg/kg	37000	µg/kg
Dimethyl phthalate	1 U	µg/L	810 U	µg/kg	790 U	µg/kg
Di-n-butyl phthalate	1.5	µg/L	810 U	µg/kg	790 U	µg/kg
Di-n-octyl phthalate	1 U	µg/L	810 U	µg/kg	790 U	µg/kg
Hexachlorobenzene	1 U	µg/L	810 U	µg/kg	790 U	µg/kg
Hexachlorobutadiene	1 U	µg/L	810 U	µg/kg	790 U	µg/kg
Hexachloroethane	1 U	µg/L	810 U	µg/kg	790 U	µg/kg
Hexachlorocyclopentadiene	5 U	µg/L	4000 U	µg/kg	4000 U	µg/kg
Isophorone	1 U	µg/L	810 U	µg/kg	790 U	µg/kg
Nitrobenzene	1 U	µg/L	810 U	µg/kg	790 U	µg/kg
N-Nitroso-di-n-propylamine	1 U	µg/L	4000 U	µg/kg	4000 U	µg/kg
N-Nitrosodiphenylamine	5 U	µg/L	810 U	µg/kg	790 U	µg/kg
Pentachlorophenol	5 U	µg/L	4000 U	µg/kg	4000 U	µg/kg
Phenol	12	µg/L	810 U	µg/kg	790 U	µg/kg

Abbreviations:
- HPAH High molecular weight polycyclic aromatic hydrocarbon
- LPAH Low molecular weight polycyclic aromatic hydrocarbon
- PAH Polycyclic aromatic hydrocarbon
- PCB Polychlorinated biphenyl

Qualifiers:
- U Analyte was not detected, the concentration is the reporting limit.
- UR Analyte was not detected, result has been rejected due to low surrogate recoveries.

Table 4.1
Surface Soil Analytical Results

	Sample ID	WW19-01	WW19-02-082310	WW19-03	WW19-Dup	WW19-04-082310	WW19-04-082310-DUP	WW19-05	WW19-06
	Date	6/30/2010	8/23/2010	6/30/2010	6/30/2010	8/23/2010	8/23/2010	6/30/2010	6/30/2010
	Time	9:45:00 AM	9:30:00 AM	10:05:00 AM	10:05:00 AM	9:15:00 AM	9:15:00 AM	10:15:00 AM	10:30:00 AM
Parameters	**Units**								
Conventionals									
Total Solids	%	48.3	53.7	77.9	83	85.9		93.3	79.7
Total Organic Carbon	%	19.8	14.5	16.4	14.1	10.6		3.88	3.54
Grain Size									
Percent passing < 1.3 micron sieve	%	6.1	5.5	4.5	4.5	6.1		3.9	5.9
Percent retained 1.3 micron sieve	%	0.1 U	3.1	1	1.5	8.1		1	1
Percent retained 3.2 micron sieve	%	6.9	7	7.6	7.5	5.1		5.4	8.4
Percent retained 7 micron sieve	%	3.1	4.7	1.5	2.5	3		4.9	1
Percent retained 9 micron sieve	%	3.8	3.1	3	1.5	4.6		3.4	3
Percent retained 13 micron sieve	%	4.6	11.7	5	6	5.6		4.4	3.9
Percent retained 22 micron sieve	%	13.8	15.6	5	5	7.1		7.4	4.4
Percent retained 32 micron sieve	%	10.5	15.3	3	1.9	5.2		8.5	8
Percent retained 75 micron sieve	%	9.5	9.3	7.9	9.1	10.1		16.4	15.4
Percent retained 150 micron sieve	%	9.8	8	10.1	11.8	13.5		14.7	15.5
Percent retained 250 micron sieve	%	12.3	6.8	12.4	15.1	15.1		14.2	14.6
Percent retained 425 micron sieve	%	10.3	4.5	10.7	12.8	10.8		8.2	8.8
Percent retained 850 micron sieve	%	7.4	2.3	7.1	8.6	3.2		2.8	3.9
Percent retained 2000 micron sieve	%	1.3	0.4	6.7	6.2	1		1.8	3.5
Percent retained 4750 micron sieve	%	0.5	0.1 U	8.8	4.2	1.6		2.9	1.5
Percent retained 9500 micron sieve	%	0.1 U	2.5	0.1 U	0.1 U	0.1 U		0.1 U	1.2
Percent retained 12500 micron sieve	%	0.1 U	0.1 U	5.6	1.7	0.1 U		0.1 U	0.1 U
Percent retained 19000 micron sieve	%	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U		0.1 U	0.1 U
Percent retained 25K micron sieve	%	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U		0.1 U	0.1 U
Percent retained 37.5K micron sieve	%	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U		0.1 U	0.1 U
Percent retained 50K micron sieve	%	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U		0.1 U	0.1 U
Percent retained 75K micron sieve	%	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U		0.1 U	0.1 U
Metals									
Arsenic	mg/kg	10 U	9	11	12	14		7	10
Cadmium	mg/kg	4	4.1	1.3	1.3	1.6		0.4	0.5
Chromium	mg/kg	76	77.9	24	26.5	44.9		31.5	29.2
Copper	mg/kg	258	330	57.7	56.9	57.2		24.6	26.1
Lead	mg/kg	131	203	171	177	142		46	98
Silver	mg/kg	0.8	0.8	0.4 U	0.4 U	2.4		0.3 U	0.3 U
Zinc	mg/kg	1340	1490	354	370	198 J		78	96
Mercury	mg/kg	0.71 J	0.42	0.34	0.32	0.46		0.08	0.08
Polychlorinated Biphenyls									
Aroclor 1016	µg/kg	32 U	33 U	31 U	31 U	31 U		33 U	31 U
Aroclor 1221	µg/kg	32 U	33 U	31 U	31 U	31 U		33 U	31 U
Aroclor 1232	µg/kg	32 U	33 U	31 U	31 U	31 U		33 U	31 U
Aroclor 1242	µg/kg	32 U	33 U	31 U	31 U	31 U		33 U	31 U
Aroclor 1248	µg/kg	32 U	50 UY	31 U	31 U	78 UY		33 U	31 U
Aroclor 1254	µg/kg	42	87	31 U	31 U	190		33 U	31 U
Aroclor 1260	µg/kg	32 U	69	31 U	31 U	200		33 U	31 U
Total PCBs	µg/kg	42	156	31 U	31 U	390		33 U	31 U

Table 4.1
Surface Soil Analytical Results

Parameters	Sample ID / Date / Time / Units	WW19-01	WW19-02-082310	WW19-03	WW19-Dup	WW19-04-082310	WW19-04-082310-DUP	WW19-05	WW19-06
	Date	6/30/2010	8/23/2010	6/30/2010	6/30/2010	8/23/2010	8/23/2010	6/30/2010	6/30/2010
	Time	9:45:00 AM	9:30:00 AM	10:05:00 AM	10:05:00 AM	9:15:00 AM	9:15:00 AM	10:15:00 AM	10:30:00 AM
	Units								
Semivolatile Organic Compounds									
LPAHs [1]									
Naphthalene	µg/kg	250	160	660	630	680	910	58 U	63 U
Acenaphthylene	µg/kg	220	200	770	720	1500	1400	58 U	63 U
Acenaphthene	µg/kg	200 U	64 U	64 U	190 U	180 U	190 U	58 U	63 U
Fluorene	µg/kg	200 U	64 U	250	320	480	530	58 U	63 U
Phenanthrene	µg/kg	1100	920	4000	4500	6200	6200	160	150
Anthracene	µg/kg	200 U	150	770	710	1300	1300	58 U	63 U
2-Methylnaphthalene	µg/kg	200 U	89	280	300	270	340	58 U	63 U
Total LPAH	µg/kg	1570	1519	6730	7180	10430	10680	160	150
HPAHs [2]	µg/kg								
Fluoranthene	µg/kg	1800	1500	9500	7100	14000 U	15000	280	280
Pyrene	µg/kg	1300	1400	10000	7500	17000	15000	340	310
Benzo(a)anthracene	µg/kg	500	450	4000	3100	6100	5800	110	100
Chrysene	µg/kg	1100	1100	5400	4400	8000	7400	170	170
Total Benzofluoranthenes	µg/kg	2610	1660	10600	9200	12800	12800	280	360
Benzo(b)fluoranthene	µg/kg	910	830	5300	4600	6400	6400	140	180
Benzo(k)fluoranthene	µg/kg	1700	830	5300	4600	6400	6400	140	180
Benzo(a)pyrene	µg/kg	930	1100	6400	5500	7800	7700	130	160
Indeno(1,2,3-cd)pyrene	µg/kg	630	680	5700	5200	6600	7200	120	160
Dibenz(a,h)anthracene	µg/kg	200 U	120	1400	1400	1900	2000	58 U	63 U
Benzo(g,h,i)perylene	µg/kg	880	1100	7800	7000	9200	9600	170	220
Total HPAH	µg/kg	9750	9110	60800	50400	69400	82500	1600	1760
Total PAH	µg/kg	11320	10629	67530	57580	79830	93180	1760	1910
Miscellaneous									
1,2,4-Trichlorobenzene	µg/kg	200 U	64 U	64 U	190 U	180 U	190 U	58 U	63 U
1,2-Dichlorobenzene	µg/kg	200 U	64 U	64 U	190 U	180 U	190 U	58 U	63 U
1,3-Dichlorobenzene	µg/kg	200 U	64 U	64 U	190 U	180 U	190 U	58 U	63 U
1,4-Dichlorobenzene	µg/kg	200 U	64 U	64 U	190 U	180 U	190 U	58 U	63 U
1-Methylnaphthalene	µg/kg	200 U	64 U	200	230	180 U	230	58 U	63 U
2,2'-Oxybis(1-Chloropropane)	µg/kg	200 U	64 U	64 U	190 U	180 U	190 U	58 U	63 U
2,4,5-Trichlorophenol	µg/kg	980 U	320 U	320 U	930 U	910 U	950 U	290 U	310 U
2,4,6-Trichlorophenol	µg/kg	980 U	320 U	320 U	930 U	910 U	950 U	290 U	310 U
2,4-Dichlorophenol	µg/kg	980 U	320 U	320 U	930 U	910 U	950 U	290 U	310 U
2,4-Dimethylphenol	µg/kg	200 U	64 U	64 U	190 U	180 U	190 U	58 U	63 U
2,4-Dinitrophenol	µg/kg	2000 U	640 U	640 U	1900 U	1800 U	1900 U	580 U	630 U
2,4-Dinitrotoluene	µg/kg	980 U	320 U	320 U	930 U	910 U	950 U	290 U	310 U
2,6-Dinitrotoluene	µg/kg	980 U	320 U	320 U	930 U	910 U	950 U	290 U	310 U
2-Chloronaphthalene	µg/kg	200 U	64 U	64 U	190 U	180 U	190 U	58 U	63 U
2-Chlorophenol	µg/kg	200 U	64 U	64 U	190 U	180 U	190 U	58 U	63 U
2-Methylphenol	µg/kg	200 U	64 U	64 U	190 U	180 U	190 U	58 U	63 U
2-Nitroaniline	µg/kg	980 U	320 U	320 U	930 U	910 U	950 U	290 U	310 U
2-Nitrophenol	µg/kg	980 U	320 U	320 U	930 U	910 U	950 U	290 U	310 U
3,3'-Dichlorobenzidine	µg/kg	980 U	320 U	320 U	930 U	910 U	950 U	290 U	310 U
3-Nitroaniline	µg/kg	980 U	320 U	320 U	930 U	910 U	950 U	290 U	310 U

Table 4.1
Surface Soil Analytical Results

Parameters	Sample ID / Date / Time / Units	WW19-01	WW19-02-082310	WW19-03	WW19-Dup	WW19-04-082310	WW19-04-082310-DUP	WW19-05	WW19-06
	Date	6/30/2010	8/23/2010	6/30/2010	6/30/2010	8/23/2010	8/23/2010	6/30/2010	6/30/2010
	Time	9:45:00 AM	9:30:00 AM	10:05:00 AM	10:05:00 AM	9:15:00 AM	9:15:00 AM	10:15:00 AM	10:30:00 AM
	Units								
Semivolatile Organic Compounds (continued)									
Miscellaneous (continued)									
4,6-Dinitro-2-Methylphenol	µg/kg	2000 U	640 U	640 U	1900 U	1800 U	1900 U	580 U	630 U
4-Bromophenyl-phenylether	µg/kg	200 U	64 U	64 U	190 U	180 U	190 U	58 U	63 U
4-Chloroaniline	µg/kg	980 U	320 U	320 U	930 U	910 U	950 U	290 U	310 U
4-Chlorophenyl-phenylether	µg/kg	200 U	64 U	64 U	190 U	180 U	190 U	58 U	63 U
4-Chloro-3-methylphenol	µg/kg	980 U	320 U	320 U	930 U	910 U	950 U	290 U	310 U
4-Methylphenol	µg/kg	200 U	64 U	64 U	190 U	180 U	190 U	58 U	63 U
4-Nitroaniline	µg/kg	980 U	320 U	320 U	930 U	910 U	950 U	290 U	310 U
4-Nitrophenol	µg/kg	980 U	320 U	320 U	930 U	910 U	950 U	290 U	310 U
Benzoic Acid	µg/kg	2000 U	640 U	640 U	1900 U	1800 U	1900 U	580 U	630 U
Benzyl Alcohol	µg/kg	980 U	320 U	320 U	930 U	910 U	950 U	290 U	310 U
Bis-(2-Chloroethyl) Ether	µg/kg	200 U	64 U	64 U	190 U	180 U	190 U	58 U	63 U
bis(2-Chloroethoxy) Methane	µg/kg	200 U	64 U	64 U	190 U	180 U	190 U	58 U	63 U
bis(2-Ethylhexyl)phthalate	µg/kg	470	200	64 U	190 U	180 U	190 U	58 U	63 U
Butylbenzylphthalate	µg/kg	12000	1800	270 U	220 U	1500	190 U	210 U	270 U
Carbazole	µg/kg	200 U	64 U	260	290	230	220	58 U	63 U
Dibenzofuran	µg/kg	200 U	64 U	91	190 U	180 U	190 U	58 U	63 U
Diethylphthalate	µg/kg	200 U	64 U	64 U	190 U	180 U	190 U	58 U	63 U
Dimethylphthalate	µg/kg	200 U	85	64 U	190 U	180 U	190 U	58 U	63 U
Di-n-Butylphthalate	µg/kg	310	160	64 U	190 U	180 U	190 U	58 U	63 U
Di-n-Octyl phthalate	µg/kg	910	64 U	64 U	190 U	180 U	190 U	58 U	63 U
Hexachlorobenzene	µg/kg	200 U	64 U	64 U	190 U	180 U	190 U	58 U	63 U
Hexachlorobutadiene	µg/kg	200 U	64 U	64 U	190 U	180 U	190 U	58 U	63 U
Hexachloroethane	µg/kg	200 U	64 U	64 U	190 U	180 U	190 U	58 U	63 U
Hexachlorocyclopentadiene	µg/kg	980 U	320 U	320 U	930 U	910 U	950 U	290 U	310 U
Isophorone	µg/kg	200 U	64 U	64 U	190 U	180 U	190 U	58 U	63 U
Nitrobenzene	µg/kg	200 U	64 U	64 U	190 U	180 U	190 U	58 U	63 U
N-Nitroso-Di-N-Propylamine	µg/kg	980 U	320 U	320 U	930 U	910 U	950 U	290 U	310 U
N-Nitrosodiphenylamine	µg/kg	200 U	64 U	64 U	190 U	180 U	190 U	58 U	63 U
Pentachlorophenol	µg/kg	980 U	320 U	320 U	930 U	910 U	950 U	290 U	310 U
Phenol	µg/kg	200 U	64 U	64 U	190 U	180 U	190 U	58 U	63 U

Notes:
1 LPAH is the sum of detected values for naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, and anthracene, 2-methylnaphthalene is not included in the LPAH sum.
2 HPAH is the sum of detected values for fluoranthene, pyrene, benzo(a)anthracene, chrysene, total benzofluoranthenes, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, dibenz(a,h)anthracene, and benzo(g,h,i)perylene.

Abbreviations:
HPAH High molecular weight polycyclic aromatic hydrocarbon
LPAH Low molecular weight polycyclic aromatic hydrocarbon
PAH Polycyclic aromatic hydrocarbon
PCB Polychlorinated biphenyl

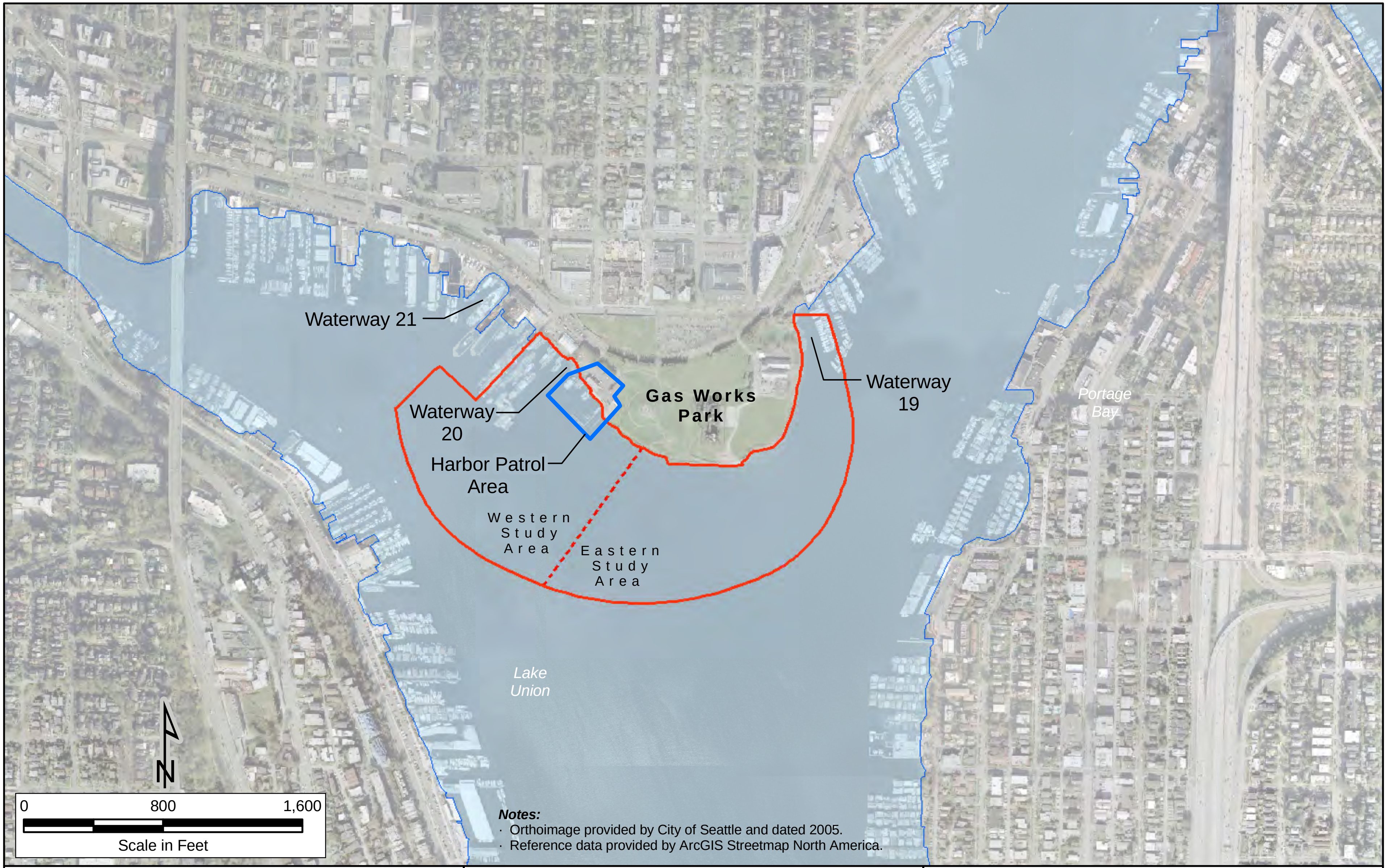
Qualifiers:
J Analyte was detected, the reported concentration is an estimate.
U Analyte was not detected, the concentration is the reporting limit.
UY Analyte was not detected, the concentration is the reporting limit, which is elevated.

Gas Works Park

Storm Drain Source Control Evaluation
Phase 3 Data Report

Figures

FINAL



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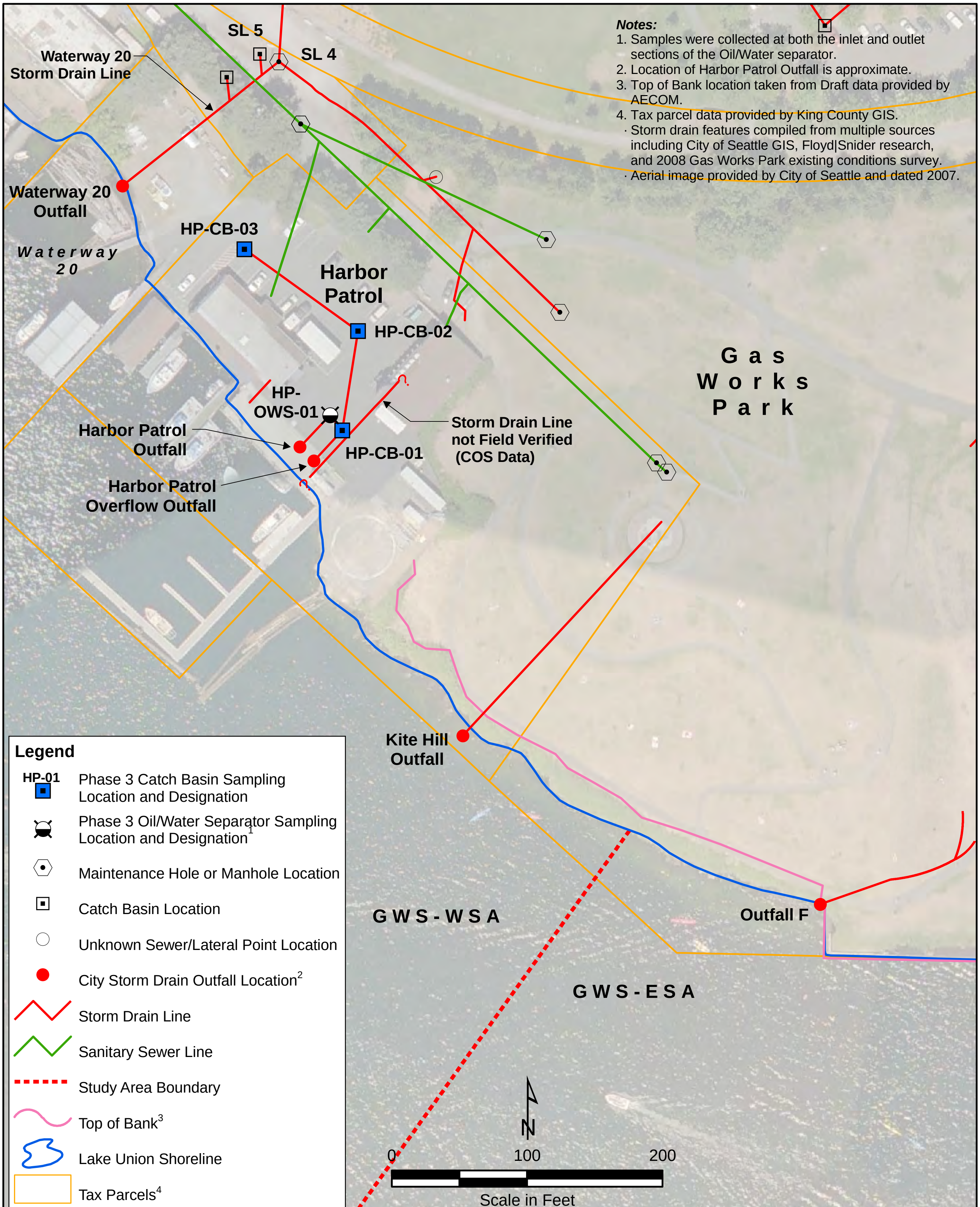
Storm Drain Source Control Evaluation
Phase 3 Data Report
Gas Works Park
City of Seattle

Figure 1.1
Vicinity Map

F:\projects\COS-GWSA\GIS\Task 7050\Phase 3 Data Report OCT 2010\PSE DRAFT\Figure 1.1 (Vicinity Map).mxd
Date: 12/14/2010 9:48 AM



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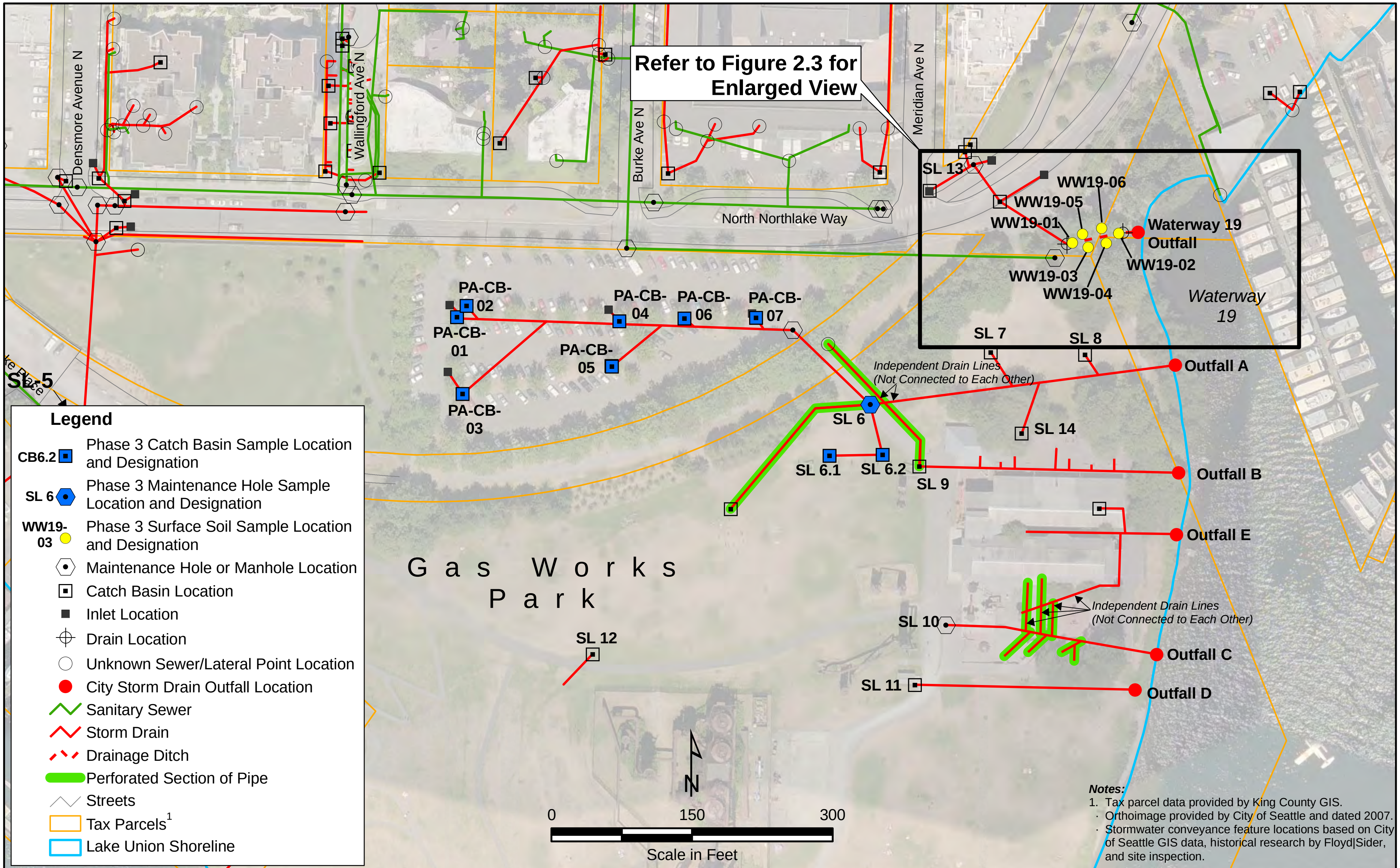
Storm Drain Source Control Evaluation
Phase 3 Data Report
Gas Works Park
City of Seattle

Figure 2.1
Solids Sample Locations
Harbor Patrol Area

F:\projects\COS-GWSA\GIS\Task 7050\Phase 3 Data Report OCT 2010\PSE DRAFT\Figure 2.1 (Solids Sample Locations - Harbor Patrol).mxd
Date: 12/14/2010 9:49 AM



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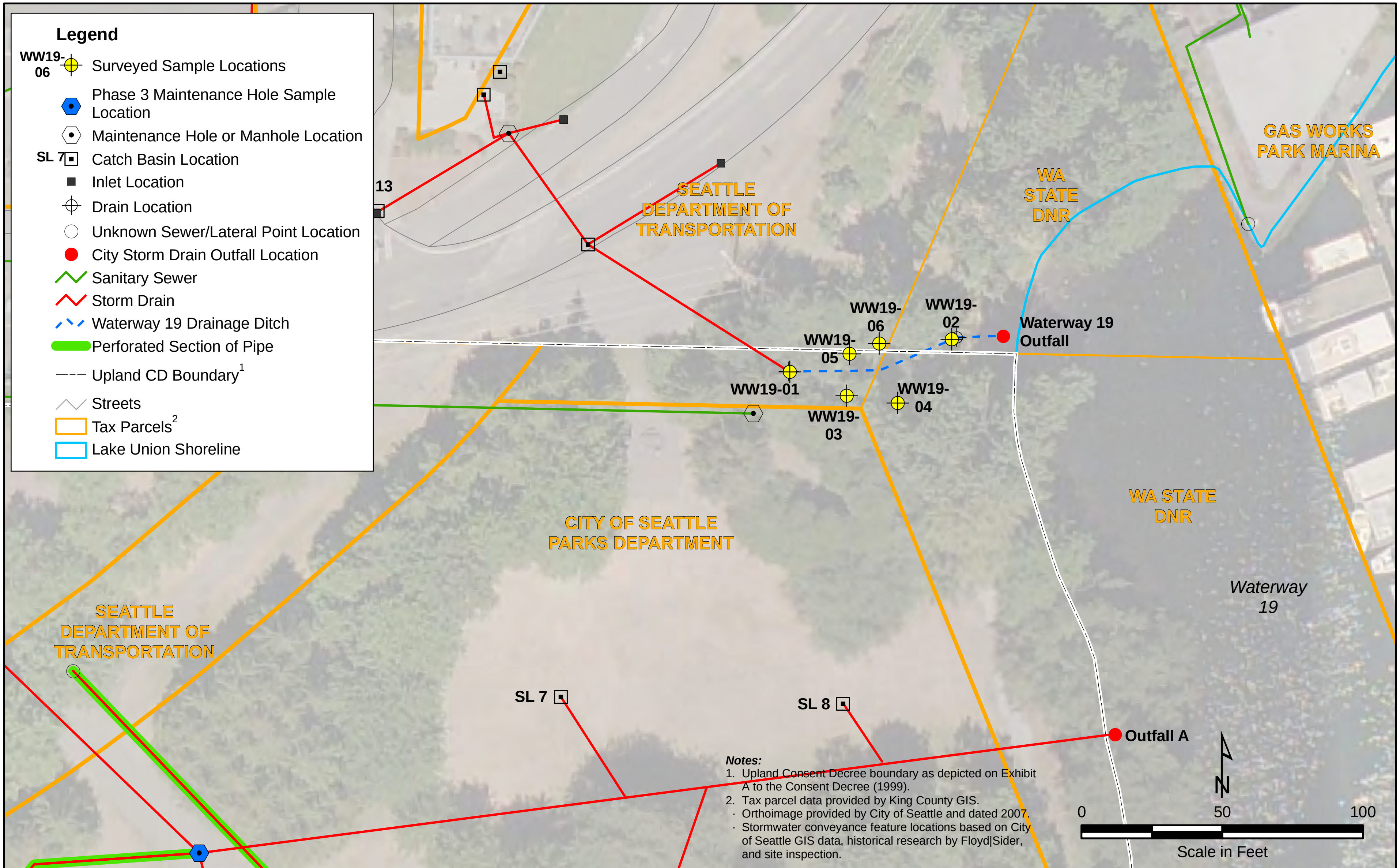
Storm Drain Source Control Evaluation
Phase 3 Data Report
Gas Works Park
City of Seattle

Figure 2.2
Solids Sample Locations
East Side

F:\projects\COS-GWSA\GIS\Task 7050\Phase 3 Data Report OCT 2010\PSE DRAFT\Figure 2.2 (Solids Sampling Locations - East Side - Ltr Landscape Format).mxd
Date: 12/14/2010 9:30 AM



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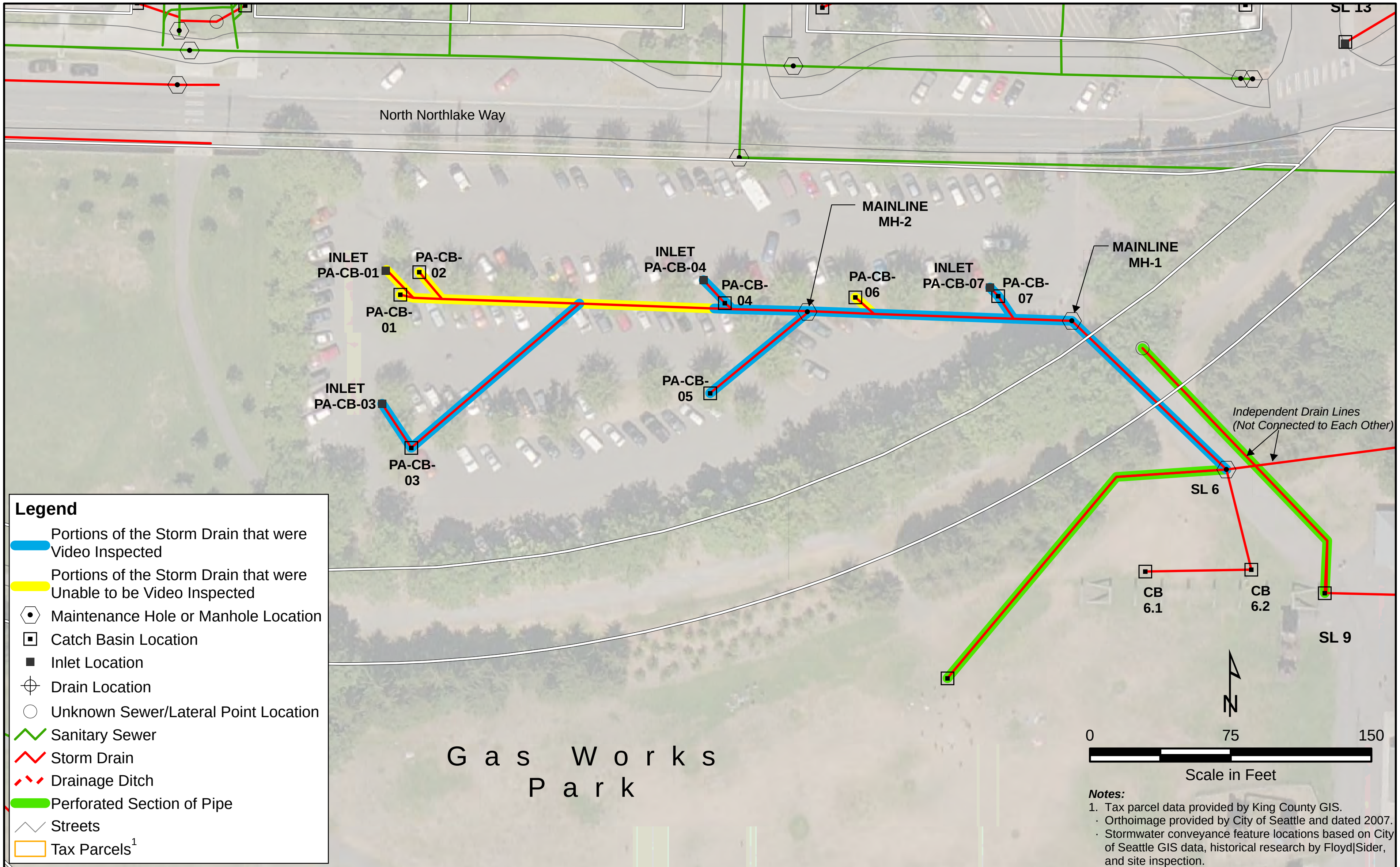
Storm Drain Source Control Evaluation
Phase 3 Data Report
Gas Works Park
City of Seattle

Figure 2.3
Solids Sample Locations
Waterway 19 Storm Drain Ditch

F:\projects\COS-GWSA\GIS\Task 7050\Phase 3 Data Report OCT 2010\PSE DRAFT\Figure 2.3 (Solids Sample Locations - WW19 Storm Drain Ditch).mxd
Date: 12/14/2010 9:47 AM



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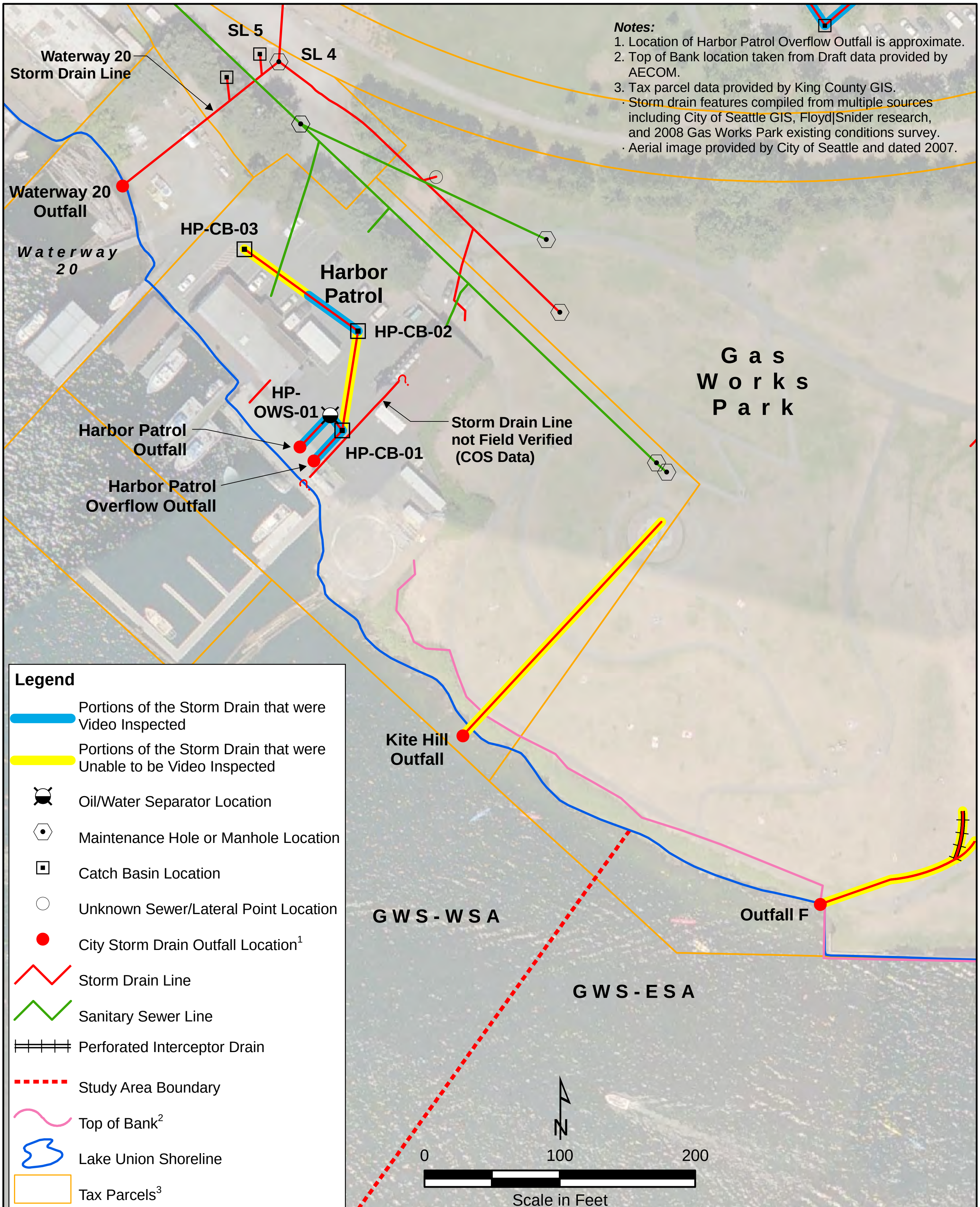
Storm Drain Source Control Evaluation
Phase 3 Data Report
Gas Works Park
City of Seattle

Figure 5.1
Video Inspection Locations
East Side

F:\projects\COS-GWSA\GIS\Task 7050\Phase 3 Data Report OCT 2010\PSE DRAFT\Figure 5.1 (Video Inspection Locations - East Side).mxd
Date: 12/15/2010 5:40 PM



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Storm Drain Source Control Evaluation
Phase 3 Data Report
Gas Works Park
City of Seattle

Figure 5.2
Video Inspection Locations
West Side

F:\projects\COS-GWSA\GIS\Task 7050\Phase 3 Data Report OCT 2010\PSE DRAFT\Figure 5.2 (Video Inspection Locations - West Side).mxd
Date: 12/14/2010 9:51 AM

Gas Works Park

Storm Drain Source Control Evaluation
Phase 3 Data Report

Appendix A
Field Photographs

FINAL

Photo 1. SPU staff sampling HP-OWS-Outlet in Harbor Patrol.

Photo 2. Solids sample, HP-OWS-Outlet in Harbor Patrol.

Photo 3. SPU staff sampling Catch Basin PA-CB-02 in Gas Works Park parking area.

Photo 4. SPU staff sampling Catch Basin PA-CB-02 in Gas Works Park parking area.

Photo 5. Solids sample, PA-CB-02.

Photo 6. Floyd|Snider staff sampling Catch Basin SL6.2 in Gas Works Park.

Photo 7. Floyd|Snider staff sampling Surface Soil Sample WW-19-03.

Photo 8. Floyd|Snider staff sampling Surface Soil Sample WW-19-05.

Gas Works Park

Storm Drain Source Control Evaluation
Phase 3 Data Report

Appendix B
Laboratory Reports

(Provided on DVD)

FINAL

SAMPLE RESULTS-CONVENTIONALS
RB73-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 07/08/10

Project: Phase 3
Event: COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Client ID: Rinsate Blank
ARI ID: 10-15157 RB73Q

Analyte	Date Batch	Method	Units	RL	Sample
Total Organic Carbon	06/28/10 062810#1	EPA 415.1	mg/L	1.50	< 1.50 U

RL Analytical reporting limit
U Undetected at reported detection limit

METHOD BLANK RESULTS-CONVENTIONALS
RB73-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 07/08/10

Project: Phase 3
Event: COS-GWSA 6020
Date Sampled: NA
Date Received: NA

Analyte	Method	Date	Units	Blank	ID
Total Organic Carbon	EPA 415.1	06/28/10	mg/L	< 1.50 U	

STANDARD REFERENCE RESULTS-CONVENTIONALS
RB73-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 07/08/10

Project: Phase 3
Event: COS-GWSA 6020
Date Sampled: NA
Date Received: NA

Analyte/SRM ID	Method	Date	Units	SRM	True Value	Recovery
Total Organic Carbon ERA 0513-10-06	EPA 415.1	06/28/10	mg/L	21.5	20.0	107.5%

REPLICATE RESULTS-CONVENTIONALS
RB73-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 07/08/10

Project: Phase 3
Event: COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Analyte	Method	Date	Units	Sample	Replicate(s)	RPD/RSD
ARI ID: RB73Q Client ID: Rinsate Blank						
Total Organic Carbon	EPA 415.1	06/28/10	mg/L	< 1.50	< 1.50	NA

MS/MSD RESULTS-CONVENTIONALS
RB73-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 07/08/10

Project: Phase 3
Event: COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Analyte	Method	Date	Units	Sample	Spike	Spike Added	Recovery
ARI ID: RB73Q Client ID: Rinsate Blank							
Total Organic Carbon	EPA 415.1	06/28/10	mg/L	< 1.50	18.1	20.0	90.5%

ANALYTICAL RESOURCES INCORPORATED

Matrix: Solid
Data Release Authorized
Reported: 07/08/10

Project: Phase 3
Event: COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Client ID: PA-CB-01
ARI ID: 10-15141 RB73A

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/30/10 063010#1	EPA 160.3	Percent	0.01	15.00
Total Organic Carbon	07/07/10 070710#1	Plumb,1981	Percent	0.196	23.0

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RB73-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Solid
Data Release Authorized:
Reported: 07/08/10

Project: Phase 3
Event: COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Client ID: PA-CB-02
ARI ID: 10-15142 RB73B

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/30/10 063010#1	EPA 160.3	Percent	0.01	26.00
Total Organic Carbon	07/07/10 070710#1	Plumb,1981	Percent	0.184	14.8

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RB73-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Solid
Data Release Authorized:
Reported: 07/08/10

Project: Phase 3
Event: COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Client ID: PA-CB-03
ARI ID: 10-15143 RB73C

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/30/10 063010#1	EPA 160.3	Percent	0.01	20.10
Total Organic Carbon	07/07/10 070710#1	Plumb,1981	Percent	0.154	16.2

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RB73-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Solid
Data Release Authorized
Reported: 07/08/10

Project: Phase 3
Event: COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Client ID: PA-CB-04
ARI ID: 10-15144 RB73D

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/30/10 063010#1	EPA 160.3	Percent	0.01	38.30
Total Organic Carbon	07/07/10 070710#1	Plumb,1981	Percent	0.198	15.4

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RB73-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Solid
Data Release Authorized:
Reported: 07/08/10

Project: Phase 3
Event: COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Client ID: PA-CB-05
ARI ID: 10-15145 RB73E

Analyte	**Date**	**Method**	**Units**	**RL**	**Sample**
Total Solids	06/30/10 063010#1	EPA 160.3	Percent	0.01	20.30
Total Organic Carbon	07/07/10 070710#1	Plumb,1981	Percent	0.176	17.6

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RB73-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Solid
Data Release Authorized:
Reported: 07/08/10

Project: Phase 3
Event: COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Client ID: PA-CB-06
ARI ID: 10-15146 RB73F

Analyte	**Date**	**Method**	**Units**	**RL**	**Sample**
Total Solids	06/30/10 063010#1	EPA 160.3	Percent	0.01	9.80
Total Organic Carbon	07/07/10 070710#1	Plumb,1981	Percent	0.194	26.9

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RB73-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Solid
Data Release Authorized:
Reported: 07/08/10

Project: Phase 3
Event: COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Client ID: PA-CB-07
ARI ID: 10-15147 RB73G

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/30/10 063010#1	EPA 160.3	Percent	0.01	19.70
Total Organic Carbon	07/07/10 070710#1	Plumb,1981	Percent	0.192	25.5

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RB73-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Solid
Data Release Authorized:
Reported: 07/08/10

Project: Phase 3
Event: COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Client ID: PA-CB-DUP
ARI ID: 10-15149 RB73I

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/30/10 063010#1	EPA 160.3	Percent	0.01	26.80
Total Organic Carbon	07/07/10 070710#1	Plumb,1981	Percent	0.186	14.4

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RB73-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Solid
Data Release Authorized:
Reported: 07/08/10

Project: Phase 3
Event: COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Client ID: SL6.1
ARI ID: 10-15150 RB73J

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/30/10 063010#1	EPA 160.3	Percent	0.01	34.50
Total Organic Carbon	07/07/10 070710#1	Plumb,1981	Percent	0.020	6.30

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RB73-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Solid
Data Release Authorized:
Reported: 07/08/10

Project: Phase 3
Event: COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Client ID: SL6.2
ARI ID: 10-15151 RB73K

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/25/10 062510#1	EPA 160.3	Percent	0.01	28.90
Total Organic Carbon	07/07/10 070710#1	Plumb,1981	Percent	0.168	19.9

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RB73-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Solid
Data Release Authorized:
Reported: 07/08/10

Project: Phase 3
Event: COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Client ID: HP-CB-01
ARI ID: 10-15152 RB73L

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/30/10 063010#1	EPA 160.3	Percent	0.01	51.70
Total Organic Carbon	07/07/10 070710#1	Plumb,1981	Percent	0.200	12.0

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RB73-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Solid
Data Release Authorized
Reported: 07/08/10

Project: Phase 3
Event: COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Client ID: HP-CB-02
ARI ID: 10-15153 RB73M

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/30/10 063010#1	EPA 160.3	Percent	0.01	39.10
Total Organic Carbon	07/07/10 070710#1	Plumb,1981	Percent	0.128	14.7

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RB73-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Solid
Data Release Authorized:
Reported: 07/08/10

Project: Phase 3
Event: COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Client ID: HP-CB-03
ARI ID: 10-15154 RB73N

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/30/10 063010#1	EPA 160.3	Percent	0.01	37.30
Total Organic Carbon	07/07/10 070710#1	Plumb,1981	Percent	0.160	16.8

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RB73-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Solid
Data Release Authorized:
Reported: 07/08/10

Project: Phase 3
Event: COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Client ID: HP-OWS-Inlet
ARI ID: 10-15155 RB730

Analyte	**Date**	**Method**	**Units**	**RL**	**Sample**
Total Solids	06/30/10 063010#1	EPA 160.3	Percent	0.01	25.10
Total Organic Carbon	07/07/10 070710#1	Plumb,1981	Percent	0.182	19.4

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RB73-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Solid
Data Release Authorized:
Reported: 07/08/10

Project: Phase 3
Event: COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Client ID: HP-OWS-Outlet
ARI ID: 10-15156 RB73P

Analyte	**Date**	**Method**	**Units**	**RL**	**Sample**
Total Solids	06/30/10 063010#1	EPA 160.3	Percent	0.01	22.70
Total Organic Carbon	07/07/10 070710#1	Plumb,1981	Percent	0.192	25.5

RL Analytical reporting limit
U Undetected at reported detection limit

METHOD BLANK RESULTS-CONVENTIONALS
RB73-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Solid
Data Release Authorized:
Reported: 07/08/10

Project: Phase 3
Event: COS-GWSA 6020
Date Sampled: NA
Date Received: NA

Analyte	Date	Units	Blank
Total Solids	06/25/10	Percent	< 0.01 U
	06/30/10		< 0.01 U
Total Organic Carbon	07/07/10	Percent	< 0.020 U

LAB CONTROL RESULTS-CONVENTIONALS
RB73-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Solid
Data Release Authorized:
Reported: 07/08/10

Project: Phase 3
Event: COS-GWSA 6020
Date Sampled: NA
Date Received: NA

Analyte/Method	QC ID	Date	Units	LCS	Spike Added	Recovery
Total Organic Carbon Plumb,1981	ICVL	07/07/10	Percent	0.103	0.100	103.0%

STANDARD REFERENCE RESULTS-CONVENTIONALS
RB73-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Solid
Data Release Authorized:
Reported: 07/08/10

Project: Phase 3
Event: COS-GWSA 6020
Date Sampled: NA
Date Received: NA

Analyte/SRM ID	Date	Units	SRM	True Value	Recovery
Total Organic Carbon NIST #8704	07/07/10	Percent	3.28	3.35	97.9%

REPLICATE RESULTS-CONVENTIONALS
RB73-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Solid
Data Release Authorized:
Reported: 07/08/10

Project: Phase 3
Event: COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Analyte	Date	Units	Sample	Replicate(s)	RPD/RSD
ARI ID: RB73A Client ID: PA-CB-01					
Total Solids	06/30/10	Percent	15.00	14.60 14.80	1.4%
Total Organic Carbon	07/07/10	Percent	23.0	19.5 22.5	8.7%

MS/MSD RESULTS-CONVENTIONALS
RB73-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Solid
Data Release Authorized:
Reported: 07/08/10

Project: Phase 3
Event: COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Analyte	Date	Units	Sample	Spike	Spike Added	Recovery
ARI ID: RB73A Client ID: PA-CB-01						
Total Organic Carbon	07/07/10	Percent	23.0	55.0	26.1	122.5%

ANALYTICAL RESOURCES INCORPORATED

SW8082/PCB WATER SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020

Client ID	DCBP % REC	DCBP LCL-UCL	TCMX % REC	TCMX LCL-UCL	TOT OUT
MB-062810	71.0%	41-111	65.5%	40-118	0
LCS-062810	79.2%	41-111	68.8%	40-118	0
LCSD-062810	79.2%	41-111	70.2%	40-118	0
Rinsate Blank	69.2%	29-118	69.2%	38-118	0

Prep Method: SW3510C
Log Number Range: 10-15157 to 10-15157

FORM-II SW8082

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

Sample ID: Rinsate Blank
SAMPLE

Lab Sample ID: RB73Q
LIMS ID: 10-15157
Matrix: Water
Data Release Authorized:
Reported: 06/30/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 06/28/10
Date Analyzed: 06/29/10 17:17
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes

Sample Amount: 500 mL
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: No
Acid Cleanup: Yes

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	1.0	< 1.0 U
53469-21-9	Aroclor 1242	1.0	< 1.0 U
12672-29-6	Aroclor 1248	1.0	< 1.0 U
11097-69-1	Aroclor 1254	1.0	< 1.0 U
11096-82-5	Aroclor 1260	1.0	< 1.0 U
11104-28-2	Aroclor 1221	1.0	< 1.0 U
11141-16-5	Aroclor 1232	1.0	< 1.0 U

Reported in µg/L (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	69.2%
Tetrachlorometaxylene	69.2%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: MB-062810
METHOD BLANK

Lab Sample ID: MB-062810
LIMS ID: 10-15157
Matrix: Water
Data Release Authorized:
Reported: 06/30/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: NA
Date Received: NA

Date Extracted: 06/28/10
Date Analyzed: 06/29/10 16:06
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes

Sample Amount: 500 mL
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: No
Acid Cleanup: Yes

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	1.0	< 1.0 U
53469-21-9	Aroclor 1242	1.0	< 1.0 U
12672-29-6	Aroclor 1248	1.0	< 1.0 U
11097-69-1	Aroclor 1254	1.0	< 1.0 U
11096-82-5	Aroclor 1260	1.0	< 1.0 U
11104-28-2	Aroclor 1221	1.0	< 1.0 U
11141-16-5	Aroclor 1232	1.0	< 1.0 U

Reported in µg/L (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	71.0%
Tetrachlorometaxylene	65.5%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: LCS-062810
LCS/LCSD

Lab Sample ID: LCS-062810
LIMS ID: 10-15157
Matrix: Water
Data Release Authorized:
Reported: 06/30/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: NA
Date Received: NA

Date Extracted LCS/LCSD: 06/28/10

Date Analyzed LCS: 06/29/10 16:29
LCSD: 06/29/10 16:53
Instrument/Analyst LCS: ECD7/JGR
LCSD: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes

Sample Amount LCS: 500 mL
LCSD: 500 mL
Final Extract Volume LCS: 5.0 mL
LCSD: 5.0 mL
Dilution Factor LCS: 1.00
LCSD: 1.00
Silica Gel: No
Acid Cleanup: Yes

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Aroclor 1016	3.63	5.00	72.6%	3.88	5.00	77.6%	6.7%
Aroclor 1260	3.93	5.00	78.6%	4.23	5.00	84.6%	7.4%

PCB Surrogate Recovery

	LCS	LCSD
Decachlorobiphenyl	79.2%	79.2%
Tetrachlorometaxylene	68.8%	70.2%

Results reported in µg/L
RPD calculated using sample concentrations per SW846.

ANALYTICAL RESOURCES INCORPORATED

SW8270 SEMIVOLATILES WATER SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020

Client ID	NBZ	FBP	TPH	DCB	PHL	2FP	TBP	2CP	TOT OUT
MB-062810	92.8%	83.2%	100%	75.2%	88.3%	94.7%	104%	87.7%	0
LCS-062810	97.2%	87.6%	100%	80.4%	105%*	99.5%	106%	99.2%	1
LCSD-062810	87.6%	84.4%	102%	71.6%	90.7%	97.9%	106%	91.2%	0
Rinsate Blank	82.8%	78.4%	94.8%	69.6%	85.1%	92.8%	94.7%	81.9%	0

	LCS/MB LIMITS	QC LIMITS
(NBZ) = d5-Nitrobenzene	(46-100)	(39-100)
(FBP) = 2-Fluorobiphenyl	(49-100)	(42-100)
(TPH) = d14-p-Terphenyl	(53-119)	(26-114)
(DCB) = d4-1,2-Dichlorobenzene	(38-100)	(32-100)
(PHL) = d5-Phenol	(50-100)	(41-100)
(2FP) = 2-Fluorophenol	(46-100)	(38-100)
(TBP) = 2,4,6-Tribromophenol	(52-123)	(48-118)
(2CP) = d4-2-Chlorophenol	(53-100)	(44-100)

Prep Method: SW3520C
Log Number Range: 10-15157 to 10-15157

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Page 1 of 2

Sample ID: Rinsate Blank
SAMPLE

Lab Sample ID: RB73Q
LIMS ID: 10-15157
Matrix: Water
Data Release Authorized:
Reported: 07/01/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 06/28/10
Date Analyzed: 06/30/10 16:36
Instrument/Analyst: NT4/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
108-95-2	Phenol	1.0	< 1.0 U
111-44-4	Bis-(2-Chloroethyl) Ether	1.0	< 1.0 U
95-57-8	2-Chlorophenol	1.0	< 1.0 U
541-73-1	1,3-Dichlorobenzene	1.0	< 1.0 U
106-46-7	1,4-Dichlorobenzene	1.0	< 1.0 U
100-51-6	Benzyl Alcohol	5.0	< 5.0 U
95-50-1	1,2-Dichlorobenzene	1.0	< 1.0 U
95-48-7	2-Methylphenol	1.0	< 1.0 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	1.0	< 1.0 U
106-44-5	4-Methylphenol	1.0	< 1.0 U
621-64-7	N-Nitroso-Di-N-Propylamine	1.0	< 1.0 U
67-72-1	Hexachloroethane	1.0	< 1.0 U
98-95-3	Nitrobenzene	1.0	< 1.0 U
78-59-1	Isophorone	1.0	< 1.0 U
88-75-5	2-Nitrophenol	5.0	< 5.0 U
105-67-9	2,4-Dimethylphenol	1.0	< 1.0 U
65-85-0	Benzoic Acid	10	< 10 U
111-91-1	bis(2-Chloroethoxy) Methane	1.0	< 1.0 U
120-83-2	2,4-Dichlorophenol	5.0	< 5.0 U
120-82-1	1,2,4-Trichlorobenzene	1.0	< 1.0 U
91-20-3	Naphthalene	1.0	< 1.0 U
106-47-8	4-Chloroaniline	5.0	< 5.0 U
87-68-3	Hexachlorobutadiene	1.0	< 1.0 U
59-50-7	4-Chloro-3-methylphenol	5.0	< 5.0 U
91-57-6	2-Methylnaphthalene	1.0	< 1.0 U
77-47-4	Hexachlorocyclopentadiene	5.0	< 5.0 U
88-06-2	2,4,6-Trichlorophenol	5.0	< 5.0 U
95-95-4	2,4,5-Trichlorophenol	5.0	< 5.0 U
91-58-7	2-Chloronaphthalene	1.0	< 1.0 U
88-74-4	2-Nitroaniline	5.0	< 5.0 U
131-11-3	Dimethylphthalate	1.0	< 1.0 U
208-96-8	Acenaphthylene	1.0	< 1.0 U
99-09-2	3-Nitroaniline	5.0	< 5.0 U
83-32-9	Acenaphthene	1.0	< 1.0 U
51-28-5	2,4-Dinitrophenol	10	< 10 U
100-02-7	4-Nitrophenol	5.0	< 5.0 U
132-64-9	Dibenzofuran	1.0	< 1.0 U
606-20-2	2,6-Dinitrotoluene	5.0	< 5.0 U
121-14-2	2,4-Dinitrotoluene	5.0	< 5.0 U
84-66-2	Diethylphthalate	1.0	< 1.0 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: Rinsate Blank
SAMPLE

Lab Sample ID: RB73Q
LIMS ID: 10-15157
Matrix: Water
Date Analyzed: 06/30/10 16:36

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020

CAS Number	Analyte	RL	Result
7005-72-3	4-Chlorophenyl-phenylether	1.0	< 1.0 U
86-73-7	Fluorene	1.0	< 1.0 U
100-01-6	4-Nitroaniline	5.0	< 5.0 U
534-52-1	4,6-Dinitro-2-Methylphenol	10	< 10 U
86-30-6	N-Nitrosodiphenylamine	5.0	< 5.0 U
101-55-3	4-Bromophenyl-phenylether	1.0	< 1.0 U
118-74-1	Hexachlorobenzene	1.0	< 1.0 U
87-86-5	Pentachlorophenol	5.0	< 5.0 U
85-01-8	Phenanthrene	1.0	< 1.0 U
86-74-8	Carbazole	1.0	< 1.0 U
120-12-7	Anthracene	1.0	< 1.0 U
84-74-2	Di-n-Butylphthalate	1.0	< 1.0 U
206-44-0	Fluoranthene	1.0	< 1.0 U
129-00-0	Pyrene	1.0	< 1.0 U
85-68-7	Butylbenzylphthalate	1.0	< 1.0 U
91-94-1	3,3'-Dichlorobenzidine	5.0	< 5.0 U
56-55-3	Benzo(a)anthracene	1.0	< 1.0 U
117-81-7	bis(2-Ethylhexyl)phthalate	1.0	< 1.0 U
218-01-9	Chrysene	1.0	< 1.0 U
117-84-0	Di-n-Octyl phthalate	1.0	< 1.0 U
205-99-2	Benzo(b)fluoranthene	1.0	< 1.0 U
207-08-9	Benzo(k)fluoranthene	1.0	< 1.0 U
50-32-8	Benzo(a)pyrene	1.0	< 1.0 U
193-39-5	Indeno(1,2,3-cd)pyrene	1.0	< 1.0 U
53-70-3	Dibenz(a,h)anthracene	1.0	< 1.0 U
191-24-2	Benzo(g,h,i)perylene	1.0	< 1.0 U
90-12-0	1-Methylnaphthalene	1.0	< 1.0 U

Reported in µg/L (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	82.8%	2-Fluorobiphenyl	78.4%
d14-p-Terphenyl	94.8%	d4-1,2-Dichlorobenzene	69.6%
d5-Phenol	85.1%	2-Fluorophenol	92.8%
2,4,6-Tribromophenol	94.7%	d4-2-Chlorophenol	81.9%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: MB-062810
METHOD BLANK

Lab Sample ID: MB-062810
LIMS ID: 10-15157
Matrix: Water
Data Release Authorized:
Reported: 07/01/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: NA
Date Received: NA

Date Extracted: 06/28/10
Date Analyzed: 06/30/10 14:55
Instrument/Analyst: NT4/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
108-95-2	Phenol	1.0	< 1.0 U
111-44-4	Bis-(2-Chloroethyl) Ether	1.0	< 1.0 U
95-57-8	2-Chlorophenol	1.0	< 1.0 U
541-73-1	1,3-Dichlorobenzene	1.0	< 1.0 U
106-46-7	1,4-Dichlorobenzene	1.0	< 1.0 U
100-51-6	Benzyl Alcohol	5.0	< 5.0 U
95-50-1	1,2-Dichlorobenzene	1.0	< 1.0 U
95-48-7	2-Methylphenol	1.0	< 1.0 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	1.0	< 1.0 U
106-44-5	4-Methylphenol	1.0	< 1.0 U
621-64-7	N-Nitroso-Di-N-Propylamine	1.0	< 1.0 U
67-72-1	Hexachloroethane	1.0	< 1.0 U
98-95-3	Nitrobenzene	1.0	< 1.0 U
78-59-1	Isophorone	1.0	< 1.0 U
88-75-5	2-Nitrophenol	5.0	< 5.0 U
105-67-9	2,4-Dimethylphenol	1.0	< 1.0 U
65-85-0	Benzoic Acid	10	< 10 U
111-91-1	bis(2-Chloroethoxy) Methane	1.0	< 1.0 U
120-83-2	2,4-Dichlorophenol	5.0	< 5.0 U
120-82-1	1,2,4-Trichlorobenzene	1.0	< 1.0 U
91-20-3	Naphthalene	1.0	< 1.0 U
106-47-8	4-Chloroaniline	5.0	< 5.0 U
87-68-3	Hexachlorobutadiene	1.0	< 1.0 U
59-50-7	4-Chloro-3-methylphenol	5.0	< 5.0 U
91-57-6	2-Methylnaphthalene	1.0	< 1.0 U
77-47-4	Hexachlorocyclopentadiene	5.0	< 5.0 U
88-06-2	2,4,6-Trichlorophenol	5.0	< 5.0 U
95-95-4	2,4,5-Trichlorophenol	5.0	< 5.0 U
91-58-7	2-Chloronaphthalene	1.0	< 1.0 U
88-74-4	2-Nitroaniline	5.0	< 5.0 U
131-11-3	Dimethylphthalate	1.0	< 1.0 U
208-96-8	Acenaphthylene	1.0	< 1.0 U
99-09-2	3-Nitroaniline	5.0	< 5.0 U
83-32-9	Acenaphthene	1.0	< 1.0 U
51-28-5	2,4-Dinitrophenol	10	< 10 U
100-02-7	4-Nitrophenol	5.0	< 5.0 U
132-64-9	Dibenzofuran	1.0	< 1.0 U
606-20-2	2,6-Dinitrotoluene	5.0	< 5.0 U
121-14-2	2,4-Dinitrotoluene	5.0	< 5.0 U
84-66-2	Diethylphthalate	1.0	< 1.0 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: MB-062810
METHOD BLANK

Lab Sample ID: MB-062810
LIMS ID: 10-15157
Matrix: Water
Date Analyzed: 06/30/10 14:55

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020

CAS Number	Analyte	RL	Result
7005-72-3	4-Chlorophenyl-phenylether	1.0	< 1.0 U
86-73-7	Fluorene	1.0	< 1.0 U
100-01-6	4-Nitroaniline	5.0	< 5.0 U
534-52-1	4,6-Dinitro-2-Methylphenol	10	< 10 U
86-30-6	N-Nitrosodiphenylamine	5.0	< 5.0 U
101-55-3	4-Bromophenyl-phenylether	1.0	< 1.0 U
118-74-1	Hexachlorobenzene	1.0	< 1.0 U
87-86-5	Pentachlorophenol	5.0	< 5.0 U
85-01-8	Phenanthrene	1.0	< 1.0 U
86-74-8	Carbazole	1.0	< 1.0 U
120-12-7	Anthracene	1.0	< 1.0 U
84-74-2	Di-n-Butylphthalate	1.0	< 1.0 U
206-44-0	Fluoranthene	1.0	< 1.0 U
129-00-0	Pyrene	1.0	< 1.0 U
85-68-7	Butylbenzylphthalate	1.0	< 1.0 U
91-94-1	3,3'-Dichlorobenzidine	5.0	< 5.0 U
56-55-3	Benzo(a)anthracene	1.0	< 1.0 U
117-81-7	bis(2-Ethylhexyl)phthalate	1.0	< 1.0 U
218-01-9	Chrysene	1.0	< 1.0 U
117-84-0	Di-n-Octyl phthalate	1.0	< 1.0 U
205-99-2	Benzo(b)fluoranthene	1.0	< 1.0 U
207-08-9	Benzo(k)fluoranthene	1.0	< 1.0 U
50-32-8	Benzo(a)pyrene	1.0	< 1.0 U
193-39-5	Indeno(1,2,3-cd)pyrene	1.0	< 1.0 U
53-70-3	Dibenz(a,h)anthracene	1.0	< 1.0 U
191-24-2	Benzo(g,h,i)perylene	1.0	< 1.0 U
90-12-0	1-Methylnaphthalene	1.0	< 1.0 U

Reported in µg/L (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	92.8%	2-Fluorobiphenyl	83.2%
d14-p-Terphenyl	100%	d4-1,2-Dichlorobenzene	75.2%
d5-Phenol	88.3%	2-Fluorophenol	94.7%
2,4,6-Tribromophenol	104%	d4-2-Chlorophenol	87.7%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: LCS-062810
LCS/LCSD

Lab Sample ID: LCS-062810
LIMS ID: 10-15157
Matrix: Water
Data Release Authorized:
Reported: 07/01/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted LCS/LCSD: 06/28/10

Sample Amount LCS: 500 mL
LCSD: 500 mL

Date Analyzed LCS: 06/30/10 15:29
LCSD: 06/30/10 16:02
Instrument/Analyst LCS: NT4/JZ
LCSD: NT4/JZ
GPC Cleanup: NO

Final Extract Volume LCS: 0.50 mL
LCSD: 0.50 mL
Dilution Factor LCS: 1.00
LCSD: 1.00

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Phenol	23.1	25.0	92.4%	21.9	25.0	87.6%	5.3%
Bis-(2-Chloroethyl) Ether	22.9	25.0	91.6%	20.1	25.0	80.4%	13.0%
2-Chlorophenol	23.8	25.0	95.2%	21.6	25.0	86.4%	9.7%
1,3-Dichlorobenzene	15.9	25.0	63.6%	14.5	25.0	58.0%	9.2%
1,4-Dichlorobenzene	16.1	25.0	64.4%	15.3	25.0	61.2%	5.1%
Benzyl Alcohol	53.4	50.0	107%	51.2	50.0	102%	4.2%
1,2-Dichlorobenzene	16.6	25.0	66.4%	14.7	25.0	58.8%	12.1%
2-Methylphenol	22.0	25.0	88.0%	19.4	25.0	77.6%	12.6%
2,2'-Oxybis(1-Chloropropane)	20.8	25.0	83.2%	18.4	25.0	73.6%	12.2%
4-Methylphenol	43.0	50.0	86.0%	40.0	50.0	80.0%	7.2%
N-Nitroso-Di-N-Propylamine	17.3	25.0	69.2%	16.8	25.0	67.2%	2.9%
Hexachloroethane	13.9	25.0	55.6%	13.3	25.0	53.2%	4.4%
Nitrobenzene	17.9 Q	25.0	71.6%	16.6 Q	25.0	66.4%	7.5%
Isophorone	23.3	25.0	93.2%	22.5	25.0	90.0%	3.5%
2-Nitrophenol	22.0	25.0	88.0%	20.8	25.0	83.2%	5.6%
2,4-Dimethylphenol	12.8	25.0	51.2%	11.9	25.0	47.6%	7.3%
Benzoic Acid	61.6	75.0	82.1%	65.4	75.0	87.2%	6.0%
bis(2-Chloroethoxy) Methane	21.4	25.0	85.6%	20.8	25.0	83.2%	2.8%
2,4-Dichlorophenol	22.4	25.0	89.6%	21.9	25.0	87.6%	2.3%
1,2,4-Trichlorobenzene	17.0	25.0	68.0%	15.8	25.0	63.2%	7.3%
Naphthalene	20.9	25.0	83.6%	19.7	25.0	78.8%	5.9%
4-Chloroaniline	65.6	60.0	109%	64.9	60.0	108%	1.1%
Hexachlorobutadiene	14.0	25.0	56.0%	13.3	25.0	53.2%	5.1%
4-Chloro-3-methylphenol	22.0	25.0	88.0%	22.7	25.0	90.8%	3.1%
2-Methylnaphthalene	20.1	25.0	80.4%	19.9	25.0	79.6%	1.0%
Hexachlorocyclopentadiene	58.7	75.0	78.3%	58.0	75.0	77.3%	1.2%
2,4,6-Trichlorophenol	23.5	25.0	94.0%	23.8	25.0	95.2%	1.3%
2,4,5-Trichlorophenol	24.2	25.0	96.8%	23.3	25.0	93.2%	3.8%
2-Chloronaphthalene	19.8	25.0	79.2%	19.3	25.0	77.2%	2.6%
2-Nitroaniline	25.8	25.0	103%	25.3	25.0	101%	2.0%
Dimethylphthalate	22.3	25.0	89.2%	22.7	25.0	90.8%	1.8%
Acenaphthylene	21.4	25.0	85.6%	21.1	25.0	84.4%	1.4%
3-Nitroaniline	81.3	64.0	127%	81.7	64.0	128%	0.5%
Acenaphthene	20.0	25.0	80.0%	19.8	25.0	79.2%	1.0%
2,4-Dinitrophenol	84.5	75.0	113%	86.7	75.0	116%	2.6%
4-Nitrophenol	25.1	25.0	100%	24.3	25.0	97.2%	3.2%
Dibenzofuran	22.7	25.0	90.8%	22.9	25.0	91.6%	0.9%
2,6-Dinitrotoluene	23.1	25.0	92.4%	23.6	25.0	94.4%	2.1%
2,4-Dinitrotoluene	23.0	25.0	92.0%	23.5	25.0	94.0%	2.2%
Diethylphthalate	22.1	25.0	88.4%	22.0	25.0	88.0%	0.5%
4-Chlorophenyl-phenylether	19.9	25.0	79.6%	20.0	25.0	80.0%	0.5%
Fluorene	21.3	25.0	85.2%	21.5	25.0	86.0%	0.9%
4-Nitroaniline	25.3	25.0	101%	25.7	25.0	103%	1.6%
4,6-Dinitro-2-Methylphenol	76.5	75.0	102%	79.5	75.0	106%	3.8%
N-Nitrosodiphenylamine	20.3	25.0	81.2%	20.0	25.0	80.0%	1.5%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: LCS-062810
LCS/LCSD

Lab Sample ID: LCS-062810
LIMS ID: 10-15157
Matrix: Water
Date Analyzed LCS: 06/30/10 15:29
LCSD: 06/30/10 16:02

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020

Analyte	**LCS**	**Spike Added-LCS**	**LCS Recovery**	**LCSD**	**Spike Added-LCSD**	**LCSD Recovery**	**RPD**
4-Bromophenyl-phenylether	22.6	25.0	90.4%	22.6	25.0	90.4%	0.0%
Hexachlorobenzene	21.4	25.0	85.6%	22.6	25.0	90.4%	5.5%
Pentachlorophenol	23.2 Q	25.0	92.8%	23.7 Q	25.0	94.8%	2.1%
Phenanthrene	24.1	25.0	96.4%	24.3	25.0	97.2%	0.8%
Carbazole	24.2	25.0	96.8%	24.9	25.0	99.6%	2.9%
Anthracene	22.6	25.0	90.4%	23.0	25.0	92.0%	1.8%
Di-n-Butylphthalate	23.3	25.0	93.2%	25.2	25.0	101%	7.8%
Fluoranthene	24.7	25.0	98.8%	25.7	25.0	103%	4.0%
Pyrene	24.6	25.0	98.4%	25.5	25.0	102%	3.6%
Butylbenzylphthalate	24.2	25.0	96.8%	24.5	25.0	98.0%	1.2%
3,3'-Dichlorobenzidine	53.4	64.0	83.4%	53.0	64.0	82.8%	0.8%
Benzo(a)anthracene	23.7	25.0	94.8%	23.8	25.0	95.2%	0.4%
bis(2-Ethylhexyl)phthalate	25.1	25.0	100%	25.1	25.0	100%	0.0%
Chrysene	24.3	25.0	97.2%	24.7	25.0	98.8%	1.6%
Di-n-Octyl phthalate	23.4	25.0	93.6%	23.5	25.0	94.0%	0.4%
Benzo(b)fluoranthene	22.0	25.0	88.0%	21.7	25.0	86.8%	1.4%
Benzo(k)fluoranthene	22.0	25.0	88.0%	21.7	25.0	86.8%	1.4%
Benzo(a)pyrene	19.4	25.0	77.6%	19.3	25.0	77.2%	0.5%
Indeno(1,2,3-cd)pyrene	24.4	25.0	97.6%	25.0	25.0	100%	2.4%
Dibenz(a,h)anthracene	24.4	25.0	97.6%	25.1	25.0	100%	2.8%
Benzo(g,h,i)perylene	24.3	25.0	97.2%	24.4	25.0	97.6%	0.4%
1-Methylnaphthalene	29.8 Q	25.0	119%	29.5 Q	25.0	118%	1.0%

Semivolatile Surrogate Recovery

	LCS	**LCSD**
d5-Nitrobenzene	97.2%	87.6%
2-Fluorobiphenyl	87.6%	84.4%
d14-p-Terphenyl	100%	102%
d4-1,2-Dichlorobenzene	80.4%	71.6%
d5-Phenol	105%	90.7%
2-Fluorophenol	99.5%	97.9%
2,4,6-Tribromophenol	106%	106%
d4-2-Chlorophenol	99.2%	91.2%

Results reported in µg/L
RPD calculated using sample concentrations per SW846.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Client: Floyd Snider	**ARI Job No.:** RB73
Client Project: COS-GWSA 6020	**Client Project No.:** Phase 3

Case Narrative

1. Fifteen samples were submitted for sample preparation and analysis on June 24, 2010 and were in good condition.
2. One sample, SL6.2, was submitted for centrifugation to separate solids, by modified Corp of Engineers draft interim guidelines.
3. The sediment for centrifugation was received in wide mouth glass jars. All glass centrifuge bottles were decontaminated, pre-rinsed with Dichloromethane and allowed to dry completely. All spoons and spatulas were pre-rinsed with Dichloromethane.
4. All samples were centrifuged in a pre-cooled centrifuge (4°C) at 1,000 x g for 30 minutes, the excess water was decanted and archived and the solid sample was spooned into a wide mouth glass jar.
5. Fifteen samples were submitted for grain size analysis and were run in a single batch. One sample from another job was chosen for triplicate analysis. The triplicate data is reported on the QA summary.
6. One sample, SL6.2, did not contain enough volume to run a standard ASTM D422 grain size analysis. This sample was suspended in liquid and run on the laser diffraction unit according to ASTM D4644.
7. The samples contained woody chunks and other organic matter which may have broken down during the oven drying or sieve steps of the procedure.
8. The samples displayed an oily sheen, a fuel-like odor and/or hydrophobic behavior towards de-ionized water which indicated the presence of an organic contaminant. This organic contaminant may have skewed the grain size results.
9. The data is provided in summary tables and plots.
10. There were no other noted anomalies in this project.

Approved by: *Geema Smith* Date: 7/7/10
Geotechnical Laboratory Manager

Floyd/Snider
COS-GWSA 6020
Phase 3

Percent Finer (Passing) Than the Indicated Size

Sieve Size (microns)	3"	2"	1 1/2"	1"	3/4"	1/2"	3/8"	#4 (4750)	#10 (2000)	#20 (850)	#40 (425)	#60 (250)	#100 (150)	#200 (75)	32	22	13	9	7	3.2	1.3
RB21 H	100.0	100.0	100.0	100.0	100.0	98.0	96.8	88.6	57.7	25.2	16.7	13.7	12.0	10.6	9.9	8.4	6.8	6.8	6.5	5.3	1.2
	100.0	100.0	100.0	100.0	100.0	97.9	97.3	88.3	54.6	25.2	16.8	13.7	12.0	10.4	10.0	8.6	6.8	6.1	5.0	5.0	0.7
	100.0	100.0	100.0	100.0	100.0	100.0	98.2	89.7	57.0	25.9	17.7	14.5	12.8	11.2	10.5	8.0	6.6	5.6	5.6	2.1	0.7
PA-CB-01	100.0	100.0	100.0	100.0	99.7	95.6	95.5	94.7	89.2	76.6	60.8	48.6	41.0	34.7	29.4	19.1	13.2	8.8	7.4	4.4	2.9
PA-CB-02	100.0	100.0	100.0	100.0	100.0	99.8	99.7	97.6	88.6	76.2	59.6	45.0	37.2	31.6	24.1	17.7	13.5	9.4	7.1	3.5	2.4
PA-CB-03	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	98.4	92.1	79.8	69.0	62.7	58.0	46.0	35.6	28.9	20.8	14.8	8.9	4.5
PA-CB-04	100.0	100.0	100.0	100.0	91.8	86.0	86.0	82.3	77.8	69.4	54.9	37.9	28.2	22.9	21.5	17.3	13.1	8.4	6.0	3.6	3.0
PA-CB-05	100.0	100.0	100.0	100.0	99.9	99.5	97.7	96.1	90.9	75.5	56.9	41.5	33.5	28.6	25.4	16.9	13.0	10.4	6.5	3.9	2.6
PA-CB-06	100.0	100.0	100.0	100.0	99.4	98.9	98.7	98.1	94.2	82.7	67.7	54.7	46.1	39.4	32.9	20.9	16.9	12.9	4.0	4.0	4.0
PA-CB-07	100.0	100.0	100.0	100.0	87.3	87.2	87.2	86.7	84.1	76.7	62.1	46.0	36.2	29.8	25.4	18.5	10.8	6.9	4.6	3.1	2.3
PA-CB-DUP	100.0	100.0	100.0	100.0	100.0	99.7	99.3	98.7	94.1	76.7	57.4	40.7	31.8	26.0	24.1	15.4	11.4	6.0	4.0	2.0	0.7
SL6.1	100.0	100.0	100.0	100.0	100.0	100.0	97.7	95.5	93.5	86.9	82.4	73.6	62.8	50.3	38.8	32.7	24.5	18.4	11.6	4.8	0.7
SL6.2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.6	90.5	78.6	60.9	51.1	36.9	28.0	22.6	10.8	4.5
HP-CB-01	100.0	100.0	100.0	100.0	100.0	100.0	98.2	93.4	89.1	80.0	62.6	47.1	38.3	31.5	23.0	19.2	11.8	8.7	5.6	3.1	1.2
HP-CB-02	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.2	97.9	94.3	84.4	71.0	60.0	48.1	31.7	24.3	18.2	13.5	9.4	4.7	0.7
HP-CB-03	100.0	100.0	100.0	100.0	100.0	100.0	98.8	98.2	95.8	88.6	74.6	57.8	45.0	35.4	25.0	19.2	15.4	10.3	6.4	3.2	0.6
HP-OWS-Inlet	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.9	99.5	98.2	95.4	92.2	89.2	84.6	58.5	45.4	34.7	24.6	16.9	8.5	2.3
HP-OWS-Outlet	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.2	97.5	93.5	89.1	85.8	81.9	62.6	51.2	37.7	28.6	18.8	8.3	2.3

Testing performed according to ASTM D421/D422

Floyd/Snider
COS-GWSA 6020
Phase 3

Percent Retained in Each Size Fraction

Description	%Coarse Gravel				% Gravel			% Coarse Sand	% Medium Sand		% Fine Sand			% Very Coarse Silt	% Coarse Silt	% Medium Silt	% Fine Silt	% Fine Silt	% Very Fine Silt	% Clay
Particle Size (microns)	3-2"	2-1 1/2"	1 1/2"-1"	1-3/4"	3/4-1/2"	1/2-3/8"	3/8"-4750	4750-2000	2000-850	850-425	425-250	250-150	150-75	75-32	32-22	22-13	13-9	9-7	7-3.2	<3.2
RB21 H	0.0	0.0	0.0	0.0	2.0	1.2	8.2	30.9	32.5	8.5	3.1	1.6	1.5	0.6	1.6	1.6	0.0	0.3	1.2	5.3
	0.0	0.0	0.0	0.0	2.1	0.6	9.0	33.6	29.5	8.3	3.1	1.7	1.6	0.4	1.4	1.8	0.7	1.1	0.0	5.0
	0.0	0.0	0.0	0.0	0.0	1.8	8.4	32.8	31.0	8.3	3.2	1.7	1.6	0.7	2.4	1.4	1.0	0.0	3.5	2.1
PA-CB-01	0.0	0.0	0.0	0.3	4.1	0.2	0.7	5.5	12.6	15.9	12.2	7.5	6.4	5.2	10.3	5.9	4.4	1.5	2.9	4.4
PA-CB-02	0.0	0.0	0.0	0.0	0.2	0.1	2.1	9.0	12.4	16.6	14.6	7.8	5.6	7.4	6.5	4.1	4.1	2.4	3.5	3.5
PA-CB-03	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.4	6.3	12.3	10.8	6.3	4.7	12.0	10.4	6.7	8.2	5.9	5.9	8.9
PA-CB-04	0.0	0.0	0.0	8.2	5.9	0.0	3.7	4.6	8.3	14.5	17.0	9.7	5.3	1.4	4.2	4.2	4.8	2.4	2.4	3.6
PA-CB-05	0.0	0.0	0.0	0.1	0.4	1.8	1.7	5.1	15.5	18.6	15.3	8.0	5.0	3.2	8.5	3.9	2.6	3.9	2.6	3.9
PA-CB-06	0.0	0.0	0.0	0.6	0.5	0.2	0.6	3.9	11.6	14.9	13.0	8.6	6.7	6.6	12.0	4.0	4.0	9.0	0.0	4.0
PA-CB-07	0.0	0.0	0.0	12.7	0.0	0.0	0.5	2.6	7.4	14.6	16.2	9.8	6.4	4.4	6.9	7.7	3.8	2.3	1.5	3.1
PA-CB-DUP	0.0	0.0	0.0	0.0	0.3	0.5	0.6	4.6	17.4	19.2	16.7	8.9	5.8	1.9	8.7	4.0	5.4	2.0	2.0	2.0
SL6.1	0.0	0.0	0.0	0.0	0.0	2.3	2.2	2.0	6.6	4.6	8.8	10.8	12.4	11.6	6.1	8.2	6.1	6.8	6.8	4.8
SL6.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	8.1	11.9	17.7	9.8	14.2	8.9	5.4	11.8	10.8
HP-CB-01	0.0	0.0	0.0	0.0	0.0	1.8	4.8	4.3	9.1	17.3	15.5	8.8	6.8	8.5	3.7	7.4	3.1	3.1	2.5	3.1
HP-CB-02	0.0	0.0	0.0	0.0	0.0	0.0	0.8	1.3	3.6	9.9	13.5	11.0	11.9	16.4	7.4	6.1	4.7	4.0	4.7	4.7
HP-CB-03	0.0	0.0	0.0	0.0	0.0	1.2	0.6	2.4	7.2	14.0	16.8	12.8	9.6	10.4	5.8	3.8	5.1	3.8	3.2	3.2
HP-OWS-Inlet	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.4	1.3	2.8	3.2	3.0	4.6	26.0	13.1	10.8	10.0	7.7	8.5	8.5
HP-OWS-Outlet	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.7	1.8	4.0	4.5	3.3	3.9	19.3	11.3	13.6	9.0	9.8	10.6	8.3

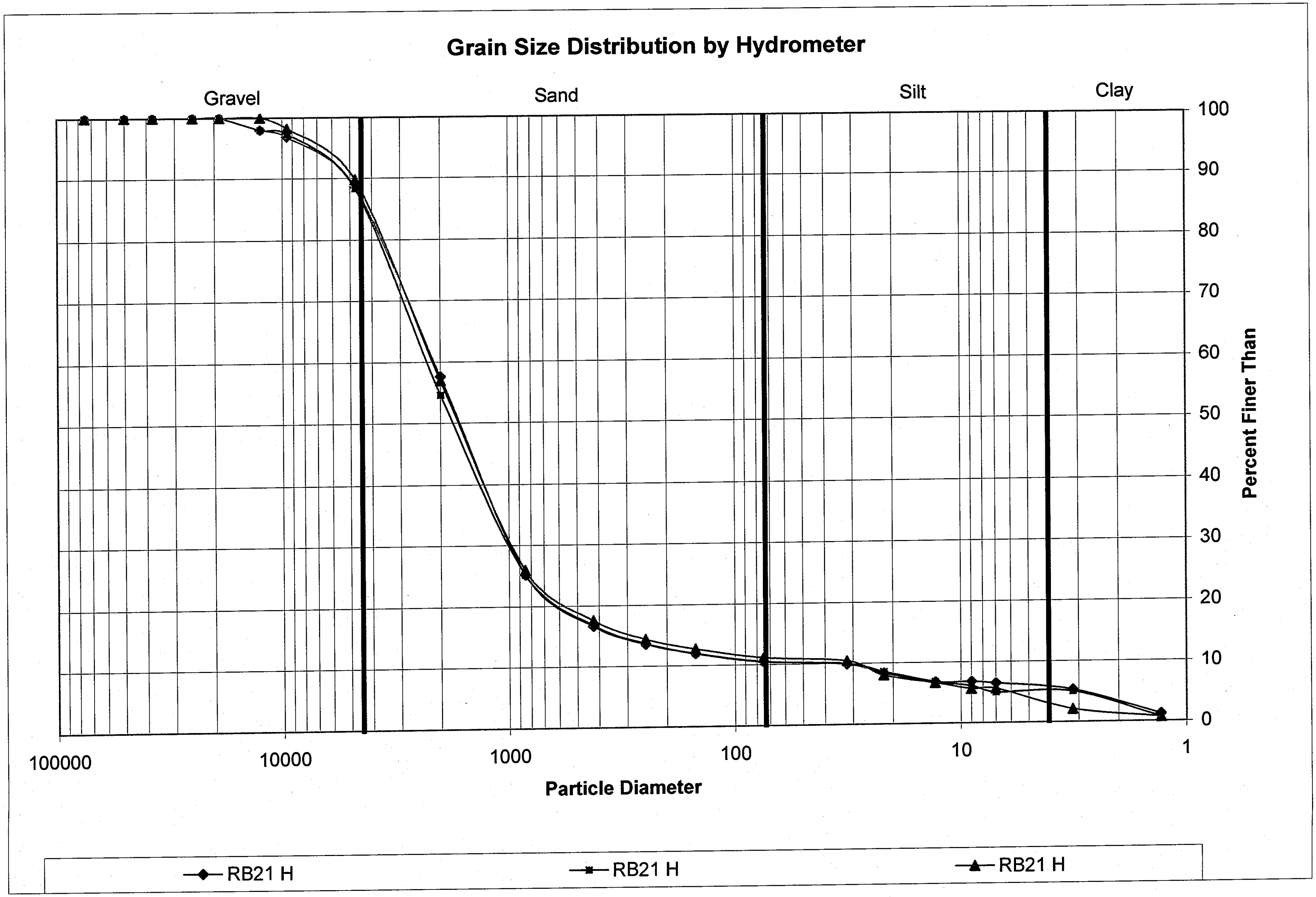
Client:	Floyd/Snider	Project No.:	COS-GWSA 6020
		Project:	Phase 3
ARI Triplicate Sample ID:	RB21H	Batch No.:	RB73-01
		Page:	1 of 1

Relative Standard Deviation, By Size

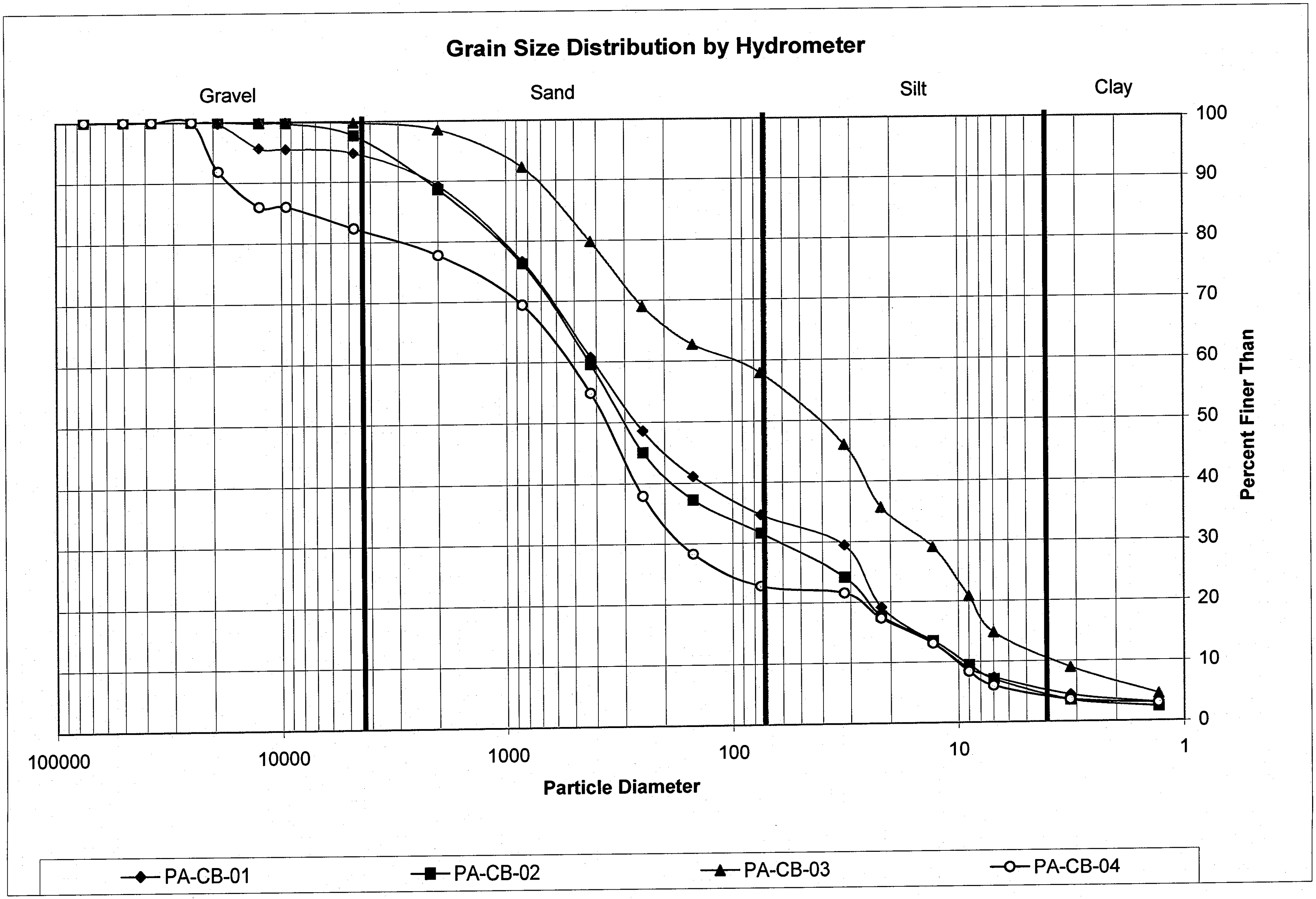
Sample ID	75000	50000	37500	25000	19000	12500	9500	4750	2000	850	425	250	150	75	32	22	13	9	7	3.2	1.3
RB21 H	100.0	100.0	100.0	100.0	100.0	98.0	96.8	88.6	57.7	25.2	16.7	13.7	12.0	10.6	9.9	8.4	6.8	6.8	6.5	5.3	1.2
RB21 H	100.0	100.0	100.0	100.0	100.0	97.9	97.3	88.3	54.6	25.2	16.8	13.7	12.0	10.4	10.0	8.6	6.8	6.1	5.0	5.0	0.7
RB21 H	100.0	100.0	100.0	100.0	100.0	100.0	98.2	89.7	57.0	25.9	17.7	14.5	12.8	11.2	10.5	8.0	6.6	5.6	5.6	2.1	0.7
AVE	100.00	100.00	100.00	100.00	100.00	98.63	97.42	88.87	56.42	25.43	17.07	13.95	12.27	10.73	10.13	8.33	6.75	6.16	5.70	4.12	0.88
STDEV	0.00	0.00	0.00	0.00	0.00	1.19	0.69	0.77	1.60	0.42	0.51	0.45	0.43	0.39	0.28	0.29	0.11	0.63	0.76	1.77	0.31
%RSD	0.00	0.00	0.00	0.00	0.00	1.20	0.71	0.87	2.83	1.66	2.97	3.23	3.47	3.67	2.81	3.43	1.61	10.19	13.36	42.80	34.92

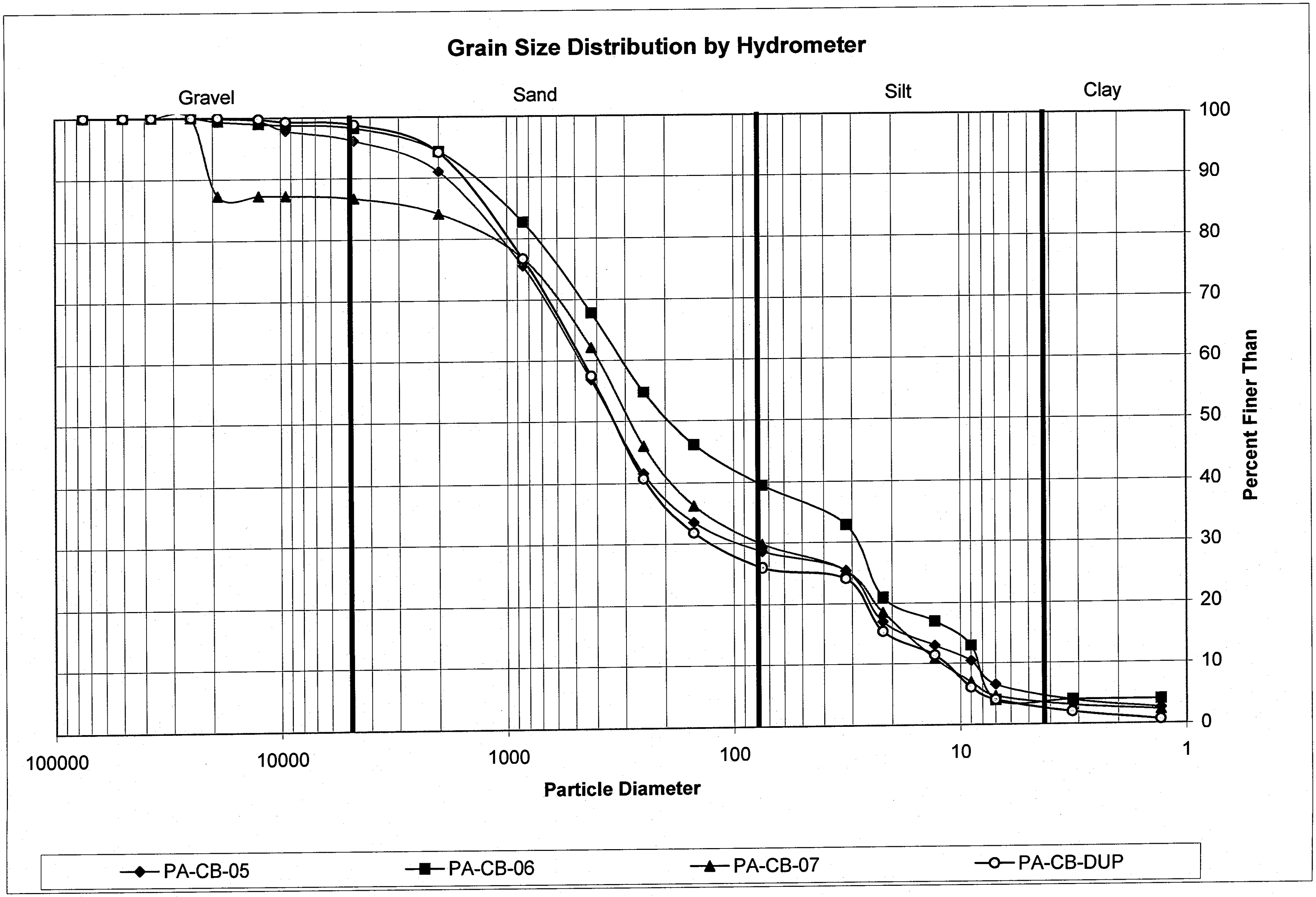
This Triplicate applies to the Batch Containing the Following Samples

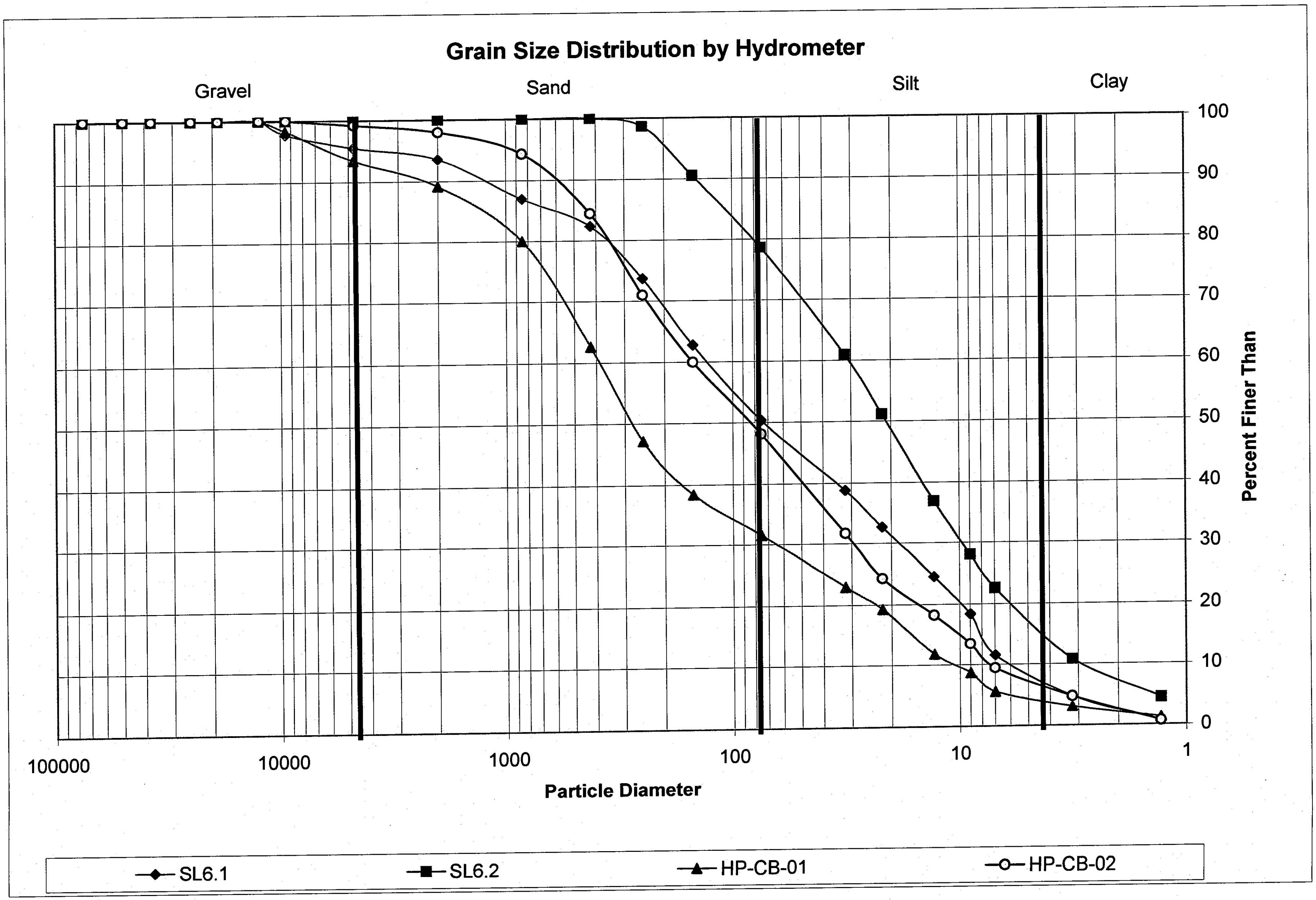
Sample ID	Date Sampled	Date Set up	Date Started	Date Complete	Data Qualifiers
RB21 H	6/15/2010	6/22/2010	6/28/2010	6/30/2010	
	6/15/2010	6/22/2010	6/28/2010	6/30/2010	
	6/15/2010	6/22/2010	6/28/2010	6/30/2010	
PA-CB-01	6/23/2010	6/25/2010	7/1/2010	7/7/2010	
PA-CB-02	6/23/2010	6/25/2010	7/1/2010	7/7/2010	
PA-CB-03	6/23/2010	6/25/2010	7/1/2010	7/7/2010	
PA-CB-04	6/23/2010	6/25/2010	7/1/2010	7/7/2010	
PA-CB-05	6/23/2010	6/25/2010	7/1/2010	7/7/2010	
PA-CB-06	6/23/2010	6/25/2010	7/1/2010	7/7/2010	
PA-CB-07	6/23/2010	6/25/2010	7/1/2010	7/7/2010	
PA-CB-DUP	6/23/2010	6/25/2010	7/1/2010	7/7/2010	
SL6.1	6/23/2010	6/25/2010	7/1/2010	7/7/2010	
SL6.2	6/23/2010	6/25/2010	7/1/2010	7/1/2010	
HP-CB-01	6/23/2010	6/25/2010	7/1/2010	7/7/2010	
HP-CB-02	6/23/2010	6/25/2010	7/1/2010	7/7/2010	
HP-CB-03	6/23/2010	6/25/2010	7/1/2010	7/7/2010	
HP-OWS-Inlet	6/23/2010	6/25/2010	7/1/2010	7/7/2010	
HP-OWS-Outlet	6/23/2010	6/25/2010	7/1/2010	7/7/2010	



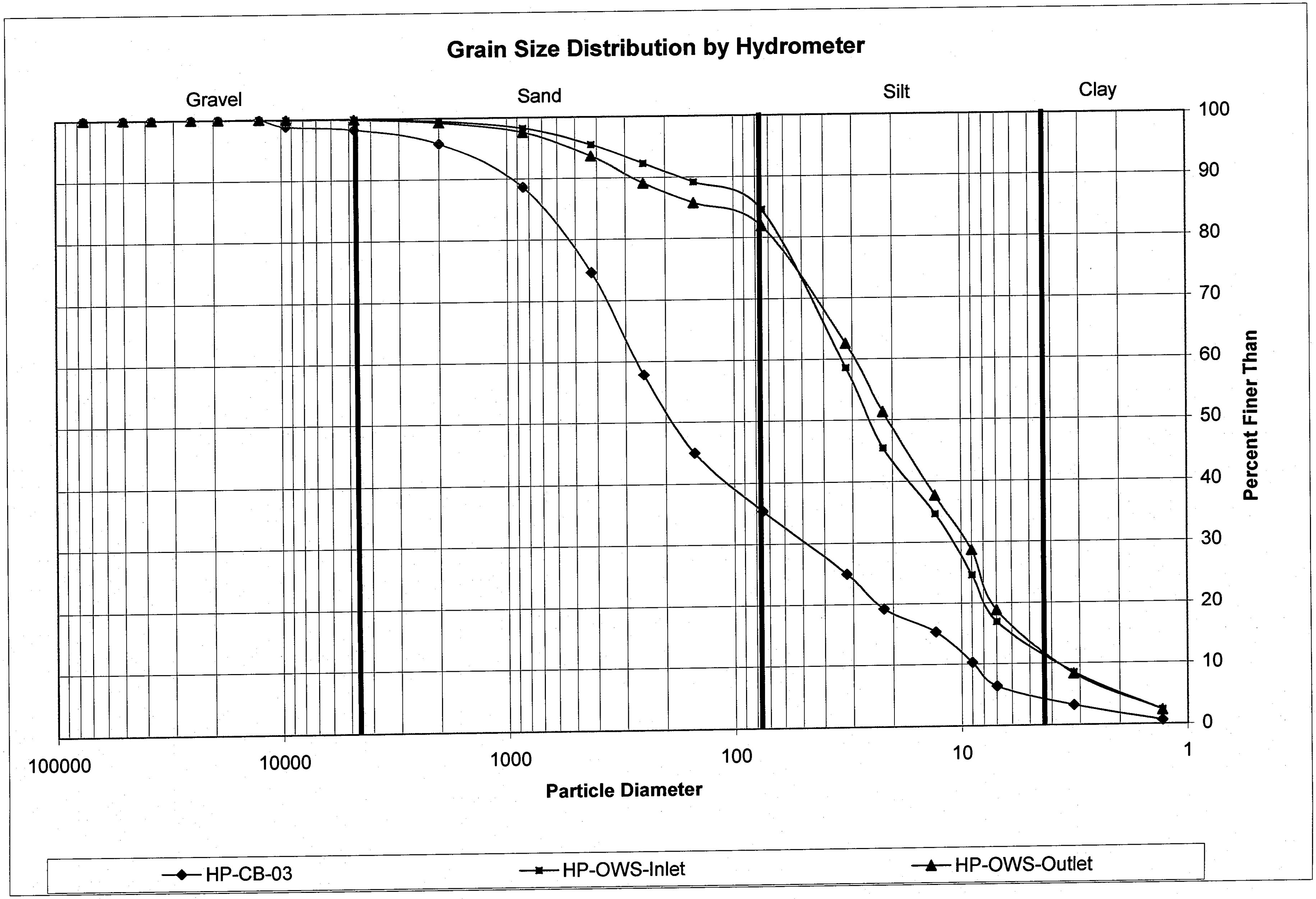
Grain Size Distribution by Hydrometer
Gravel
Sand
Silt
Clay
100
90
80
70
60
50
40
30
20
10
0
Percent Finer Than
100000
10000
1000
100
10
1
Particle Diameter
RB21 H
RB21 H
RB21 H


Grain Size Distribution by Hydrometer
Gravel
Sand
Silt
Clay
100
90
80
70
60
50
40
30
20
10
0
Percent Finer Than
100000
10000
1000
100
10
1
Particle Diameter
PA-CB-01
PA-CB-02
PA-CB-03
PA-CB-04


Grain Size Distribution by Hydrometer
Gravel
Sand
Silt
Clay
100
90
80
70
60
50
40
30
20
10
0
Percent Finer Than
100000
10000
1000
100
10
1
Particle Diameter
PA-CB-05
PA-CB-06
PA-CB-07
PA-CB-DUP



Grain Size Distribution by Hydrometer
Gravel
Sand
Silt
Clay
100
90
80
70
60
50
40
30
20
10
0
Percent Finer Than
100000
10000
1000
100
10
1
Particle Diameter
SL6.1
SL6.2
HP-CB-01
HP-CB-02



Grain Size Distribution by Hydrometer
Gravel
Sand
Silt
Clay
100
90
80
70
60
50
40
30
20
10
0
Percent Finer Than
100000
10000
1000
100
10
1
Particle Diameter
HP-CB-03
HP-OWS-Inlet
HP-OWS-Outlet

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: PA-CB-01
SAMPLE

Lab Sample ID: RB73A
LIMS ID: 10-15141
Matrix: Solid
Data Release Authorized:
Reported: 07/01/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Percent Total Solids: 15.0%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	06/28/10	6010B	06/29/10	7440-38-2	Arsenic	30	30	U
3050B	06/28/10	6010B	06/29/10	**7440-43-9**	**Cadmium**	1	**1**	
3050B	06/28/10	6010B	06/29/10	**7440-47-3**	**Chromium**	3	**38**	
3050B	06/28/10	6010B	06/29/10	**7440-50-8**	**Copper**	1	**165**	
3050B	06/28/10	6010B	06/29/10	**7439-92-1**	**Lead**	10	**120**	
CLP	06/28/10	7471A	06/29/10	7439-97-6	Mercury	0.1	0.1	U
3050B	06/28/10	6010B	06/29/10	7440-22-4	Silver	2	2	U
3050B	06/28/10	6010B	06/29/10	**7440-66-6**	**Zinc**	6	**446**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: PA-CB-01
DUPLICATE

Lab Sample ID: RB73A
LIMS ID: 10-15141
Matrix: Solid
Data Release Authorized:
Reported: 07/01/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Arsenic	6010B	30 U	30 U	0.0%	+/- 30	L
Cadmium	6010B	1	1 U	0.0%	+/- 1	L
Chromium	6010B	38	32	17.1%	+/- 20%	
Copper	6010B	165	131	23.0%	+/- 20%	*
Lead	6010B	120	90	28.6%	+/- 20%	*
Mercury	7471A	0.1 U	0.1 U	0.0%	+/- 0.1	L
Silver	6010B	2 U	2 U	0.0%	+/- 2	L
Zinc	6010B	446	356	22.4%	+/- 20%	*

Reported in mg/kg-dry

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: PA-CB-01
MATRIX SPIKE

Lab Sample ID: RB73A
LIMS ID: 10-15141
Matrix: Solid
Data Release Authorized:
Reported: 07/01/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Arsenic	6010B	30 U	1,240	1,220	102%	
Cadmium	6010B	1	304	304	99.7%	
Chromium	6010B	38	347	304	102%	
Copper	6010B	165	430	304	87.2%	
Lead	6010B	120	1,300	1,220	96.7%	
Mercury	7471A	0.1 U	1.3	1.34	97.0%	
Silver	6010B	2 U	301	304	99.0%	
Zinc	6010B	446	663	304	71.4%	N

Reported in mg/kg-dry

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: PA-CB-02
SAMPLE

Lab Sample ID: RB73B
LIMS ID: 10-15142
Matrix: Solid
Data Release Authorized:
Reported: 07/01/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Percent Total Solids: 26.0%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	06/28/10	6010B	06/29/10	7440-38-2	Arsenic	20	20	U
3050B	06/28/10	6010B	06/29/10	**7440-43-9**	**Cadmium**	0.7	**1.3**	
3050B	06/28/10	6010B	06/29/10	**7440-47-3**	**Chromium**	2	**46**	
3050B	06/28/10	6010B	06/29/10	**7440-50-8**	**Copper**	0.7	**152**	
3050B	06/28/10	6010B	06/29/10	**7439-92-1**	**Lead**	7	**112**	
CLP	06/28/10	7471A	06/29/10	7439-97-6	Mercury	0.1	0.1	U
3050B	06/28/10	6010B	06/29/10	7440-22-4	Silver	1	1	U
3050B	06/28/10	6010B	06/29/10	**7440-66-6**	**Zinc**	4	**449**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: PA-CB-03
SAMPLE

Lab Sample ID: RB73C
LIMS ID: 10-15143
Matrix: Solid
Data Release Authorized:
Reported: 07/01/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Percent Total Solids: 20.1%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	06/28/10	6010B	06/29/10	7440-38-2	Arsenic	20	20	U
3050B	06/28/10	6010B	06/29/10	**7440-43-9**	**Cadmium**	0.9	**1.2**	
3050B	06/28/10	6010B	06/29/10	**7440-47-3**	**Chromium**	2	**38**	
3050B	06/28/10	6010B	06/29/10	**7440-50-8**	**Copper**	0.9	**105**	
3050B	06/28/10	6010B	06/29/10	**7439-92-1**	**Lead**	9	**80**	
CLP	06/28/10	7471A	06/29/10	**7439-97-6**	**Mercury**	0.09	**0.12**	
3050B	06/28/10	6010B	06/29/10	7440-22-4	Silver	1	1	U
3050B	06/28/10	6010B	06/29/10	**7440-66-6**	**Zinc**	5	**325**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: PA-CB-04
SAMPLE

Lab Sample ID: RB73D
LIMS ID: 10-15144
Matrix: Solid
Data Release Authorized:
Reported: 07/01/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Percent Total Solids: 38.4%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	06/28/10	6010B	06/29/10	7440-38-2	Arsenic	10	10	U
3050B	06/28/10	6010B	06/29/10	**7440-43-9**	**Cadmium**	0.5	**0.5**	
3050B	06/28/10	6010B	06/29/10	**7440-47-3**	**Chromium**	1	**21**	
3050B	06/28/10	6010B	06/29/10	**7440-50-8**	**Copper**	0.5	**48.6**	
3050B	06/28/10	6010B	06/29/10	**7439-92-1**	**Lead**	5	**38**	
CLP	06/28/10	7471A	06/29/10	7439-97-6	Mercury	0.06	0.06	U
3050B	06/28/10	6010B	06/29/10	7440-22-4	Silver	0.7	0.7	U
3050B	06/28/10	6010B	06/29/10	**7440-66-6**	**Zinc**	2	**152**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: PA-CB-05
SAMPLE

Lab Sample ID: RB73E
LIMS ID: 10-15145
Matrix: Solid
Data Release Authorized
Reported: 07/01/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Percent Total Solids: 20.3%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	06/28/10	6010B	06/29/10	7440-38-2	Arsenic	20	20	U
3050B	06/28/10	6010B	06/29/10	7440-43-9	Cadmium	0.9	0.9	U
3050B	06/28/10	6010B	06/29/10	**7440-47-3**	**Chromium**	2	**66**	
3050B	06/28/10	6010B	06/29/10	**7440-50-8**	**Copper**	0.9	**97.4**	
3050B	06/28/10	6010B	06/29/10	**7439-92-1**	**Lead**	9	**65**	
CLP	06/28/10	7471A	06/29/10	7439-97-6	Mercury	0.1	0.1	U
3050B	06/28/10	6010B	06/29/10	7440-22-4	Silver	1	1	U
3050B	06/28/10	6010B	06/29/10	**7440-66-6**	**Zinc**	5	**279**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: PA-CB-06
SAMPLE

Lab Sample ID: RB73F
LIMS ID: 10-15146
Matrix: Solid
Data Release Authorized:
Reported: 07/01/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Percent Total Solids: 9.8%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	06/28/10	6010B	06/29/10	7440-38-2	Arsenic	50	50	U
3050B	06/28/10	6010B	06/29/10	7440-43-9	Cadmium	2	2	U
3050B	06/28/10	6010B	06/29/10	**7440-47-3**	**Chromium**	5	**35**	
3050B	06/28/10	6010B	06/29/10	**7440-50-8**	**Copper**	2	**122**	
3050B	06/28/10	6010B	06/29/10	**7439-92-1**	**Lead**	20	**120**	
CLP	06/28/10	7471A	06/29/10	7439-97-6	Mercury	0.2	0.2	U
3050B	06/28/10	6010B	06/29/10	7440-22-4	Silver	3	3	U
3050B	06/28/10	6010B	06/29/10	**7440-66-6**	**Zinc**	10	**420**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: PA-CB-07
SAMPLE

Lab Sample ID: RB73G
LIMS ID: 10-15147
Matrix: Solid
Data Release Authorized:
Reported: 07/01/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Percent Total Solids: 19.7%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	06/28/10	6010B	06/29/10	7440-38-2	Arsenic	20	20	U
3050B	06/28/10	6010B	06/29/10	**7440-43-9**	**Cadmium**	1	**1**	
3050B	06/28/10	6010B	06/29/10	**7440-47-3**	**Chromium**	2	**41**	
3050B	06/28/10	6010B	06/29/10	**7440-50-8**	**Copper**	1	**131**	
3050B	06/28/10	6010B	06/29/10	**7439-92-1**	**Lead**	10	**120**	
CLP	06/28/10	7471A	06/29/10	7439-97-6	Mercury	0.1	0.1	U
3050B	06/28/10	6010B	06/29/10	7440-22-4	Silver	1	1	U
3050B	06/28/10	6010B	06/29/10	**7440-66-6**	**Zinc**	5	**416**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: PA-CB-DUP
SAMPLE

Lab Sample ID: RB73I
LIMS ID: 10-15149
Matrix: Solid
Data Release Authorized:
Reported: 07/01/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Percent Total Solids: 26.8%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	06/28/10	6010B	06/29/10	7440-38-2	Arsenic	20	20	U
3050B	06/28/10	6010B	06/29/10	7440-43-9	Cadmium	0.7	0.7	U
3050B	06/28/10	6010B	06/29/10	**7440-47-3**	**Chromium**	2	**24**	
3050B	06/28/10	6010B	06/29/10	**7440-50-8**	**Copper**	0.7	**65.1**	
3050B	06/28/10	6010B	06/29/10	**7439-92-1**	**Lead**	7	**50**	
CLP	06/28/10	7471A	06/29/10	7439-97-6	Mercury	0.09	0.09	U
3050B	06/28/10	6010B	06/29/10	7440-22-4	Silver	1	1	U
3050B	06/28/10	6010B	06/29/10	**7440-66-6**	**Zinc**	4	**199**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: SL6.1
SAMPLE

Lab Sample ID: RB73J
LIMS ID: 10-15150
Matrix: Solid
Data Release Authorized:
Reported: 07/01/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Percent Total Solids: 34.5%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	06/28/10	6010B	06/29/10	7440-38-2	Arsenic	10	40	
3050B	06/28/10	6010B	06/29/10	7440-43-9	Cadmium	0.6	3.8	
3050B	06/28/10	6010B	06/29/10	7440-47-3	Chromium	1	42	
3050B	06/28/10	6010B	06/29/10	7440-50-8	Copper	0.6	68.1	
3050B	06/28/10	6010B	06/29/10	7439-92-1	Lead	6	59	
CLP	06/28/10	7471A	06/29/10	7439-97-6	Mercury	0.07	0.31	
3050B	06/28/10	6010B	06/29/10	7440-22-4	Silver	0.8	2.0	
3050B	06/28/10	6010B	06/29/10	7440-66-6	Zinc	3	308	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: SL6.2
SAMPLE

Lab Sample ID: RB73K
LIMS ID: 10-15151
Matrix: Solid
Data Release Authorized:
Reported: 07/01/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Percent Total Solids: 28.9%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	06/28/10	6010B	06/29/10	7440-38-2	Arsenic	20	60	
3050B	06/28/10	6010B	06/29/10	7440-43-9	Cadmium	0.6	4.4	
3050B	06/28/10	6010B	06/29/10	7440-47-3	Chromium	2	34	
3050B	06/28/10	6010B	06/29/10	7440-50-8	Copper	0.6	69.5	
3050B	06/28/10	6010B	06/29/10	7439-92-1	Lead	6	44	
CLP	06/28/10	7471A	06/29/10	7439-97-6	Mercury	0.06	0.18	
3050B	06/28/10	6010B	06/29/10	7440-22-4	Silver	0.9	0.9	U
3050B	06/28/10	6010B	06/29/10	7440-66-6	Zinc	3	334	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: HP-CB-01
SAMPLE

Lab Sample ID: RB73L
LIMS ID: 10-15152
Matrix: Solid
Data Release Authorized:
Reported: 07/01/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Percent Total Solids: 51.7%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	06/28/10	6010B	06/29/10	7440-38-2	Arsenic	9	13	
3050B	06/28/10	6010B	06/29/10	7440-43-9	Cadmium	0.4	3.2	
3050B	06/28/10	6010B	06/29/10	7440-47-3	Chromium	0.9	65.2	
3050B	06/28/10	6010B	06/29/10	7440-50-8	Copper	0.4	281	
3050B	06/28/10	6010B	06/29/10	7439-92-1	Lead	4	148	
CLP	06/28/10	7471A	06/29/10	7439-97-6	Mercury	0.04	0.10	
3050B	06/28/10	6010B	06/29/10	7440-22-4	Silver	0.6	0.6	
3050B	06/28/10	6010B	06/29/10	7440-66-6	Zinc	2	934	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: HP-CB-02
SAMPLE

Lab Sample ID: RB73M
LIMS ID: 10-15153
Matrix: Solid
Data Release Authorized:
Reported: 07/01/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Percent Total Solids: 39.1%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	06/28/10	6010B	06/29/10	**7440-38-2**	**Arsenic**	10	**10**	
3050B	06/28/10	6010B	06/29/10	**7440-43-9**	**Cadmium**	0.5	**5.7**	
3050B	06/28/10	6010B	06/29/10	**7440-47-3**	**Chromium**	1	**99**	
3050B	06/28/10	6010B	06/29/10	**7440-50-8**	**Copper**	0.5	**327**	
3050B	06/28/10	6010B	06/29/10	**7439-92-1**	**Lead**	5	**179**	
CLP	06/28/10	7471A	06/29/10	**7439-97-6**	**Mercury**	0.05	**0.44**	
3050B	06/28/10	6010B	06/29/10	7440-22-4	Silver	0.7	0.7	U
3050B	06/28/10	6010B	06/29/10	**7440-66-6**	**Zinc**	2	**1,020**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: HP-CB-03
SAMPLE

Lab Sample ID: RB73N
LIMS ID: 10-15154
Matrix: Solid
Data Release Authorized:
Reported: 07/01/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Percent Total Solids: 37.3%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	06/28/10	6010B	06/29/10	7440-38-2	Arsenic	10	10	U
3050B	06/28/10	6010B	06/29/10	**7440-43-9**	**Cadmium**	0.5	**2.0**	
3050B	06/28/10	6010B	06/29/10	**7440-47-3**	**Chromium**	1	**65**	
3050B	06/28/10	6010B	06/29/10	**7440-50-8**	**Copper**	0.5	**321**	
3050B	06/28/10	6010B	06/29/10	**7439-92-1**	**Lead**	5	**204**	
CLP	06/28/10	7471A	06/29/10	**7439-97-6**	**Mercury**	0.05	**0.11**	
3050B	06/28/10	6010B	06/29/10	7440-22-4	Silver	0.8	0.8	U
3050B	06/28/10	6010B	06/29/10	**7440-66-6**	**Zinc**	3	**899**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: HP-OWS-Inlet
SAMPLE

Lab Sample ID: RB73O
LIMS ID: 10-15155
Matrix: Solid
Data Release Authorized:
Reported: 07/01/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Percent Total Solids: 25.1%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	06/28/10	6010B	06/29/10	7440-38-2	Arsenic	20	20	U
3050B	06/28/10	6010B	06/29/10	**7440-43-9**	**Cadmium**	0.8	**7.9**	
3050B	06/28/10	6010B	06/29/10	**7440-47-3**	**Chromium**	2	**96**	
3050B	06/28/10	6010B	06/29/10	**7440-50-8**	**Copper**	0.8	**551**	
3050B	06/28/10	6010B	06/29/10	**7439-92-1**	**Lead**	8	**346**	
CLP	06/28/10	7471A	06/29/10	**7439-97-6**	**Mercury**	0.09	**0.24**	
3050B	06/28/10	6010B	06/29/10	7440-22-4	Silver	1	1	U
3050B	06/28/10	6010B	06/29/10	**7440-66-6**	**Zinc**	4	**14,400**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: HP-OWS-Outlet
SAMPLE

Lab Sample ID: RB73P
LIMS ID: 10-15156
Matrix: Solid
Data Release Authorized:
Reported: 07/01/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Percent Total Solids: 22.7%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	06/28/10	6010B	06/29/10	**7440-38-2**	**Arsenic**	20	**20**	
3050B	06/28/10	6010B	06/29/10	**7440-43-9**	**Cadmium**	0.8	**7.9**	
3050B	06/28/10	6010B	06/29/10	**7440-47-3**	**Chromium**	2	**175**	
3050B	06/28/10	6010B	06/29/10	**7440-50-8**	**Copper**	0.8	**605**	
3050B	06/28/10	6010B	06/29/10	**7439-92-1**	**Lead**	8	**319**	
CLP	06/28/10	7471A	06/29/10	**7439-97-6**	**Mercury**	0.08	**0.34**	
3050B	06/28/10	6010B	06/29/10	7440-22-4	Silver	1	1	U
3050B	06/28/10	6010B	06/29/10	**7440-66-6**	**Zinc**	4	**6,920**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: METHOD BLANK

Lab Sample ID: RB73MB
LIMS ID: 10-15142
Matrix: Solid
Data Release Authorized:
Reported: 07/01/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: NA
Date Received: NA

Percent Total Solids: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	06/28/10	6010B	06/29/10	7440-38-2	Arsenic	5	5	U
3050B	06/28/10	6010B	06/29/10	7440-43-9	Cadmium	0.2	0.2	U
3050B	06/28/10	6010B	06/29/10	7440-47-3	Chromium	0.5	0.5	U
3050B	06/28/10	6010B	06/29/10	7440-50-8	Copper	0.2	0.2	U
3050B	06/28/10	6010B	06/29/10	7439-92-1	Lead	2	2	U
CLP	06/28/10	7471A	06/29/10	7439-97-6	Mercury	0.02	0.02	U
3050B	06/28/10	6010B	06/29/10	7440-22-4	Silver	0.3	0.3	U
3050B	06/28/10	6010B	06/29/10	7440-66-6	Zinc	1	1	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: LAB CONTROL

Lab Sample ID: RB73LCS
LIMS ID: 10-15142
Matrix: Solid
Data Release Authorized:
Reported: 07/01/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	6010B	204	200	102%	
Cadmium	6010B	51.1	50.0	102%	
Chromium	6010B	52.1	50.0	104%	
Copper	6010B	46.8	50.0	93.6%	
Lead	6010B	199	200	99.5%	
Mercury	7471A	0.46	0.50	92.0%	
Silver	6010B	51.3	50.0	103%	
Zinc	6010B	49	50	98.0%	

Reported in mg/kg-dry

N-Control limit not met
NA-Not Applicable, Analyte Not Spiked
Control Limits: 80-120%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: Rinsate Blank
SAMPLE

Lab Sample ID: RB73Q
LIMS ID: 10-15157
Matrix: Water
Data Release Authorized:
Reported: 07/01/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
3010A	06/28/10	6010B	06/29/10	7440-38-2	Arsenic	0.05	0.05	U
3010A	06/28/10	6010B	06/29/10	7440-43-9	Cadmium	0.002	0.002	U
3010A	06/28/10	6010B	06/29/10	7440-47-3	Chromium	0.005	0.005	U
3010A	06/28/10	6010B	06/29/10	7440-50-8	Copper	0.002	0.002	U
3010A	06/28/10	6010B	06/29/10	7439-92-1	Lead	0.02	0.02	U
7470A	06/28/10	7470A	06/29/10	7439-97-6	Mercury	0.0001	0.0001	U
3010A	06/28/10	6010B	06/29/10	7440-22-4	Silver	0.003	0.003	U
3010A	06/28/10	6010B	06/29/10	7440-66-6	Zinc	0.01	0.01	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: METHOD BLANK

Lab Sample ID: RB73MB
LIMS ID: 10-15157
Matrix: Water
Data Release Authorized:
Reported: 07/01/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: NA
Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
3010A	06/28/10	6010B	06/29/10	7440-38-2	Arsenic	0.05	0.05	U
3010A	06/28/10	6010B	06/29/10	7440-43-9	Cadmium	0.002	0.002	U
3010A	06/28/10	6010B	06/29/10	7440-47-3	Chromium	0.005	0.005	U
3010A	06/28/10	6010B	06/29/10	7440-50-8	Copper	0.002	0.002	U
3010A	06/28/10	6010B	06/29/10	7439-92-1	Lead	0.02	0.02	U
7470A	06/28/10	7470A	06/29/10	7439-97-6	Mercury	0.0001	0.0001	U
3010A	06/28/10	6010B	06/29/10	7440-22-4	Silver	0.003	0.003	U
3010A	06/28/10	6010B	06/29/10	7440-66-6	Zinc	0.01	0.01	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: LAB CONTROL

Lab Sample ID: RB73LCS
LIMS ID: 10-15157
Matrix: Water
Data Release Authorized:
Reported: 07/01/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	6010B	2.03	2.00	102%	
Cadmium	6010B	0.512	0.500	102%	
Chromium	6010B	0.527	0.500	105%	
Copper	6010B	0.473	0.500	94.6%	
Lead	6010B	1.98	2.00	99.0%	
Mercury	7470A	0.0020	0.0020	100%	
Silver	6010B	0.511	0.500	102%	
Zinc	6010B	0.50	0.50	100%	

Reported in mg/L

N-Control limit not met
Control Limits: 80-120%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: PA-CB-01
SAMPLE

Lab Sample ID: RB73A
LIMS ID: 10-15141
Matrix: Solid
Data Release Authorized: VTS
Reported: 07/07/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 06/29/10
Date Analyzed: 07/02/10 18:01
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.2 g-dry-wt
Final Extract Volume: 4.0 mL
Dilution Factor: 5.00
Silica Gel: Yes

Percent Moisture: 79.5%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	33	< 33 U
53469-21-9	Aroclor 1242	33	< 33 U
12672-29-6	Aroclor 1248	33	< 33 U
11097-69-1	Aroclor 1254	33	< 33 U
11096-82-5	**Aroclor 1260**	**33**	**34**
11104-28-2	Aroclor 1221	33	< 33 U
11141-16-5	Aroclor 1232	33	< 33 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	89.5%
Tetrachlorometaxylene	97.1%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: PA-CB-02
SAMPLE

Lab Sample ID: RB73B
LIMS ID: 10-15142
Matrix: Solid
Data Release Authorized: VTS
Reported: 07/07/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 06/29/10
Date Analyzed: 07/06/10 09:35
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.2 g-dry-wt
Final Extract Volume: 4.0 mL
Dilution Factor: 5.00
Silica Gel: Yes

Percent Moisture: 68.9%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	33	< 33 U
53469-21-9	Aroclor 1242	33	< 33 U
12672-29-6	Aroclor 1248	33	< 33 U
11097-69-1	**Aroclor 1254**	**33**	**41**
11096-82-5	**Aroclor 1260**	**33**	**44**
11104-28-2	Aroclor 1221	33	< 33 U
11141-16-5	Aroclor 1232	33	< 33 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	91.4%
Tetrachlorometaxylene	77.6%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: PA-CB-03
SAMPLE

Lab Sample ID: RB73C
LIMS ID: 10-15143
Matrix: Solid
Data Release Authorized: VTS
Reported: 07/07/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 06/29/10
Date Analyzed: 07/02/10 18:38
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.1 g-dry-wt
Final Extract Volume: 4.0 mL
Dilution Factor: 5.00
Silica Gel: Yes

Percent Moisture: 73.9%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	33	< 33 U
53469-21-9	Aroclor 1242	33	< 33 U
12672-29-6	Aroclor 1248	33	< 33 U
11097-69-1	Aroclor 1254	33	< 33 U
11096-82-5	Aroclor 1260	33	< 33 U
11104-28-2	Aroclor 1221	33	< 33 U
11141-16-5	Aroclor 1232	33	< 33 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	86.6%
Tetrachlorometaxylene	95.4%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: MB-062910
METHOD BLANK

Lab Sample ID: MB-062910
LIMS ID: 10-15144
Matrix: Solid
Data Release Authorized: VTS
Reported: 07/07/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: NA
Date Received: NA

Date Extracted: 06/29/10
Date Analyzed: 07/02/10 17:23
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.0 g
Final Extract Volume: 4.0 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: NA

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	6.7	< 6.7 U
53469-21-9	Aroclor 1242	6.7	< 6.7 U
12672-29-6	Aroclor 1248	6.7	< 6.7 U
11097-69-1	Aroclor 1254	6.7	< 6.7 U
11096-82-5	Aroclor 1260	6.7	< 6.7 U
11104-28-2	Aroclor 1221	6.7	< 6.7 U
11141-16-5	Aroclor 1232	6.7	< 6.7 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery	
Decachlorobiphenyl	80.2%
Tetrachlorometaxylene	65.5%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: PA-CB-04
SAMPLE

Lab Sample ID: RB73D
LIMS ID: 10-15144
Matrix: Solid
Data Release Authorized: VTS
Reported: 07/07/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 06/29/10
Date Analyzed: 07/02/10 18:57
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.4 g-dry-wt
Final Extract Volume: 4.0 mL
Dilution Factor: 5.00
Silica Gel: Yes

Percent Moisture: 60.2%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	32	< 32 U
53469-21-9	Aroclor 1242	32	< 32 U
12672-29-6	Aroclor 1248	32	< 32 U
11097-69-1	Aroclor 1254	32	< 32 U
11096-82-5	Aroclor 1260	32	< 32 U
11104-28-2	Aroclor 1221	32	< 32 U
11141-16-5	Aroclor 1232	32	< 32 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	107%
Tetrachlorometaxylene	99.9%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: PA-CB-04
MATRIX SPIKE

Lab Sample ID: RB73D
LIMS ID: 10-15144
Matrix: Solid
Data Release Authorized: VTS
Reported: 07/07/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 06/29/10
Date Analyzed: 07/02/10 19:16
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.4 g-dry-wt
Final Extract Volume: 4.0 mL
Dilution Factor: 5.00
Silica Gel: Yes

Percent Moisture: 60.2%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	32	---
53469-21-9	Aroclor 1242	32	< 32 U
12672-29-6	Aroclor 1248	32	< 32 U
11097-69-1	Aroclor 1254	32	< 32 U
11096-82-5	Aroclor 1260	32	---
11104-28-2	Aroclor 1221	32	< 32 U
11141-16-5	Aroclor 1232	32	< 32 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	96.9%
Tetrachlorometaxylene	94.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: PA-CB-04
MATRIX SPIKE DUP

Lab Sample ID: RB73D
LIMS ID: 10-15144
Matrix: Solid
Data Release Authorized: VTS
Reported: 07/07/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 06/29/10
Date Analyzed: 07/02/10 19:35
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.4 g-dry-wt
Final Extract Volume: 4.0 mL
Dilution Factor: 5.00
Silica Gel: Yes

Percent Moisture: 60.2%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	32	---
53469-21-9	Aroclor 1242	32	< 32 U
12672-29-6	Aroclor 1248	32	< 32 U
11097-69-1	Aroclor 1254	32	< 32 U
11096-82-5	Aroclor 1260	32	---
11104-28-2	Aroclor 1221	32	< 32 U
11141-16-5	Aroclor 1232	32	< 32 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	100%
Tetrachlorometaxylene	96.1%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: PA-CB-05
SAMPLE

Lab Sample ID: RB73E
LIMS ID: 10-15145
Matrix: Solid
Data Release Authorized: VTS
Reported: 07/07/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 06/29/10
Date Analyzed: 07/02/10 19:53
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.2 g-dry-wt
Final Extract Volume: 4.0 mL
Dilution Factor: 5.00
Silica Gel: Yes

Percent Moisture: 73.6%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	33	< 33 U
53469-21-9	Aroclor 1242	33	< 33 U
12672-29-6	Aroclor 1248	33	< 33 U
11097-69-1	Aroclor 1254	33	< 33 U
11096-82-5	Aroclor 1260	33	< 33 U
11104-28-2	Aroclor 1221	33	< 33 U
11141-16-5	Aroclor 1232	33	< 33 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	73.2%
Tetrachlorometaxylene	76.5%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: PA-CB-06
SAMPLE

Lab Sample ID: RB73F
LIMS ID: 10-15146
Matrix: Solid
Data Release Authorized: VJB
Reported: 07/07/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 06/29/10
Date Analyzed: 07/02/10 20:12
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.1 g-dry-wt
Final Extract Volume: 4.0 mL
Dilution Factor: 5.00
Silica Gel: Yes

Percent Moisture: 83.7%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	33	< 33 U
53469-21-9	Aroclor 1242	33	< 33 U
12672-29-6	Aroclor 1248	33	< 33 U
11097-69-1	Aroclor 1254	33	< 33 U
11096-82-5	Aroclor 1260	33	< 33 U
11104-28-2	Aroclor 1221	33	< 33 U
11141-16-5	Aroclor 1232	33	< 33 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	79.8%
Tetrachlorometaxylene	61.4%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: PA-CB-07
SAMPLE

Lab Sample ID: RB73G
LIMS ID: 10-15147
Matrix: Solid
Data Release Authorized: VTS
Reported: 07/07/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 06/29/10
Date Analyzed: 07/02/10 21:09
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.3 g-dry-wt
Final Extract Volume: 4.0 mL
Dilution Factor: 5.00
Silica Gel: Yes

Percent Moisture: 75.6%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	33	< 33 U
53469-21-9	Aroclor 1242	33	< 33 U
12672-29-6	Aroclor 1248	33	< 33 U
11097-69-1	**Aroclor 1254**	**33**	**36**
11096-82-5	Aroclor 1260	33	< 33 U
11104-28-2	Aroclor 1221	33	< 33 U
11141-16-5	Aroclor 1232	33	< 33 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	92.2%
Tetrachlorometaxylene	88.1%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: PA-CB-DUP
SAMPLE

Lab Sample ID: RB73I
LIMS ID: 10-15149
Matrix: Solid
Data Release Authorized: VTS
Reported: 07/07/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 06/29/10
Date Analyzed: 07/02/10 21:28
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.2 g-dry-wt
Final Extract Volume: 4.0 mL
Dilution Factor: 5.00
Silica Gel: Yes

Percent Moisture: 74.8%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	33	< 33 U
53469-21-9	Aroclor 1242	33	< 33 U
12672-29-6	Aroclor 1248	33	< 33 U
11097-69-1	Aroclor 1254	33	< 33 U
11096-82-5	Aroclor 1260	33	< 33 U
11104-28-2	Aroclor 1221	33	< 33 U
11141-16-5	Aroclor 1232	33	< 33 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	90.4%
Tetrachlorometaxylene	81.8%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: SL6.1
SAMPLE

Lab Sample ID: RB73J
LIMS ID: 10-15150
Matrix: Solid
Data Release Authorized: VTS
Reported: 07/07/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 06/29/10
Date Analyzed: 07/06/10 09:59
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.4 g-dry-wt
Final Extract Volume: 4.0 mL
Dilution Factor: 5.00
Silica Gel: Yes

Percent Moisture: 61.0%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	32	< 32 U
53469-21-9	Aroclor 1242	32	< 32 U
12672-29-6	**Aroclor 1248**	**32**	**170**
11097-69-1	**Aroclor 1254**	**32**	**210**
11096-82-5	**Aroclor 1260**	**32**	**140**
11104-28-2	Aroclor 1221	32	< 32 U
11141-16-5	Aroclor 1232	32	< 32 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	80.2%
Tetrachlorometaxylene	74.1%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: SL6.2
SAMPLE

Lab Sample ID: RB73K
LIMS ID: 10-15151
Matrix: Solid
Data Release Authorized: VJS
Reported: 07/07/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 06/29/10
Date Analyzed: 07/06/10 10:22
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.1 g-dry-wt
Final Extract Volume: 4.0 mL
Dilution Factor: 5.00
Silica Gel: Yes

Percent Moisture: 71.1%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	33	< 33 U
53469-21-9	Aroclor 1242	33	< 33 U
12672-29-6	Aroclor 1248	33	< 33 U
11097-69-1	**Aroclor 1254**	**33**	**53**
11096-82-5	Aroclor 1260	33	< 33 U
11104-28-2	Aroclor 1221	33	< 33 U
11141-16-5	Aroclor 1232	33	< 33 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	98.4%
Tetrachlorometaxylene	82.1%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: HP-CB-01
SAMPLE

Lab Sample ID: RB73L
LIMS ID: 10-15152
Matrix: Solid
Data Release Authorized: VTS
Reported: 07/07/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 06/29/10
Date Analyzed: 07/06/10 10:46
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.6 g-dry-wt
Final Extract Volume: 4.0 mL
Dilution Factor: 5.00
Silica Gel: Yes

Percent Moisture: 41.8%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	32	< 32 U
53469-21-9	Aroclor 1242	32	< 32 U
12672-29-6	Aroclor 1248	32	< 32 U
11097-69-1	**Aroclor 1254**	**32**	**36**
11096-82-5	Aroclor 1260	32	< 32 U
11104-28-2	Aroclor 1221	32	< 32 U
11141-16-5	Aroclor 1232	32	< 32 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	85.0%
Tetrachlorometaxylene	85.6%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: HP-CB-02
SAMPLE

Lab Sample ID: RB73M
LIMS ID: 10-15153
Matrix: Solid
Data Release Authorized: VTS
Reported: 07/07/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 06/29/10
Date Analyzed: 07/06/10 11:10
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.3 g-dry-wt
Final Extract Volume: 4.0 mL
Dilution Factor: 5.00
Silica Gel: Yes

Percent Moisture: 51.3%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	32	< 32 U
53469-21-9	Aroclor 1242	32	< 32 U
12672-29-6	Aroclor 1248	41	< 41 Y
11097-69-1	**Aroclor 1254**	**32**	**88**
11096-82-5	**Aroclor 1260**	**32**	**37**
11104-28-2	Aroclor 1221	32	< 32 U
11141-16-5	Aroclor 1232	32	< 32 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	107%
Tetrachlorometaxylene	85.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: HP-CB-03
SAMPLE

Lab Sample ID: RB73N
LIMS ID: 10-15154
Matrix: Solid
Data Release Authorized: VTS
Reported: 07/07/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 06/29/10
Date Analyzed: 07/02/10 23:02
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.6 g-dry-wt
Final Extract Volume: 4.0 mL
Dilution Factor: 5.00
Silica Gel: Yes

Percent Moisture: 56.1%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	32	< 32 U
53469-21-9	Aroclor 1242	32	< 32 U
12672-29-6	Aroclor 1248	32	< 32 U
11097-69-1	**Aroclor 1254**	**32**	**41**
11096-82-5	Aroclor 1260	32	< 32 U
11104-28-2	Aroclor 1221	32	< 32 U
11141-16-5	Aroclor 1232	32	< 32 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	85.6%
Tetrachlorometaxylene	89.4%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: HP-OWS-Inlet
SAMPLE

Lab Sample ID: RB73O
LIMS ID: 10-15155
Matrix: Solid
Data Release Authorized: VTS
Reported: 07/07/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 06/29/10
Date Analyzed: 07/06/10 11:33
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.3 g-dry-wt
Final Extract Volume: 4.0 mL
Dilution Factor: 10.0
Silica Gel: Yes

Percent Moisture: 71.6%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	65	< 65 U
53469-21-9	Aroclor 1242	65	< 65 U
12672-29-6	Aroclor 1248	65	< 65 U
11097-69-1	**Aroclor 1254**	**65**	**110**
11096-82-5	Aroclor 1260	65	< 65 U
11104-28-2	Aroclor 1221	65	< 65 U
11141-16-5	Aroclor 1232	65	< 65 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	108%
Tetrachlorometaxylene	79.8%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: HP-OWS-Outlet
SAMPLE

Lab Sample ID: RB73P
LIMS ID: 10-15156
Matrix: Solid
Data Release Authorized: VTS
Reported: 07/07/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 06/29/10
Date Analyzed: 07/06/10 11:57
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.2 g-dry-wt
Final Extract Volume: 4.0 mL
Dilution Factor: 10.0
Silica Gel: Yes

Percent Moisture: 71.8%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	65	< 65 U
53469-21-9	Aroclor 1242	65	< 65 U
12672-29-6	Aroclor 1248	65	< 65 U
11097-69-1	**Aroclor 1254**	**65**	**100**
11096-82-5	Aroclor 1260	65	< 65 U
11104-28-2	Aroclor 1221	65	< 65 U
11141-16-5	Aroclor 1232	65	< 65 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery	
Decachlorobiphenyl	104%
Tetrachlorometaxylene	76.2%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: PA-CB-04
MS/MSD

Lab Sample ID: RB73D
LIMS ID: 10-15144
Matrix: Solid
Data Release Authorized: VTS
Reported: 07/07/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted MS/MSD: 06/29/10

Date Analyzed MS: 07/02/10 19:16
MSD: 07/02/10 19:35
Instrument/Analyst MS: ECD5/JGR
MSD: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount MS: 12.4 g-dry-wt
MSD: 12.4 g-dry-wt
Final Extract Volume MS: 4.0 mL
MSD: 4.0 mL
Dilution Factor MS: 5.00
MSD: 5.00
Silica Gel: Yes

Percent Moisture: 60.2%

Analyte	Sample	MS	Spike Added-MS	MS Recovery	MSD	Spike Added-MSD	MSD Recovery	RPD
Aroclor 1016	< 32.3 U	152	162	93.8%	146	161	90.7%	4.0%
Aroclor 1260	< 32.3 U	166	162	102%	160	161	99.4%	3.7%

Results reported in µg/kg (ppb)
RPD calculated using sample concentrations per SW846.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: LCS-062910
LAB CONTROL

Lab Sample ID: LCS-062910
LIMS ID: 10-15144
Matrix: Solid
Data Release Authorized: VTS
Reported: 07/07/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: NA
Date Received: NA

Date Extracted: 06/29/10
Date Analyzed: 07/02/10 17:42
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.0 g-dry-wt
Final Extract Volume: 4.0 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: NA

Analyte	**Lab Control**	**Spike Added**	**Recovery**
Aroclor 1016	131	167	78.4%
Aroclor 1260	133	167	79.6%

PCB Surrogate Recovery

Decachlorobiphenyl	79.0%
Tetrachlorometaxylene	64.0%

Results reported in µg/kg (ppb)

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D GC/MS
Page 1 of 1

Sample ID: MB-062910
METHOD BLANK

Lab Sample ID: MB-062910
LIMS ID: 10-15148
Matrix: Solid
Data Release Authorized: VTS
Reported: 07/08/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: NA
Date Received: NA

Date Extracted: 06/29/10
Date Analyzed: 06/30/10 12:41
Instrument/Analyst: NT4/JZ
GPC Cleanup: No
Alumina: No
Silica Gel: Yes

Sample Amount: 7.50 g
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00
Percent Moisture: NA

CAS Number	Analyte	RL	Result
91-20-3	Naphthalene	67	< 67 U
91-57-6	2-Methylnaphthalene	67	< 67 U
90-12-0	1-Methylnaphthalene	67	< 67 U
208-96-8	Acenaphthylene	67	< 67 U
83-32-9	Acenaphthene	67	< 67 U
86-73-7	Fluorene	67	< 67 U
85-01-8	Phenanthrene	67	< 67 U
120-12-7	Anthracene	67	< 67 U
206-44-0	Fluoranthene	67	< 67 U
129-00-0	Pyrene	67	< 67 U
56-55-3	Benzo(a)anthracene	67	< 67 U
218-01-9	Chrysene	67	< 67 U
50-32-8	Benzo(a)pyrene	67	< 67 U
193-39-5	Indeno(1,2,3-cd)pyrene	67	< 67 U
53-70-3	Dibenz(a,h)anthracene	67	< 67 U
191-24-2	Benzo(g,h,i)perylene	67	< 67 U
132-64-9	Dibenzofuran	67	< 67 U
TOTBFA	Total Benzofluoranthenes	67	< 67 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery	
d14-p-Terphenyl	91.2%
2-Fluorobiphenyl	75.6%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D GC/MS

Sample ID: SL6-BASE
SAMPLE

Lab Sample ID: RB73H
LIMS ID: 10-15148
Matrix: Solid
Data Release Authorized: VTS
Reported: 07/08/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 06/29/10
Date Analyzed: 06/30/10 14:21
Instrument/Analyst: NT4/JZ
GPC Cleanup: No
Alumina: No
Silica Gel: Yes

Sample Amount: 7.99 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00
Percent Moisture: 60.6%

CAS Number	Analyte	RL	Result
91-20-3	**Naphthalene**	**63**	**81**
91-57-6	2-Methylnaphthalene	63	< 63 U
90-12-0	1-Methylnaphthalene	63	< 63 U
208-96-8	**Acenaphthylene**	**63**	**97**
83-32-9	Acenaphthene	63	< 63 U
86-73-7	Fluorene	63	< 63 U
85-01-8	**Phenanthrene**	**63**	**510**
120-12-7	**Anthracene**	**63**	**91**
206-44-0	**Fluoranthene**	**63**	**1,400**
129-00-0	**Pyrene**	**63**	**2,200**
56-55-3	**Benzo(a)anthracene**	**63**	**660**
218-01-9	**Chrysene**	**63**	**820**
50-32-8	**Benzo(a)pyrene**	**63**	**1,000**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**63**	**680**
53-70-3	**Dibenz(a,h)anthracene**	**63**	**78**
191-24-2	**Benzo(g,h,i)perylene**	**63**	**1,000**
132-64-9	Dibenzofuran	63	< 63 U
TOTBFA	**Total Benzofluoranthenes**	**63**	**1,300**

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery	
d14-p-Terphenyl	82.0%
2-Fluorobiphenyl	72.8%

ANALYTICAL RESOURCES INCORPORATED

SW8270 PNA SURROGATE RECOVERY SUMMARY

Matrix: Solid

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020

Client ID	TER	FBP	TOT OUT
MB-062910	91.2%	75.6%	0
LCS-062910	94.8%	72.8%	0
LCSD-062910	96.0%	73.2%	0
SL6-BASE	82.0%	72.8%	0

	LCS/MB LIMITS	QC LIMITS
(TER) = d14-p-Terphenyl	(47-112)	(35-112)
(FBP) = 2-Fluorobiphenyl	(40-100)	(34-100)

Prep Method: SW3550B
Log Number Range: 10-15148 to 10-15148

FORM-II SW8270 PNA

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D GC/MS
Page 1 of 1

Sample ID: LCS-062910
LCS/LCSD

Lab Sample ID: LCS-062910
LIMS ID: 10-15148
Matrix: Solid
Data Release Authorized: VTS
Reported: 07/08/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: NA
Date Received: 06/23/10

Date Extracted LCS/LCSD: 06/29/10
Date Analyzed LCS: 06/30/10 13:14
LCSD: 06/30/10 13:48
Instrument/Analyst LCS: NT4/JZ
LCSD: NT4/JZ
GPC Cleanup: No
Silica Gel Cleanup: Yes

Sample Amount LCS: 7.50 g
LCSD: 7.50 g
Final Extract Volume LCS: 0.50 mL
LCSD: 0.50 mL
Dilution Factor LCS: 1.00
LCSD: 1.00
Alumina Cleanup: No

Analyte	**LCS**	**Spike Added-LCS**	**LCS Recovery**	**LCSD**	**Spike Added-LCSD**	**LCSD Recovery**	**RPD**
Naphthalene	1170	1670	70.1%	1110	1670	66.5%	5.3%
2-Methylnaphthalene	1180	1670	70.7%	1180	1670	70.7%	0.0%
1-Methylnaphthalene	1210	1670	72.5%	1210	1670	72.5%	0.0%
Acenaphthylene	1250	1670	74.9%	1180	1670	70.7%	5.8%
Acenaphthene	1130	1670	67.7%	1120	1670	67.1%	0.9%
Fluorene	1200	1670	71.9%	1190	1670	71.3%	0.8%
Phenanthrene	1330	1670	79.6%	1370	1670	82.0%	3.0%
Anthracene	1310	1670	78.4%	1320	1670	79.0%	0.8%
Fluoranthene	1400	1670	83.8%	1540	1670	92.2%	9.5%
Pyrene	1480	1670	88.6%	1540	1670	92.2%	4.0%
Benzo(a)anthracene	1470	1670	88.0%	1480	1670	88.6%	0.7%
Chrysene	1390	1670	83.2%	1380	1670	82.6%	0.7%
Benzo(a)pyrene	1230	1670	73.7%	1200	1670	71.9%	2.5%
Indeno(1,2,3-cd)pyrene	1410	1670	84.4%	1390	1670	83.2%	1.4%
Dibenz(a,h)anthracene	1300	1670	77.8%	1370	1670	82.0%	5.2%
Benzo(g,h,i)perylene	1410	1670	84.4%	1350	1670	80.8%	4.3%
Dibenzofuran	1300	1670	77.8%	1290	1670	77.2%	0.8%
Total Benzofluoranthenes	2630	3330	79.0%	2540	3330	76.3%	3.5%

Semivolatile Surrogate Recovery

	LCS	**LCSD**
d14-p-Terphenyl	94.8%	96.0%
2-Fluorobiphenyl	72.8%	73.2%

Results reported in µg/kg
RPD calculated using sample concentrations per SW846.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: PA-CB-01
SAMPLE

Lab Sample ID: RB73A
LIMS ID: 10-15141
Matrix: Solid
Data Release Authorized: VTS
Reported: 07/10/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 06/29/10
Date Analyzed: 07/01/10 17:14
Instrument/Analyst: NT4/JZ
GPC Cleanup: Yes

Sample Amount: 6.84 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 3.00
Percent Moisture: 79.5%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	440	< 440 U
111-44-4	Bis-(2-Chloroethyl) Ether	440	< 440 U
95-57-8	2-Chlorophenol	440	< 440 U
541-73-1	1,3-Dichlorobenzene	440	< 440 U
106-46-7	1,4-Dichlorobenzene	440	< 440 U
100-51-6	Benzyl Alcohol	2,200	< 2,200 U
95-50-1	1,2-Dichlorobenzene	440	< 440 U
95-48-7	2-Methylphenol	440	< 440 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	440	< 440 U
106-44-5	4-Methylphenol	440	< 440 U
621-64-7	N-Nitroso-Di-N-Propylamine	2,200	< 2,200 U
67-72-1	Hexachloroethane	440	< 440 U
98-95-3	Nitrobenzene	440	< 440 U
78-59-1	Isophorone	440	< 440 U
88-75-5	2-Nitrophenol	2,200	< 2,200 U
105-67-9	2,4-Dimethylphenol	440	< 440 U
65-85-0	Benzoic Acid	4,400	< 4,400 U
111-91-1	bis(2-Chloroethoxy) Methane	440	< 440 U
120-83-2	2,4-Dichlorophenol	2,200	< 2,200 U
120-82-1	1,2,4-Trichlorobenzene	440	< 440 U
91-20-3	Naphthalene	440	< 440 U
106-47-8	4-Chloroaniline	2,200	< 2,200 U
87-68-3	Hexachlorobutadiene	440	< 440 U
59-50-7	4-Chloro-3-methylphenol	2,200	< 2,200 U
91-57-6	2-Methylnaphthalene	440	< 440 U
77-47-4	Hexachlorocyclopentadiene	2,200	< 2,200 U
88-06-2	2,4,6-Trichlorophenol	2,200	< 2,200 U
95-95-4	2,4,5-Trichlorophenol	2,200	< 2,200 U
91-58-7	2-Chloronaphthalene	440	< 440 U
88-74-4	2-Nitroaniline	2,200	< 2,200 U
131-11-3	Dimethylphthalate	440	< 440 U
208-96-8	Acenaphthylene	440	< 440 U
99-09-2	3-Nitroaniline	2,200	< 2,200 U
83-32-9	Acenaphthene	440	< 440 U
51-28-5	2,4-Dinitrophenol	4,400	< 4,400 U
100-02-7	4-Nitrophenol	2,200	< 2,200 U
132-64-9	Dibenzofuran	440	< 440 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: PA-CB-01
SAMPLE

Lab Sample ID: RB73A
LIMS ID: 10-15141
Matrix: Solid
Date Analyzed: 07/01/10 17:14

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020

CAS Number	Analyte	RL	Result
606-20-2	2,6-Dinitrotoluene	2,200	< 2,200 U
121-14-2	2,4-Dinitrotoluene	2,200	< 2,200 U
84-66-2	Diethylphthalate	440	< 440 U
7005-72-3	4-Chlorophenyl-phenylether	440	< 440 U
86-73-7	Fluorene	440	< 440 U
100-01-6	4-Nitroaniline	2,200	< 2,200 U
534-52-1	4,6-Dinitro-2-Methylphenol	4,400	< 4,400 U
86-30-6	N-Nitrosodiphenylamine	440	< 440 U
101-55-3	4-Bromophenyl-phenylether	440	< 440 U
118-74-1	Hexachlorobenzene	440	< 440 U
87-86-5	Pentachlorophenol	2,200	< 2,200 U
85-01-8	**Phenanthrene**	**440**	**500**
86-74-8	Carbazole	440	< 440 U
120-12-7	Anthracene	440	< 440 U
84-74-2	Di-n-Butylphthalate	440	< 440 U
206-44-0	**Fluoranthene**	**440**	**780**
129-00-0	**Pyrene**	**440**	**820**
85-68-7	Butylbenzylphthalate	440	< 440 U
91-94-1	3,3'-Dichlorobenzidine	2,200	< 2,200 U
56-55-3	Benzo(a)anthracene	440	< 440 U
117-81-7	**bis(2-Ethylhexyl)phthalate**	**440**	**17,000**
218-01-9	**Chrysene**	**440**	**600**
117-84-0	**Di-n-Octyl phthalate**	**440**	**770**
205-99-2	Benzo(b)fluoranthene	440	< 440 U
207-08-9	Benzo(k)fluoranthene	440	< 440 U
50-32-8	Benzo(a)pyrene	440	< 440 U
193-39-5	Indeno(1,2,3-cd)pyrene	440	< 440 U
53-70-3	Dibenz(a,h)anthracene	440	< 440 U
191-24-2	Benzo(g,h,i)perylene	440	< 440 U
90-12-0	1-Methylnaphthalene	440	< 440 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	77.0%	2-Fluorobiphenyl	81.6%
d14-p-Terphenyl	76.3%	d4-1,2-Dichlorobenzene	62.4%
d5-Phenol	82.2%	2-Fluorophenol	85.4%
2,4,6-Tribromophenol	95.2%	d4-2-Chlorophenol	77.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: PA-CB-02
SAMPLE

Lab Sample ID: RB73B
LIMS ID: 10-15142
Matrix: Solid
Data Release Authorized: VDJ
Reported: 07/10/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 06/29/10
Date Analyzed: 07/01/10 17:48
Instrument/Analyst: NT4/JZ
GPC Cleanup: Yes

Sample Amount: 7.97 g-dry-wt
Final Extract Volume: 2.0 mL
Dilution Factor: 3.00
Percent Moisture: 68.9%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	750	< 750 U
111-44-4	Bis-(2-Chloroethyl) Ether	750	< 750 U
95-57-8	2-Chlorophenol	750	< 750 U
541-73-1	1,3-Dichlorobenzene	750	< 750 U
106-46-7	1,4-Dichlorobenzene	750	< 750 U
100-51-6	Benzyl Alcohol	3,800	< 3,800 U
95-50-1	1,2-Dichlorobenzene	750	< 750 U
95-48-7	2-Methylphenol	750	< 750 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	750	< 750 U
106-44-5	4-Methylphenol	750	< 750 U
621-64-7	N-Nitroso-Di-N-Propylamine	3,800	< 3,800 U
67-72-1	Hexachloroethane	750	< 750 U
98-95-3	Nitrobenzene	750	< 750 U
78-59-1	Isophorone	750	< 750 U
88-75-5	2-Nitrophenol	3,800	< 3,800 U
105-67-9	2,4-Dimethylphenol	750	< 750 U
65-85-0	Benzoic Acid	7,500	< 7,500 U
111-91-1	bis(2-Chloroethoxy) Methane	750	< 750 U
120-83-2	2,4-Dichlorophenol	3,800	< 3,800 U
120-82-1	1,2,4-Trichlorobenzene	750	< 750 U
91-20-3	Naphthalene	750	< 750 U
106-47-8	4-Chloroaniline	3,800	< 3,800 U
87-68-3	Hexachlorobutadiene	750	< 750 U
59-50-7	4-Chloro-3-methylphenol	3,800	< 3,800 U
91-57-6	2-Methylnaphthalene	750	< 750 U
77-47-4	Hexachlorocyclopentadiene	3,800	< 3,800 U
88-06-2	2,4,6-Trichlorophenol	3,800	< 3,800 U
95-95-4	2,4,5-Trichlorophenol	3,800	< 3,800 U
91-58-7	2-Chloronaphthalene	750	< 750 U
88-74-4	2-Nitroaniline	3,800	< 3,800 U
131-11-3	Dimethylphthalate	750	< 750 U
208-96-8	Acenaphthylene	750	< 750 U
99-09-2	3-Nitroaniline	3,800	< 3,800 U
83-32-9	Acenaphthene	750	< 750 U
51-28-5	2,4-Dinitrophenol	7,500	< 7,500 U
100-02-7	4-Nitrophenol	3,800	< 3,800 U
132-64-9	Dibenzofuran	750	< 750 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: PA-CB-02
SAMPLE

Lab Sample ID: RB73B
LIMS ID: 10-15142
Matrix: Solid
Date Analyzed: 07/01/10 17:48

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020

CAS Number	Analyte	RL	Result
606-20-2	2,6-Dinitrotoluene	3,800	< 3,800 U
121-14-2	2,4-Dinitrotoluene	3,800	< 3,800 U
84-66-2	Diethylphthalate	750	< 750 U
7005-72-3	4-Chlorophenyl-phenylether	750	< 750 U
86-73-7	Fluorene	750	< 750 U
100-01-6	4-Nitroaniline	3,800	< 3,800 U
534-52-1	4,6-Dinitro-2-Methylphenol	7,500	< 7,500 U
86-30-6	N-Nitrosodiphenylamine	750	< 750 U
101-55-3	4-Bromophenyl-phenylether	750	< 750 U
118-74-1	Hexachlorobenzene	750	< 750 U
87-86-5	Pentachlorophenol	3,800	< 3,800 U
85-01-8	**Phenanthrene**	**750**	**810**
86-74-8	Carbazole	750	< 750 U
120-12-7	Anthracene	750	< 750 U
84-74-2	Di-n-Butylphthalate	750	< 750 U
206-44-0	**Fluoranthene**	**750**	**1,200**
129-00-0	**Pyrene**	**750**	**1,300**
85-68-7	Butylbenzylphthalate	750	< 750 U
91-94-1	3,3'-Dichlorobenzidine	3,800	< 3,800 U
56-55-3	Benzo(a)anthracene	750	< 750 U
117-81-7	**bis(2-Ethylhexyl)phthalate**	**750**	**20,000**
218-01-9	**Chrysene**	**750**	**900**
117-84-0	**Di-n-Octyl phthalate**	**750**	**1,200**
205-99-2	Benzo(b)fluoranthene	750	< 750 U
207-08-9	Benzo(k)fluoranthene	750	< 750 U
50-32-8	Benzo(a)pyrene	750	< 750 U
193-39-5	Indeno(1,2,3-cd)pyrene	750	< 750 U
53-70-3	Dibenz(a,h)anthracene	750	< 750 U
191-24-2	Benzo(g,h,i)perylene	750	< 750 U
90-12-0	1-Methylnaphthalene	750	< 750 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	83.0%	2-Fluorobiphenyl	88.3%
d14-p-Terphenyl	86.4%	d4-1,2-Dichlorobenzene	61.0%
d5-Phenol	86.7%	2-Fluorophenol	86.7%
2,4,6-Tribromophenol	97.3%	d4-2-Chlorophenol	81.6%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: PA-CB-03
SAMPLE

Lab Sample ID: RB73C
LIMS ID: 10-15143
Matrix: Solid
Data Release Authorized: VDJ
Reported: 07/10/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 06/29/10
Date Analyzed: 07/01/10 18:21
Instrument/Analyst: NT4/JZ
GPC Cleanup: Yes

Sample Amount: 7.58 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 3.00
Percent Moisture: 73.9%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	400	< 400 U
111-44-4	Bis-(2-Chloroethyl) Ether	400	< 400 U
95-57-8	2-Chlorophenol	400	< 400 U
541-73-1	1,3-Dichlorobenzene	400	< 400 U
106-46-7	1,4-Dichlorobenzene	400	< 400 U
100-51-6	Benzyl Alcohol	2,000	< 2,000 U
95-50-1	1,2-Dichlorobenzene	400	< 400 U
95-48-7	2-Methylphenol	400	< 400 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	400	< 400 U
106-44-5	4-Methylphenol	400	< 400 U
621-64-7	N-Nitroso-Di-N-Propylamine	2,000	< 2,000 U
67-72-1	Hexachloroethane	400	< 400 U
98-95-3	Nitrobenzene	400	< 400 U
78-59-1	Isophorone	400	< 400 U
88-75-5	2-Nitrophenol	2,000	< 2,000 U
105-67-9	2,4-Dimethylphenol	400	< 400 U
65-85-0	Benzoic Acid	4,000	< 4,000 U
111-91-1	bis(2-Chloroethoxy) Methane	400	< 400 U
120-83-2	2,4-Dichlorophenol	2,000	< 2,000 U
120-82-1	1,2,4-Trichlorobenzene	400	< 400 U
91-20-3	Naphthalene	400	< 400 U
106-47-8	4-Chloroaniline	2,000	< 2,000 U
87-68-3	Hexachlorobutadiene	400	< 400 U
59-50-7	4-Chloro-3-methylphenol	2,000	< 2,000 U
91-57-6	2-Methylnaphthalene	400	< 400 U
77-47-4	Hexachlorocyclopentadiene	2,000	< 2,000 U
88-06-2	2,4,6-Trichlorophenol	2,000	< 2,000 U
95-95-4	2,4,5-Trichlorophenol	2,000	< 2,000 U
91-58-7	2-Chloronaphthalene	400	< 400 U
88-74-4	2-Nitroaniline	2,000	< 2,000 U
131-11-3	Dimethylphthalate	400	< 400 U
208-96-8	Acenaphthylene	400	< 400 U
99-09-2	3-Nitroaniline	2,000	< 2,000 U
83-32-9	Acenaphthene	400	< 400 U
51-28-5	2,4-Dinitrophenol	4,000	< 4,000 U
100-02-7	4-Nitrophenol	2,000	< 2,000 U
132-64-9	Dibenzofuran	400	< 400 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: PA-CB-03
SAMPLE

Lab Sample ID: RB73C
LIMS ID: 10-15143
Matrix: Solid
Date Analyzed: 07/01/10 18:21

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020

CAS Number	Analyte	RL	Result
606-20-2	2,6-Dinitrotoluene	2,000	< 2,000 U
121-14-2	2,4-Dinitrotoluene	2,000	< 2,000 U
84-66-2	Diethylphthalate	400	< 400 U
7005-72-3	4-Chlorophenyl-phenylether	400	< 400 U
86-73-7	Fluorene	400	< 400 U
100-01-6	4-Nitroaniline	2,000	< 2,000 U
534-52-1	4,6-Dinitro-2-Methylphenol	4,000	< 4,000 U
86-30-6	N-Nitrosodiphenylamine	400	< 400 U
101-55-3	4-Bromophenyl-phenylether	400	< 400 U
118-74-1	Hexachlorobenzene	400	< 400 U
87-86-5	Pentachlorophenol	2,000	< 2,000 U
85-01-8	**Phenanthrene**	**400**	**710**
86-74-8	Carbazole	400	< 400 U
120-12-7	Anthracene	400	< 400 U
84-74-2	Di-n-Butylphthalate	400	< 400 U
206-44-0	**Fluoranthene**	**400**	**1,000**
129-00-0	**Pyrene**	**400**	**1,100**
85-68-7	Butylbenzylphthalate	400	< 400 U
91-94-1	3,3'-Dichlorobenzidine	2,000	< 2,000 U
56-55-3	Benzo(a)anthracene	400	< 400 U
117-81-7	**bis(2-Ethylhexyl)phthalate**	**400**	**20,000**
218-01-9	**Chrysene**	**400**	**700**
117-84-0	**Di-n-Octyl phthalate**	**400**	**530**
205-99-2	Benzo(b)fluoranthene	400	< 400 U
207-08-9	Benzo(k)fluoranthene	400	< 400 U
50-32-8	**Benzo(a)pyrene**	**400**	**410**
193-39-5	Indeno(1,2,3-cd)pyrene	400	< 400 U
53-70-3	Dibenz(a,h)anthracene	400	< 400 U
191-24-2	**Benzo(g,h,i)perylene**	**400**	**490**
90-12-0	1-Methylnaphthalene	400	< 400 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	64.8%	2-Fluorobiphenyl	79.7%
d14-p-Terphenyl	78.2%	d4-1,2-Dichlorobenzene	64.6%
d5-Phenol	78.7%	2-Fluorophenol	77.8%
2,4,6-Tribromophenol	97.3%	d4-2-Chlorophenol	73.6%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: PA-CB-04
SAMPLE

Lab Sample ID: RB73D
LIMS ID: 10-15144
Matrix: Solid
Data Release Authorized: VTS
Reported: 07/10/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 06/29/10
Date Analyzed: 07/01/10 18:55
Instrument/Analyst: NT4/JZ
GPC Cleanup: Yes

Sample Amount: 7.83 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 3.00
Percent Moisture: 60.2%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	380	< 380 U
111-44-4	Bis-(2-Chloroethyl) Ether	380	< 380 U
95-57-8	2-Chlorophenol	380	< 380 U
541-73-1	1,3-Dichlorobenzene	380	< 380 U
106-46-7	1,4-Dichlorobenzene	380	< 380 U
100-51-6	Benzyl Alcohol	1,900	< 1,900 U
95-50-1	1,2-Dichlorobenzene	380	< 380 U
95-48-7	2-Methylphenol	380	< 380 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	380	< 380 U
106-44-5	4-Methylphenol	380	< 380 U
621-64-7	N-Nitroso-Di-N-Propylamine	1,900	< 1,900 U
67-72-1	Hexachloroethane	380	< 380 U
98-95-3	Nitrobenzene	380	< 380 U
78-59-1	Isophorone	380	< 380 U
88-75-5	2-Nitrophenol	1,900	< 1,900 U
105-67-9	2,4-Dimethylphenol	380	< 380 U
65-85-0	Benzoic Acid	3,800	< 3,800 U
111-91-1	bis(2-Chloroethoxy) Methane	380	< 380 U
120-83-2	2,4-Dichlorophenol	1,900	< 1,900 U
120-82-1	1,2,4-Trichlorobenzene	380	< 380 U
91-20-3	Naphthalene	380	< 380 U
106-47-8	4-Chloroaniline	1,900	< 1,900 U
87-68-3	Hexachlorobutadiene	380	< 380 U
59-50-7	4-Chloro-3-methylphenol	1,900	< 1,900 U
91-57-6	2-Methylnaphthalene	380	< 380 U
77-47-4	Hexachlorocyclopentadiene	1,900	< 1,900 U
88-06-2	2,4,6-Trichlorophenol	1,900	< 1,900 U
95-95-4	2,4,5-Trichlorophenol	1,900	< 1,900 U
91-58-7	2-Chloronaphthalene	380	< 380 U
88-74-4	2-Nitroaniline	1,900	< 1,900 U
131-11-3	Dimethylphthalate	380	< 380 U
208-96-8	Acenaphthylene	380	< 380 U
99-09-2	3-Nitroaniline	1,900	< 1,900 U
83-32-9	Acenaphthene	380	< 380 U
51-28-5	2,4-Dinitrophenol	3,800	< 3,800 U
100-02-7	4-Nitrophenol	1,900	< 1,900 U
132-64-9	Dibenzofuran	380	< 380 U

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

ANALYTICAL RESOURCES INCORPORATED

Sample ID: PA-CB-04
SAMPLE

Lab Sample ID: RB73D
LIMS ID: 10-15144
Matrix: Solid
Date Analyzed: 07/01/10 18:55

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020

CAS Number	Analyte	RL	Result
606-20-2	2,6-Dinitrotoluene	1,900	< 1,900 U
121-14-2	2,4-Dinitrotoluene	1,900	< 1,900 U
84-66-2	Diethylphthalate	380	< 380 U
7005-72-3	4-Chlorophenyl-phenylether	380	< 380 U
86-73-7	Fluorene	380	< 380 U
100-01-6	4-Nitroaniline	1,900	< 1,900 U
534-52-1	4,6-Dinitro-2-Methylphenol	3,800	< 3,800 U
86-30-6	N-Nitrosodiphenylamine	380	< 380 U
101-55-3	4-Bromophenyl-phenylether	380	< 380 U
118-74-1	Hexachlorobenzene	380	< 380 U
87-86-5	Pentachlorophenol	1,900	< 1,900 U
85-01-8	Phenanthrene	380	< 380 U
86-74-8	Carbazole	380	< 380 U
120-12-7	Anthracene	380	< 380 U
84-74-2	Di-n-Butylphthalate	380	< 380 U
206-44-0	**Fluoranthene**	**380**	**400**
129-00-0	**Pyrene**	**380**	**480**
85-68-7	Butylbenzylphthalate	380	< 380 U
91-94-1	3,3'-Dichlorobenzidine	1,900	< 1,900 U
56-55-3	Benzo(a)anthracene	380	< 380 U
117-81-7	**bis(2-Ethylhexyl)phthalate**	**380**	**7,400**
218-01-9	Chrysene	380	< 380 U
117-84-0	Di-n-Octyl phthalate	380	< 380 U
205-99-2	Benzo(b)fluoranthene	380	< 380 U
207-08-9	Benzo(k)fluoranthene	380	< 380 U
50-32-8	Benzo(a)pyrene	380	< 380 U
193-39-5	Indeno(1,2,3-cd)pyrene	380	< 380 U
53-70-3	Dibenz(a,h)anthracene	380	< 380 U
191-24-2	Benzo(g,h,i)perylene	380	< 380 U
90-12-0	1-Methylnaphthalene	380	< 380 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	68.2%	2-Fluorobiphenyl	79.4%
d14-p-Terphenyl	80.4%	d4-1,2-Dichlorobenzene	60.5%
d5-Phenol	68.2%	2-Fluorophenol	71.5%
2,4,6-Tribromophenol	102%	d4-2-Chlorophenol	69.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: PA-CB-05
SAMPLE

Lab Sample ID: RB73E
LIMS ID: 10-15145
Matrix: Solid
Data Release Authorized: VTS
Reported: 07/10/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 06/29/10
Date Analyzed: 07/01/10 19:29
Instrument/Analyst: NT4/JZ
GPC Cleanup: Yes

Sample Amount: 7.85 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 3.00
Percent Moisture: 73.6%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	380	< 380 U
111-44-4	Bis-(2-Chloroethyl) Ether	380	< 380 U
95-57-8	2-Chlorophenol	380	< 380 U
541-73-1	1,3-Dichlorobenzene	380	< 380 U
106-46-7	1,4-Dichlorobenzene	380	< 380 U
100-51-6	Benzyl Alcohol	1,900	< 1,900 U
95-50-1	1,2-Dichlorobenzene	380	< 380 U
95-48-7	2-Methylphenol	380	< 380 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	380	< 380 U
106-44-5	4-Methylphenol	380	< 380 U
621-64-7	N-Nitroso-Di-N-Propylamine	1,900	< 1,900 U
67-72-1	Hexachloroethane	380	< 380 U
98-95-3	Nitrobenzene	380	< 380 U
78-59-1	Isophorone	380	< 380 U
88-75-5	2-Nitrophenol	1,900	< 1,900 U
105-67-9	2,4-Dimethylphenol	380	< 380 U
65-85-0	Benzoic Acid	3,800	< 3,800 U
111-91-1	bis(2-Chloroethoxy) Methane	380	< 380 U
120-83-2	2,4-Dichlorophenol	1,900	< 1,900 U
120-82-1	1,2,4-Trichlorobenzene	380	< 380 U
91-20-3	Naphthalene	380	< 380 U
106-47-8	4-Chloroaniline	1,900	< 1,900 U
87-68-3	Hexachlorobutadiene	380	< 380 U
59-50-7	4-Chloro-3-methylphenol	1,900	< 1,900 U
91-57-6	2-Methylnaphthalene	380	< 380 U
77-47-4	Hexachlorocyclopentadiene	1,900	< 1,900 U
88-06-2	2,4,6-Trichlorophenol	1,900	< 1,900 U
95-95-4	2,4,5-Trichlorophenol	1,900	< 1,900 U
91-58-7	2-Chloronaphthalene	380	< 380 U
88-74-4	2-Nitroaniline	1,900	< 1,900 U
131-11-3	Dimethylphthalate	380	< 380 U
208-96-8	Acenaphthylene	380	< 380 U
99-09-2	3-Nitroaniline	1,900	< 1,900 U
83-32-9	Acenaphthene	380	< 380 U
51-28-5	2,4-Dinitrophenol	3,800	< 3,800 U
100-02-7	4-Nitrophenol	1,900	< 1,900 U
132-64-9	Dibenzofuran	380	< 380 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: PA-CB-05
SAMPLE

Lab Sample ID: RB73E
LIMS ID: 10-15145
Matrix: Solid
Date Analyzed: 07/01/10 19:29

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020

CAS Number	Analyte	RL	Result
606-20-2	2,6-Dinitrotoluene	1,900	< 1,900 U
121-14-2	2,4-Dinitrotoluene	1,900	< 1,900 U
84-66-2	Diethylphthalate	380	< 380 U
7005-72-3	4-Chlorophenyl-phenylether	380	< 380 U
86-73-7	Fluorene	380	< 380 U
100-01-6	4-Nitroaniline	1,900	< 1,900 U
534-52-1	4,6-Dinitro-2-Methylphenol	3,800	< 3,800 U
86-30-6	N-Nitrosodiphenylamine	380	< 380 U
101-55-3	4-Bromophenyl-phenylether	380	< 380 U
118-74-1	Hexachlorobenzene	380	< 380 U
87-86-5	Pentachlorophenol	1,900	< 1,900 U
85-01-8	**Phenanthrene**	**380**	**400**
86-74-8	Carbazole	380	< 380 U
120-12-7	Anthracene	380	< 380 U
84-74-2	Di-n-Butylphthalate	380	< 380 U
206-44-0	**Fluoranthene**	**380**	**540**
129-00-0	**Pyrene**	**380**	**590**
85-68-7	Butylbenzylphthalate	380	< 380 U
91-94-1	3,3'-Dichlorobenzidine	1,900	< 1,900 U
56-55-3	Benzo(a)anthracene	380	< 380 U
117-81-7	**bis(2-Ethylhexyl)phthalate**	**380**	**28,000**
218-01-9	**Chrysene**	**380**	**440**
117-84-0	**Di-n-Octyl phthalate**	**380**	**650**
205-99-2	Benzo(b)fluoranthene	380	< 380 U
207-08-9	Benzo(k)fluoranthene	380	< 380 U
50-32-8	Benzo(a)pyrene	380	< 380 U
193-39-5	Indeno(1,2,3-cd)pyrene	380	< 380 U
53-70-3	Dibenz(a,h)anthracene	380	< 380 U
191-24-2	Benzo(g,h,i)perylene	380	< 380 U
90-12-0	1-Methylnaphthalene	380	< 380 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	72.5%	2-Fluorobiphenyl	83.0%
d14-p-Terphenyl	80.6%	d4-1,2-Dichlorobenzene	72.2%
d5-Phenol	83.2%	2-Fluorophenol	81.9%
2,4,6-Tribromophenol	92.3%	d4-2-Chlorophenol	73.8%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: PA-CB-06
SAMPLE

Lab Sample ID: RB73F
~~LIMS ID: 10-15146~~
Matrix: Solid
Data Release Authorized: VTJ
Reported: 07/10/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 06/29/10
Date Analyzed: 07/01/10 20:02
Instrument/Analyst: NT4/JZ
GPC Cleanup: Yes

Sample Amount: 5.07 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 3.00
Percent Moisture: 83.7%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	590	< 590 U
111-44-4	Bis-(2-Chloroethyl) Ether	590	< 590 U
95-57-8	2-Chlorophenol	590	< 590 U
541-73-1	1,3-Dichlorobenzene	590	< 590 U
106-46-7	1,4-Dichlorobenzene	590	< 590 U
100-51-6	Benzyl Alcohol	3,000	< 3,000 U
95-50-1	1,2-Dichlorobenzene	590	< 590 U
95-48-7	2-Methylphenol	590	< 590 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	590	< 590 U
106-44-5	4-Methylphenol	590	< 590 U
621-64-7	N-Nitroso-Di-N-Propylamine	3,000	< 3,000 U
67-72-1	Hexachloroethane	590	< 590 U
98-95-3	Nitrobenzene	590	< 590 U
78-59-1	Isophorone	590	< 590 U
88-75-5	2-Nitrophenol	3,000	< 3,000 U
105-67-9	2,4-Dimethylphenol	590	< 590 U
65-85-0	Benzoic Acid	5,900	< 5,900 U
111-91-1	bis(2-Chloroethoxy) Methane	590	< 590 U
120-83-2	2,4-Dichlorophenol	3,000	< 3,000 U
120-82-1	1,2,4-Trichlorobenzene	590	< 590 U
91-20-3	Naphthalene	590	< 590 U
106-47-8	4-Chloroaniline	3,000	< 3,000 U
87-68-3	Hexachlorobutadiene	590	< 590 U
59-50-7	4-Chloro-3-methylphenol	3,000	< 3,000 U
91-57-6	2-Methylnaphthalene	590	< 590 U
77-47-4	Hexachlorocyclopentadiene	3,000	< 3,000 U
88-06-2	2,4,6-Trichlorophenol	3,000	< 3,000 U
95-95-4	2,4,5-Trichlorophenol	3,000	< 3,000 U
91-58-7	2-Chloronaphthalene	590	< 590 U
88-74-4	2-Nitroaniline	3,000	< 3,000 U
131-11-3	Dimethylphthalate	590	< 590 U
208-96-8	Acenaphthylene	590	< 590 U
99-09-2	3-Nitroaniline	3,000	< 3,000 U
83-32-9	Acenaphthene	590	< 590 U
51-28-5	2,4-Dinitrophenol	5,900	< 5,900 U
100-02-7	4-Nitrophenol	3,000	< 3,000 U
132-64-9	Dibenzofuran	590	< 590 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS — **Sample ID: PA-CB-06**

SAMPLE

Lab Sample ID: RB73F — QC Report No: RB73-Floyd/Snider
LIMS ID: 10-15146 — Project: Phase 3
Matrix: Solid — COS-GWSA 6020
Date Analyzed: 07/01/10 20:02

CAS Number	Analyte	RL	Result
606-20-2	2,6-Dinitrotoluene	3,000	< 3,000 U
121-14-2	2,4-Dinitrotoluene	3,000	< 3,000 U
84-66-2	Diethylphthalate	590	< 590 U
7005-72-3	4-Chlorophenyl-phenylether	590	< 590 U
86-73-7	Fluorene	590	< 590 U
100-01-6	4-Nitroaniline	3,000	< 3,000 U
534-52-1	4,6-Dinitro-2-Methylphenol	5,900	< 5,900 U
86-30-6	N-Nitrosodiphenylamine	590	< 590 U
101-55-3	4-Bromophenyl-phenylether	590	< 590 U
118-74-1	Hexachlorobenzene	590	< 590 U
87-86-5	Pentachlorophenol	3,000	< 3,000 U
85-01-8	**Phenanthrene**	**590**	**680**
86-74-8	Carbazole	590	< 590 U
120-12-7	Anthracene	590	< 590 U
84-74-2	Di-n-Butylphthalate	590	< 590 U
206-44-0	**Fluoranthene**	**590**	**1,000**
129-00-0	**Pyrene**	**590**	**1,100**
85-68-7	Butylbenzylphthalate	590	< 590 U
91-94-1	3,3'-Dichlorobenzidine	3,000	< 3,000 U
56-55-3	Benzo(a)anthracene	590	< 590 U
117-81-7	**bis(2-Ethylhexyl)phthalate**	**590**	**18,000**
218-01-9	**Chrysene**	**590**	**780**
117-84-0	**Di-n-Octyl phthalate**	**590**	**900**
205-99-2	Benzo(b)fluoranthene	590	< 590 U
207-08-9	Benzo(k)fluoranthene	590	< 590 U
50-32-8	Benzo(a)pyrene	590	< 590 U
193-39-5	Indeno(1,2,3-cd)pyrene	590	< 590 U
53-70-3	Dibenz(a,h)anthracene	590	< 590 U
191-24-2	Benzo(g,h,i)perylene	590	< 590 U
90-12-0	1-Methylnaphthalene	590	< 590 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	70.8%	2-Fluorobiphenyl	80.4%
d14-p-Terphenyl	78.2%	d4-1,2-Dichlorobenzene	67.0%
d5-Phenol	88.5%	2-Fluorophenol	75.2%
2,4,6-Tribromophenol	88.5%	d4-2-Chlorophenol	73.8%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: PA-CB-07
SAMPLE

Lab Sample ID: RB73G
LIMS ID: 10-15147
Matrix: Solid
Data Release Authorized: VP
Reported: 07/10/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 06/29/10
Date Analyzed: 07/01/10 20:36
Instrument/Analyst: NT4/JZ
GPC Cleanup: Yes

Sample Amount: 6.67 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 3.00
Percent Moisture: 75.6%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	450	< 450 U
111-44-4	Bis-(2-Chloroethyl) Ether	450	< 450 U
95-57-8	2-Chlorophenol	450	< 450 U
541-73-1	1,3-Dichlorobenzene	450	< 450 U
106-46-7	1,4-Dichlorobenzene	450	< 450 U
100-51-6	Benzyl Alcohol	2,200	< 2,200 U
95-50-1	1,2-Dichlorobenzene	450	< 450 U
95-48-7	2-Methylphenol	450	< 450 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	450	< 450 U
106-44-5	4-Methylphenol	450	< 450 U
621-64-7	N-Nitroso-Di-N-Propylamine	2,200	< 2,200 U
67-72-1	Hexachloroethane	450	< 450 U
98-95-3	Nitrobenzene	450	< 450 U
78-59-1	Isophorone	450	< 450 U
88-75-5	2-Nitrophenol	2,200	< 2,200 U
105-67-9	2,4-Dimethylphenol	450	< 450 U
65-85-0	Benzoic Acid	4,500	< 4,500 U
111-91-1	bis(2-Chloroethoxy) Methane	450	< 450 U
120-83-2	2,4-Dichlorophenol	2,200	< 2,200 U
120-82-1	1,2,4-Trichlorobenzene	450	< 450 U
91-20-3	Naphthalene	450	< 450 U
106-47-8	4-Chloroaniline	2,200	< 2,200 U
87-68-3	Hexachlorobutadiene	450	< 450 U
59-50-7	4-Chloro-3-methylphenol	2,200	< 2,200 U
91-57-6	2-Methylnaphthalene	450	< 450 U
77-47-4	Hexachlorocyclopentadiene	2,200	< 2,200 U
88-06-2	2,4,6-Trichlorophenol	2,200	< 2,200 U
95-95-4	2,4,5-Trichlorophenol	2,200	< 2,200 U
91-58-7	2-Chloronaphthalene	450	< 450 U
88-74-4	2-Nitroaniline	2,200	< 2,200 U
131-11-3	**Dimethylphthalate**	**450**	**510**
208-96-8	Acenaphthylene	450	< 450 U
99-09-2	3-Nitroaniline	2,200	< 2,200 U
83-32-9	Acenaphthene	450	< 450 U
51-28-5	2,4-Dinitrophenol	4,500	< 4,500 U
100-02-7	4-Nitrophenol	2,200	< 2,200 U
132-64-9	Dibenzofuran	450	< 450 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: PA-CB-07
SAMPLE

Lab Sample ID: RB73G
~~LIMS ID: 10-15147~~
Matrix: Solid
Date Analyzed: 07/01/10 20:36

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020

CAS Number	Analyte	RL	Result
606-20-2	2,6-Dinitrotoluene	2,200	< 2,200 U
121-14-2	2,4-Dinitrotoluene	2,200	< 2,200 U
84-66-2	Diethylphthalate	450	< 450 U
7005-72-3	4-Chlorophenyl-phenylether	450	< 450 U
86-73-7	Fluorene	450	< 450 U
100-01-6	4-Nitroaniline	2,200	< 2,200 U
534-52-1	4,6-Dinitro-2-Methylphenol	4,500	< 4,500 U
86-30-6	N-Nitrosodiphenylamine	450	< 450 U
101-55-3	4-Bromophenyl-phenylether	450	< 450 U
118-74-1	Hexachlorobenzene	450	< 450 U
87-86-5	Pentachlorophenol	2,200	< 2,200 U
85-01-8	**Phenanthrene**	**450**	**1,000**
86-74-8	Carbazole	450	< 450 U
120-12-7	Anthracene	450	< 450 U
84-74-2	Di-n-Butylphthalate	450	< 450 U
206-44-0	**Fluoranthene**	**450**	**1,500**
129-00-0	**Pyrene**	**450**	**1,600**
85-68-7	Butylbenzylphthalate	450	< 450 U
91-94-1	3,3'-Dichlorobenzidine	2,200	< 2,200 U
56-55-3	**Benzo(a)anthracene**	**450**	**540**
117-81-7	**bis(2-Ethylhexyl)phthalate**	**450**	**19,000**
218-01-9	**Chrysene**	**450**	**1,000**
117-84-0	**Di-n-Octyl phthalate**	**450**	**900**
205-99-2	**Benzo(b)fluoranthene**	**450**	**510**
207-08-9	**Benzo(k)fluoranthene**	**450**	**510**
50-32-8	**Benzo(a)pyrene**	**450**	**690**
193-39-5	Indeno(1,2,3-cd)pyrene	450	< 450 U
53-70-3	Dibenz(a,h)anthracene	450	< 450 U
191-24-2	**Benzo(g,h,i)perylene**	**450**	**640**
90-12-0	1-Methylnaphthalene	450	< 450 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	70.3%	2-Fluorobiphenyl	84.5%
d14-p-Terphenyl	84.5%	d4-1,2-Dichlorobenzene	63.8%
d5-Phenol	79.7%	2-Fluorophenol	84.5%
2,4,6-Tribromophenol	112%	d4-2-Chlorophenol	75.4%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: PA-CB-DUP
SAMPLE

Lab Sample ID: RB73I
LIMS ID: 10-15149
Matrix: Solid
Data Release Authorized: VTS
Reported: 07/10/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 06/29/10
Date Analyzed: 07/01/10 21:10
Instrument/Analyst: NT4/JZ
GPC Cleanup: Yes

Sample Amount: 7.62 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 3.00
Percent Moisture: 74.8%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	390	< 390 U
111-44-4	Bis-(2-Chloroethyl) Ether	390	< 390 U
95-57-8	2-Chlorophenol	390	< 390 U
541-73-1	1,3-Dichlorobenzene	390	< 390 U
106-46-7	1,4-Dichlorobenzene	390	< 390 U
100-51-6	Benzyl Alcohol	2,000	< 2,000 U
95-50-1	1,2-Dichlorobenzene	390	< 390 U
95-48-7	2-Methylphenol	390	< 390 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	390	< 390 U
106-44-5	**4-Methylphenol**	**390**	**420**
621-64-7	N-Nitroso-Di-N-Propylamine	2,000	< 2,000 U
67-72-1	Hexachloroethane	390	< 390 U
98-95-3	Nitrobenzene	390	< 390 U
78-59-1	Isophorone	390	< 390 U
88-75-5	2-Nitrophenol	2,000	< 2,000 U
105-67-9	2,4-Dimethylphenol	390	< 390 U
65-85-0	Benzoic Acid	3,900	< 3,900 U
111-91-1	bis(2-Chloroethoxy) Methane	390	< 390 U
120-83-2	2,4-Dichlorophenol	2,000	< 2,000 U
120-82-1	1,2,4-Trichlorobenzene	390	< 390 U
91-20-3	Naphthalene	390	< 390 U
106-47-8	4-Chloroaniline	2,000	< 2,000 U
87-68-3	Hexachlorobutadiene	390	< 390 U
59-50-7	4-Chloro-3-methylphenol	2,000	< 2,000 U
91-57-6	2-Methylnaphthalene	390	< 390 U
77-47-4	Hexachlorocyclopentadiene	2,000	< 2,000 U
88-06-2	2,4,6-Trichlorophenol	2,000	< 2,000 U
95-95-4	2,4,5-Trichlorophenol	2,000	< 2,000 U
91-58-7	2-Chloronaphthalene	390	< 390 U
88-74-4	2-Nitroaniline	2,000	< 2,000 U
131-11-3	Dimethylphthalate	390	< 390 U
208-96-8	Acenaphthylene	390	< 390 U
99-09-2	3-Nitroaniline	2,000	< 2,000 U
83-32-9	Acenaphthene	390	< 390 U
51-28-5	2,4-Dinitrophenol	3,900	< 3,900 U
100-02-7	4-Nitrophenol	2,000	< 2,000 U
132-64-9	Dibenzofuran	390	< 390 U

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: PA-CB-DUP
SAMPLE

Lab Sample ID: RB73I
LIMS ID: 10-15149
Matrix: Solid
Date Analyzed: 07/01/10 21:10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020

CAS Number	Analyte	RL	Result
606-20-2	2,6-Dinitrotoluene	2,000	< 2,000 U
121-14-2	2,4-Dinitrotoluene	2,000	< 2,000 U
84-66-2	Diethylphthalate	390	< 390 U
7005-72-3	4-Chlorophenyl-phenylether	390	< 390 U
86-73-7	Fluorene	390	< 390 U
100-01-6	4-Nitroaniline	2,000	< 2,000 U
534-52-1	4,6-Dinitro-2-Methylphenol	3,900	< 3,900 U
86-30-6	N-Nitrosodiphenylamine	390	< 390 U
101-55-3	4-Bromophenyl-phenylether	390	< 390 U
118-74-1	Hexachlorobenzene	390	< 390 U
87-86-5	Pentachlorophenol	2,000	< 2,000 U
85-01-8	**Phenanthrene**	**390**	**420**
86-74-8	Carbazole	390	< 390 U
120-12-7	Anthracene	390	< 390 U
84-74-2	Di-n-Butylphthalate	390	< 390 U
206-44-0	**Fluoranthene**	**390**	**620**
129-00-0	**Pyrene**	**390**	**710**
85-68-7	Butylbenzylphthalate	390	< 390 U
91-94-1	3,3'-Dichlorobenzidine	2,000	< 2,000 U
56-55-3	Benzo(a)anthracene	390	< 390 U
117-81-7	**bis(2-Ethylhexyl)phthalate**	**390**	**7,500**
218-01-9	**Chrysene**	**390**	**410**
117-84-0	**Di-n-Octyl phthalate**	**390**	**850**
205-99-2	Benzo(b)fluoranthene	390	< 390 U
207-08-9	Benzo(k)fluoranthene	390	< 390 U
50-32-8	Benzo(a)pyrene	390	< 390 U
193-39-5	Indeno(1,2,3-cd)pyrene	390	< 390 U
53-70-3	Dibenz(a,h)anthracene	390	< 390 U
191-24-2	Benzo(g,h,i)perylene	390	< 390 U
90-12-0	1-Methylnaphthalene	390	< 390 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	58.8%	2-Fluorobiphenyl	76.1%
d14-p-Terphenyl	76.1%	d4-1,2-Dichlorobenzene	61.0%
d5-Phenol	82.6%	2-Fluorophenol	78.9%
2,4,6-Tribromophenol	95.8%	d4-2-Chlorophenol	73.8%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: SL6.1
SAMPLE

Lab Sample ID: RB73J
~~LIMS ID: 10-15150~~
Matrix: Solid
Data Release Authorized: VT
Reported: 07/10/10

QC Report No: RB73-Floyd/Snider
~~Project: Phase 3~~
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 06/29/10
Date Analyzed: 07/01/10 21:43
Instrument/Analyst: NT4/JZ
GPC Cleanup: Yes

Sample Amount: 8.09 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 3.00
Percent Moisture: 61.0%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	180	< 180 U
111-44-4	Bis-(2-Chloroethyl) Ether	180	< 180 U
95-57-8	2-Chlorophenol	180	< 180 U
541-73-1	1,3-Dichlorobenzene	180	< 180 U
106-46-7	1,4-Dichlorobenzene	180	< 180 U
100-51-6	Benzyl Alcohol	930	< 930 U
95-50-1	1,2-Dichlorobenzene	180	< 180 U
95-48-7	2-Methylphenol	180	< 180 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	180	< 180 U
106-44-5	4-Methylphenol	180	< 180 U
621-64-7	N-Nitroso-Di-N-Propylamine	930	< 930 U
67-72-1	Hexachloroethane	180	< 180 U
98-95-3	Nitrobenzene	180	< 180 U
78-59-1	Isophorone	180	< 180 U
88-75-5	2-Nitrophenol	930	< 930 U
105-67-9	2,4-Dimethylphenol	180	< 180 U
65-85-0	Benzoic Acid	1,800	< 1,800 U
111-91-1	bis(2-Chloroethoxy) Methane	180	< 180 U
120-83-2	2,4-Dichlorophenol	930	< 930 U
120-82-1	1,2,4-Trichlorobenzene	180	< 180 U
91-20-3	**Naphthalene**	**180**	**1,900**
106-47-8	4-Chloroaniline	930	< 930 U
87-68-3	Hexachlorobutadiene	180	< 180 U
59-50-7	4-Chloro-3-methylphenol	930	< 930 U
91-57-6	**2-Methylnaphthalene**	**180**	**1,700**
77-47-4	Hexachlorocyclopentadiene	930	< 930 U
88-06-2	2,4,6-Trichlorophenol	930	< 930 U
95-95-4	2,4,5-Trichlorophenol	930	< 930 U
91-58-7	2-Chloronaphthalene	180	< 180 U
88-74-4	2-Nitroaniline	930	< 930 U
131-11-3	Dimethylphthalate	180	< 180 U
208-96-8	**Acenaphthylene**	**180**	**1,400**
99-09-2	3-Nitroaniline	930	< 930 U
83-32-9	**Acenaphthene**	**180**	**1,300**
51-28-5	2,4-Dinitrophenol	1,800	< 1,800 U
100-02-7	4-Nitrophenol	930	< 930 U
132-64-9	**Dibenzofuran**	**180**	**650**

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: SL6.1
SAMPLE

Lab Sample ID: RB73J
~~LIMS ID: 10-15150~~
Matrix: Solid
Date Analyzed: 07/01/10 21:43

QC Report No: RB73-Floyd/Snider
~~Project: Phase 3~~
COS-GWSA 6020

CAS Number	Analyte	RL	Result
606-20-2	2,6-Dinitrotoluene	930	< 930 U
121-14-2	2,4-Dinitrotoluene	930	< 930 U
84-66-2	Diethylphthalate	180	< 180 U
7005-72-3	4-Chlorophenyl-phenylether	180	< 180 U
86-73-7	**Fluorene**	**180**	**2,600**
100-01-6	4-Nitroaniline	930	< 930 U
534-52-1	4,6-Dinitro-2-Methylphenol	1,800	< 1,800 U
86-30-6	N-Nitrosodiphenylamine	180	< 180 U
101-55-3	4-Bromophenyl-phenylether	180	< 180 U
118-74-1	Hexachlorobenzene	180	< 180 U
87-86-5	Pentachlorophenol	930	< 930 U
85-01-8	**Phenanthrene**	**180**	**13,000**
86-74-8	**Carbazole**	**180**	**340 M**
120-12-7	**Anthracene**	**180**	**3,200**
84-74-2	Di-n-Butylphthalate	180	< 180 U
206-44-0	**Fluoranthene**	**180**	**17,000 ES**
129-00-0	**Pyrene**	**180**	**18,000 ES**
85-68-7	Butylbenzylphthalate	180	< 180 U
91-94-1	3,3'-Dichlorobenzidine	930	< 930 U
56-55-3	**Benzo(a)anthracene**	**180**	**6,100**
117-81-7	**bis(2-Ethylhexyl)phthalate**	**180**	**580**
218-01-9	**Chrysene**	**180**	**7,600**
117-84-0	Di-n-Octyl phthalate	180	< 180 U
205-99-2	**Benzo(b)fluoranthene**	**180**	**5,200**
207-08-9	**Benzo(k)fluoranthene**	**180**	**5,200**
50-32-8	**Benzo(a)pyrene**	**180**	**8,800**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**180**	**4,800**
53-70-3	**Dibenz(a,h)anthracene**	**180**	**1,000**
191-24-2	**Benzo(g,h,i)perylene**	**180**	**6,200**
90-12-0	**1-Methylnaphthalene**	**180**	**2,200 Q**

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	77.0%	2-Fluorobiphenyl	87.8%
d14-p-Terphenyl	90.7%	d4-1,2-Dichlorobenzene	69.4%
d5-Phenol	90.4%	2-Fluorophenol	88.0%
2,4,6-Tribromophenol	111%	d4-2-Chlorophenol	76.7%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: SL6.1
DILUTION

Lab Sample ID: RB73J
~~LIMS ID: 10-15150~~
Matrix: Solid
Data Release Authorized: VT
Reported: 07/10/10

QC Report No: RB73-Floyd/Snider
~~Project: Phase 3~~
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 06/29/10
Date Analyzed: 07/02/10 15:22
Instrument/Analyst: NT4/JZ
GPC Cleanup: Yes

Sample Amount: 8.09 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 10.0
Percent Moisture: 61.0%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	620	< 620 U
111-44-4	Bis-(2-Chloroethyl) Ether	620	< 620 U
95-57-8	2-Chlorophenol	620	< 620 U
541-73-1	1,3-Dichlorobenzene	620	< 620 U
106-46-7	1,4-Dichlorobenzene	620	< 620 U
100-51-6	Benzyl Alcohol	3,100	< 3,100 U
95-50-1	1,2-Dichlorobenzene	620	< 620 U
95-48-7	2-Methylphenol	620	< 620 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	620	< 620 U
106-44-5	4-Methylphenol	620	< 620 U
621-64-7	N-Nitroso-Di-N-Propylamine	3,100	< 3,100 U
67-72-1	Hexachloroethane	620	< 620 U
98-95-3	Nitrobenzene	620	< 620 U
78-59-1	Isophorone	620	< 620 U
88-75-5	2-Nitrophenol	3,100	< 3,100 U
105-67-9	2,4-Dimethylphenol	620	< 620 U
65-85-0	Benzoic Acid	6,200	< 6,200 U
111-91-1	bis(2-Chloroethoxy) Methane	620	< 620 U
120-83-2	2,4-Dichlorophenol	3,100	< 3,100 U
120-82-1	1,2,4-Trichlorobenzene	620	< 620 U
91-20-3	**Naphthalene**	**620**	**2,000**
106-47-8	4-Chloroaniline	3,100	< 3,100 U
87-68-3	Hexachlorobutadiene	620	< 620 U
59-50-7	4-Chloro-3-methylphenol	3,100	< 3,100 U
91-57-6	**2-Methylnaphthalene**	**620**	**1,800**
77-47-4	Hexachlorocyclopentadiene	3,100	< 3,100 U
88-06-2	2,4,6-Trichlorophenol	3,100	< 3,100 U
95-95-4	2,4,5-Trichlorophenol	3,100	< 3,100 U
91-58-7	2-Chloronaphthalene	620	< 620 U
88-74-4	2-Nitroaniline	3,100	< 3,100 U
131-11-3	Dimethylphthalate	620	< 620 U
208-96-8	**Acenaphthylene**	**620**	**1,400**
99-09-2	3-Nitroaniline	3,100	< 3,100 U
83-32-9	**Acenaphthene**	**620**	**1,500**
51-28-5	2,4-Dinitrophenol	6,200	< 6,200 U
100-02-7	4-Nitrophenol	3,100	< 3,100 U
132-64-9	**Dibenzofuran**	**620**	**690**

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: SL6.1
DILUTION

Lab Sample ID: RB73J
~~LIMS ID: 10-15150~~
Matrix: Solid
Date Analyzed: 07/02/10 15:22

QC Report No: RB73-Floyd/Snider
~~Project: Phase 3~~
COS-GWSA 6020

CAS Number	Analyte	RL	Result
606-20-2	2,6-Dinitrotoluene	3,100	< 3,100 U
121-14-2	2,4-Dinitrotoluene	3,100	< 3,100 U
84-66-2	Diethylphthalate	620	< 620 U
7005-72-3	4-Chlorophenyl-phenylether	620	< 620 U
86-73-7	**Fluorene**	**620**	**2,700**
100-01-6	4-Nitroaniline	3,100	< 3,100 U
534-52-1	4,6-Dinitro-2-Methylphenol	6,200	< 6,200 U
86-30-6	N-Nitrosodiphenylamine	620	< 620 U
101-55-3	4-Bromophenyl-phenylether	620	< 620 U
118-74-1	Hexachlorobenzene	620	< 620 U
87-86-5	Pentachlorophenol	3,100	< 3,100 U
85-01-8	**Phenanthrene**	**620**	**14,000**
86-74-8	Carbazole	620	< 620 U
120-12-7	**Anthracene**	**620**	**3,400**
84-74-2	Di-n-Butylphthalate	620	< 620 U
206-44-0	**Fluoranthene**	**620**	**21,000**
129-00-0	**Pyrene**	**620**	**25,000**
85-68-7	Butylbenzylphthalate	620	< 620 U
91-94-1	3,3'-Dichlorobenzidine	3,100	< 3,100 U
56-55-3	**Benzo(a)anthracene**	**620**	**6,300**
117-81-7	**bis(2-Ethylhexyl)phthalate**	**620**	**620**
218-01-9	**Chrysene**	**620**	**8,700**
117-84-0	Di-n-Octyl phthalate	620	< 620 U
205-99-2	**Benzo(b)fluoranthene**	**620**	**5,600**
207-08-9	**Benzo(k)fluoranthene**	**620**	**5,600**
50-32-8	**Benzo(a)pyrene**	**620**	**9,400**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**620**	**6,500**
53-70-3	**Dibenz(a,h)anthracene**	**620**	**1,100**
191-24-2	**Benzo(g,h,i)perylene**	**620**	**9,700**
90-12-0	**1-Methylnaphthalene**	**620**	**2,300 Q**

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	81.6%	2-Fluorobiphenyl	95.2%
d14-p-Terphenyl	97.2%	d4-1,2-Dichlorobenzene	70.4%
d5-Phenol	97.9%	2-Fluorophenol	88.3%
2,4,6-Tribromophenol	117%	d4-2-Chlorophenol	77.3%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: SL6.2
SAMPLE

Lab Sample ID: RB73K
~~LIMS ID: 10-15151~~
Matrix: Solid
Data Release Authorized: VTS
Reported: 07/10/10

QC Report No: RB73-Floyd/Snider
~~Project: Phase 3~~
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 06/29/10
Date Analyzed: 07/01/10 22:17
Instrument/Analyst: NT4/JZ
GPC Cleanup: Yes

Sample Amount: 7.68 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00
Percent Moisture: 71.1%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	65	< 65 U
111-44-4	Bis-(2-Chloroethyl) Ether	65	< 65 U
95-57-8	2-Chlorophenol	65	< 65 U
541-73-1	1,3-Dichlorobenzene	65	< 65 U
106-46-7	1,4-Dichlorobenzene	65	< 65 U
100-51-6	Benzyl Alcohol	330	< 330 U
95-50-1	1,2-Dichlorobenzene	65	< 65 U
95-48-7	2-Methylphenol	65	< 65 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	65	< 65 U
106-44-5	**4-Methylphenol**	**65**	**520**
621-64-7	N-Nitroso-Di-N-Propylamine	330	< 330 U
67-72-1	Hexachloroethane	65	< 65 U
98-95-3	Nitrobenzene	65	< 65 U
78-59-1	Isophorone	65	< 65 U
88-75-5	2-Nitrophenol	330	< 330 U
105-67-9	2,4-Dimethylphenol	65	< 65 U
65-85-0	Benzoic Acid	650	< 650 U
111-91-1	bis(2-Chloroethoxy) Methane	65	< 65 U
120-83-2	2,4-Dichlorophenol	330	< 330 U
120-82-1	1,2,4-Trichlorobenzene	65	< 65 U
91-20-3	**Naphthalene**	**65**	**520**
106-47-8	4-Chloroaniline	330	< 330 U
87-68-3	Hexachlorobutadiene	65	< 65 U
59-50-7	4-Chloro-3-methylphenol	330	< 330 U
91-57-6	**2-Methylnaphthalene**	**65**	**370**
77-47-4	Hexachlorocyclopentadiene	330	< 330 U
88-06-2	2,4,6-Trichlorophenol	330	< 330 U
95-95-4	2,4,5-Trichlorophenol	330	< 330 U
91-58-7	2-Chloronaphthalene	65	< 65 U
88-74-4	2-Nitroaniline	330	< 330 U
131-11-3	Dimethylphthalate	65	< 65 U
208-96-8	**Acenaphthylene**	**65**	**470**
99-09-2	3-Nitroaniline	330	< 330 U
83-32-9	**Acenaphthene**	**65**	**140**
51-28-5	2,4-Dinitrophenol	650	< 650 U
100-02-7	4-Nitrophenol	330	< 330 U
132-64-9	**Dibenzofuran**	**65**	**79**

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: SL6.2
SAMPLE

Lab Sample ID: RB73K
LIMS ID: 10-15151
Matrix: Solid
Date Analyzed: 07/01/10 22:17

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020

CAS Number	Analyte	RL	Result
606-20-2	2,6-Dinitrotoluene	330	< 330 U
121-14-2	2,4-Dinitrotoluene	330	< 330 U
84-66-2	Diethylphthalate	65	< 65 U
7005-72-3	4-Chlorophenyl-phenylether	65	< 65 U
86-73-7	**Fluorene**	**65**	**490**
100-01-6	4-Nitroaniline	330	< 330 U
534-52-1	4,6-Dinitro-2-Methylphenol	650	< 650 U
86-30-6	N-Nitrosodiphenylamine	65	< 65 U
101-55-3	4-Bromophenyl-phenylether	65	< 65 U
118-74-1	Hexachlorobenzene	65	< 65 U
87-86-5	Pentachlorophenol	330	< 330 U
85-01-8	**Phenanthrene**	**65**	**3,600**
86-74-8	**Carbazole**	**65**	**130**
120-12-7	**Anthracene**	**65**	**900**
84-74-2	Di-n-Butylphthalate	65	< 65 U
206-44-0	**Fluoranthene**	**65**	**7,700 ES**
129-00-0	**Pyrene**	**65**	**7,600 ES**
85-68-7	Butylbenzylphthalate	65	< 65 U
91-94-1	3,3'-Dichlorobenzidine	330	< 330 U
56-55-3	**Benzo(a)anthracene**	**65**	**3,100**
117-81-7	**bis(2-Ethylhexyl)phthalate**	**65**	**540**
218-01-9	**Chrysene**	**65**	**3,500**
117-84-0	Di-n-Octyl phthalate	65	< 65 U
205-99-2	**Benzo(b)fluoranthene**	**65**	**2,700**
207-08-9	**Benzo(k)fluoranthene**	**65**	**2,700**
50-32-8	**Benzo(a)pyrene**	**65**	**4,800**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**65**	**250**
53-70-3	**Dibenz(a,h)anthracene**	**65**	**520**
191-24-2	**Benzo(g,h,i)perylene**	**65**	**2,700**
90-12-0	**1-Methylnaphthalene**	**65**	**290 Q**

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	70.8%	2-Fluorobiphenyl	77.2%
d14-p-Terphenyl	75.6%	d4-1,2-Dichlorobenzene	62.0%
d5-Phenol	84.0%	2-Fluorophenol	84.0%
2,4,6-Tribromophenol	108%	d4-2-Chlorophenol	73.6%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: SL6.2
DILUTION

Lab Sample ID: RB73K
~~LIMS ID: 10-15151~~
Matrix: Solid
Data Release Authorized: VTS
Reported: 07/10/10

QC Report No: RB73-Floyd/Snider
~~Project: Phase 3~~
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 06/29/10
Date Analyzed: 07/02/10 15:56
Instrument/Analyst: NT4/JZ
GPC Cleanup: Yes

Sample Amount: 7.68 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 3.00
Percent Moisture: 71.1%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	200	< 200 U
111-44-4	Bis-(2-Chloroethyl) Ether	200	< 200 U
95-57-8	2-Chlorophenol	200	< 200 U
541-73-1	1,3-Dichlorobenzene	200	< 200 U
106-46-7	1,4-Dichlorobenzene	200	< 200 U
100-51-6	Benzyl Alcohol	980	< 980 U
95-50-1	1,2-Dichlorobenzene	200	< 200 U
95-48-7	2-Methylphenol	200	< 200 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	200	< 200 U
106-44-5	**4-Methylphenol**	**200**	**460**
621-64-7	N-Nitroso-Di-N-Propylamine	980	< 980 U
67-72-1	Hexachloroethane	200	< 200 U
98-95-3	Nitrobenzene	200	< 200 U
78-59-1	Isophorone	200	< 200 U
88-75-5	2-Nitrophenol	980	< 980 U
105-67-9	2,4-Dimethylphenol	200	< 200 U
65-85-0	Benzoic Acid	2,000	< 2,000 U
111-91-1	bis(2-Chloroethoxy) Methane	200	< 200 U
120-83-2	2,4-Dichlorophenol	980	< 980 U
120-82-1	1,2,4-Trichlorobenzene	200	< 200 U
91-20-3	**Naphthalene**	**200**	**510**
106-47-8	4-Chloroaniline	980	< 980 U
87-68-3	Hexachlorobutadiene	200	< 200 U
59-50-7	4-Chloro-3-methylphenol	980	< 980 U
91-57-6	**2-Methylnaphthalene**	**200**	**350**
77-47-4	Hexachlorocyclopentadiene	980	< 980 U
88-06-2	2,4,6-Trichlorophenol	980	< 980 U
95-95-4	2,4,5-Trichlorophenol	980	< 980 U
91-58-7	2-Chloronaphthalene	200	< 200 U
88-74-4	2-Nitroaniline	980	< 980 U
131-11-3	Dimethylphthalate	200	< 200 U
208-96-8	**Acenaphthylene**	**200**	**470**
99-09-2	3-Nitroaniline	980	< 980 U
83-32-9	Acenaphthene	200	< 200 U
51-28-5	2,4-Dinitrophenol	2,000	< 2,000 U
100-02-7	4-Nitrophenol	980	< 980 U
132-64-9	Dibenzofuran	200	< 200 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: SL6.2
DILUTION

Lab Sample ID: RB73K
LIMS ID: 10-15151
Matrix: Solid
Date Analyzed: 07/02/10 15:56

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020

CAS Number	Analyte	RL	Result
606-20-2	2,6-Dinitrotoluene	980	< 980 U
121-14-2	2,4-Dinitrotoluene	980	< 980 U
84-66-2	Diethylphthalate	200	< 200 U
7005-72-3	4-Chlorophenyl-phenylether	200	< 200 U
86-73-7	**Fluorene**	**200**	**460**
100-01-6	4-Nitroaniline	980	< 980 U
534-52-1	4,6-Dinitro-2-Methylphenol	2,000	< 2,000 U
86-30-6	N-Nitrosodiphenylamine	200	< 200 U
101-55-3	4-Bromophenyl-phenylether	200	< 200 U
118-74-1	Hexachlorobenzene	200	< 200 U
87-86-5	Pentachlorophenol	980	< 980 U
85-01-8	**Phenanthrene**	**200**	**3,800**
86-74-8	Carbazole	200	< 200 U
120-12-7	**Anthracene**	**200**	**900**
84-74-2	Di-n-Butylphthalate	200	< 200 U
206-44-0	**Fluoranthene**	**200**	**9,400**
129-00-0	**Pyrene**	**200**	**11,000**
85-68-7	Butylbenzylphthalate	200	< 200 U
91-94-1	3,3'-Dichlorobenzidine	980	< 980 U
56-55-3	**Benzo(a)anthracene**	**200**	**3,100**
117-81-7	**bis(2-Ethylhexyl)phthalate**	**200**	**500**
218-01-9	**Chrysene**	**200**	**4,100**
117-84-0	Di-n-Octyl phthalate	200	< 200 U
205-99-2	**Benzo(b)fluoranthene**	**200**	**2,700**
207-08-9	**Benzo(k)fluoranthene**	**200**	**2,700**
50-32-8	**Benzo(a)pyrene**	**200**	**4,500**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**200**	**3,000**
53-70-3	**Dibenz(a,h)anthracene**	**200**	**630**
191-24-2	**Benzo(g,h,i)perylene**	**200**	**4,400**
90-12-0	**1-Methylnaphthalene**	**200**	**290 Q**

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	67.2%	2-Fluorobiphenyl	79.8%
d14-p-Terphenyl	80.9%	d4-1,2-Dichlorobenzene	59.8%
d5-Phenol	87.2%	2-Fluorophenol	84.0%
2,4,6-Tribromophenol	97.6%	d4-2-Chlorophenol	76.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: MB-062910
METHOD BLANK

Lab Sample ID: MB-062910
LIMS ID: 10-15152
Matrix: Solid
Data Release Authorized: VTS
Reported: 07/10/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: NA
Date Received: NA

Date Extracted: 06/29/10
Date Analyzed: 07/01/10 16:07
Instrument/Analyst: NT4/JZ
GPC Cleanup: Yes

Sample Amount: 7.50 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00
Percent Moisture: NA

CAS Number	Analyte	RL	Result
108-95-2	Phenol	67	< 67 U
111-44-4	Bis-(2-Chloroethyl) Ether	67	< 67 U
95-57-8	2-Chlorophenol	67	< 67 U
541-73-1	1,3-Dichlorobenzene	67	< 67 U
106-46-7	1,4-Dichlorobenzene	67	< 67 U
100-51-6	Benzyl Alcohol	330	< 330 U
95-50-1	1,2-Dichlorobenzene	67	< 67 U
95-48-7	2-Methylphenol	67	< 67 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	67	< 67 U
106-44-5	4-Methylphenol	67	< 67 U
621-64-7	N-Nitroso-Di-N-Propylamine	330	< 330 U
67-72-1	Hexachloroethane	67	< 67 U
98-95-3	Nitrobenzene	67	< 67 U
78-59-1	Isophorone	67	< 67 U
88-75-5	2-Nitrophenol	330	< 330 U
105-67-9	2,4-Dimethylphenol	67	< 67 U
65-85-0	Benzoic Acid	670	< 670 U
111-91-1	bis(2-Chloroethoxy) Methane	67	< 67 U
120-83-2	2,4-Dichlorophenol	330	< 330 U
120-82-1	1,2,4-Trichlorobenzene	67	< 67 U
91-20-3	Naphthalene	67	< 67 U
106-47-8	4-Chloroaniline	330	< 330 U
87-68-3	Hexachlorobutadiene	67	< 67 U
59-50-7	4-Chloro-3-methylphenol	330	< 330 U
91-57-6	2-Methylnaphthalene	67	< 67 U
77-47-4	Hexachlorocyclopentadiene	330	< 330 U
88-06-2	2,4,6-Trichlorophenol	330	< 330 U
95-95-4	2,4,5-Trichlorophenol	330	< 330 U
91-58-7	2-Chloronaphthalene	67	< 67 U
88-74-4	2-Nitroaniline	330	< 330 U
131-11-3	Dimethylphthalate	67	< 67 U
208-96-8	Acenaphthylene	67	< 67 U
99-09-2	3-Nitroaniline	330	< 330 U
83-32-9	Acenaphthene	67	< 67 U
51-28-5	2,4-Dinitrophenol	670	< 670 U
100-02-7	4-Nitrophenol	330	< 330 U
132-64-9	Dibenzofuran	67	< 67 U

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

ANALYTICAL RESOURCES INCORPORATED

Sample ID: MB-062910
METHOD BLANK

Lab Sample ID: MB-062910
LIMS ID: 10-15152
Matrix: Solid
Date Analyzed: 07/01/10 16:07

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020

CAS Number	Analyte	RL	Result
606-20-2	2,6-Dinitrotoluene	330	< 330 U
121-14-2	2,4-Dinitrotoluene	330	< 330 U
84-66-2	Diethylphthalate	67	< 67 U
7005-72-3	4-Chlorophenyl-phenylether	67	< 67 U
86-73-7	Fluorene	67	< 67 U
100-01-6	4-Nitroaniline	330	< 330 U
534-52-1	4,6-Dinitro-2-Methylphenol	670	< 670 U
86-30-6	N-Nitrosodiphenylamine	67	< 67 U
101-55-3	4-Bromophenyl-phenylether	67	< 67 U
118-74-1	Hexachlorobenzene	67	< 67 U
87-86-5	Pentachlorophenol	330	< 330 U
85-01-8	Phenanthrene	67	< 67 U
86-74-8	Carbazole	67	< 67 U
120-12-7	Anthracene	67	< 67 U
84-74-2	Di-n-Butylphthalate	67	< 67 U
206-44-0	Fluoranthene	67	< 67 U
129-00-0	Pyrene	67	< 67 U
85-68-7	Butylbenzylphthalate	67	< 67 U
91-94-1	3,3'-Dichlorobenzidine	330	< 330 U
56-55-3	Benzo(a)anthracene	67	< 67 U
117-81-7	bis(2-Ethylhexyl)phthalate	67	< 67 U
218-01-9	Chrysene	67	< 67 U
117-84-0	Di-n-Octyl phthalate	67	< 67 U
205-99-2	Benzo(b)fluoranthene	67	< 67 U
207-08-9	Benzo(k)fluoranthene	67	< 67 U
50-32-8	Benzo(a)pyrene	67	< 67 U
193-39-5	Indeno(1,2,3-cd)pyrene	67	< 67 U
53-70-3	Dibenz(a,h)anthracene	67	< 67 U
191-24-2	Benzo(g,h,i)perylene	67	< 67 U
90-12-0	1-Methylnaphthalene	67	< 67 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	70.4%	2-Fluorobiphenyl	72.4%
d14-p-Terphenyl	92.4%	d4-1,2-Dichlorobenzene	72.8%
d5-Phenol	74.4%	2-Fluorophenol	81.6%
2,4,6-Tribromophenol	80.8%	d4-2-Chlorophenol	71.7%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: HP-CB-01
SAMPLE

Lab Sample ID: RB73L
LIMS ID: 10-15152
Matrix: Solid
Data Release Authorized: VTS
Reported: 07/10/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 06/29/10
Date Analyzed: 07/01/10 22:50
Instrument/Analyst: NT4/JZ
GPC Cleanup: Yes

Sample Amount: 8.06 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 3.00
Percent Moisture: 41.8%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	370	< 370 U
111-44-4	Bis-(2-Chloroethyl) Ether	370	< 370 U
95-57-8	2-Chlorophenol	370	< 370 U
541-73-1	1,3-Dichlorobenzene	370	< 370 U
106-46-7	1,4-Dichlorobenzene	370	< 370 U
100-51-6	Benzyl Alcohol	1,900	< 1,900 U
95-50-1	1,2-Dichlorobenzene	370	< 370 U
95-48-7	2-Methylphenol	370	< 370 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	370	< 370 U
106-44-5	4-Methylphenol	370	< 370 U
621-64-7	N-Nitroso-Di-N-Propylamine	1,900	< 1,900 U
67-72-1	Hexachloroethane	370	< 370 U
98-95-3	Nitrobenzene	370	< 370 U
78-59-1	Isophorone	370	< 370 U
88-75-5	2-Nitrophenol	1,900	< 1,900 U
105-67-9	2,4-Dimethylphenol	370	< 370 U
65-85-0	Benzoic Acid	3,700	< 3,700 U
111-91-1	bis(2-Chloroethoxy) Methane	370	< 370 U
120-83-2	2,4-Dichlorophenol	1,900	< 1,900 U
120-82-1	1,2,4-Trichlorobenzene	370	< 370 U
91-20-3	Naphthalene	370	< 370 U
106-47-8	4-Chloroaniline	1,900	< 1,900 U
87-68-3	Hexachlorobutadiene	370	< 370 U
59-50-7	4-Chloro-3-methylphenol	1,900	< 1,900 U
91-57-6	2-Methylnaphthalene	370	< 370 U
77-47-4	Hexachlorocyclopentadiene	1,900	< 1,900 U
88-06-2	2,4,6-Trichlorophenol	1,900	< 1,900 U
95-95-4	2,4,5-Trichlorophenol	1,900	< 1,900 U
91-58-7	2-Chloronaphthalene	370	< 370 U
88-74-4	2-Nitroaniline	1,900	< 1,900 U
131-11-3	Dimethylphthalate	370	< 370 U
208-96-8	Acenaphthylene	370	< 370 U
99-09-2	3-Nitroaniline	1,900	< 1,900 U
83-32-9	Acenaphthene	370	< 370 U
51-28-5	2,4-Dinitrophenol	3,700	< 3,700 U
100-02-7	4-Nitrophenol	1,900	< 1,900 U
132-64-9	Dibenzofuran	370	< 370 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: HP-CB-01
SAMPLE

Lab Sample ID: RB73L
LIMS ID: 10-15152
Matrix: Solid
Date Analyzed: 07/01/10 22:50

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020

CAS Number	Analyte	RL	Result
606-20-2	2,6-Dinitrotoluene	1,900	< 1,900 U
121-14-2	2,4-Dinitrotoluene	1,900	< 1,900 U
84-66-2	Diethylphthalate	370	< 370 U
7005-72-3	4-Chlorophenyl-phenylether	370	< 370 U
86-73-7	Fluorene	370	< 370 U
100-01-6	4-Nitroaniline	1,900	< 1,900 U
534-52-1	4,6-Dinitro-2-Methylphenol	3,700	< 3,700 U
86-30-6	N-Nitrosodiphenylamine	370	< 370 U
101-55-3	4-Bromophenyl-phenylether	370	< 370 U
118-74-1	Hexachlorobenzene	370	< 370 U
87-86-5	Pentachlorophenol	1,900	< 1,900 U
85-01-8	**Phenanthrene**	**370**	**840**
86-74-8	Carbazole	370	< 370 U
120-12-7	Anthracene	370	< 370 U
84-74-2	Di-n-Butylphthalate	370	< 370 U
206-44-0	**Fluoranthene**	**370**	**1,200**
129-00-0	**Pyrene**	**370**	**1,200**
85-68-7	Butylbenzylphthalate	370	< 370 U
91-94-1	3,3'-Dichlorobenzidine	1,900	< 1,900 U
56-55-3	Benzo(a)anthracene	370	< 370 U
117-81-7	**bis(2-Ethylhexyl)phthalate**	**370**	**46,000 ES**
218-01-9	**Chrysene**	**370**	**740**
117-84-0	**Di-n-Octyl phthalate**	**370**	**2,300**
205-99-2	**Benzo(b)fluoranthene**	**370**	**410**
207-08-9	**Benzo(k)fluoranthene**	**370**	**410**
50-32-8	**Benzo(a)pyrene**	**370**	**470**
193-39-5	Indeno(1,2,3-cd)pyrene	370	< 370 U
53-70-3	Dibenz(a,h)anthracene	370	< 370 U
191-24-2	**Benzo(g,h,i)perylene**	**370**	**380**
90-12-0	1-Methylnaphthalene	370	< 370 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	67.7%	2-Fluorobiphenyl	79.0%
d14-p-Terphenyl	75.4%	d4-1,2-Dichlorobenzene	64.1%
d5-Phenol	77.8%	2-Fluorophenol	74.4%
2,4,6-Tribromophenol	85.8%	d4-2-Chlorophenol	66.7%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: HP-CB-01
DILUTION

Lab Sample ID: RB73L
LIMS ID: 10-15152
Matrix: Solid
Data Release Authorized: VTS
Reported: 07/10/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 06/29/10
Date Analyzed: 07/02/10 16:30
Instrument/Analyst: NT4/JZ
GPC Cleanup: Yes

Sample Amount: 8.06 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 10.0
Percent Moisture: 41.8%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	1,200	< 1,200 U
111-44-4	Bis-(2-Chloroethyl) Ether	1,200	< 1,200 U
95-57-8	2-Chlorophenol	1,200	< 1,200 U
541-73-1	1,3-Dichlorobenzene	1,200	< 1,200 U
106-46-7	1,4-Dichlorobenzene	1,200	< 1,200 U
100-51-6	Benzyl Alcohol	6,200	< 6,200 U
95-50-1	1,2-Dichlorobenzene	1,200	< 1,200 U
95-48-7	2-Methylphenol	1,200	< 1,200 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	1,200	< 1,200 U
106-44-5	4-Methylphenol	1,200	< 1,200 U
621-64-7	N-Nitroso-Di-N-Propylamine	6,200	< 6,200 U
67-72-1	Hexachloroethane	1,200	< 1,200 U
98-95-3	Nitrobenzene	1,200	< 1,200 U
78-59-1	Isophorone	1,200	< 1,200 U
88-75-5	2-Nitrophenol	6,200	< 6,200 U
105-67-9	2,4-Dimethylphenol	1,200	< 1,200 U
65-85-0	Benzoic Acid	12,000	< 12,000 U
111-91-1	bis(2-Chloroethoxy) Methane	1,200	< 1,200 U
120-83-2	2,4-Dichlorophenol	6,200	< 6,200 U
120-82-1	1,2,4-Trichlorobenzene	1,200	< 1,200 U
91-20-3	Naphthalene	1,200	< 1,200 U
106-47-8	4-Chloroaniline	6,200	< 6,200 U
87-68-3	Hexachlorobutadiene	1,200	< 1,200 U
59-50-7	4-Chloro-3-methylphenol	6,200	< 6,200 U
91-57-6	2-Methylnaphthalene	1,200	< 1,200 U
77-47-4	Hexachlorocyclopentadiene	6,200	< 6,200 U
88-06-2	2,4,6-Trichlorophenol	6,200	< 6,200 U
95-95-4	2,4,5-Trichlorophenol	6,200	< 6,200 U
91-58-7	2-Chloronaphthalene	1,200	< 1,200 U
88-74-4	2-Nitroaniline	6,200	< 6,200 U
131-11-3	Dimethylphthalate	1,200	< 1,200 U
208-96-8	Acenaphthylene	1,200	< 1,200 U
99-09-2	3-Nitroaniline	6,200	< 6,200 U
83-32-9	Acenaphthene	1,200	< 1,200 U
51-28-5	2,4-Dinitrophenol	12,000	< 12,000 U
100-02-7	4-Nitrophenol	6,200	< 6,200 U
132-64-9	Dibenzofuran	1,200	< 1,200 U

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: HP-CB-01
DILUTION

Lab Sample ID: RB73L
LIMS ID: 10-15152
Matrix: Solid
Date Analyzed: 07/02/10 16:30

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020

CAS Number	Analyte	RL	Result
606-20-2	2,6-Dinitrotoluene	6,200	< 6,200 U
121-14-2	2,4-Dinitrotoluene	6,200	< 6,200 U
84-66-2	Diethylphthalate	1,200	< 1,200 U
7005-72-3	4-Chlorophenyl-phenylether	1,200	< 1,200 U
86-73-7	Fluorene	1,200	< 1,200 U
100-01-6	4-Nitroaniline	6,200	< 6,200 U
534-52-1	4,6-Dinitro-2-Methylphenol	12,000	< 12,000 U
86-30-6	N-Nitrosodiphenylamine	1,200	< 1,200 U
101-55-3	4-Bromophenyl-phenylether	1,200	< 1,200 U
118-74-1	Hexachlorobenzene	1,200	< 1,200 U
87-86-5	Pentachlorophenol	6,200	< 6,200 U
85-01-8	Phenanthrene	1,200	< 1,200 U
86-74-8	Carbazole	1,200	< 1,200 U
120-12-7	Anthracene	1,200	< 1,200 U
84-74-2	Di-n-Butylphthalate	1,200	< 1,200 U
206-44-0	Fluoranthene	1,200	< 1,200 U
129-00-0	**Pyrene**	**1,200**	**1,400**
85-68-7	Butylbenzylphthalate	1,200	< 1,200 U
91-94-1	3,3'-Dichlorobenzidine	6,200	< 6,200 U
56-55-3	Benzo(a)anthracene	1,200	< 1,200 U
117-81-7	**bis(2-Ethylhexyl)phthalate**	**1,200**	**57,000**
218-01-9	Chrysene	1,200	< 1,200 U
117-84-0	Di-n-Octyl phthalate	1,200	< 1,200 U
205-99-2	Benzo(b)fluoranthene	1,200	< 1,200 U
207-08-9	Benzo(k)fluoranthene	1,200	< 1,200 U
50-32-8	Benzo(a)pyrene	1,200	< 1,200 U
193-39-5	Indeno(1,2,3-cd)pyrene	1,200	< 1,200 U
53-70-3	Dibenz(a,h)anthracene	1,200	< 1,200 U
191-24-2	Benzo(g,h,i)perylene	1,200	< 1,200 U
90-12-0	1-Methylnaphthalene	1,200	< 1,200 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	75.2%	2-Fluorobiphenyl	96.0%
d14-p-Terphenyl	95.2%	d4-1,2-Dichlorobenzene	65.6%
d5-Phenol	91.2%	2-Fluorophenol	91.2%
2,4,6-Tribromophenol	101%	d4-2-Chlorophenol	81.6%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: HP-CB-01
MATRIX SPIKE

Lab Sample ID: RB73L
LIMS ID: 10-15152
Matrix: Solid
Data Release Authorized: VD
Reported: 07/10/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 06/29/10
Date Analyzed: 07/01/10 23:24
Instrument/Analyst: NT4/JZ
GPC Cleanup: Yes

Sample Amount: 7.76 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 3.00
Percent Moisture: 41.8%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	390	---
111-44-4	Bis-(2-Chloroethyl) Ether	390	---
95-57-8	2-Chlorophenol	390	---
541-73-1	1,3-Dichlorobenzene	390	---
106-46-7	1,4-Dichlorobenzene	390	---
100-51-6	Benzyl Alcohol	1,900	---
95-50-1	1,2-Dichlorobenzene	390	---
95-48-7	2-Methylphenol	390	---
108-60-1	2,2'-Oxybis(1-Chloropropane)	390	---
106-44-5	4-Methylphenol	390	---
621-64-7	N-Nitroso-Di-N-Propylamine	1,900	---
67-72-1	Hexachloroethane	390	---
98-95-3	Nitrobenzene	390	---
78-59-1	Isophorone	390	---
88-75-5	2-Nitrophenol	1,900	---
105-67-9	2,4-Dimethylphenol	390	---
65-85-0	Benzoic Acid	3,900	---
111-91-1	bis(2-Chloroethoxy) Methane	390	---
120-83-2	2,4-Dichlorophenol	1,900	---
120-82-1	1,2,4-Trichlorobenzene	390	---
91-20-3	Naphthalene	390	---
106-47-8	4-Chloroaniline	1,900	---
87-68-3	Hexachlorobutadiene	390	---
59-50-7	4-Chloro-3-methylphenol	1,900	---
91-57-6	2-Methylnaphthalene	390	---
77-47-4	Hexachlorocyclopentadiene	1,900	---
88-06-2	2,4,6-Trichlorophenol	1,900	---
95-95-4	2,4,5-Trichlorophenol	1,900	---
91-58-7	2-Chloronaphthalene	390	---
88-74-4	2-Nitroaniline	1,900	---
131-11-3	Dimethylphthalate	390	---
208-96-8	Acenaphthylene	390	---
99-09-2	3-Nitroaniline	1,900	---
83-32-9	Acenaphthene	390	---
51-28-5	2,4-Dinitrophenol	3,900	---
100-02-7	4-Nitrophenol	1,900	---
132-64-9	Dibenzofuran	390	---

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: HP-CB-01
MATRIX SPIKE

Lab Sample ID: RB73L
LIMS ID: 10-15152
Matrix: Solid
Date Analyzed: 07/01/10 23:24

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020

CAS Number	Analyte	RL	Result
606-20-2	2,6-Dinitrotoluene	1,900	---
121-14-2	2,4-Dinitrotoluene	1,900	---
84-66-2	Diethylphthalate	390	---
7005-72-3	4-Chlorophenyl-phenylether	390	---
86-73-7	Fluorene	390	---
100-01-6	4-Nitroaniline	1,900	---
534-52-1	4,6-Dinitro-2-Methylphenol	3,900	---
86-30-6	N-Nitrosodiphenylamine	390	---
101-55-3	4-Bromophenyl-phenylether	390	---
118-74-1	Hexachlorobenzene	390	---
87-86-5	Pentachlorophenol	1,900	---
85-01-8	Phenanthrene	390	---
86-74-8	Carbazole	390	---
120-12-7	Anthracene	390	---
84-74-2	Di-n-Butylphthalate	390	---
206-44-0	Fluoranthene	390	---
129-00-0	Pyrene	390	---
85-68-7	Butylbenzylphthalate	390	---
91-94-1	3,3'-Dichlorobenzidine	1,900	---
56-55-3	Benzo(a)anthracene	390	---
117-81-7	bis(2-Ethylhexyl)phthalate	390	---
218-01-9	Chrysene	390	---
117-84-0	Di-n-Octyl phthalate	390	---
205-99-2	Benzo(b)fluoranthene	390	---
207-08-9	Benzo(k)fluoranthene	390	---
50-32-8	Benzo(a)pyrene	390	---
193-39-5	Indeno(1,2,3-cd)pyrene	390	---
53-70-3	Dibenz(a,h)anthracene	390	---
191-24-2	Benzo(g,h,i)perylene	390	---
90-12-0	1-Methylnaphthalene	390	---

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	71.8%	2-Fluorobiphenyl	82.8%
d14-p-Terphenyl	87.6%	d4-1,2-Dichlorobenzene	62.2%
d5-Phenol	89.4%	2-Fluorophenol	81.9%
2,4,6-Tribromophenol	103%	d4-2-Chlorophenol	81.4%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: HP-CB-01
MATRIX SPIKE DUPLICATE

Lab Sample ID: RB73L
LIMS ID: 10-15152
Matrix: Solid
Data Release Authorized: VJT
Reported: 07/10/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 06/29/10
Date Analyzed: 07/01/10 23:58
Instrument/Analyst: NT4/JZ
GPC Cleanup: Yes

Sample Amount: 7.71 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 3.00
Percent Moisture: 41.8%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	390	---
111-44-4	Bis-(2-Chloroethyl) Ether	390	---
95-57-8	2-Chlorophenol	390	---
541-73-1	1,3-Dichlorobenzene	390	---
106-46-7	1,4-Dichlorobenzene	390	---
100-51-6	Benzyl Alcohol	2,000	---
95-50-1	1,2-Dichlorobenzene	390	---
95-48-7	2-Methylphenol	390	---
108-60-1	2,2'-Oxybis(1-Chloropropane)	390	---
106-44-5	4-Methylphenol	390	---
621-64-7	N-Nitroso-Di-N-Propylamine	2,000	---
67-72-1	Hexachloroethane	390	---
98-95-3	Nitrobenzene	390	---
78-59-1	Isophorone	390	---
88-75-5	2-Nitrophenol	2,000	---
105-67-9	2,4-Dimethylphenol	390	---
65-85-0	Benzoic Acid	3,900	---
111-91-1	bis(2-Chloroethoxy) Methane	390	---
120-83-2	2,4-Dichlorophenol	2,000	---
120-82-1	1,2,4-Trichlorobenzene	390	---
91-20-3	Naphthalene	390	---
106-47-8	4-Chloroaniline	2,000	---
87-68-3	Hexachlorobutadiene	390	---
59-50-7	4-Chloro-3-methylphenol	2,000	---
91-57-6	2-Methylnaphthalene	390	---
77-47-4	Hexachlorocyclopentadiene	2,000	---
88-06-2	2,4,6-Trichlorophenol	2,000	---
95-95-4	2,4,5-Trichlorophenol	2,000	---
91-58-7	2-Chloronaphthalene	390	---
88-74-4	2-Nitroaniline	2,000	---
131-11-3	Dimethylphthalate	390	---
208-96-8	Acenaphthylene	390	---
99-09-2	3-Nitroaniline	2,000	---
83-32-9	Acenaphthene	390	---
51-28-5	2,4-Dinitrophenol	3,900	---
100-02-7	4-Nitrophenol	2,000	---
132-64-9	Dibenzofuran	390	---

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: HP-CB-01
MATRIX SPIKE DUPLICATE

Lab Sample ID: RB73L
LIMS ID: 10-15152
Matrix: Solid
Date Analyzed: 07/01/10 23:58

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020

CAS Number	Analyte	RL	Result
606-20-2	2,6-Dinitrotoluene	2,000	---
121-14-2	2,4-Dinitrotoluene	2,000	---
84-66-2	Diethylphthalate	390	---
7005-72-3	4-Chlorophenyl-phenylether	390	---
86-73-7	Fluorene	390	---
100-01-6	4-Nitroaniline	2,000	---
534-52-1	4,6-Dinitro-2-Methylphenol	3,900	---
86-30-6	N-Nitrosodiphenylamine	390	---
101-55-3	4-Bromophenyl-phenylether	390	---
118-74-1	Hexachlorobenzene	390	---
87-86-5	Pentachlorophenol	2,000	---
85-01-8	Phenanthrene	390	---
86-74-8	Carbazole	390	---
120-12-7	Anthracene	390	---
84-74-2	Di-n-Butylphthalate	390	---
206-44-0	Fluoranthene	390	---
129-00-0	Pyrene	390	---
85-68-7	Butylbenzylphthalate	390	---
91-94-1	3,3'-Dichlorobenzidine	2,000	---
56-55-3	Benzo(a)anthracene	390	---
117-81-7	bis(2-Ethylhexyl)phthalate	390	---
218-01-9	Chrysene	390	---
117-84-0	Di-n-Octyl phthalate	390	---
205-99-2	Benzo(b)fluoranthene	390	---
207-08-9	Benzo(k)fluoranthene	390	---
50-32-8	Benzo(a)pyrene	390	---
193-39-5	Indeno(1,2,3-cd)pyrene	390	---
53-70-3	Dibenz(a,h)anthracene	390	---
191-24-2	Benzo(g,h,i)perylene	390	---
90-12-0	1-Methylnaphthalene	390	---

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	72.2%	2-Fluorobiphenyl	83.3%
d14-p-Terphenyl	86.4%	d4-1,2-Dichlorobenzene	67.7%
d5-Phenol	75.0%	2-Fluorophenol	76.3%
2,4,6-Tribromophenol	107%	d4-2-Chlorophenol	75.4%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: HP-CB-02
SAMPLE

Lab Sample ID: RB73M
~~LIMS ID: 10-15153~~
Matrix: Solid
Data Release Authorized: VD
Reported: 07/10/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 06/29/10
Date Analyzed: 07/02/10 17:03
Instrument/Analyst: NT4/JZ
GPC Cleanup: Yes

Sample Amount: 7.89 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 15.0
Percent Moisture: 51.3%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	950	< 950 U
111-44-4	Bis-(2-Chloroethyl) Ether	950	< 950 U
95-57-8	2-Chlorophenol	950	< 950 U
541-73-1	1,3-Dichlorobenzene	950	< 950 U
106-46-7	1,4-Dichlorobenzene	950	< 950 U
100-51-6	Benzyl Alcohol	4,800	< 4,800 U
95-50-1	1,2-Dichlorobenzene	950	< 950 U
95-48-7	2-Methylphenol	950	< 950 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	950	< 950 U
106-44-5	4-Methylphenol	950	< 950 U
621-64-7	N-Nitroso-Di-N-Propylamine	4,800	< 4,800 U
67-72-1	Hexachloroethane	950	< 950 U
98-95-3	Nitrobenzene	950	< 950 U
78-59-1	Isophorone	950	< 950 U
88-75-5	2-Nitrophenol	4,800	< 4,800 U
105-67-9	2,4-Dimethylphenol	950	< 950 U
65-85-0	Benzoic Acid	9,500	< 9,500 U
111-91-1	bis(2-Chloroethoxy) Methane	950	< 950 U
120-83-2	2,4-Dichlorophenol	4,800	< 4,800 U
120-82-1	1,2,4-Trichlorobenzene	950	< 950 U
91-20-3	Naphthalene	950	< 950 U
106-47-8	4-Chloroaniline	4,800	< 4,800 U
87-68-3	Hexachlorobutadiene	950	< 950 U
59-50-7	4-Chloro-3-methylphenol	4,800	< 4,800 U
91-57-6	2-Methylnaphthalene	950	< 950 U
77-47-4	Hexachlorocyclopentadiene	4,800	< 4,800 U
88-06-2	2,4,6-Trichlorophenol	4,800	< 4,800 U
95-95-4	2,4,5-Trichlorophenol	4,800	< 4,800 U
91-58-7	2-Chloronaphthalene	950	< 950 U
88-74-4	2-Nitroaniline	4,800	< 4,800 U
131-11-3	Dimethylphthalate	950	< 950 U
208-96-8	Acenaphthylene	950	< 950 U
99-09-2	3-Nitroaniline	4,800	< 4,800 U
83-32-9	Acenaphthene	950	< 950 U
51-28-5	2,4-Dinitrophenol	9,500	< 9,500 U
100-02-7	4-Nitrophenol	4,800	< 4,800 U
132-64-9	Dibenzofuran	950	< 950 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: HP-CB-02
SAMPLE

Lab Sample ID: RB73M
~~LIMS ID: 10-15153~~
Matrix: Solid
Date Analyzed: 07/02/10 17:03

QC Report No: RB73-Floyd/Snider
~~Project: Phase 3~~
COS-GWSA 6020

CAS Number	Analyte	RL	Result
606-20-2	2,6-Dinitrotoluene	4,800	< 4,800 U
121-14-2	2,4-Dinitrotoluene	4,800	< 4,800 U
84-66-2	Diethylphthalate	950	< 950 U
7005-72-3	4-Chlorophenyl-phenylether	950	< 950 U
86-73-7	Fluorene	950	< 950 U
100-01-6	4-Nitroaniline	4,800	< 4,800 U
534-52-1	4,6-Dinitro-2-Methylphenol	9,500	< 9,500 U
86-30-6	N-Nitrosodiphenylamine	950	< 950 U
101-55-3	4-Bromophenyl-phenylether	950	< 950 U
118-74-1	Hexachlorobenzene	950	< 950 U
87-86-5	Pentachlorophenol	4,800	< 4,800 U
85-01-8	**Phenanthrene**	**950**	**2,600**
86-74-8	Carbazole	950	< 950 U
120-12-7	Anthracene	950	< 950 U
84-74-2	Di-n-Butylphthalate	950	< 950 U
206-44-0	**Fluoranthene**	**950**	**4,000**
129-00-0	**Pyrene**	**950**	**4,000**
85-68-7	Butylbenzylphthalate	950	< 950 U
91-94-1	3,3'-Dichlorobenzidine	4,800	< 4,800 U
56-55-3	**Benzo(a)anthracene**	**950**	**1,400**
117-81-7	**bis(2-Ethylhexyl)phthalate**	**950**	**48,000**
218-01-9	**Chrysene**	**950**	**2,500**
117-84-0	Di-n-Octyl phthalate	950	< 950 U
205-99-2	**Benzo(b)fluoranthene**	**950**	**1,300**
207-08-9	**Benzo(k)fluoranthene**	**950**	**1,300**
50-32-8	**Benzo(a)pyrene**	**950**	**1,500**
193-39-5	Indeno(1,2,3-cd)pyrene	950	< 950 U
53-70-3	Dibenz(a,h)anthracene	950	< 950 U
191-24-2	**Benzo(g,h,i)perylene**	**950**	**1,500**
90-12-0	1-Methylnaphthalene	950	< 950 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	76.8%	2-Fluorobiphenyl	85.8%
d14-p-Terphenyl	84.6%	d4-1,2-Dichlorobenzene	63.0%
d5-Phenol	91.6%	2-Fluorophenol	86.0%
2,4,6-Tribromophenol	72.4%	d4-2-Chlorophenol	71.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: HP-CB-03
SAMPLE

Lab Sample ID: RB73N
LIMS ID: 10-15154
Matrix: Solid
Data Release Authorized: VTS
Reported: 07/10/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 06/29/10
Date Analyzed: 07/02/10 01:05
Instrument/Analyst: NT4/JZ
GPC Cleanup: Yes

Sample Amount: 7.93 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 3.00
Percent Moisture: 56.1%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	190	< 190 U
111-44-4	Bis-(2-Chloroethyl) Ether	190	< 190 U
95-57-8	2-Chlorophenol	190	< 190 U
541-73-1	1,3-Dichlorobenzene	190	< 190 U
106-46-7	1,4-Dichlorobenzene	190	< 190 U
100-51-6	Benzyl Alcohol	950	< 950 U
95-50-1	1,2-Dichlorobenzene	190	< 190 U
95-48-7	2-Methylphenol	190	< 190 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	190	< 190 U
106-44-5	**4-Methylphenol**	**190**	**810**
621-64-7	N-Nitroso-Di-N-Propylamine	950	< 950 U
67-72-1	Hexachloroethane	190	< 190 U
98-95-3	Nitrobenzene	190	< 190 U
78-59-1	Isophorone	190	< 190 U
88-75-5	2-Nitrophenol	950	< 950 U
105-67-9	2,4-Dimethylphenol	190	< 190 U
65-85-0	Benzoic Acid	1,900	< 1,900 U
111-91-1	bis(2-Chloroethoxy) Methane	190	< 190 U
120-83-2	2,4-Dichlorophenol	950	< 950 U
120-82-1	1,2,4-Trichlorobenzene	190	< 190 U
91-20-3	**Naphthalene**	**190**	**400**
106-47-8	4-Chloroaniline	950	< 950 U
87-68-3	Hexachlorobutadiene	190	< 190 U
59-50-7	4-Chloro-3-methylphenol	950	< 950 U
91-57-6	**2-Methylnaphthalene**	**190**	**470**
77-47-4	Hexachlorocyclopentadiene	950	< 950 U
88-06-2	2,4,6-Trichlorophenol	950	< 950 U
95-95-4	2,4,5-Trichlorophenol	950	< 950 U
91-58-7	2-Chloronaphthalene	190	< 190 U
88-74-4	2-Nitroaniline	950	< 950 U
131-11-3	**Dimethylphthalate**	**190**	**240**
208-96-8	Acenaphthylene	190	< 190 U
99-09-2	3-Nitroaniline	950	< 950 U
83-32-9	Acenaphthene	190	< 190 U
51-28-5	2,4-Dinitrophenol	1,900	< 1,900 U
100-02-7	4-Nitrophenol	950	< 950 U
132-64-9	Dibenzofuran	190	< 190 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: HP-CB-03
SAMPLE

Lab Sample ID: RB73N
LIMS ID: 10-15154
Matrix: Solid
Date Analyzed: 07/02/10 01:05

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020

CAS Number	Analyte	RL	Result
606-20-2	2,6-Dinitrotoluene	950	< 950 U
121-14-2	2,4-Dinitrotoluene	950	< 950 U
84-66-2	Diethylphthalate	190	< 190 U
7005-72-3	4-Chlorophenyl-phenylether	190	< 190 U
86-73-7	Fluorene	190	< 190 U
100-01-6	4-Nitroaniline	950	< 950 U
534-52-1	4,6-Dinitro-2-Methylphenol	1,900	< 1,900 U
86-30-6	N-Nitrosodiphenylamine	190	< 190 U
101-55-3	4-Bromophenyl-phenylether	190	< 190 U
118-74-1	Hexachlorobenzene	190	< 190 U
87-86-5	Pentachlorophenol	950	< 950 U
85-01-8	**Phenanthrene**	**190**	**1,400**
86-74-8	Carbazole	190	< 190 U
120-12-7	**Anthracene**	**190**	**200**
84-74-2	Di-n-Butylphthalate	190	< 190 U
206-44-0	**Fluoranthene**	**190**	**1,900**
129-00-0	**Pyrene**	**190**	**1,900**
85-68-7	Butylbenzylphthalate	190	< 190 U
91-94-1	3,3'-Dichlorobenzidine	950	< 950 U
56-55-3	**Benzo(a)anthracene**	**190**	**280**
117-81-7	**bis(2-Ethylhexyl)phthalate**	**190**	**22,000 ES**
218-01-9	**Chrysene**	**190**	**1,100**
117-84-0	**Di-n-Octyl phthalate**	**190**	**1,300**
205-99-2	**Benzo(b)fluoranthene**	**190**	**630**
207-08-9	**Benzo(k)fluoranthene**	**190**	**630**
50-32-8	**Benzo(a)pyrene**	**190**	**810**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**190**	**280**
53-70-3	Dibenz(a,h)anthracene	190	< 190 U
191-24-2	**Benzo(g,h,i)perylene**	**190**	**400**
90-12-0	**1-Methylnaphthalene**	**190**	**370 Q**

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	67.1%	2-Fluorobiphenyl	79.3%
d14-p-Terphenyl	62.9%	d4-1,2-Dichlorobenzene	61.7%
d5-Phenol	84.8%	2-Fluorophenol	80.8%
2,4,6-Tribromophenol	102%	d4-2-Chlorophenol	74.6%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: HP-CB-03
DILUTION

Lab Sample ID: RB73N
LIMS ID: 10-15154
Matrix: Solid
Data Release Authorized: VTS
Reported: 07/10/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 06/29/10
Date Analyzed: 07/02/10 17:37
Instrument/Analyst: NT4/JZ
GPC Cleanup: Yes

Sample Amount: 7.93 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 10.0
Percent Moisture: 56.1%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	630	< 630 U
111-44-4	Bis-(2-Chloroethyl) Ether	630	< 630 U
95-57-8	2-Chlorophenol	630	< 630 U
541-73-1	1,3-Dichlorobenzene	630	< 630 U
106-46-7	1,4-Dichlorobenzene	630	< 630 U
100-51-6	Benzyl Alcohol	3,200	< 3,200 U
95-50-1	1,2-Dichlorobenzene	630	< 630 U
95-48-7	2-Methylphenol	630	< 630 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	630	< 630 U
106-44-5	**4-Methylphenol**	**630**	**900**
621-64-7	N-Nitroso-Di-N-Propylamine	3,200	< 3,200 U
67-72-1	Hexachloroethane	630	< 630 U
98-95-3	Nitrobenzene	630	< 630 U
78-59-1	Isophorone	630	< 630 U
88-75-5	2-Nitrophenol	3,200	< 3,200 U
105-67-9	2,4-Dimethylphenol	630	< 630 U
65-85-0	Benzoic Acid	6,300	< 6,300 U
111-91-1	bis(2-Chloroethoxy) Methane	630	< 630 U
120-83-2	2,4-Dichlorophenol	3,200	< 3,200 U
120-82-1	1,2,4-Trichlorobenzene	630	< 630 U
91-20-3	Naphthalene	630	< 630 U
106-47-8	4-Chloroaniline	3,200	< 3,200 U
87-68-3	Hexachlorobutadiene	630	< 630 U
59-50-7	4-Chloro-3-methylphenol	3,200	< 3,200 U
91-57-6	2-Methylnaphthalene	630	< 630 U
77-47-4	Hexachlorocyclopentadiene	3,200	< 3,200 U
88-06-2	2,4,6-Trichlorophenol	3,200	< 3,200 U
95-95-4	2,4,5-Trichlorophenol	3,200	< 3,200 U
91-58-7	2-Chloronaphthalene	630	< 630 U
88-74-4	2-Nitroaniline	3,200	< 3,200 U
131-11-3	Dimethylphthalate	630	< 630 U
208-96-8	Acenaphthylene	630	< 630 U
99-09-2	3-Nitroaniline	3,200	< 3,200 U
83-32-9	Acenaphthene	630	< 630 U
51-28-5	2,4-Dinitrophenol	6,300	< 6,300 U
100-02-7	4-Nitrophenol	3,200	< 3,200 U
132-64-9	Dibenzofuran	630	< 630 U

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

ANALYTICAL RESOURCES INCORPORATED

Sample ID: HP-CB-03
DILUTION

Lab Sample ID: RB73N
~~LIMS ID: 10-15154~~
Matrix: Solid
Date Analyzed: 07/02/10 17:37

QC Report No: RB73-Floyd/Snider
~~Project: Phase 3~~
COS-GWSA 6020

CAS Number	Analyte	RL	Result
606-20-2	2,6-Dinitrotoluene	3,200	< 3,200 U
121-14-2	2,4-Dinitrotoluene	3,200	< 3,200 U
84-66-2	Diethylphthalate	630	< 630 U
7005-72-3	4-Chlorophenyl-phenylether	630	< 630 U
86-73-7	Fluorene	630	< 630 U
100-01-6	4-Nitroaniline	3,200	< 3,200 U
534-52-1	4,6-Dinitro-2-Methylphenol	6,300	< 6,300 U
86-30-6	N-Nitrosodiphenylamine	630	< 630 U
101-55-3	4-Bromophenyl-phenylether	630	< 630 U
118-74-1	Hexachlorobenzene	630	< 630 U
87-86-5	Pentachlorophenol	3,200	< 3,200 U
85-01-8	**Phenanthrene**	**630**	**1,600**
86-74-8	Carbazole	630	< 630 U
120-12-7	Anthracene	630	< 630 U
84-74-2	Di-n-Butylphthalate	630	< 630 U
206-44-0	**Fluoranthene**	**630**	**2,200**
129-00-0	**Pyrene**	**630**	**3,000**
85-68-7	Butylbenzylphthalate	630	< 630 U
91-94-1	3,3'-Dichlorobenzidine	3,200	< 3,200 U
56-55-3	**Benzo(a)anthracene**	**630**	**660**
117-81-7	**bis(2-Ethylhexyl)phthalate**	**630**	**29,000**
218-01-9	**Chrysene**	**630**	**1,200**
117-84-0	Di-n-Octyl phthalate	630	< 630 U
205-99-2	**Benzo(b)fluoranthene**	**630**	**700**
207-08-9	**Benzo(k)fluoranthene**	**630**	**700**
50-32-8	**Benzo(a)pyrene**	**630**	**870**
193-39-5	Indeno(1,2,3-cd)pyrene	630	< 630 U
53-70-3	Dibenz(a,h)anthracene	630	< 630 U
191-24-2	**Benzo(g,h,i)perylene**	**630**	**860**
90-12-0	1-Methylnaphthalene	630	< 630 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	85.2%	2-Fluorobiphenyl	95.2%
d14-p-Terphenyl	82.0%	d4-1,2-Dichlorobenzene	65.6%
d5-Phenol	99.5%	2-Fluorophenol	93.6%
2,4,6-Tribromophenol	92.8%	d4-2-Chlorophenol	80.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: HP-OWS-Inlet
SAMPLE

Lab Sample ID: RB73O
LIMS ID: 10-15155
Matrix: Solid
Data Release Authorized: VJJ
Reported: 07/10/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 06/29/10
Date Analyzed: 07/02/10 18:10
Instrument/Analyst: NT4/JZ
GPC Cleanup: Yes

Sample Amount: 6.40 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 15.0
Percent Moisture: 71.6%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	2,300	< 2,300 U
111-44-4	Bis-(2-Chloroethyl) Ether	2,300	< 2,300 U
95-57-8	2-Chlorophenol	2,300	< 2,300 U
541-73-1	1,3-Dichlorobenzene	2,300	< 2,300 U
106-46-7	1,4-Dichlorobenzene	2,300	< 2,300 U
100-51-6	Benzyl Alcohol	12,000	< 12,000 U
95-50-1	1,2-Dichlorobenzene	2,300	< 2,300 U
95-48-7	2-Methylphenol	2,300	< 2,300 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	2,300	< 2,300 U
106-44-5	4-Methylphenol	2,300	< 2,300 U
621-64-7	N-Nitroso-Di-N-Propylamine	12,000	< 12,000 U
67-72-1	Hexachloroethane	2,300	< 2,300 U
98-95-3	Nitrobenzene	2,300	< 2,300 U
78-59-1	Isophorone	2,300	< 2,300 U
88-75-5	2-Nitrophenol	12,000	< 12,000 U
105-67-9	2,4-Dimethylphenol	2,300	< 2,300 U
65-85-0	Benzoic Acid	23,000	< 23,000 U
111-91-1	bis(2-Chloroethoxy) Methane	2,300	< 2,300 U
120-83-2	2,4-Dichlorophenol	12,000	< 12,000 U
120-82-1	1,2,4-Trichlorobenzene	2,300	< 2,300 U
91-20-3	Naphthalene	2,300	< 2,300 U
106-47-8	4-Chloroaniline	12,000	< 12,000 U
87-68-3	Hexachlorobutadiene	2,300	< 2,300 U
59-50-7	4-Chloro-3-methylphenol	12,000	< 12,000 U
91-57-6	2-Methylnaphthalene	2,300	< 2,300 U
77-47-4	Hexachlorocyclopentadiene	12,000	< 12,000 U
88-06-2	2,4,6-Trichlorophenol	12,000	< 12,000 U
95-95-4	2,4,5-Trichlorophenol	12,000	< 12,000 U
91-58-7	2-Chloronaphthalene	2,300	< 2,300 U
88-74-4	2-Nitroaniline	12,000	< 12,000 U
131-11-3	Dimethylphthalate	2,300	< 2,300 U
208-96-8	Acenaphthylene	2,300	< 2,300 U
99-09-2	3-Nitroaniline	12,000	< 12,000 U
83-32-9	Acenaphthene	2,300	< 2,300 U
51-28-5	2,4-Dinitrophenol	23,000	< 23,000 U
100-02-7	4-Nitrophenol	12,000	< 12,000 U
132-64-9	Dibenzofuran	2,300	< 2,300 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: HP-OWS-Inlet
SAMPLE

Lab Sample ID: RB73O
~~LIMS ID: 10-15155~~
Matrix: Solid
Date Analyzed: 07/02/10 18:10

QC Report No: RB73-Floyd/Snider
~~Project: Phase 3~~
COS-GWSA 6020

CAS Number	Analyte	RL	Result
606-20-2	2,6-Dinitrotoluene	12,000	< 12,000 U
121-14-2	2,4-Dinitrotoluene	12,000	< 12,000 U
84-66-2	Diethylphthalate	2,300	< 2,300 U
7005-72-3	4-Chlorophenyl-phenylether	2,300	< 2,300 U
86-73-7	Fluorene	2,300	< 2,300 U
100-01-6	4-Nitroaniline	12,000	< 12,000 U
534-52-1	4,6-Dinitro-2-Methylphenol	23,000	< 23,000 U
86-30-6	N-Nitrosodiphenylamine	2,300	< 2,300 U
101-55-3	4-Bromophenyl-phenylether	2,300	< 2,300 U
118-74-1	Hexachlorobenzene	2,300	< 2,300 U
87-86-5	Pentachlorophenol	12,000	< 12,000 U
85-01-8	**Phenanthrene**	**2,300**	**2,800**
86-74-8	Carbazole	2,300	< 2,300 U
120-12-7	Anthracene	2,300	< 2,300 U
84-74-2	Di-n-Butylphthalate	2,300	< 2,300 U
206-44-0	**Fluoranthene**	**2,300**	**3,600**
129-00-0	**Pyrene**	**2,300**	**3,900**
85-68-7	Butylbenzylphthalate	2,300	< 2,300 U
91-94-1	3,3'-Dichlorobenzidine	12,000	< 12,000 U
56-55-3	Benzo(a)anthracene	2,300	< 2,300 U
117-81-7	**bis(2-Ethylhexyl)phthalate**	**2,300**	**90,000**
218-01-9	**Chrysene**	**2,300**	**2,600**
117-84-0	**Di-n-Octyl phthalate**	**2,300**	**11,000**
205-99-2	Benzo(b)fluoranthene	2,300	< 2,300 U
207-08-9	Benzo(k)fluoranthene	2,300	< 2,300 U
50-32-8	Benzo(a)pyrene	2,300	< 2,300 U
193-39-5	Indeno(1,2,3-cd)pyrene	2,300	< 2,300 U
53-70-3	Dibenz(a,h)anthracene	2,300	< 2,300 U
191-24-2	Benzo(g,h,i)perylene	2,300	< 2,300 U
90-12-0	1-Methylnaphthalene	2,300	< 2,300 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	70.8%	2-Fluorobiphenyl	78.0%
d14-p-Terphenyl	84.0%	d4-1,2-Dichlorobenzene	64.8%
d5-Phenol	96.0%	2-Fluorophenol	74.4%
2,4,6-Tribromophenol	40.0%	d4-2-Chlorophenol	65.6%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: HP-OWS-Outlet
SAMPLE

Lab Sample ID: RB73P
~~LIMS ID: 10-15156~~
Matrix: Solid
Data Release Authorized: VJJ
Reported: 07/10/10

QC Report No: RB73-Floyd/Snider
~~Project: Phase 3~~
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 06/29/10
Date Analyzed: 07/02/10 18:44
Instrument/Analyst: NT4/JZ
GPC Cleanup: Yes

Sample Amount: 7.52 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 15.0
Percent Moisture: 71.8%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	2,000	< 2,000 U
111-44-4	Bis-(2-Chloroethyl) Ether	2,000	< 2,000 U
95-57-8	2-Chlorophenol	2,000	< 2,000 U
541-73-1	1,3-Dichlorobenzene	2,000	< 2,000 U
106-46-7	1,4-Dichlorobenzene	2,000	< 2,000 U
100-51-6	Benzyl Alcohol	10,000	< 10,000 U
95-50-1	1,2-Dichlorobenzene	2,000	< 2,000 U
95-48-7	2-Methylphenol	2,000	< 2,000 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	2,000	< 2,000 U
106-44-5	4-Methylphenol	2,000	< 2,000 U
621-64-7	N-Nitroso-Di-N-Propylamine	10,000	< 10,000 U
67-72-1	Hexachloroethane	2,000	< 2,000 U
98-95-3	Nitrobenzene	2,000	< 2,000 U
78-59-1	Isophorone	2,000	< 2,000 U
88-75-5	2-Nitrophenol	10,000	< 10,000 U
105-67-9	2,4-Dimethylphenol	2,000	< 2,000 U
65-85-0	Benzoic Acid	20,000	< 20,000 U
111-91-1	bis(2-Chloroethoxy) Methane	2,000	< 2,000 U
120-83-2	2,4-Dichlorophenol	10,000	< 10,000 U
120-82-1	1,2,4-Trichlorobenzene	2,000	< 2,000 U
91-20-3	Naphthalene	2,000	< 2,000 U
106-47-8	4-Chloroaniline	10,000	< 10,000 U
87-68-3	Hexachlorobutadiene	2,000	< 2,000 U
59-50-7	4-Chloro-3-methylphenol	10,000	< 10,000 U
91-57-6	2-Methylnaphthalene	2,000	< 2,000 U
77-47-4	Hexachlorocyclopentadiene	10,000	< 10,000 U
88-06-2	2,4,6-Trichlorophenol	10,000	< 10,000 U
95-95-4	2,4,5-Trichlorophenol	10,000	< 10,000 U
91-58-7	2-Chloronaphthalene	2,000	< 2,000 U
88-74-4	2-Nitroaniline	10,000	< 10,000 U
131-11-3	Dimethylphthalate	2,000	< 2,000 U
208-96-8	Acenaphthylene	2,000	< 2,000 U
99-09-2	3-Nitroaniline	10,000	< 10,000 U
83-32-9	Acenaphthene	2,000	< 2,000 U
51-28-5	2,4-Dinitrophenol	20,000	< 20,000 U
100-02-7	4-Nitrophenol	10,000	< 10,000 U
132-64-9	Dibenzofuran	2,000	< 2,000 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: HP-OWS-Outlet
SAMPLE

Lab Sample ID: RB73P
LIMS ID: 10-15156
Matrix: Solid
Date Analyzed: 07/02/10 18:44

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020

CAS Number	Analyte	RL	Result
606-20-2	2,6-Dinitrotoluene	10,000	< 10,000 U
121-14-2	2,4-Dinitrotoluene	10,000	< 10,000 U
84-66-2	Diethylphthalate	2,000	< 2,000 U
7005-72-3	4-Chlorophenyl-phenylether	2,000	< 2,000 U
86-73-7	Fluorene	2,000	< 2,000 U
100-01-6	4-Nitroaniline	10,000	< 10,000 U
534-52-1	4,6-Dinitro-2-Methylphenol	20,000	< 20,000 U
86-30-6	N-Nitrosodiphenylamine	2,000	< 2,000 U
101-55-3	4-Bromophenyl-phenylether	2,000	< 2,000 U
118-74-1	Hexachlorobenzene	2,000	< 2,000 U
87-86-5	Pentachlorophenol	10,000	< 10,000 U
85-01-8	**Phenanthrene**	**2,000**	**3,200**
86-74-8	Carbazole	2,000	< 2,000 U
120-12-7	Anthracene	2,000	< 2,000 U
84-74-2	Di-n-Butylphthalate	2,000	< 2,000 U
206-44-0	**Fluoranthene**	**2,000**	**4,200**
129-00-0	**Pyrene**	**2,000**	**4,600**
85-68-7	Butylbenzylphthalate	2,000	< 2,000 U
91-94-1	3,3'-Dichlorobenzidine	10,000	< 10,000 U
56-55-3	Benzo(a)anthracene	2,000	< 2,000 U
117-81-7	**bis(2-Ethylhexyl)phthalate**	**2,000**	**79,000**
218-01-9	**Chrysene**	**2,000**	**3,200**
117-84-0	**Di-n-Octyl phthalate**	**2,000**	**7,500**
205-99-2	Benzo(b)fluoranthene	2,000	< 2,000 U
207-08-9	Benzo(k)fluoranthene	2,000	< 2,000 U
50-32-8	Benzo(a)pyrene	2,000	< 2,000 U
193-39-5	Indeno(1,2,3-cd)pyrene	2,000	< 2,000 U
53-70-3	Dibenz(a,h)anthracene	2,000	< 2,000 U
191-24-2	**Benzo(g,h,i)perylene**	**2,000**	**2,200**
90-12-0	1-Methylnaphthalene	2,000	< 2,000 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	68.4%	2-Fluorobiphenyl	93.6%
d14-p-Terphenyl	86.4%	d4-1,2-Dichlorobenzene	42.0%
d5-Phenol	94.4%	2-Fluorophenol	80.8%
2,4,6-Tribromophenol	60.0%	d4-2-Chlorophenol	72.0%

ANALYTICAL RESOURCES INCORPORATED

SW8270 SEMIVOLATILES SOIL/SEDIMENT SURROGATE RECOVERY SUMMARY

Matrix: Solid

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020

Client ID	NBZ	FBP	TPH	DCB	PHL	2FP	TBP	2CP	TOT OUT
PA-CB-01	77.0%	81.6%	76.3%	62.4%	82.2%	85.4%	95.2%	77.0%	0
PA-CB-02	83.0%	88.3%	86.4%	61.0%	86.7%	86.7%	97.3%	81.6%	0
PA-CB-03	64.8%	79.7%	78.2%	64.6%	78.7%	77.8%	97.3%	73.6%	0
PA-CB-04	68.2%	79.4%	80.4%	60.5%	68.2%	71.5%	102%	69.3%	0
PA-CB-05	72.5%	83.0%	80.6%	72.2%	83.2%	81.9%	92.3%	73.8%	0
PA-CB-06	70.8%	80.4%	78.2%	67.0%	88.5%	75.2%	88.5%	73.8%	0
PA-CB-07	70.3%	84.5%	84.5%	63.8%	79.7%	84.5%	112%	75.4%	0
PA-CB-DUP	58.8%	76.1%	76.1%	61.0%	82.6%	78.9%	95.8%	73.8%	0
SL6.1	77.0%	87.8%	90.7%	69.4%	90.4%	88.0%	111%	76.7%	0
SL6.1 DL	81.6%	95.2%	97.2%	70.4%	97.9%	88.3%	117%*	77.3%	1
SL6.2	70.8%	77.2%	75.6%	62.0%	84.0%	84.0%	108%	73.6%	0
SL6.2 DL	67.2%	79.8%	80.9%	59.8%	87.2%	84.0%	97.6%	76.3%	0
MB-062910	70.4%	72.4%	92.4%	72.8%	74.4%	81.6%	80.8%	71.7%	0
LCS-062910	66.4%	75.2%	91.2%	67.6%	78.4%	83.2%	88.8%	76.3%	0
HP-CB-01	67.7%	79.0%	75.4%	64.1%	77.8%	74.4%	85.8%	66.7%	0
HP-CB-01 DL	75.2%	96.0%	95.2%	65.6%	91.2%	91.2%	101%	81.6%	0
HP-CB-01 MS	71.8%	82.8%	87.6%	62.2%	89.4%	81.9%	103%	81.4%	0
HP-CB-01 MSD	72.2%	83.3%	86.4%	67.7%	75.0%	76.3%	107%	75.4%	0
HP-CB-02	76.8%	85.8%	84.6%	63.0%	91.6%	86.0%	72.4%	71.2%	0
HP-CB-03	67.1%	79.3%	62.9%	61.7%	84.8%	80.8%	102%	74.6%	0
HP-CB-03 DL	85.2%	95.2%	82.0%	65.6%	99.5%	93.6%	92.8%	80.3%	0
HP-OWS-Inlet	70.8%	78.0%	84.0%	64.8%	96.0%	74.4%	40.0%	65.6%	0
HP-OWS-Outlet	68.4%	93.6%	86.4%	42.0%	94.4%	80.8%	60.0%	72.0%	0

	LCS/MB LIMITS	QC LIMITS
(NBZ) = d5-Nitrobenzene	(39-100)	(32-100)
(FBP) = 2-Fluorobiphenyl	(44-100)	(36-100)
(TPH) = d14-p-Terphenyl	(55-106)	(35-113)
(DCB) = d4-1,2-Dichlorobenzene	(34-100)	(30-100)
(PHL) = d5-Phenol	(39-100)	(31-100)
(2FP) = 2-Fluorophenol	(14-100)	(10-100)
(TBP) = 2,4,6-Tribromophenol	(47-109)	(28-116)
(2CP) = d4-2-Chlorophenol	(43-100)	(33-100)

Prep Method: SW3550B
Log Number Range: 10-15141 to 10-15156

FORM-II SW8270

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: HP-CB-01
MS/MSD

Lab Sample ID: RB73L
LIMS ID: 10-15152
Matrix: Solid
Data Release Authorized: VTS
Reported: 07/10/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted MS/MSD: 06/29/10

Date Analyzed MS: 07/01/10 23:24
MSD: 07/01/10 23:58
Instrument/Analyst MS: NT4/JZ
MSD: NT4/JZ
GPC Cleanup: Yes

Sample Amount MS: 7.76 g-dry-wt
MSD: 7.71 g-dry-wt
Final Extract Volume MS: 1.0 mL
MSD: 1.0 mL
Dilution Factor MS: 3.00
MSD: 3.00
Percent Moisture: 41.8 %

Analyte	Sample	MS	Spike Added-MS	MS Recovery	MSD	Spike Added-MSD	MSD Recovery	RPD
Phenol	< 372 U	1120	1610	69.6%	1180	1620	72.8%	5.2%
Bis-(2-Chloroethyl) Ether	< 372 U	932	1610	57.9%	969	1620	59.8%	3.9%
2-Chlorophenol	< 372 U	1050	1610	65.2%	1120	1620	69.1%	6.5%
1,3-Dichlorobenzene	< 372 U	912	1610	56.6%	984	1620	60.7%	7.6%
1,4-Dichlorobenzene	< 372 U	843	1610	52.4%	926	1620	57.2%	9.4%
Benzyl Alcohol	< 1860 U	2900	3220	90.1%	2900	3240	89.5%	0.0%
1,2-Dichlorobenzene	< 372 U	858	1610	53.3%	1010	1620	62.3%	16.3%
2-Methylphenol	< 372 U	1090	1610	67.7%	1110	1620	68.5%	1.8%
2,2'-Oxybis(1-Chloropropane)	< 372 U	738	1610	45.8%	914	1620	56.4%	21.3%
4-Methylphenol	< 372 U	2160	3220	67.1%	2280	3240	70.4%	5.4%
N-Nitroso-Di-N-Propylamine	< 1860 U	1200 J	1610	74.5%	1270 J	1620	78.4%	5.7%
Hexachloroethane	< 372 U	858	1610	53.3%	735	1620	45.4%	15.4%
Nitrobenzene	< 372 U	758 Q	1610	47.1%	848 Q	1620	52.3%	11.2%
Isophorone	< 372 U	1050	1610	65.2%	1180	1620	72.8%	11.7%
2-Nitrophenol	< 1860 U	1030 J	1610	64.0%	1140 J	1620	70.4%	10.1%
2,4-Dimethylphenol	< 372 U	1090	1610	67.7%	1170	1620	72.2%	7.1%
Benzoic Acid	< 3720 U	3090 J	4830	64.0%	3320 J	4860	68.3%	7.2%
bis(2-Chloroethoxy) Methane	< 372 U	1030	1610	64.0%	1110	1620	68.5%	7.5%
2,4-Dichlorophenol	< 1860 U	1070 J	1610	66.5%	1180 J	1620	72.8%	9.8%
1,2,4-Trichlorobenzene	< 372 U	1090	1610	67.7%	1180	1620	72.8%	7.9%
Naphthalene	< 372 U	1340	1610	83.2%	1430	1620	88.3%	6.5%
4-Chloroaniline	< 1860 U	752 J	3870	19.4%	840 J	3890	21.6%	11.1%
Hexachlorobutadiene	< 372 U	939	1610	58.3%	1140	1620	70.4%	19.3%
4-Chloro-3-methylphenol	< 1860 U	1210 J	1610	75.2%	1460 J	1620	90.1%	18.7%
2-Methylnaphthalene	< 372 U	1460	1610	90.7%	1680	1620	104%	14.0%
Hexachlorocyclopentadiene	< 1860 U	1150 J	4830	23.8%	1130 J	4860	23.3%	1.8%
2,4,6-Trichlorophenol	< 1860 U	1290 J	1610	80.1%	1440 J	1620	88.9%	11.0%
2,4,5-Trichlorophenol	< 1860 U	1350 J	1610	83.9%	1450 J	1620	89.5%	7.1%
2-Chloronaphthalene	< 372 U	1100	1610	68.3%	1220	1620	75.3%	10.3%
2-Nitroaniline	< 1860 U	1160 J	1610	72.0%	1310 J	1620	80.9%	12.1%
Dimethylphthalate	< 372 U	1330	1610	82.6%	1380	1620	85.2%	3.7%
Acenaphthylene	< 372 U	1300	1610	80.7%	1450	1620	89.5%	10.9%
3-Nitroaniline	< 1860 U	1700 J	4120	41.3%	2190	4150	52.8%	25.2%
Acenaphthene	< 372 U	1160	1610	72.0%	1270	1620	78.4%	9.1%
2,4-Dinitrophenol	< 3720 U	2870 J	4830	59.4%	3000 J	4860	61.7%	4.4%
4-Nitrophenol	< 1860 U	1280 J	1610	79.5%	1310 J	1620	80.9%	2.3%
Dibenzofuran	< 372 U	1370	1610	85.1%	1510	1620	93.2%	9.7%
2,6-Dinitrotoluene	< 1860 U	889 J	1610	55.2%	1200 J	1620	74.1%	29.8%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: HP-CB-01
MS/MSD

Lab Sample ID: RB73L
LIMS ID: 10-15152
Matrix: Solid
Date Analyzed MS: 07/01/10 23:24
MSD: 07/01/10 23:58

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020

Analyte	Sample	MS	Spike Added-MS	MS Recovery	MSD	Spike Added-MSD	MSD Recovery	RPD
2,4-Dinitrotoluene	< 1860 U	1250 J	1610	77.6%	1300 J	1620	80.2%	3.9%
Diethylphthalate	< 372 U	1210	1610	75.2%	1320	1620	81.5%	8.7%
4-Chlorophenyl-phenylether	< 372 U	1120	1610	69.6%	1210	1620	74.7%	7.7%
Fluorene	< 372 U	1320	1610	82.0%	1390	1620	85.8%	5.2%
4-Nitroaniline	< 1860 U	731 J	1610	45.4%	759 J	1620	46.9%	3.8%
4,6-Dinitro-2-Methylphenol	< 3720 U	3190 J	4830	66.0%	3580 J	4860	73.7%	11.5%
N-Nitrosodiphenylamine	< 372 U	1260	1610	78.3%	1360	1620	84.0%	7.6%
4-Bromophenyl-phenylether	< 372 U	1190	1610	73.9%	1300	1620	80.2%	8.8%
Hexachlorobenzene	< 372 U	1190	1610	73.9%	1350	1620	83.3%	12.6%
Pentachlorophenol	< 1860 U	1980 Q	1610	123%	1940 JQ	1620	120%	2.0%
Phenanthrene	837	2250	1610	87.8%	2320	1620	91.5%	3.1%
Carbazole	< 372 U	1430	1610	88.8%	1590	1620	98.1%	10.6%
Anthracene	< 372 U	1400	1610	87.0%	1530	1620	94.4%	8.9%
Di-n-Butylphthalate	< 372 U	1320	1610	82.0%	1530	1620	94.4%	14.7%
Fluoranthene	1180	2810	1610	101%	3050	1620	115%	8.2%
Pyrene	1200	2650	1610	90.1%	2910	1620	106%	9.4%
Butylbenzylphthalate	< 372 U	1360	1610	84.5%	1630	1620	101%	18.1%
3,3'-Dichlorobenzidine	< 1860 U	< 1930 U	4120	NA	< 1950 U	4150	NA	NA
Benzo(a)anthracene	< 372 U	1690	1610	105%	1720	1620	106%	1.8%
bis(2-Ethylhexyl)phthalate	45600 ES	51600 ES	1610	NA	52000 ES	1620	NA	0.8%
Chrysene	741	2120	1610	85.7%	2370	1620	101%	11.1%
Di-n-Octyl phthalate	2290	3970	1610	104%	3970	1620	104%	0.0%
Benzo(b)fluoranthene	406	1670	1610	78.5%	1780	1620	84.8%	6.4%
Benzo(k)fluoranthene	406	1670	1610	78.5%	1780	1620	84.8%	6.4%
Benzo(a)pyrene	469	1680	1610	75.2%	1760	1620	79.7%	4.7%
Indeno(1,2,3-cd)pyrene	< 372 U	1170	1610	72.7%	1350	1620	83.3%	14.3%
Dibenz(a,h)anthracene	< 372 U	1040	1610	64.6%	1120	1620	69.1%	7.4%
Benzo(g,h,i)perylene	383	1210	1610	51.4%	1320	1620	57.8%	8.7%
1-Methylnaphthalene	< 372 U	1860 Q	1610	116%	2170 Q	1620	134%	15.4%

Reported in µg/kg (ppb)
RPD calculated using sample concentrations per SW846.
NA-No recovery due to high concentration of analyte in original sample and/or calculated negative recovery.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: LCS-062910
LAB CONTROL

Lab Sample ID: LCS-062910
LIMS ID: 10-15152
Matrix: Solid
Data Release Authorized: VD
Reported: 07/10/10

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 06/29/10
Date Analyzed: 07/01/10 16:41
Instrument/Analyst: NT4/JZ
GPC Cleanup: Yes

Sample Amount: 7.50 g
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00
Percent Moisture: NA

Analyte	**Lab Control**	**Spike Added**	**Recovery**
Phenol	1180	1670	70.7%
Bis-(2-Chloroethyl) Ether	1110	1670	66.5%
2-Chlorophenol	1150	1670	68.9%
1,3-Dichlorobenzene	1040	1670	62.3%
1,4-Dichlorobenzene	1040	1670	62.3%
Benzyl Alcohol	2120	3330	63.7%
1,2-Dichlorobenzene	1050	1670	62.9%
2-Methylphenol	1090	1670	65.3%
2,2'-Oxybis(1-Chloropropane)	999	1670	59.8%
4-Methylphenol	2280	3330	68.5%
N-Nitroso-Di-N-Propylamine	1210	1670	72.5%
Hexachloroethane	1010	1670	60.5%
Nitrobenzene	798 Q	1670	47.8%
Isophorone	1170	1670	70.1%
2-Nitrophenol	1130	1670	67.7%
2,4-Dimethylphenol	981	1670	58.7%
Benzoic Acid	3320	5000	66.4%
bis(2-Chloroethoxy) Methane	1130	1670	67.7%
2,4-Dichlorophenol	1100	1670	65.9%
1,2,4-Trichlorobenzene	1090	1670	65.3%
Naphthalene	1160	1670	69.5%
4-Chloroaniline	2800	4000	70.0%
Hexachlorobutadiene	1010	1670	60.5%
4-Chloro-3-methylphenol	1100	1670	65.9%
2-Methylnaphthalene	1180	1670	70.7%
Hexachlorocyclopentadiene	5200	5000	104%
2,4,6-Trichlorophenol	1220	1670	73.1%
2,4,5-Trichlorophenol	1150	1670	68.9%
2-Chloronaphthalene	1150	1670	68.9%
2-Nitroaniline	1290	1670	77.2%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: LCS-062910
LAB CONTROL

Lab Sample ID: LCS-062910
LIMS ID: 10-15152
Matrix: Solid
Date Analyzed: 07/01/10 16:41

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020

Analyte	Lab Control	Spike Added	Recovery
Dimethylphthalate	1230	1670	73.7%
Acenaphthylene	1220	1670	73.1%
3-Nitroaniline	3910	4270	91.6%
Acenaphthene	1110	1670	66.5%
2,4-Dinitrophenol	4470	5000	89.4%
4-Nitrophenol	972	1670	58.2%
Dibenzofuran	1280	1670	76.6%
2,6-Dinitrotoluene	1270	1670	76.0%
2,4-Dinitrotoluene	1320	1670	79.0%
Diethylphthalate	1250	1670	74.9%
4-Chlorophenyl-phenylether	1100	1670	65.9%
Fluorene	1190	1670	71.3%
4-Nitroaniline	1260	1670	75.4%
4,6-Dinitro-2-Methylphenol	4220	5000	84.4%
N-Nitrosodiphenylamine	1260	1670	75.4%
4-Bromophenyl-phenylether	1190	1670	71.3%
Hexachlorobenzene	1200	1670	71.9%
Pentachlorophenol	1220 Q	1670	73.1%
Phenanthrene	1380	1670	82.6%
Carbazole	1500	1670	89.8%
Anthracene	1330	1670	79.6%
Di-n-Butylphthalate	1430	1670	85.6%
Fluoranthene	1450	1670	86.8%
Pyrene	1500	1670	89.8%
Butylbenzylphthalate	1410	1670	84.4%
3,3'-Dichlorobenzidine	2950	4270	69.1%
Benzo(a)anthracene	1360	1670	81.4%
bis(2-Ethylhexyl)phthalate	1450	1670	86.8%
Chrysene	1470	1670	88.0%
Di-n-Octyl phthalate	1360	1670	81.4%
Benzo(b)fluoranthene	2620	1670	157%
Benzo(k)fluoranthene	1350	1670	80.8%
Benzo(a)pyrene	1350	1670	80.8%
Indeno(1,2,3-cd)pyrene	1440	1670	86.2%
Dibenz(a,h)anthracene	1390	1670	83.2%
Benzo(g,h,i)perylene	1400	1670	83.8%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: LCS-062910
LAB CONTROL

Lab Sample ID: LCS-062910
LIMS ID: 10-15152
Matrix: Solid
Date Analyzed: 07/01/10 16:41

QC Report No: RB73-Floyd/Snider
Project: Phase 3
COS-GWSA 6020

Analyte	**Lab Control**	**Spike Added**	**Recovery**
1-Methylnaphthalene	1620 Q	1670	97.0%

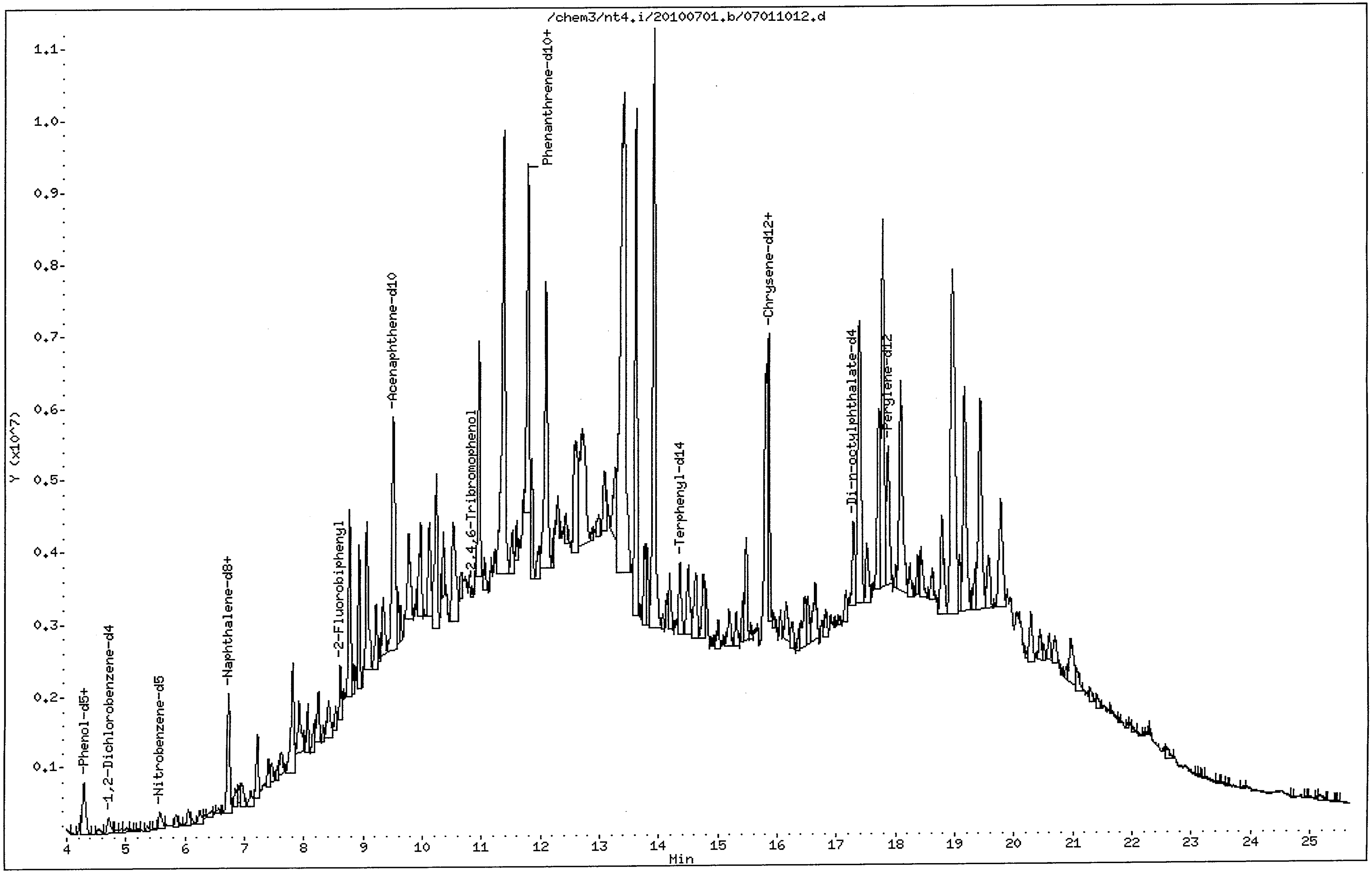
Semivolatile Surrogate Recovery	
d5-Nitrobenzene	66.4%
2-Fluorobiphenyl	75.2%
d14-p-Terphenyl	91.2%
d4-1,2-Dichlorobenzene	67.6%
d5-Phenol	78.4%
2-Fluorophenol	83.2%
2,4,6-Tribromophenol	88.8%
d4-2-Chlorophenol	76.3%

Reported in µg/kg (ppb)

Data File: /chem3/nt4.i/20100701.b/07011012.d
Date : 01-JUL-2010 21:43
Client ID: SL6.1
Sample Info: RB73J,3,
Volume Injected (uL): 1.0
Column phase: ZB-5msi

Instrument: nt4.i

Operator: JZ
Column diameter: 0.32



ANALYTICAL RESOURCES INCORPORATED

SW8270 PNA SURROGATE RECOVERY SUMMARY

Matrix: Solid

QC Report No: RF64-Floyd/Snider
Project: Phase 3
COS-GWSA 6020

Client ID	TER	FBP	TOT OUT
MB-080610	90.4%	69.2%	0
LCS-080610	94.8%	66.0%	0
LCSD-080610	89.2%	61.2%	0
PA-CB-01	92.0%	86.0%	0
PA-CB-02	75.6%	77.0%	0
PA-CB-03	97.4%	82.7%	0
PA-CB-04	87.4%	87.5%	0
PA-CB-05	90.4%	81.5%	0
PA-CB-06	93.4%	73.0%	0
PA-CB-07	91.2%	83.3%	0
PA-CB-DUP	117%*	91.8%	1
PA-CB-DUP DL	83.6%	80.8%	0
HP-CB-01	104%	80.3%	0
HP-CB-02	97.9%	71.5%	0
HP-CB-03	90.8%	74.0%	0
HP-OWS-INLET	71.5%	65.5%	0
HP-OWS-OUTLET	104%	82.4%	0

	LCS/MB LIMITS	QC LIMITS
(TER) = d14-p-Terphenyl	(47-112)	(35-112)
(FBP) = 2-Fluorobiphenyl	(40-100)	(34-100)

Prep Method: SW3550B
Log Number Range: 10-17487 to 10-17499

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D GC/MS

Sample ID: PA-CB-01
SAMPLE

Lab Sample ID: RF64A
LIMS ID: 10-17487
Matrix: Solid
Data Release Authorized:
Reported: 08/11/10

QC Report No: RF64-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 08/06/10
Date Analyzed: 08/09/10 13:47
Instrument/Analyst: NT4/JZ
GPC Cleanup: No
Alumina: No
Silica Gel: Yes

Sample Amount: 7.45 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 3.00
Percent Moisture: 75.2%

CAS Number	Analyte	RL	Result
91-20-3	Naphthalene	200	< 200 U
91-57-6	2-Methylnaphthalene	200	< 200 U
90-12-0	1-Methylnaphthalene	200	< 200 U
208-96-8	Acenaphthylene	200	< 200 U
83-32-9	Acenaphthene	200	< 200 U
86-73-7	Fluorene	200	< 200 U
85-01-8	**Phenanthrene**	**200**	**590**
120-12-7	Anthracene	200	< 200 U
206-44-0	**Fluoranthene**	**200**	**850**
129-00-0	**Pyrene**	**200**	**1,000**
56-55-3	**Benzo(a)anthracene**	**200**	**240**
218-01-9	**Chrysene**	**200**	**670**
50-32-8	**Benzo(a)pyrene**	**200**	**370**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**200**	**220**
53-70-3	Dibenz(a,h)anthracene	200	< 200 U
191-24-2	**Benzo(g,h,i)perylene**	**200**	**320**
132-64-9	Dibenzofuran	200	< 200 U
TOTBFA	**Total Benzofluoranthenes**	**200**	**750**

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery	
d14-p-Terphenyl	92.0%
2-Fluorobiphenyl	86.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D GC/MS
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Sample ID: PA-CB-02
SAMPLE

Lab Sample ID: RF64B
LIMS ID: 10-17488
Matrix: Solid
Data Release Authorized:
Reported: 08/11/10

QC Report No: RF64-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 08/06/10
Date Analyzed: 08/09/10 14:20
Instrument/Analyst: NT4/JZ
GPC Cleanup: No
Alumina: No
Silica Gel: Yes

Sample Amount: 7.97 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 3.00
Percent Moisture: 56.2%

CAS Number	Analyte	RL	Result
91-20-3	Naphthalene	190	< 190 U
91-57-6	2-Methylnaphthalene	190	< 190 U
90-12-0	1-Methylnaphthalene	190	< 190 U
208-96-8	Acenaphthylene	190	< 190 U
83-32-9	Acenaphthene	190	< 190 U
86-73-7	Fluorene	190	< 190 U
85-01-8	**Phenanthrene**	**190**	**460**
120-12-7	Anthracene	190	< 190 U
206-44-0	**Fluoranthene**	**190**	**710**
129-00-0	**Pyrene**	**190**	**780**
56-55-3	**Benzo(a)anthracene**	**190**	**210**
218-01-9	**Chrysene**	**190**	**540**
50-32-8	**Benzo(a)pyrene**	**190**	**290**
193-39-5	Indeno(1,2,3-cd)pyrene	190	< 190 U
53-70-3	Dibenz(a,h)anthracene	190	< 190 U
191-24-2	**Benzo(g,h,i)perylene**	**190**	**240**
132-64-9	Dibenzofuran	190	< 190 U
TOTBFA	**Total Benzofluoranthenes**	**190**	**680**

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery	
d14-p-Terphenyl	75.6%
2-Fluorobiphenyl	77.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D GC/MS

Sample ID: PA-CB-03
SAMPLE

Lab Sample ID: RF64C
LIMS ID: 10-17489
Matrix: Solid
Data Release Authorized:
Reported: 08/11/10

QC Report No: RF64-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 08/06/10
Date Analyzed: 08/09/10 14:54
Instrument/Analyst: NT4/JZ
GPC Cleanup: No
Alumina: No
Silica Gel: Yes

Sample Amount: 7.80 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 3.00
Percent Moisture: 72.3%

CAS Number	Analyte	RL	Result
91-20-3	Naphthalene	190	< 190 U
91-57-6	2-Methylnaphthalene	190	< 190 U
90-12-0	1-Methylnaphthalene	190	< 190 U
208-96-8	Acenaphthylene	190	< 190 U
83-32-9	Acenaphthene	190	< 190 U
86-73-7	Fluorene	190	< 190 U
85-01-8	**Phenanthrene**	**190**	**680**
120-12-7	Anthracene	190	< 190 U
206-44-0	**Fluoranthene**	**190**	**1,000**
129-00-0	**Pyrene**	**190**	**1,300**
56-55-3	**Benzo(a)anthracene**	**190**	**300**
218-01-9	**Chrysene**	**190**	**700**
50-32-8	**Benzo(a)pyrene**	**190**	**380**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**190**	**200**
53-70-3	Dibenz(a,h)anthracene	190	< 190 U
191-24-2	**Benzo(g,h,i)perylene**	**190**	**310**
132-64-9	Dibenzofuran	190	< 190 U
TOTBFA	**Total Benzofluoranthenes**	**190**	**910**

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery	
d14-p-Terphenyl	97.4%
2-Fluorobiphenyl	82.7%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D GC/MS

Sample ID: PA-CB-04
SAMPLE

Lab Sample ID: RF64D
LIMS ID: 10-17490
Matrix: Solid
Data Release Authorized:
Reported: 08/11/10

QC Report No: RF64-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 08/06/10
Date Analyzed: 08/09/10 15:27
Instrument/Analyst: NT4/JZ
GPC Cleanup: No
Alumina: No
Silica Gel: Yes

Sample Amount: 7.85 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 3.00
Percent Moisture: 58.9%

CAS Number	Analyte	RL	Result
91-20-3	Naphthalene	190	< 190 U
91-57-6	2-Methylnaphthalene	190	< 190 U
90-12-0	1-Methylnaphthalene	190	< 190 U
208-96-8	Acenaphthylene	190	< 190 U
83-32-9	Acenaphthene	190	< 190 U
86-73-7	Fluorene	190	< 190 U
85-01-8	**Phenanthrene**	**190**	**440**
120-12-7	Anthracene	190	< 190 U
206-44-0	**Fluoranthene**	**190**	**960**
129-00-0	**Pyrene**	**190**	**910**
56-55-3	**Benzo(a)anthracene**	**190**	**400**
218-01-9	**Chrysene**	**190**	**570**
50-32-8	**Benzo(a)pyrene**	**190**	**440**
193-39-5	Indeno(1,2,3-cd)pyrene	190	< 190 U
53-70-3	Dibenz(a,h)anthracene	190	< 190 U
191-24-2	**Benzo(g,h,i)perylene**	**190**	**220**
132-64-9	Dibenzofuran	190	< 190 U
TOTBFA	**Total Benzofluoranthenes**	**190**	**920**

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery	
d14-p-Terphenyl	87.4%
2-Fluorobiphenyl	87.5%

ANALYTICAL
RESOURCES
INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D GC/MS
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Sample ID: PA-CB-05
SAMPLE

Lab Sample ID: RF64E
LIMS ID: 10-17491
Matrix: Solid
Data Release Authorized:
Reported: 08/11/10

QC Report No: RF64-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 08/06/10
Date Analyzed: 08/09/10 16:01
Instrument/Analyst: NT4/JZ
GPC Cleanup: No
Alumina: No
Silica Gel: Yes

Sample Amount: 7.65 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 3.00
Percent Moisture: 68.2%

CAS Number	Analyte	RL	Result
91-20-3	Naphthalene	200	< 200 U
91-57-6	2-Methylnaphthalene	200	< 200 U
90-12-0	1-Methylnaphthalene	200	< 200 U
208-96-8	Acenaphthylene	200	< 200 U
83-32-9	Acenaphthene	200	< 200 U
86-73-7	Fluorene	200	< 200 U
85-01-8	**Phenanthrene**	**200**	**390**
120-12-7	Anthracene	200	< 200 U
206-44-0	**Fluoranthene**	**200**	**580**
129-00-0	**Pyrene**	**200**	**710**
56-55-3	Benzo(a)anthracene	200	< 200 U
218-01-9	**Chrysene**	**200**	**420**
50-32-8	**Benzo(a)pyrene**	**200**	**230**
193-39-5	Indeno(1,2,3-cd)pyrene	200	< 200 U
53-70-3	Dibenz(a,h)anthracene	200	< 200 U
191-24-2	Benzo(g,h,i)perylene	200	< 200 U
132-64-9	Dibenzofuran	200	< 200 U
TOTBFA	**Total Benzofluoranthenes**	**200**	**600**

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery	
d14-p-Terphenyl	90.4%
2-Fluorobiphenyl	81.5%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D GC/MS

Sample ID: PA-CB-06
SAMPLE

Lab Sample ID: RF64F
LIMS ID: 10-17492
Matrix: Solid
Data Release Authorized:
Reported: 08/11/10

QC Report No: RF64-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 08/06/10
Date Analyzed: 08/09/10 16:34
Instrument/Analyst: NT4/JZ
GPC Cleanup: No
Alumina: No
Silica Gel: Yes

Sample Amount: 7.57 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 3.00
Percent Moisture: 80.7%

CAS Number	Analyte	RL	Result
91-20-3	Naphthalene	200	< 200 U
91-57-6	2-Methylnaphthalene	200	< 200 U
90-12-0	1-Methylnaphthalene	200	< 200 U
208-96-8	Acenaphthylene	200	< 200 U
83-32-9	Acenaphthene	200	< 200 U
86-73-7	Fluorene	200	< 200 U
85-01-8	**Phenanthrene**	**200**	**470**
120-12-7	Anthracene	200	< 200 U
206-44-0	**Fluoranthene**	**200**	**740**
129-00-0	**Pyrene**	**200**	**1,200**
56-55-3	**Benzo(a)anthracene**	**200**	**220**
218-01-9	**Chrysene**	**200**	**560**
50-32-8	**Benzo(a)pyrene**	**200**	**310**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**200**	**200**
53-70-3	Dibenz(a,h)anthracene	200	< 200 U
191-24-2	**Benzo(g,h,i)perylene**	**200**	**300**
132-64-9	Dibenzofuran	200	< 200 U
TOTBFA	**Total Benzofluoranthenes**	**200**	**790**

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery	
d14-p-Terphenyl	93.4%
2-Fluorobiphenyl	73.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D GC/MS

Sample ID: PA-CB-07
SAMPLE

Lab Sample ID: RF64G
LIMS ID: 10-17493
Matrix: Solid
Data Release Authorized:
Reported: 08/11/10

QC Report No: RF64-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 08/06/10
Date Analyzed: 08/09/10 17:07
Instrument/Analyst: NT4/JZ
GPC Cleanup: No
Alumina: No
Silica Gel: Yes

Sample Amount: 7.74 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 3.00
Percent Moisture: 71.6%

CAS Number	Analyte	RL	Result
91-20-3	Naphthalene	390	< 390 U
91-57-6	2-Methylnaphthalene	390	< 390 U
90-12-0	1-Methylnaphthalene	390	< 390 U
208-96-8	Acenaphthylene	390	< 390 U
83-32-9	Acenaphthene	390	< 390 U
86-73-7	Fluorene	390	< 390 U
85-01-8	**Phenanthrene**	**390**	**840**
120-12-7	Anthracene	390	< 390 U
206-44-0	**Fluoranthene**	**390**	**1,400**
129-00-0	**Pyrene**	**390**	**1,800**
56-55-3	**Benzo(a)anthracene**	**390**	**500**
218-01-9	**Chrysene**	**390**	**1,000**
50-32-8	**Benzo(a)pyrene**	**390**	**670**
193-39-5	Indeno(1,2,3-cd)pyrene	390	< 390 U
53-70-3	Dibenz(a,h)anthracene	390	< 390 U
191-24-2	**Benzo(g,h,i)perylene**	**390**	**450**
132-64-9	Dibenzofuran	390	< 390 U
TOTBFA	**Total Benzofluoranthenes**	**390**	**1,500**

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d14-p-Terphenyl	91.2%
2-Fluorobiphenyl	83.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D GC/MS

Sample ID: PA-CB-DUP
SAMPLE

Lab Sample ID: RF64H
LIMS ID: 10-17494
Matrix: Solid
Data Release Authorized:
Reported: 08/11/10

QC Report No: RF64-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 08/06/10
Date Analyzed: 08/09/10 17:41
Instrument/Analyst: NT4/JZ
GPC Cleanup: No
Alumina: No
Silica Gel: Yes

Sample Amount: 7.61 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 3.00
Percent Moisture: 70.9%

CAS Number	Analyte	RL	Result
91-20-3	Naphthalene	200	< 200 U
91-57-6	2-Methylnaphthalene	200	< 200 U
90-12-0	1-Methylnaphthalene	200	< 200 U
208-96-8	Acenaphthylene	200	< 200 U
83-32-9	Acenaphthene	200	< 200 U
86-73-7	Fluorene	200	< 200 U
85-01-8	**Phenanthrene**	**200**	**680**
120-12-7	Anthracene	200	< 200 U
206-44-0	**Fluoranthene**	**200**	**820**
129-00-0	**Pyrene**	**200**	**1,100**
56-55-3	**Benzo(a)anthracene**	**200**	**260**
218-01-9	**Chrysene**	**200**	**550**
50-32-8	**Benzo(a)pyrene**	**200**	**340**
193-39-5	Indeno(1,2,3-cd)pyrene	200	< 200 U
53-70-3	Dibenz(a,h)anthracene	200	< 200 U
191-24-2	**Benzo(g,h,i)perylene**	**200**	**250**
132-64-9	Dibenzofuran	200	< 200 U
TOTBFA	**Total Benzofluoranthenes**	**200**	**840**

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d14-p-Terphenyl	117%
2-Fluorobiphenyl	91.8%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D GC/MS

Sample ID: PA-CB-DUP
DILUTION

Lab Sample ID: RF64H
LIMS ID: 10-17494
Matrix: Solid
Data Release Authorized:
Reported: 08/11/10

QC Report No: RF64-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 08/06/10
Date Analyzed: 08/10/10 14:52
Instrument/Analyst: NT4/JZ
GPC Cleanup: No
Alumina: No
Silica Gel: Yes

Sample Amount: 7.61 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 5.00
Percent Moisture: 70.9%

CAS Number	Analyte	RL	Result
91-20-3	Naphthalene	330	< 330 U
91-57-6	2-Methylnaphthalene	330	< 330 U
90-12-0	1-Methylnaphthalene	330	< 330 U
208-96-8	Acenaphthylene	330	< 330 U
83-32-9	Acenaphthene	330	< 330 U
86-73-7	Fluorene	330	< 330 U
85-01-8	**Phenanthrene**	**330**	**580**
120-12-7	Anthracene	330	< 330 U
206-44-0	**Fluoranthene**	**330**	**700**
129-00-0	**Pyrene**	**330**	**780**
56-55-3	Benzo(a)anthracene	330	< 330 U
218-01-9	**Chrysene**	**330**	**480**
50-32-8	Benzo(a)pyrene	330	< 330 U
193-39-5	Indeno(1,2,3-cd)pyrene	330	< 330 U
53-70-3	Dibenz(a,h)anthracene	330	< 330 U
191-24-2	Benzo(g,h,i)perylene	330	< 330 U
132-64-9	Dibenzofuran	330	< 330 U
TOTBFA	**Total Benzofluoranthenes**	**330**	**690**

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d14-p-Terphenyl	83.6%
2-Fluorobiphenyl	80.8%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D GC/MS
Page 1 of 1

Sample ID: HP-CB-01
SAMPLE

Lab Sample ID: RF64I
LIMS ID: 10-17495
Matrix: Solid
Data Release Authorized:
Reported: 08/11/10

QC Report No: RF64-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 08/06/10
Date Analyzed: 08/09/10 18:14
Instrument/Analyst: NT4/JZ
GPC Cleanup: No
Alumina: No
Silica Gel: Yes

Sample Amount: 8.03 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 3.00
Percent Moisture: 38.4%

CAS Number	Analyte	RL	Result
91-20-3	**Naphthalene**	**190**	**240**
91-57-6	**2-Methylnaphthalene**	**190**	**350**
90-12-0	**1-Methylnaphthalene**	**190**	**260**
208-96-8	Acenaphthylene	190	< 190 U
83-32-9	Acenaphthene	190	< 190 U
86-73-7	**Fluorene**	**190**	**200**
85-01-8	**Phenanthrene**	**190**	**1,200**
120-12-7	**Anthracene**	**190**	**240**
206-44-0	**Fluoranthene**	**190**	**1,800**
129-00-0	**Pyrene**	**190**	**2,300**
56-55-3	**Benzo(a)anthracene**	**190**	**620**
218-01-9	**Chrysene**	**190**	**1,000**
50-32-8	**Benzo(a)pyrene**	**190**	**700**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**190**	**260**
53-70-3	Dibenz(a,h)anthracene	190	< 190 U
191-24-2	**Benzo(g,h,i)perylene**	**190**	**380**
132-64-9	Dibenzofuran	190	< 190 U
TOTBFA	**Total Benzofluoranthenes**	**190**	**1,500**

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery	
d14-p-Terphenyl	104%
2-Fluorobiphenyl	80.3%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D GC/MS

Sample ID: HP-CB-02
SAMPLE

Lab Sample ID: RF64J
LIMS ID: 10-17496
Matrix: Solid
Data Release Authorized:
Reported: 08/11/10

QC Report No: RF64-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 08/06/10
Date Analyzed: 08/09/10 18:48
Instrument/Analyst: NT4/JZ
GPC Cleanup: No
Alumina: No
Silica Gel: Yes

Sample Amount: 8.00 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 3.00
Percent Moisture: 46.8%

CAS Number	Analyte	RL	Result
91-20-3	**Naphthalene**	**190**	**660**
91-57-6	**2-Methylnaphthalene**	**190**	**690**
90-12-0	**1-Methylnaphthalene**	**190**	**540**
208-96-8	Acenaphthylene	190	< 190 U
83-32-9	Acenaphthene	190	< 190 U
86-73-7	**Fluorene**	**190**	**300**
85-01-8	**Phenanthrene**	**190**	**2,000**
120-12-7	**Anthracene**	**190**	**270**
206-44-0	**Fluoranthene**	**190**	**2,500**
129-00-0	**Pyrene**	**190**	**3,300**
56-55-3	**Benzo(a)anthracene**	**190**	**810**
218-01-9	**Chrysene**	**190**	**1,400**
50-32-8	**Benzo(a)pyrene**	**190**	**910**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**190**	**370**
53-70-3	Dibenz(a,h)anthracene	190	< 190 U
191-24-2	**Benzo(g,h,i)perylene**	**190**	**550**
132-64-9	**Dibenzofuran**	**190**	**240**
TOTBFA	**Total Benzofluoranthenes**	**190**	**2,000**

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery	
d14-p-Terphenyl	97.9%
2-Fluorobiphenyl	71.5%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D GC/MS

Sample ID: HP-CB-03
SAMPLE

Lab Sample ID: RF64K
LIMS ID: 10-17497
Matrix: Solid
Data Release Authorized:
Reported: 08/11/10

QC Report No: RF64-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 08/06/10
Date Analyzed: 08/10/10 20:03
Instrument/Analyst: NT4/JZ
GPC Cleanup: No
Alumina: No
Silica Gel: Yes

Sample Amount: 7.78 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 10.0
Percent Moisture: 52.0%

CAS Number	Analyte	RL	Result
91-20-3	Naphthalene	640	< 640 U
91-57-6	2-Methylnaphthalene	640	< 640 U
90-12-0	1-Methylnaphthalene	640	< 640 U
208-96-8	Acenaphthylene	640	< 640 U
83-32-9	Acenaphthene	640	< 640 U
86-73-7	Fluorene	640	< 640 U
85-01-8	**Phenanthrene**	**640**	**1,500**
120-12-7	Anthracene	640	< 640 U
206-44-0	**Fluoranthene**	**640**	**1,800**
129-00-0	**Pyrene**	**640**	**2,100**
56-55-3	Benzo(a)anthracene	640	< 640 U
218-01-9	**Chrysene**	**640**	**1,100**
50-32-8	Benzo(a)pyrene	640	< 640 U
193-39-5	Indeno(1,2,3-cd)pyrene	640	< 640 U
53-70-3	Dibenz(a,h)anthracene	640	< 640 U
191-24-2	Benzo(g,h,i)perylene	640	< 640 U
132-64-9	Dibenzofuran	640	< 640 U
TOTBFA	**Total Benzofluoranthenes**	**640**	**1,700**

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d14-p-Terphenyl	90.8%
2-Fluorobiphenyl	74.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D GC/MS
Page 1 of 1

Sample ID: HP-OWS-INLET SAMPLE

Lab Sample ID: RF64L
LIMS ID: 10-17498
Matrix: Solid
Data Release Authorized:
Reported: 08/11/10

QC Report No: RF64-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 08/06/10
Date Analyzed: 08/10/10 13:45
Instrument/Analyst: NT4/JZ
GPC Cleanup: No
Alumina: No
Silica Gel: Yes

Sample Amount: 7.72 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 3.00
Percent Moisture: 65.4%

CAS Number	Analyte	RL	Result
91-20-3	**Naphthalene**	**390**	**1,400**
91-57-6	**2-Methylnaphthalene**	**390**	**2,300**
90-12-0	**1-Methylnaphthalene**	**390**	**1,400**
208-96-8	Acenaphthylene	390	< 390 U
83-32-9	Acenaphthene	390	< 390 U
86-73-7	**Fluorene**	**390**	**440**
85-01-8	**Phenanthrene**	**390**	**2,500**
120-12-7	Anthracene	390	< 390 U
206-44-0	**Fluoranthene**	**390**	**3,200**
129-00-0	**Pyrene**	**390**	**3,600**
56-55-3	**Benzo(a)anthracene**	**390**	**1,100**
218-01-9	**Chrysene**	**390**	**2,300**
50-32-8	**Benzo(a)pyrene**	**390**	**1,400**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**390**	**500**
53-70-3	Dibenz(a,h)anthracene	390	< 390 U
191-24-2	**Benzo(g,h,i)perylene**	**390**	**730**
132-64-9	Dibenzofuran	390	< 390 U
TOTBFA	**Total Benzofluoranthenes**	**390**	**2,900**

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery	
d14-p-Terphenyl	71.5%
2-Fluorobiphenyl	65.5%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D GC/MS

Sample ID: HP-OWS-OUTLET
SAMPLE

Lab Sample ID: RF64M
LIMS ID: 10-17499
Matrix: Solid
Data Release Authorized:
Reported: 08/11/10

QC Report No: RF64-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Date Extracted: 08/06/10
Date Analyzed: 08/10/10 20:36
Instrument/Analyst: NT4/JZ
GPC Cleanup: No
Alumina: No
Silica Gel: Yes

Sample Amount: 7.83 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 10.0
Percent Moisture: 63.2%

CAS Number	Analyte	RL	Result
91-20-3	Naphthalene	1,300	< 1,300 U
91-57-6	2-Methylnaphthalene	1,300	< 1,300 U
90-12-0	1-Methylnaphthalene	1,300	< 1,300 U
208-96-8	Acenaphthylene	1,300	< 1,300 U
83-32-9	Acenaphthene	1,300	< 1,300 U
86-73-7	Fluorene	1,300	< 1,300 U
85-01-8	**Phenanthrene**	**1,300**	**3,000**
120-12-7	Anthracene	1,300	< 1,300 U
206-44-0	**Fluoranthene**	**1,300**	**4,300**
129-00-0	**Pyrene**	**1,300**	**5,200**
56-55-3	**Benzo(a)anthracene**	**1,300**	**1,300**
218-01-9	**Chrysene**	**1,300**	**2,800**
50-32-8	**Benzo(a)pyrene**	**1,300**	**1,600**
193-39-5	Indeno(1,2,3-cd)pyrene	1,300	< 1,300 U
53-70-3	Dibenz(a,h)anthracene	1,300	< 1,300 U
191-24-2	Benzo(g,h,i)perylene	1,300	< 1,300 U
132-64-9	Dibenzofuran	1,300	< 1,300 U
TOTBFA	**Total Benzofluoranthenes**	**1,300**	**4,300**

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery	
d14-p-Terphenyl	104%
2-Fluorobiphenyl	82.4%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D GC/MS

Sample ID: MB-080610
METHOD BLANK

Lab Sample ID: MB-080610
LIMS ID: 10-17487
Matrix: Solid
Data Release Authorized:
Reported: 08/11/10

QC Report No: RF64-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: NA
Date Received: NA

Date Extracted: 08/06/10
Date Analyzed: 08/09/10 12:06
Instrument/Analyst: NT4/JZ
GPC Cleanup: No
Alumina: No
Silica Gel: Yes

Sample Amount: 7.50 g
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00
Percent Moisture: NA

CAS Number	Analyte	RL	Result
91-20-3	Naphthalene	67	< 67 U
91-57-6	2-Methylnaphthalene	67	< 67 U
90-12-0	1-Methylnaphthalene	67	< 67 U
208-96-8	Acenaphthylene	67	< 67 U
83-32-9	Acenaphthene	67	< 67 U
86-73-7	Fluorene	67	< 67 U
85-01-8	Phenanthrene	67	< 67 U
120-12-7	Anthracene	67	< 67 U
206-44-0	Fluoranthene	67	< 67 U
129-00-0	Pyrene	67	< 67 U
56-55-3	Benzo(a)anthracene	67	< 67 U
218-01-9	Chrysene	67	< 67 U
50-32-8	Benzo(a)pyrene	67	< 67 U
193-39-5	Indeno(1,2,3-cd)pyrene	67	< 67 U
53-70-3	Dibenz(a,h)anthracene	67	< 67 U
191-24-2	Benzo(g,h,i)perylene	67	< 67 U
132-64-9	Dibenzofuran	67	< 67 U
TOTBFA	Total Benzofluoranthenes	67	< 67 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d14-p-Terphenyl	90.4%
2-Fluorobiphenyl	69.2%

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D GC/MS

ANALYTICAL RESOURCES INCORPORATED

Sample ID: LCS-080610
LCS/LCSD

Lab Sample ID: LCS-080610
LIMS ID: 10-17487
Matrix: Solid
Data Release Authorized:
Reported: 08/11/10

QC Report No: RF64-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: NA
Date Received: 06/23/10

Date Extracted LCS/LCSD: 08/06/10

Date Analyzed LCS: 08/09/10 12:40
LCSD: 08/09/10 13:13
Instrument/Analyst LCS: NT4/JZ
LCSD: NT4/JZ
GPC Cleanup: No
Silica Gel Cleanup: Yes

Sample Amount LCS: 7.50 g
LCSD: 7.50 g
Final Extract Volume LCS: 0.50 mL
LCSD: 0.50 mL
Dilution Factor LCS: 1.00
LCSD: 1.00
Alumina Cleanup: No

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Naphthalene	1000	1670	59.9%	943	1670	56.5%	5.9%
2-Methylnaphthalene	1040	1670	62.3%	1000	1670	59.9%	3.9%
1-Methylnaphthalene	1050	1670	62.9%	1000	1670	59.9%	4.9%
Acenaphthylene	1060	1670	63.5%	1050	1670	62.9%	0.9%
Acenaphthene	1030	1670	61.7%	1010	1670	60.5%	2.0%
Fluorene	1150	1670	68.9%	1130	1670	67.7%	1.8%
Phenanthrene	1240	1670	74.3%	1250	1670	74.9%	0.8%
Anthracene	1240	1670	74.3%	1240	1670	74.3%	0.0%
Fluoranthene	1340	1670	80.2%	1350	1670	80.8%	0.7%
Pyrene	1420	1670	85.0%	1390	1670	83.2%	2.1%
Benzo(a)anthracene	1390	1670	83.2%	1350	1670	80.8%	2.9%
Chrysene	1370	1670	82.0%	1330	1670	79.6%	3.0%
Benzo(a)pyrene	1250	1670	74.9%	1210	1670	72.5%	3.3%
Indeno(1,2,3-cd)pyrene	1610	1670	96.4%	1540	1670	92.2%	4.4%
Dibenz(a,h)anthracene	1620	1670	97.0%	1550	1670	92.8%	4.4%
Benzo(g,h,i)perylene	1650	1670	98.8%	1580	1670	94.6%	4.3%
Dibenzofuran	1170	1670	70.1%	1160	1670	69.5%	0.9%
Total Benzofluoranthenes	2680	3330	80.5%	2650	3330	79.6%	1.1%

Semivolatile Surrogate Recovery

	LCS	LCSD
d14-p-Terphenyl	94.8%	89.2%
2-Fluorobiphenyl	66.0%	61.2%

Results reported in µg/kg
RPD calculated using sample concentrations per SW846.

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: METHOD BLANK

Lab Sample ID: RK54MB
LIMS ID: 10-21394
Matrix: Solid
Data Release Authorized:
Reported: 09/06/10

QC Report No: RK54-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: NA
Date Received: NA

Percent Total Solids: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	08/31/10	6010B	09/02/10	7440-38-2	Arsenic	5	5	U
3050B	08/31/10	6010B	09/02/10	7440-43-9	Cadmium	0.2	0.2	U
3050B	08/31/10	6010B	09/02/10	7440-47-3	Chromium	0.5	0.5	U
3050B	08/31/10	6010B	09/02/10	7440-50-8	Copper	0.2	0.2	U
3050B	08/31/10	6010B	09/02/10	7439-92-1	Lead	2	2	U
CLP	08/31/10	7471A	09/03/10	7439-97-6	Mercury	0.02	0.02	U
3050B	08/31/10	6010B	09/02/10	7440-22-4	Silver	0.3	0.3	U
3050B	08/31/10	6010B	09/02/10	7440-66-6	Zinc	1	1	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: HP-OWS-INLET
SAMPLE

Lab Sample ID: RK54A
LIMS ID: 10-21394
Matrix: Solid
Data Release Authorized:
Reported: 09/06/10

QC Report No: RK54-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Percent Total Solids: 39.1%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	08/31/10	6010B	09/02/10	7440-38-2	Arsenic	10	20	
3050B	08/31/10	6010B	09/02/10	7440-43-9	Cadmium	0.5	9.3	
3050B	08/31/10	6010B	09/02/10	7440-47-3	Chromium	1	91	
3050B	08/31/10	6010B	09/02/10	7440-50-8	Copper	0.5	648	
3050B	08/31/10	6010B	09/02/10	7439-92-1	Lead	5	320	
CLP	08/31/10	7471A	09/03/10	7439-97-6	Mercury	0.06	0.37	
3050B	08/31/10	6010B	09/02/10	7440-22-4	Silver	0.8	0.8	U
3050B	08/31/10	6010B	09/02/10	7440-66-6	Zinc	3	6,930	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: HP-OWS-OUTLAT
SAMPLE

Lab Sample ID: RK54B
LIMS ID: 10-21395
Matrix: Solid
Data Release Authorized:
Reported: 09/06/10

QC Report No: RK54-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 06/23/10
Date Received: 06/23/10

Percent Total Solids: 41.8%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	08/31/10	6010B	09/02/10	**7440-38-2**	**Arsenic**	10	**20**	
3050B	08/31/10	6010B	09/02/10	**7440-43-9**	**Cadmium**	0.5	**7.1**	
3050B	08/31/10	6010B	09/02/10	**7440-47-3**	**Chromium**	1	**80**	
3050B	08/31/10	6010B	09/02/10	**7440-50-8**	**Copper**	0.5	**584**	
3050B	08/31/10	6010B	09/02/10	**7439-92-1**	**Lead**	5	**303**	
CLP	08/31/10	7471A	09/03/10	**7439-97-6**	**Mercury**	0.05	**0.39**	
3050B	08/31/10	6010B	09/02/10	7440-22-4	Silver	0.7	0.7	U
3050B	08/31/10	6010B	09/02/10	**7440-66-6**	**Zinc**	2	**6,410**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: LAB CONTROL

Lab Sample ID: RK54LCS
LIMS ID: 10-21394
Matrix: Solid
Data Release Authorized:
Reported: 09/06/10

QC Report No: RK54-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	6010B	204	200	102%	
Cadmium	6010B	48.9	50.0	97.8%	
Chromium	6010B	50.3	50.0	101%	
Copper	6010B	48.9	50.0	97.8%	
Lead	6010B	198	200	99.0%	
Mercury	7471A	0.52	0.50	104%	
Silver	6010B	49.5	50.0	99.0%	
Zinc	6010B	49	50	98.0%	

Reported in mg/kg-dry

N-Control limit not met
NA-Not Applicable, Analyte Not Spiked
Control Limits: 80-120%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: SL7-051910
SAMPLE

Lab Sample ID: QX55A
LIMS ID: 10-12290
Matrix: Soil
Data Release Authorized:
Reported: 05/28/10

QC Report No: QX55-Floyd/Snider
Project: NE Corner Source Control
COS-GWSA
Date Sampled: 05/19/10
Date Received: 05/19/10

Date Extracted: 05/25/10
Date Analyzed: 05/27/10 19:04
Instrument/Analyst: NT6/JZ
GPC Cleanup: No

Sample Amount: 3.72 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 3.00
Percent Moisture: 66.3%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	810	< 810 U
111-44-4	Bis-(2-Chloroethyl) Ether	810	< 810 U
95-57-8	2-Chlorophenol	810	< 810 U
541-73-1	1,3-Dichlorobenzene	810	< 810 U
106-46-7	1,4-Dichlorobenzene	810	< 810 U
100-51-6	Benzyl Alcohol	4,000	< 4,000 U
95-50-1	1,2-Dichlorobenzene	810	< 810 U
95-48-7	2-Methylphenol	810	< 810 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	810	< 810 U
106-44-5	4-Methylphenol	810	< 810 U
621-64-7	N-Nitroso-Di-N-Propylamine	4,000	< 4,000 U
67-72-1	Hexachloroethane	810	< 810 U
98-95-3	Nitrobenzene	810	< 810 U
78-59-1	Isophorone	810	< 810 U
88-75-5	2-Nitrophenol	4,000	< 4,000 U
105-67-9	2,4-Dimethylphenol	810	< 810 U
65-85-0	Benzoic Acid	8,100	< 8,100 U
111-91-1	bis(2-Chloroethoxy) Methane	810	< 810 U
120-83-2	2,4-Dichlorophenol	4,000	< 4,000 U
120-82-1	1,2,4-Trichlorobenzene	810	< 810 U
91-20-3	**Naphthalene**	**810**	**2,000**
106-47-8	4-Chloroaniline	4,000	< 4,000 U
87-68-3	Hexachlorobutadiene	810	< 810 U
59-50-7	4-Chloro-3-methylphenol	4,000	< 4,000 U
91-57-6	2-Methylnaphthalene	810	< 810 U
77-47-4	Hexachlorocyclopentadiene	4,000	< 4,000 U
88-06-2	2,4,6-Trichlorophenol	4,000	< 4,000 U
95-95-4	2,4,5-Trichlorophenol	4,000	< 4,000 U
91-58-7	2-Chloronaphthalene	810	< 810 U
88-74-4	2-Nitroaniline	4,000	< 4,000 U
131-11-3	Dimethylphthalate	810	< 810 U
208-96-8	**Acenaphthylene**	**810**	**5,100**
99-09-2	3-Nitroaniline	4,000	< 4,000 U
83-32-9	Acenaphthene	810	< 810 U
51-28-5	2,4-Dinitrophenol	8,100	< 8,100 U
100-02-7	4-Nitrophenol	4,000	< 4,000 U
132-64-9	Dibenzofuran	810	< 810 U
606-20-2	2,6-Dinitrotoluene	4,000	< 4,000 U
121-14-2	2,4-Dinitrotoluene	4,000	< 4,000 U
84-66-2	Diethylphthalate	810	< 810 U
7005-72-3	4-Chlorophenyl-phenylether	810	< 810 U
86-73-7	**Fluorene**	**810**	**1,200**
100-01-6	4-Nitroaniline	4,000	< 4,000 U
534-52-1	4,6-Dinitro-2-Methylphenol	8,100	< 8,100 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: SL7-051910
SAMPLE

Lab Sample ID: QX55A
LIMS ID: 10-12290
Matrix: Soil
Date Analyzed: 05/27/10 19:04

QC Report No: QX55-Floyd/Snider
Project: NE Corner Source Control
COS-GWSA

CAS Number	Analyte	RL	Result
86-30-6	N-Nitrosodiphenylamine	810	< 810 U
101-55-3	4-Bromophenyl-phenylether	810	< 810 U
118-74-1	Hexachlorobenzene	810	< 810 U
87-86-5	Pentachlorophenol	4,000	< 4,000 U
85-01-8	**Phenanthrene**	**810**	**16,000**
86-74-8	Carbazole	810	< 810 U
120-12-7	**Anthracene**	**810**	**4,500**
84-74-2	Di-n-Butylphthalate	810	< 810 U
206-44-0	**Fluoranthene**	**810**	**67,000 E**
129-00-0	**Pyrene**	**810**	**83,000 ES**
85-68-7	Butylbenzylphthalate	810	< 810 U
91-94-1	3,3'-Dichlorobenzidine	4,000	< 4,000 U
56-55-3	**Benzo(a)anthracene**	**810**	**30,000**
117-81-7	**bis(2-Ethylhexyl)phthalate**	**810**	**2,900**
218-01-9	**Chrysene**	**810**	**37,000**
117-84-0	Di-n-Octyl phthalate	810	< 810 U
205-99-2	**Benzo(b)fluoranthene**	**810**	**34,000**
207-08-9	**Benzo(k)fluoranthene**	**810**	**34,000**
50-32-8	**Benzo(a)pyrene**	**810**	**52,000**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**810**	**41,000**
53-70-3	**Dibenz(a,h)anthracene**	**810**	**11,000**
191-24-2	**Benzo(g,h,i)perylene**	**810**	**59,000**
90-12-0	1-Methylnaphthalene	810	< 810 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	77.5%	2-Fluorobiphenyl	86.9%
d14-p-Terphenyl	75.6%	d4-1,2-Dichlorobenzene	65.0%
d5-Phenol	73.8%	2-Fluorophenol	77.8%
2,4,6-Tribromophenol	84.0%	d4-2-Chlorophenol	77.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: SL7-051910
DILUTION

Lab Sample ID: QX55A
LIMS ID: 10-12290
Matrix: Soil
Data Release Authorized:
Reported: 05/28/10

QC Report No: QX55-Floyd/Snider
Project: NE Corner Source Control
COS-GWSA
Date Sampled: 05/19/10
Date Received: 05/19/10

Date Extracted: 05/25/10
Date Analyzed: 05/27/10 20:09
Instrument/Analyst: NT6/JZ
GPC Cleanup: No

Sample Amount: 3.72 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 10.0
Percent Moisture: 66.3%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	2,700	< 2,700 U
111-44-4	Bis-(2-Chloroethyl) Ether	2,700	< 2,700 U
95-57-8	2-Chlorophenol	2,700	< 2,700 U
541-73-1	1,3-Dichlorobenzene	2,700	< 2,700 U
106-46-7	1,4-Dichlorobenzene	2,700	< 2,700 U
100-51-6	Benzyl Alcohol	13,000	< 13,000 U
95-50-1	1,2-Dichlorobenzene	2,700	< 2,700 U
95-48-7	2-Methylphenol	2,700	< 2,700 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	2,700	< 2,700 U
106-44-5	4-Methylphenol	2,700	< 2,700 U
621-64-7	N-Nitroso-Di-N-Propylamine	13,000	< 13,000 U
67-72-1	Hexachloroethane	2,700	< 2,700 U
98-95-3	Nitrobenzene	2,700	< 2,700 U
78-59-1	Isophorone	2,700	< 2,700 U
88-75-5	2-Nitrophenol	13,000	< 13,000 U
105-67-9	2,4-Dimethylphenol	2,700	< 2,700 U
65-85-0	Benzoic Acid	27,000	< 27,000 U
111-91-1	bis(2-Chloroethoxy) Methane	2,700	< 2,700 U
120-83-2	2,4-Dichlorophenol	13,000	< 13,000 U
120-82-1	1,2,4-Trichlorobenzene	2,700	< 2,700 U
91-20-3	Naphthalene	2,700	< 2,700 U
106-47-8	4-Chloroaniline	13,000	< 13,000 U
87-68-3	Hexachlorobutadiene	2,700	< 2,700 U
59-50-7	4-Chloro-3-methylphenol	13,000	< 13,000 U
91-57-6	2-Methylnaphthalene	2,700	< 2,700 U
77-47-4	Hexachlorocyclopentadiene	13,000	< 13,000 U
88-06-2	2,4,6-Trichlorophenol	13,000	< 13,000 U
95-95-4	2,4,5-Trichlorophenol	13,000	< 13,000 U
91-58-7	2-Chloronaphthalene	2,700	< 2,700 U
88-74-4	2-Nitroaniline	13,000	< 13,000 U
131-11-3	Dimethylphthalate	2,700	< 2,700 U
208-96-8	**Acenaphthylene**	**2,700**	**4,700**
99-09-2	3-Nitroaniline	13,000	< 13,000 U
83-32-9	Acenaphthene	2,700	< 2,700 U
51-28-5	2,4-Dinitrophenol	27,000	< 27,000 U
100-02-7	4-Nitrophenol	13,000	< 13,000 U
132-64-9	Dibenzofuran	2,700	< 2,700 U
606-20-2	2,6-Dinitrotoluene	13,000	< 13,000 U
121-14-2	2,4-Dinitrotoluene	13,000	< 13,000 U
84-66-2	Diethylphthalate	2,700	< 2,700 U
7005-72-3	4-Chlorophenyl-phenylether	2,700	< 2,700 U
86-73-7	Fluorene	2,700	< 2,700 U
100-01-6	4-Nitroaniline	13,000	< 13,000 U
534-52-1	4,6-Dinitro-2-Methylphenol	27,000	< 27,000 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: SL7-051910
DILUTION

Lab Sample ID: QX55A
LIMS ID: 10-12290
Matrix: Soil
Date Analyzed: 05/27/10 20:09

QC Report No: QX55-Floyd/Snider
Project: NE Corner Source Control
COS-GWSA

CAS Number	**Analyte**	**RL**	**Result**
86-30-6	N-Nitrosodiphenylamine	2,700	< 2,700 U
101-55-3	4-Bromophenyl-phenylether	2,700	< 2,700 U
118-74-1	Hexachlorobenzene	2,700	< 2,700 U
87-86-5	Pentachlorophenol	13,000	< 13,000 U
85-01-8	**Phenanthrene**	**2,700**	**15,000**
86-74-8	Carbazole	2,700	< 2,700 U
120-12-7	**Anthracene**	**2,700**	**4,200**
84-74-2	Di-n-Butylphthalate	2,700	< 2,700 U
206-44-0	**Fluoranthene**	**2,700**	**71,000**
129-00-0	**Pyrene**	**2,700**	**110,000**
85-68-7	Butylbenzylphthalate	2,700	< 2,700 U
91-94-1	3,3'-Dichlorobenzidine	13,000	< 13,000 U
56-55-3	**Benzo(a)anthracene**	**2,700**	**29,000**
117-81-7	**bis(2-Ethylhexyl)phthalate**	**2,700**	**2,900**
218-01-9	**Chrysene**	**2,700**	**36,000**
117-84-0	Di-n-Octyl phthalate	2,700	< 2,700 U
205-99-2	**Benzo(b)fluoranthene**	**2,700**	**33,000**
207-08-9	**Benzo(k)fluoranthene**	**2,700**	**33,000**
50-32-8	**Benzo(a)pyrene**	**2,700**	**50,000**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**2,700**	**35,000**
53-70-3	**Dibenz(a,h)anthracene**	**2,700**	**6,900**
191-24-2	**Benzo(g,h,i)perylene**	**2,700**	**52,000**
90-12-0	1-Methylnaphthalene	2,700	< 2,700 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	80.8%	2-Fluorobiphenyl	84.8%
d14-p-Terphenyl	84.8%	d4-1,2-Dichlorobenzene	65.6%
d5-Phenol	73.6%	2-Fluorophenol	85.3%
2,4,6-Tribromophenol	72.5%	d4-2-Chlorophenol	80.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: SL8-051910
SAMPLE

Lab Sample ID: QX55B
LIMS ID: 10-12291
Matrix: Soil
Data Release Authorized:
Reported: 05/28/10

QC Report No: QX55-Floyd/Snider
Project: NE Corner Source Control
COS-GWSA
Date Sampled: 05/19/10
Date Received: 05/19/10

Date Extracted: 05/25/10
Date Analyzed: 05/27/10 19:36
Instrument/Analyst: NT6/JZ
GPC Cleanup: No

Sample Amount: 3.78 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 3.00
Percent Moisture: 65.6%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	790	< 790 U
111-44-4	Bis-(2-Chloroethyl) Ether	790	< 790 U
95-57-8	2-Chlorophenol	790	< 790 U
541-73-1	1,3-Dichlorobenzene	790	< 790 U
106-46-7	1,4-Dichlorobenzene	790	< 790 U
100-51-6	Benzyl Alcohol	4,000	< 4,000 U
95-50-1	1,2-Dichlorobenzene	790	< 790 U
95-48-7	2-Methylphenol	790	< 790 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	790	< 790 U
106-44-5	4-Methylphenol	790	< 790 U
621-64-7	N-Nitroso-Di-N-Propylamine	4,000	< 4,000 U
67-72-1	Hexachloroethane	790	< 790 U
98-95-3	Nitrobenzene	790	< 790 U
78-59-1	Isophorone	790	< 790 U
88-75-5	2-Nitrophenol	4,000	< 4,000 U
105-67-9	2,4-Dimethylphenol	790	< 790 U
65-85-0	Benzoic Acid	7,900	< 7,900 U
111-91-1	bis(2-Chloroethoxy) Methane	790	< 790 U
120-83-2	2,4-Dichlorophenol	4,000	< 4,000 U
120-82-1	1,2,4-Trichlorobenzene	790	< 790 U
91-20-3	Naphthalene	790	< 790 U
106-47-8	4-Chloroaniline	4,000	< 4,000 U
87-68-3	Hexachlorobutadiene	790	< 790 U
59-50-7	4-Chloro-3-methylphenol	4,000	< 4,000 U
91-57-6	2-Methylnaphthalene	790	< 790 U
77-47-4	Hexachlorocyclopentadiene	4,000	< 4,000 U
88-06-2	2,4,6-Trichlorophenol	4,000	< 4,000 U
95-95-4	2,4,5-Trichlorophenol	4,000	< 4,000 U
91-58-7	2-Chloronaphthalene	790	< 790 U
88-74-4	2-Nitroaniline	4,000	< 4,000 U
131-11-3	Dimethylphthalate	790	< 790 U
208-96-8	**Acenaphthylene**	**790**	**2,100**
99-09-2	3-Nitroaniline	4,000	< 4,000 U
83-32-9	Acenaphthene	790	< 790 U
51-28-5	2,4-Dinitrophenol	7,900	< 7,900 U
100-02-7	4-Nitrophenol	4,000	< 4,000 U
132-64-9	Dibenzofuran	790	< 790 U
606-20-2	2,6-Dinitrotoluene	4,000	< 4,000 U
121-14-2	2,4-Dinitrotoluene	4,000	< 4,000 U
84-66-2	**Diethylphthalate**	**790**	**37,000**
7005-72-3	4-Chlorophenyl-phenylether	790	< 790 U
86-73-7	Fluorene	790	< 790 U
100-01-6	4-Nitroaniline	4,000	< 4,000 U
534-52-1	4,6-Dinitro-2-Methylphenol	7,900	< 7,900 U

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: SL8-051910
SAMPLE

Lab Sample ID: QX55B
LIMS ID: 10-12291
Matrix: Soil
Date Analyzed: 05/27/10 19:36

QC Report No: QX55-Floyd/Snider
Project: NE Corner Source Control
COS-GWSA

CAS Number	Analyte	RL	Result
86-30-6	N-Nitrosodiphenylamine	790	< 790 U
101-55-3	4-Bromophenyl-phenylether	790	< 790 U
118-74-1	Hexachlorobenzene	790	< 790 U
87-86-5	Pentachlorophenol	4,000	< 4,000 U
85-01-8	**Phenanthrene**	**790**	**2,500**
86-74-8	Carbazole	790	< 790 U
120-12-7	**Anthracene**	**790**	**950**
84-74-2	Di-n-Butylphthalate	790	< 790 U
206-44-0	**Fluoranthene**	**790**	**8,500**
129-00-0	**Pyrene**	**790**	**14,000**
85-68-7	Butylbenzylphthalate	790	< 790 U
91-94-1	3,3'-Dichlorobenzidine	4,000	< 4,000 U
56-55-3	**Benzo(a)anthracene**	**790**	**4,900**
117-81-7	bis(2-Ethylhexyl)phthalate	790	< 790 U
218-01-9	**Chrysene**	**790**	**6,900**
117-84-0	Di-n-Octyl phthalate	790	< 790 U
205-99-2	**Benzo(b)fluoranthene**	**790**	**8,200**
207-08-9	**Benzo(k)fluoranthene**	**790**	**8,200**
50-32-8	**Benzo(a)pyrene**	**790**	**9,200**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**790**	**7,200**
53-70-3	**Dibenz(a,h)anthracene**	**790**	**1,500**
191-24-2	**Benzo(g,h,i)perylene**	**790**	**10,000**
90-12-0	1-Methylnaphthalene	790	< 790 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	67.0%	2-Fluorobiphenyl	74.2%
d14-p-Terphenyl	69.4%	d4-1,2-Dichlorobenzene	55.0%
d5-Phenol	65.3%	2-Fluorophenol	67.5%
2,4,6-Tribromophenol	77.3%	d4-2-Chlorophenol	67.5%

ANALYTICAL RESOURCES INCORPORATED

SW8270 SEMIVOLATILES SOIL/SEDIMENT SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: QX55-Floyd/Snider
Project: NE Corner Source Control
COS-GWSA

Client ID	NBZ	FBP	TPH	DCB	PHL	2FP	TBP	2CP	TOT OUT
MB-052510	52.4%	59.2%	83.6%	52.8%	60.8%	62.9%	65.3%	61.3%	0
LCS-052510	58.0%	67.2%	72.0%	55.2%	77.3%	65.6%	90.7%	70.1%	0
LCSD-052510	60.4%	75.2%	70.8%	54.8%	76.8%	63.2%	89.9%	70.9%	0
SL7-051910	77.5%	86.9%	75.6%	65.0%	73.8%	77.8%	84.0%	77.3%	0
SL7-051910 DL	80.8%	84.8%	84.8%	65.6%	73.6%	85.3%	72.5%	80.0%	0
SL8-051910	67.0%	74.2%	69.4%	55.0%	65.3%	67.5%	77.3%	67.5%	0

	LCS/MB LIMITS	QC LIMITS
(NBZ) = d5-Nitrobenzene	(39-100)	(32-100)
(FBP) = 2-Fluorobiphenyl	(44-100)	(36-100)
(TPH) = d14-p-Terphenyl	(55-106)	(35-113)
(DCB) = d4-1,2-Dichlorobenzene	(34-100)	(30-100)
(PHL) = d5-Phenol	(39-100)	(31-100)
(2FP) = 2-Fluorophenol	(14-100)	(10-100)
(TBP) = 2,4,6-Tribromophenol	(47-109)	(28-116)
(2CP) = d4-2-Chlorophenol	(43-100)	(33-100)

Prep Method: SW3550B
Log Number Range: 10-12290 to 10-12291

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: LCS-052510
LCS/LCSD

Lab Sample ID: LCS-052510
LIMS ID: 10-12290
Matrix: Soil
Data Release Authorized:
Reported: 05/28/10

QC Report No: QX55-Floyd/Snider
Project: NE Corner Source Control
COS-GWSA
Date Sampled: 05/19/10
Date Received: 05/19/10

Date Extracted LCS/LCSD: 05/25/10

Date Analyzed LCS: 05/27/10 18:00
LCSD: 05/27/10 18:32
Instrument/Analyst LCS: NT6/JZ
LCSD: NT6/JZ
GPC Cleanup: No

Sample Amount LCS: 7.50 g
LCSD: 7.50 g
Final Extract Volume LCS: 0.5 mL
LCSD: 0.5 mL
Dilution Factor LCS: 1.00
LCSD: 1.00
Percent Moisture: NA

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Phenol	1200	1670	71.9%	1210	1670	72.5%	0.8%
Bis-(2-Chloroethyl) Ether	1020	1670	61.1%	1040	1670	62.3%	1.9%
2-Chlorophenol	1130	1670	67.7%	1140	1670	68.3%	0.9%
1,3-Dichlorobenzene	867	1670	51.9%	874	1670	52.3%	0.8%
1,4-Dichlorobenzene	869	1670	52.0%	892	1670	53.4%	2.6%
Benzyl Alcohol	2340	3330	70.3%	2270	3330	68.2%	3.0%
1,2-Dichlorobenzene	892	1670	53.4%	900	1670	53.9%	0.9%
2-Methylphenol	1050	1670	62.9%	1080	1670	64.7%	2.8%
2,2'-Oxybis(1-Chloropropane)	918	1670	55.0%	927	1670	55.5%	1.0%
4-Methylphenol	1020	3330	30.6%	1050	3330	31.5%	2.9%
N-Nitroso-Di-N-Propylamine	1150	1670	68.9%	1090	1670	65.3%	5.4%
Hexachloroethane	917	1670	54.9%	887	1670	53.1%	3.3%
Nitrobenzene	888	1670	53.2%	938	1670	56.2%	5.5%
Isophorone	1150	1670	68.9%	1200	1670	71.9%	4.3%
2-Nitrophenol	939	1670	56.2%	987	1670	59.1%	5.0%
2,4-Dimethylphenol	961	1670	57.5%	1050	1670	62.9%	8.9%
Benzoic Acid	1950	5000	39.0%	2420	5000	48.4%	21.5%
bis(2-Chloroethoxy) Methane	895	1670	53.6%	954	1670	57.1%	6.4%
2,4-Dichlorophenol	985	1670	59.0%	1020	1670	61.1%	3.5%
1,2,4-Trichlorobenzene	843	1670	50.5%	881	1670	52.8%	4.4%
Naphthalene	959	1670	57.4%	1010	1670	60.5%	5.2%
4-Chloroaniline	3140	4000	78.5%	3190	4000	79.8%	1.6%
Hexachlorobutadiene	805	1670	48.2%	869	1670	52.0%	7.6%
4-Chloro-3-methylphenol	1260	1670	75.4%	1250	1670	74.9%	0.8%
2-Methylnaphthalene	1090	1670	65.3%	1100	1670	65.9%	0.9%
Hexachlorocyclopentadiene	3400	5000	68.0%	3550	5000	71.0%	4.3%
2,4,6-Trichlorophenol	1250	1670	74.9%	1370	1670	82.0%	9.2%
2,4,5-Trichlorophenol	1250	1670	74.9%	1400	1670	83.8%	11.3%
2-Chloronaphthalene	1100	1670	65.9%	1190	1670	71.3%	7.9%
2-Nitroaniline	1630	1670	97.6%	1640	1670	98.2%	0.6%
Dimethylphthalate	1360	1670	81.4%	1400	1670	83.8%	2.9%
Acenaphthylene	1200	1670	71.9%	1250	1670	74.9%	4.1%
3-Nitroaniline	4940	4270	116%	5040	4270	118%	2.0%
Acenaphthene	1350	1670	80.8%	1390	1670	83.2%	2.9%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: LCSD-052510
LCS/LCSD

Lab Sample ID: LCS-052510
LIMS ID: 10-12290
Matrix: Soil
Date Analyzed LCS: 05/27/10 18:00
LCSD: 05/27/10 18:32

QC Report No: QX55-Floyd/Snider
Project: NE Corner Source Control
COS-GWSA

Analyte	**LCS**	**Spike Added-LCS**	**LCS Recovery**	**LCSD**	**Spike Added-LCSD**	**LCSD Recovery**	**RPD**
2,4-Dinitrophenol	3120 Q	5000	62.4%	3170 Q	5000	63.4%	1.6%
4-Nitrophenol	1240	1670	74.3%	1030	1670	61.7%	18.5%
Dibenzofuran	1290	1670	77.2%	1350	1670	80.8%	4.5%
2,6-Dinitrotoluene	1320	1670	79.0%	1330	1670	79.6%	0.8%
2,4-Dinitrotoluene	1480	1670	88.6%	1510	1670	90.4%	2.0%
Diethylphthalate	1350	1670	80.8%	1390	1670	83.2%	2.9%
4-Chlorophenyl-phenylether	1180	1670	70.7%	1220	1670	73.1%	3.3%
Fluorene	1300	1670	77.8%	1310	1670	78.4%	0.8%
4-Nitroaniline	1410	1670	84.4%	1480	1670	88.6%	4.8%
4,6-Dinitro-2-Methylphenol	3190	5000	63.8%	3190	5000	63.8%	0.0%
N-Nitrosodiphenylamine	1190	1670	71.3%	1190	1670	71.3%	0.0%
4-Bromophenyl-phenylether	1130	1670	67.7%	1160	1670	69.5%	2.6%
Hexachlorobenzene	1120	1670	67.1%	1130	1670	67.7%	0.9%
Pentachlorophenol	843 Q	1670	50.5%	828 Q	1670	49.6%	1.8%
Phenanthrene	1310	1670	78.4%	1320	1670	79.0%	0.8%
Carbazole	1320	1670	79.0%	1340	1670	80.2%	1.5%
Anthracene	1250	1670	74.9%	1270	1670	76.0%	1.6%
Di-n-Butylphthalate	1360	1670	81.4%	1400	1670	83.8%	2.9%
Fluoranthene	1380	1670	82.6%	1410	1670	84.4%	2.2%
Pyrene	1230	1670	73.7%	1210	1670	72.5%	1.6%
Butylbenzylphthalate	1240	1670	74.3%	1220	1670	73.1%	1.6%
3,3'-Dichlorobenzidine	3450	4270	80.8%	3650	4270	85.5%	5.6%
Benzo(a)anthracene	1180	1670	70.7%	1200	1670	71.9%	1.7%
bis(2-Ethylhexyl)phthalate	1450	1670	86.8%	1460	1670	87.4%	0.7%
Chrysene	1220	1670	73.1%	1240	1670	74.3%	1.6%
Di-n-Octyl phthalate	1370	1670	82.0%	1410	1670	84.4%	2.9%
Benzo(b)fluoranthene	1360	1670	81.4%	1460	1670	87.4%	7.1%
Benzo(k)fluoranthene	1470	1670	88.0%	1410	1670	84.4%	4.2%
Benzo(a)pyrene	1190	1670	71.3%	1230	1670	73.7%	3.3%
Indeno(1,2,3-cd)pyrene	1330	1670	79.6%	1380	1670	82.6%	3.7%
Dibenz(a,h)anthracene	1270	1670	76.0%	1320	1670	79.0%	3.9%
Benzo(g,h,i)perylene	1370	1670	82.0%	1390	1670	83.2%	1.4%
1-Methylnaphthalene	1020	1670	61.1%	1030	1670	61.7%	1.0%

Semivolatile Surrogate Recovery

	LCS	**LCSD**
d5-Nitrobenzene	58.0%	60.4%
2-Fluorobiphenyl	67.2%	75.2%
d14-p-Terphenyl	72.0%	70.8%
d4-1,2-Dichlorobenzene	55.2%	54.8%
d5-Phenol	77.3%	76.8%
2-Fluorophenol	65.6%	63.2%
2,4,6-Tribromophenol	90.7%	89.9%
d4-2-Chlorophenol	70.1%	70.9%

Reported in µg/kg (ppb)
RPD calculated using sample concentrations per SW846.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: MB-052510
METHOD BLANK

Lab Sample ID: MB-052510
LIMS ID: 10-12290
Matrix: Soil
Data Release Authorized:
Reported: 05/28/10

QC Report No: QX55-Floyd/Snider
Project: NE Corner Source Control
COS-GWSA
Date Sampled: NA
Date Received: NA

Date Extracted: 05/25/10
Date Analyzed: 05/27/10 17:28
Instrument/Analyst: NT6/JZ
GPC Cleanup: No

Sample Amount: 7.50 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00
Percent Moisture: NA

CAS Number	Analyte	RL	Result
108-95-2	Phenol	67	< 67 U
111-44-4	Bis-(2-Chloroethyl) Ether	67	< 67 U
95-57-8	2-Chlorophenol	67	< 67 U
541-73-1	1,3-Dichlorobenzene	67	< 67 U
106-46-7	1,4-Dichlorobenzene	67	< 67 U
100-51-6	Benzyl Alcohol	330	< 330 U
95-50-1	1,2-Dichlorobenzene	67	< 67 U
95-48-7	2-Methylphenol	67	< 67 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	67	< 67 U
106-44-5	4-Methylphenol	67	< 67 U
621-64-7	N-Nitroso-Di-N-Propylamine	330	< 330 U
67-72-1	Hexachloroethane	67	< 67 U
98-95-3	Nitrobenzene	67	< 67 U
78-59-1	Isophorone	67	< 67 U
88-75-5	2-Nitrophenol	330	< 330 U
105-67-9	2,4-Dimethylphenol	67	< 67 U
65-85-0	Benzoic Acid	670	< 670 U
111-91-1	bis(2-Chloroethoxy) Methane	67	< 67 U
120-83-2	2,4-Dichlorophenol	330	< 330 U
120-82-1	1,2,4-Trichlorobenzene	67	< 67 U
91-20-3	Naphthalene	67	< 67 U
106-47-8	4-Chloroaniline	330	< 330 U
87-68-3	Hexachlorobutadiene	67	< 67 U
59-50-7	4-Chloro-3-methylphenol	330	< 330 U
91-57-6	2-Methylnaphthalene	67	< 67 U
77-47-4	Hexachlorocyclopentadiene	330	< 330 U
88-06-2	2,4,6-Trichlorophenol	330	< 330 U
95-95-4	2,4,5-Trichlorophenol	330	< 330 U
91-58-7	2-Chloronaphthalene	67	< 67 U
88-74-4	2-Nitroaniline	330	< 330 U
131-11-3	Dimethylphthalate	67	< 67 U
208-96-8	Acenaphthylene	67	< 67 U
99-09-2	3-Nitroaniline	330	< 330 U
83-32-9	Acenaphthene	67	< 67 U
51-28-5	2,4-Dinitrophenol	670	< 670 U
100-02-7	4-Nitrophenol	330	< 330 U
132-64-9	Dibenzofuran	67	< 67 U
606-20-2	2,6-Dinitrotoluene	330	< 330 U
121-14-2	2,4-Dinitrotoluene	330	< 330 U
84-66-2	Diethylphthalate	67	< 67 U
7005-72-3	4-Chlorophenyl-phenylether	67	< 67 U
86-73-7	Fluorene	67	< 67 U
100-01-6	4-Nitroaniline	330	< 330 U
534-52-1	4,6-Dinitro-2-Methylphenol	670	< 670 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: MB-052510
METHOD BLANK

Lab Sample ID: MB-052510
LIMS ID: 10-12290
Matrix: Soil
Date Analyzed: 05/27/10 17:28

QC Report No: QX55-Floyd/Snider
Project: NE Corner Source Control
COS-GWSA

CAS Number	Analyte	RL	Result
86-30-6	N-Nitrosodiphenylamine	67	< 67 U
101-55-3	4-Bromophenyl-phenylether	67	< 67 U
118-74-1	Hexachlorobenzene	67	< 67 U
87-86-5	Pentachlorophenol	330	< 330 U
85-01-8	Phenanthrene	67	< 67 U
86-74-8	Carbazole	67	< 67 U
120-12-7	Anthracene	67	< 67 U
84-74-2	Di-n-Butylphthalate	67	< 67 U
206-44-0	Fluoranthene	67	< 67 U
129-00-0	Pyrene	67	< 67 U
85-68-7	Butylbenzylphthalate	67	< 67 U
91-94-1	3,3'-Dichlorobenzidine	330	< 330 U
56-55-3	Benzo(a)anthracene	67	< 67 U
117-81-7	bis(2-Ethylhexyl)phthalate	67	< 67 U
218-01-9	Chrysene	67	< 67 U
117-84-0	Di-n-Octyl phthalate	67	< 67 U
205-99-2	Benzo(b)fluoranthene	67	< 67 U
207-08-9	Benzo(k)fluoranthene	67	< 67 U
50-32-8	Benzo(a)pyrene	67	< 67 U
193-39-5	Indeno(1,2,3-cd)pyrene	67	< 67 U
53-70-3	Dibenz(a,h)anthracene	67	< 67 U
191-24-2	Benzo(g,h,i)perylene	67	< 67 U
90-12-0	1-Methylnaphthalene	67	< 67 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	52.4%	2-Fluorobiphenyl	59.2%
d14-p-Terphenyl	83.6%	d4-1,2-Dichlorobenzene	52.8%
d5-Phenol	60.8%	2-Fluorophenol	62.9%
2,4,6-Tribromophenol	65.3%	d4-2-Chlorophenol	61.3%

SAMPLES RECEIVED SUMMARY 05/21/10

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **QX08**

Logged by: AV
Cooler Temp.(Deg.C): AMB

Contact: Geiselbrecht, Allison
Client: Floyd/Snider
Validatable Data Pkg: No
Special Instructions:

Project Manager: Sue D. 206-695-6207
VTSR: 05/19/10
Data Due: 06/02/10
Project No: COS-GWSA
Proj ID: NE Corner Source Control
SDG No:
Analytical Protocol: In-house
Deliverables:

2 Sample(s)

ARI ID	Client ID	Matrix Condition	Sampling Date/Time	Ext PrpOnly	BOTTLES ON HOLD
10-12059-QX08A	SL7-051910	Filter Bag	05/19/10 10:00	X	
10-12060-QX08B	SL8-051910	Filter Bag	05/19/10 10:10	X	

Please verify the information shown here. If there are questions or discrepancies, contact your ARI Project Manager designated above.

Unless other arrangements for storage/archiving samples are made for this project, volatile samples not consumed will be disposed of **06/18/10**. All other sample aliquots will be disposed no earlier than **08/31/10**.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Organic Extractions Laboratory
Analyst Notes

ARI Job No.: QXØ8

Client ID: Floyd/Snider

Parameter: SAmple Prep - Filter bags

Client Project: NE Corner Source Control

SOP Number(s):

No Anomalies:

List problems, concerns, corrective actions and any other pertinent information
Sample prep time: 1hr 30min
Sample A sediment weight: 184.16g
Pictures 100-82, 100-83, 100-84, 100-85, 100-86, 100-87, 100-88, 100-89, 100-90, 100-91, ~~100-24~~ 100-92 ww, 100-93
Sample B Sediment weight: 17.7g
Pictures 100-76, 100-77, 100-78, 100-79, 100-80, 100-81 WW 5/20/10

Analyst Initials:		Date:	

3056F

Revision 006
1/12/07

SAMPLE RESULTS-CONVENTIONALS
RC58-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 07/12/10

Project: Phase 3
Event: COSGWSA6020
Date Sampled: 06/30/10
Date Received: 06/30/10

Client ID: Rinsate Blank
ARI ID: 10-15712 RC58F

Analyte	Date Batch	Method	Units	RL	Sample
Total Organic Carbon	07/01/10 070110#1	EPA 415.1	mg/L	1.50	< 1.50 U

RL Analytical reporting limit
U Undetected at reported detection limit

METHOD BLANK RESULTS-CONVENTIONALS
RC58-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 07/12/10

Project: Phase 3
Event: COSGWSA6020
Date Sampled: NA
Date Received: NA

Analyte	Method	Date	Units	Blank	ID
Total Organic Carbon	EPA 415.1	07/01/10	mg/L	< 1.50 U	

STANDARD REFERENCE RESULTS-CONVENTIONALS
RC58-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 07/12/10

Project: Phase 3
Event: COSGWSA6020
Date Sampled: NA
Date Received: NA

Analyte/SRM ID	Method	Date	Units	SRM	True Value	Recovery
Total Organic Carbon ERA 0513-10-06	EPA 415.1	07/01/10	mg/L	19.8	20.0	99.0%

REPLICATE RESULTS-CONVENTIONALS
RC58-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 07/12/10

Project: Phase 3
Event: COSGWSA6020
Date Sampled: 06/30/10
Date Received: 06/30/10

Analyte	Method	Date	Units	Sample	Replicate(s)	RPD/RSD
ARI ID: RC58F Client ID: Rinsate Blank						
Total Organic Carbon	EPA 415.1	07/01/10	mg/L	< 1.50	< 1.50	NA

MS/MSD RESULTS-CONVENTIONALS
RC58-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 07/12/10

Project: Phase 3
Event: COSGWSA6020
Date Sampled: 06/30/10
Date Received: 06/30/10

Analyte	Method	Date	Units	Sample	Spike	Spike Added	Recovery
ARI ID: RC58F Client ID: Rinsate Blank							
Total Organic Carbon	EPA 415.1	07/01/10	mg/L	< 1.50	17.4	20.0	87.0%

SAMPLE RESULTS-CONVENTIONALS
RC58-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Soil
Data Release Authorized:
Reported: 07/12/10

Project: Phase 3
Event: COSGWSA6020
Date Sampled: 06/30/10
Date Received: 06/30/10

Client ID: WW19-01
ARI ID: 10-15707 RC58A

Analyte	Date	Method	Units	RL	Sample
Total Solids	07/06/10 070610#1	EPA 160.3	Percent	0.01	48.30
Total Organic Carbon	07/09/10 070910#1	Plumb,1981	Percent	0.198	19.8

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RC58-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Soil
Data Release Authorized:
Reported: 07/12/10

Project: Phase 3
Event: COSGWSA6020
Date Sampled: 06/30/10
Date Received: 06/30/10

Client ID: WW19-03
ARI ID: 10-15708 RC58B

Analyte	Date	Method	Units	RL	Sample
Total Solids	07/06/10 070610#1	EPA 160.3	Percent	0.01	77.90
Total Organic Carbon	07/09/10 070910#1	Plumb,1981	Percent	0.196	16.4

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RC58-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Soil
Data Release Authorized:
Reported: 07/12/10

Project: Phase 3
Event: COSGWSA6020
Date Sampled: 06/30/10
Date Received: 06/30/10

Client ID: WW19-05
ARI ID: 10-15709 RC58C

Analyte	Date	Method	Units	RL	Sample
Total Solids	07/06/10 070610#1	EPA 160.3	Percent	0.01	93.30
Total Organic Carbon	07/09/10 070910#1	Plumb,1981	Percent	0.020	3.88

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RC58-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Soil
Data Release Authorized:
Reported: 07/12/10

Project: Phase 3
Event: COSGWSA6020
Date Sampled: 06/30/10
Date Received: 06/30/10

Client ID: WW19-06
ARI ID: 10-15710 RC58D

Analyte	Date	Method	Units	RL	Sample
Total Solids	07/06/10 070610#1	EPA 160.3	Percent	0.01	79.70
Total Organic Carbon	07/09/10 070910#1	Plumb,1981	Percent	0.020	3.54

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RC58-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Soil
Data Release Authorized:
Reported: 07/12/10

Project: Phase 3
Event: COSGWSA6020
Date Sampled: 06/30/10
Date Received: 06/30/10

Client ID: WW19-Dup
ARI ID: 10-15711 RC58E

Analyte	**Date**	**Method**	**Units**	**RL**	**Sample**
Total Solids	07/06/10 070610#1	EPA 160.3	Percent	0.01	83.00
Total Organic Carbon	07/09/10 070910#1	Plumb,1981	Percent	0.196	14.1

RL Analytical reporting limit
U Undetected at reported detection limit

METHOD BLANK RESULTS-CONVENTIONALS
RC58-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Soil
Data Release Authorized:
Reported: 07/12/10

Project: Phase 3
Event: COSGWSA6020
Date Sampled: NA
Date Received: NA

Analyte	Date	Units	Blank
Total Solids	07/06/10	Percent	< 0.01 U
Total Organic Carbon	07/09/10	Percent	< 0.020 U

LAB CONTROL RESULTS-CONVENTIONALS
RC58-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Soil
Data Release Authorized:
Reported: 07/12/10

Project: Phase 3
Event: COSGWSA6020
Date Sampled: NA
Date Received: NA

Analyte/Method	QC ID	Date	Units	LCS	Spike Added	Recovery
Total Organic Carbon Plumb,1981	ICVL	07/09/10	Percent	0.093	0.100	93.0%

STANDARD REFERENCE RESULTS-CONVENTIONALS
RC58-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Soil
Data Release Authorized:
Reported: 07/12/10

Project: Phase 3
Event: COSGWSA6020
Date Sampled: NA
Date Received: NA

Analyte/SRM ID	Date	Units	SRM	True Value	Recovery
Total Organic Carbon NIST #8704	07/09/10	Percent	3.41	3.35	101.8%

REPLICATE RESULTS-CONVENTIONALS
RC58-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Soil
Data Release Authorized:
Reported: 07/12/10

Project: Phase 3
Event: COSGWSA6020
Date Sampled: 06/30/10
Date Received: 06/30/10

Analyte	Date	Units	Sample	Replicate(s)	RPD/RSD
ARI ID: RC58C Client ID: WW19-05					
Total Solids	07/06/10	Percent	93.30	93.60 93.70	0.2%
Total Organic Carbon	07/09/10	Percent	3.88	3.81 2.71	18.9%

MS/MSD RESULTS-CONVENTIONALS
RC58-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Soil
Data Release Authorized:
Reported: 07/12/10

Project: Phase 3
Event: COSGWSA6020
Date Sampled: 06/30/10
Date Received: 06/30/10

Analyte	Date	Units	Sample	Spike	Spike Added	Recovery
ARI ID: RC58C Client ID: WW19-05						
Total Organic Carbon	07/09/10	Percent	3.88	9.39	5.13	107.4%

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Client: Floyd Snider	**ARI Job No.:** RC58
Client Project: Phase 3	**Client Project No.:** COSGWA6020

Case Narrative

1. Five samples were submitted for testing on July 1, 2010, and were in good condition.
2. The samples were submitted for grain size distribution according to ASTM D422. The samples were prepared according to ASTM D421.
3. An assumed specific gravity of 2.65 was used in the hydrometer calculations.
4. A standard milkshake mixer type device was used to disperse the fine fraction sample.
5. One sample from another job was chosen for triplicate analysis. The triplicate data can be found on the QA summary.
6. The samples contained high percentages of organic matter which may have broken down during the washing and sieving processes.
7. The data is provided in summary tables and plots.
8. There were no further anomalies in the samples or test method.

Approved by: Geotechnical Laboratory Manager Date: 7/14/10

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Floyd/Snider
Phase 3
COSGWA6020

Percent Finer (Passing) Than the Indicated Size

Sieve Size (microns)	3"	2"	1 1/2"	1"	3/4"	1/2"	3/8"	#4 (4750)	#10 (2000)	#20 (850)	#40 (425)	#60 (250)	#100 (150)	#200 (75)	32	22	13	9	7	3.2	1.3
QV05 A	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.7	99.3	97.4	92.2	80.6	65.2	58.2	47.3	41.1	36.5	28.7	20.2
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	99.7	99.3	97.5	92.9	83.2	67.2	59.5	48.1	43.5	38.2	28.2	19.8
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.6	99.5	99.1	97.2	92.4	81.6	64.0	57.1	45.7	41.9	37.3	27.4	18.3
WW19-01	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.5	98.2	90.7	80.5	68.2	58.4	48.9	38.4	24.6	20.0	16.1	13.1	6.1	6.1
WW19-03	100.0	100.0	100.0	100.0	100.0	94.4	94.4	85.6	78.8	71.8	61.1	48.7	38.6	30.7	27.7	22.7	17.6	14.6	13.1	5.5	4.5
WW19-05	100.0	100.0	100.0	100.0	100.0	100.0	100.0	97.1	95.3	92.4	84.2	70.0	55.4	39.0	30.5	23.1	18.7	15.2	10.3	4.9	3.9
WW19-06	100.0	100.0	100.0	100.0	100.0	100.0	98.8	97.3	93.8	89.9	81.1	66.5	51.0	35.6	27.6	23.2	19.2	16.3	15.3	6.9	5.9
WW19-Dup	100.0	100.0	100.0	100.0	100.0	98.3	98.3	94.1	87.9	79.3	66.5	51.4	39.6	30.5	28.6	23.6	17.6	16.1	13.6	6.0	4.5

Testing performed according to ASTM D421/D422

Floyd/Snider
Phase 3
COSGWA6020

Percent Retained in Each Size Fraction

Description	%Coarse Gravel				% Gravel			% Coarse Sand	% Medium Sand		% Fine Sand			% Very Coarse Silt	% Coarse Silt	% Medium Silt	% Fine Silt	% Fine Silt	% Very Fine Silt	% Clay
Particle Size (microns)	3-2"	2-1 1/2"	1 1/2"-1"	1-3/4"	3/4-1/2"	1/2-3/8"	3/8"-4750	4750-2000	2000-850	850-425	425-250	250-150	150-75	75-32	32-22	22-13	13-9	9-7	7-3.2	<3.2
QV05 A	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.4	2.0	5.2	11.6	15.4	7.0	10.9	6.2	4.7	7.8	28.7
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.4	1.8	4.6	9.7	16.1	7.6	11.4	4.6	5.3	9.9	28.2
	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.2	0.4	1.9	4.8	10.8	17.6	6.9	11.4	3.8	4.6	9.9	27.4
WW19-01	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.3	7.4	10.3	12.3	9.8	9.5	10.5	13.8	4.6	3.8	3.1	6.9	6.1
WW19-03	0.0	0.0	0.0	0.0	5.6	0.0	8.8	6.7	7.1	10.7	12.4	10.1	7.9	3.0	5.0	5.0	3.0	1.5	7.6	5.5
WW19-05	0.0	0.0	0.0	0.0	0.0	0.0	2.9	1.8	2.8	8.2	14.2	14.7	16.4	8.5	7.4	4.4	3.4	4.9	5.4	4.9
WW19-06	0.0	0.0	0.0	0.0	0.0	1.2	1.5	3.5	3.9	8.8	14.6	15.5	15.4	8.0	4.4	3.9	3.0	1.0	8.4	6.9
WW19-Dup	0.0	0.0	0.0	0.0	1.7	0.0	4.2	6.2	8.6	12.8	15.1	11.8	9.1	1.9	5.0	6.0	1.5	2.5	7.5	6.0

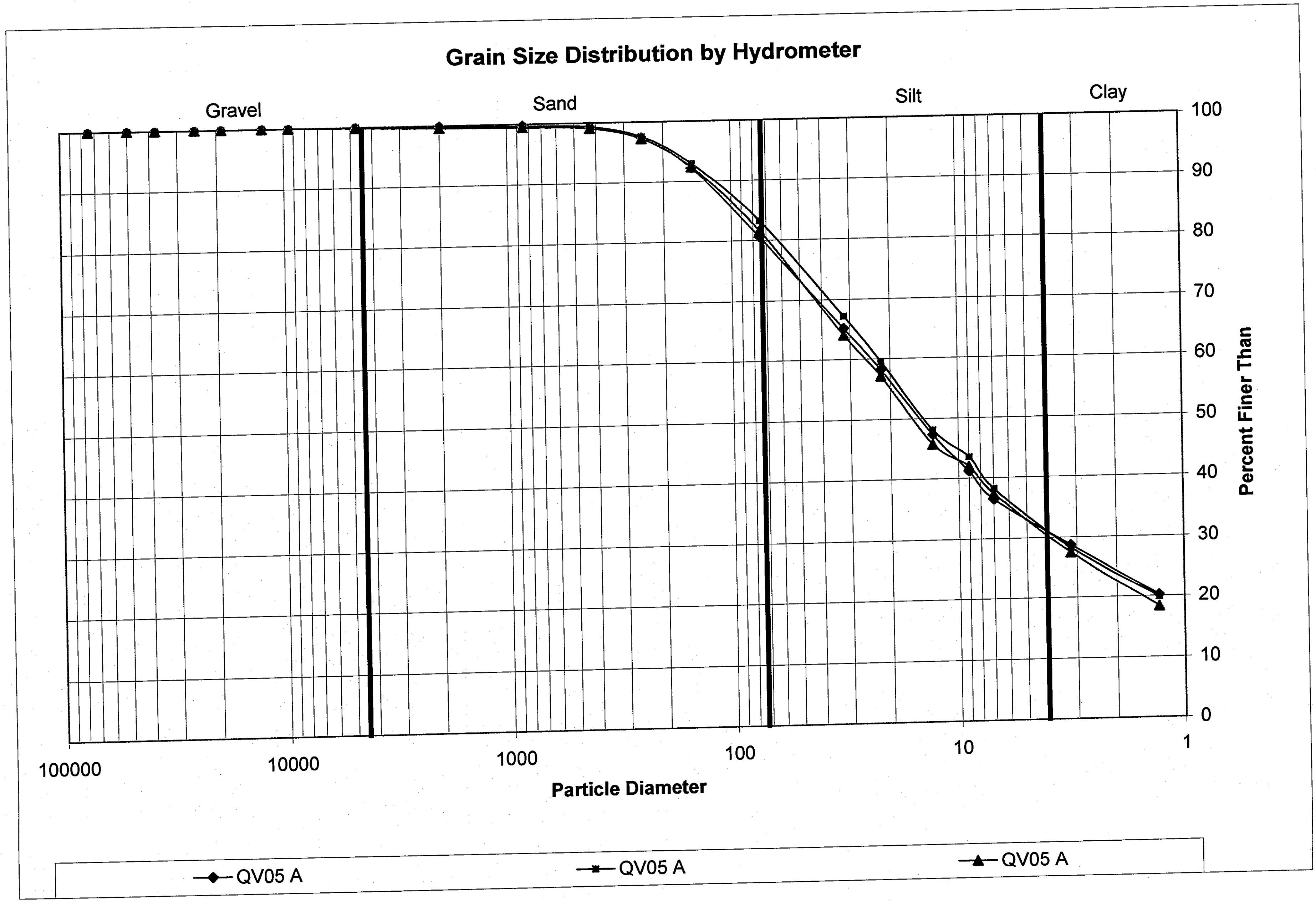
Client:	Floyd/Snider	Project No.:	Phase 3
		Project:	COSGWA6020
ARI Triplicate Sample ID:	QV05 A	Batch No.:	RC58-01
		Page:	1 of 1

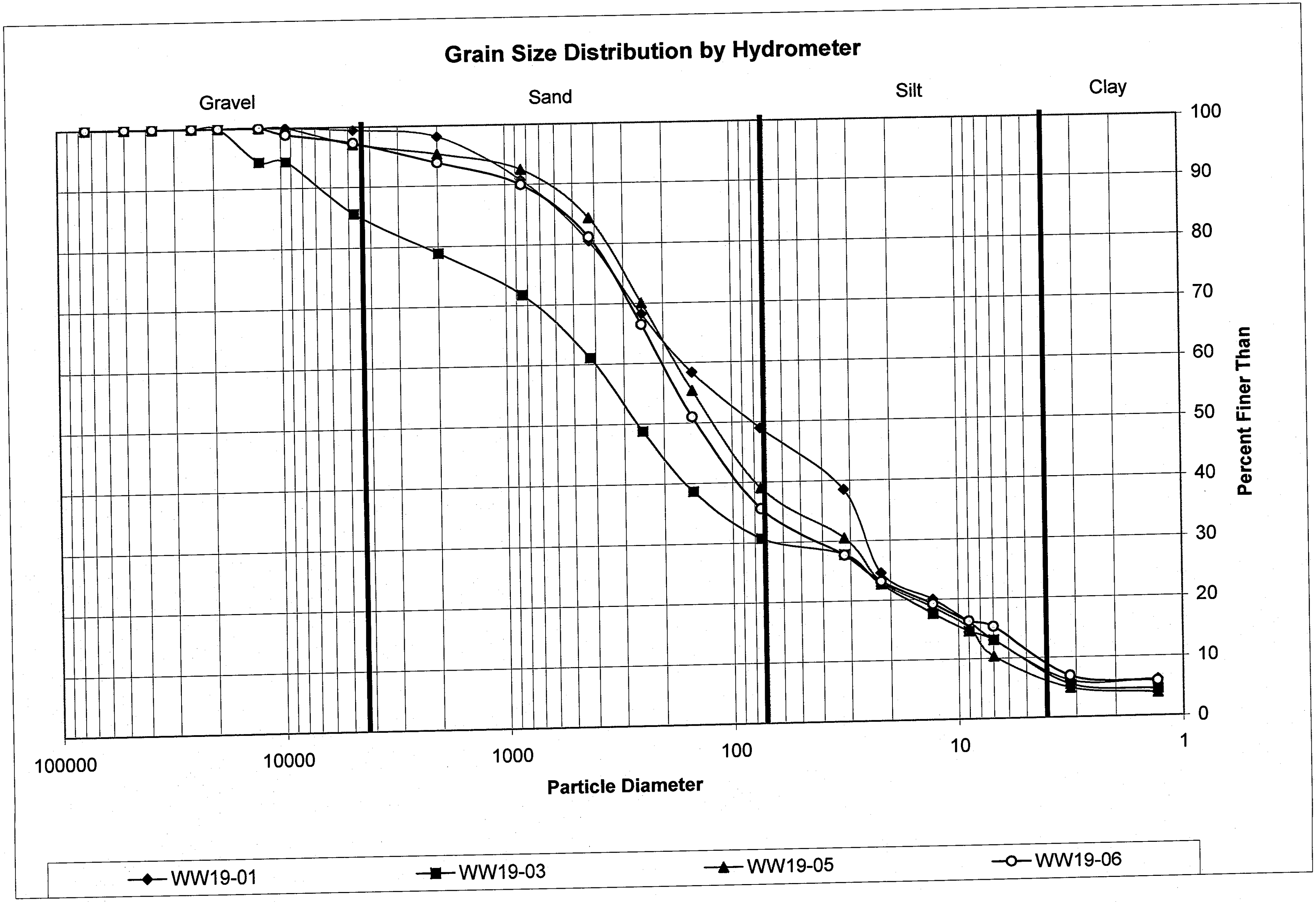
Relative Standard Deviation, By Size

Sample ID	75000	50000	37500	25000	19000	12500	9500	4750	2000	850	425	250	150	75	32	22	13	9	7	3.2	1.3
QV05 A	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.7	99.3	97.4	92.2	80.6	65.2	58.2	47.3	41.1	36.5	28.7	20.2
QV05 A	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	99.7	99.3	97.5	92.9	83.2	67.2	59.5	48.1	43.5	38.2	28.2	19.8
QV05 A	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.6	99.5	99.1	97.2	92.4	81.6	64.0	57.1	45.7	41.9	37.3	27.4	18.3
AVE	100.00	100.00	100.00	100.00	100.00	100.00	100.00	99.96	99.78	99.64	99.24	97.36	92.49	81.79	65.44	58.28	47.04	42.17	37.32	28.12	19.43
STDEV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.15	0.16	0.16	0.17	0.39	1.34	1.59	1.19	1.21	1.21	0.85	0.64	1.01
%RSD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.15	0.16	0.16	0.17	0.43	1.64	2.44	2.05	2.56	2.88	2.27	2.29	5.18

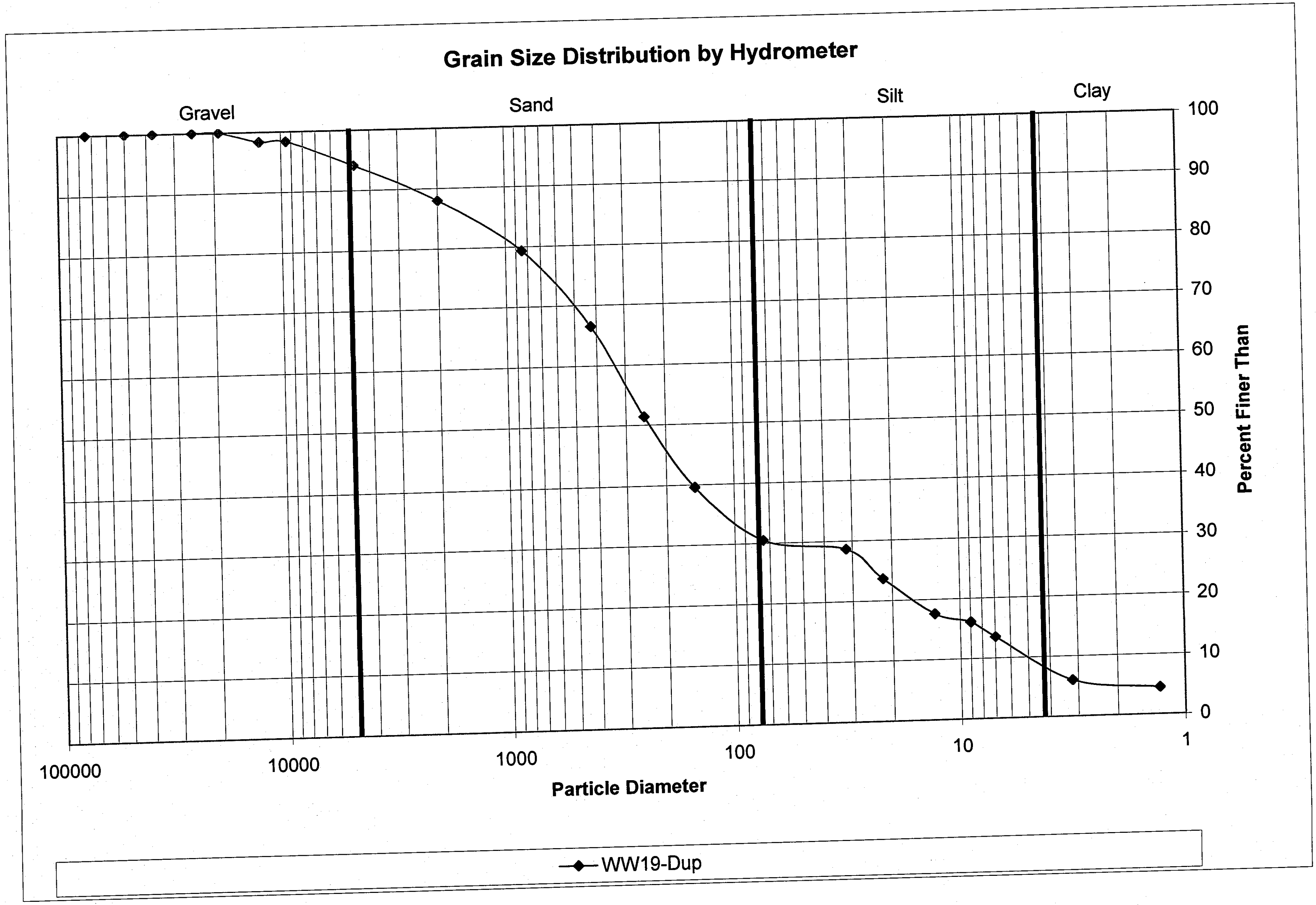
This Triplicate applies to the Batch Containing the Following Samples

Sample ID	Date Sampled	Date Set up	Date Started	Date Complete	Data Qualifiers
QV05 A	5/1/2010	5/7/2010	5/17/2010	5/19/2010	
	5/1/2010	5/7/2010	5/17/2010	5/19/2010	
	5/1/2010	5/7/2010	5/17/2010	5/19/2010	
WW19-01	6/30/2010	7/6/2010	7/12/2010	7/14/2010	
WW19-03	6/30/2010	7/6/2010	7/12/2010	7/14/2010	
WW19-05	6/30/2010	7/6/2010	7/12/2010	7/14/2010	
WW19-06	6/30/2010	7/6/2010	7/12/2010	7/14/2010	
WW19-Dup	6/30/2010	7/6/2010	7/12/2010	7/14/2010	


Grain Size Distribution by Hydrometer
Gravel
Sand
Silt
Clay
100
90
80
70
60
50
40
30
20
10
0
Percent Finer Than
100000
10000
1000
100
10
1
Particle Diameter
QV05 A
QV05 A
QV05 A



Grain Size Distribution by Hydrometer
Gravel
Sand
Silt
Clay
100
90
80
70
60
50
40
30
20
10
0
Percent Finer Than
100000
10000
1000
100
10
1
Particle Diameter
WW19-01
WW19-03
WW19-05
WW19-06



Grain Size Distribution by Hydrometer
Gravel
Sand
Silt
Clay
100
90
80
70
60
50
40
30
20
10
0
Percent Finer Than
100000
10000
1000
100
10
1
Particle Diameter
WW19-Dup

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: WW19-01
SAMPLE

Lab Sample ID: RC58A
LIMS ID: 10-15707
Matrix: Soil
Data Release Authorized:
Reported: 07/09/10

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020
Date Sampled: 06/30/10
Date Received: 06/30/10

Percent Total Solids: 48.6%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	07/01/10	6010B	07/08/10	7440-38-2	Arsenic	10	10	U
3050B	07/01/10	6010B	07/08/10	**7440-43-9**	**Cadmium**	0.4	**4.0**	
3050B	07/01/10	6010B	07/08/10	**7440-47-3**	**Chromium**	1	**76**	
3050B	07/01/10	6010B	07/08/10	**7440-50-8**	**Copper**	0.4	**258**	
3050B	07/01/10	6010B	07/08/10	**7439-92-1**	**Lead**	4	**131**	
CLP	07/01/10	7471A	07/02/10	**7439-97-6**	**Mercury**	0.04	**0.71**	
3050B	07/01/10	6010B	07/08/10	**7440-22-4**	**Silver**	0.6	**0.8**	
3050B	07/01/10	6010B	07/08/10	**7440-66-6**	**Zinc**	2	**1,340**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: WW19-01
DUPLICATE

Lab Sample ID: RC58A
LIMS ID: 10-15707
Matrix: Soil
Data Release Authorized:
Reported: 07/09/10

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020
Date Sampled: 06/30/10
Date Received: 06/30/10

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Arsenic	6010B	10 U	10 U	0.0%	+/- 10	L
Cadmium	6010B	4.0	3.9	2.5%	+/- 20%	
Chromium	6010B	76	88	14.6%	+/- 20%	
Copper	6010B	258	249	3.6%	+/- 20%	
Lead	6010B	131	130	0.8%	+/- 20%	
Mercury	7471A	0.71	0.54	27.2%	+/- 20%	*
Silver	6010B	0.8	0.9	11.8%	+/- 0.6	L
Zinc	6010B	1,340	1,320	1.5%	+/- 20%	

Reported in mg/kg-dry

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: WW19-01
MATRIX SPIKE

Lab Sample ID: RC58A
LIMS ID: 10-15707
Matrix: Soil
Data Release Authorized:
Reported: 07/09/10

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020
Date Sampled: 06/30/10
Date Received: 06/30/10

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Arsenic	6010B	10 U	380	393	96.7%	
Cadmium	6010B	4.0	101	98.2	98.8%	
Chromium	6010B	76	169	98.2	94.7%	
Copper	6010B	258	344	98.2	87.6%	
Lead	6010B	131	498	393	93.4%	
Mercury	7471A	0.71	0.86	0.353	42.5%	N
Silver	6010B	0.8	88.0	98.2	88.8%	
Zinc	6010B	1,340	1,400	98.2	61.1%	H

Reported in mg/kg-dry

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: WW19-03
SAMPLE

Lab Sample ID: RC58B
LIMS ID: 10-15708
Matrix: Soil
Data Release Authorized:
Reported: 07/09/10

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020
Date Sampled: 06/30/10
Date Received: 06/30/10

Percent Total Solids: 78.0%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	07/01/10	6010B	07/08/10	**7440-38-2**	**Arsenic**	6	**11**	
3050B	07/01/10	6010B	07/08/10	**7440-43-9**	**Cadmium**	0.2	**1.3**	
3050B	07/01/10	6010B	07/08/10	**7440-47-3**	**Chromium**	0.6	**24.0**	
3050B	07/01/10	6010B	07/08/10	**7440-50-8**	**Copper**	0.2	**57.7**	
3050B	07/01/10	6010B	07/08/10	**7439-92-1**	**Lead**	2	**171**	
CLP	07/01/10	7471A	07/02/10	**7439-97-6**	**Mercury**	0.03	**0.34**	
3050B	07/01/10	6010B	07/08/10	7440-22-4	Silver	0.4	0.4	U
3050B	07/01/10	6010B	07/08/10	**7440-66-6**	**Zinc**	1	**354**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: WW19-05
SAMPLE

Lab Sample ID: RC58C
LIMS ID: 10-15709
Matrix: Soil
Data Release Authorized
Reported: 07/09/10

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020
Date Sampled: 06/30/10
Date Received: 06/30/10

Percent Total Solids: 92.6%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	07/01/10	6010B	07/08/10	7440-38-2	Arsenic	5	7	
3050B	07/01/10	6010B	07/08/10	7440-43-9	Cadmium	0.2	0.4	
3050B	07/01/10	6010B	07/08/10	7440-47-3	Chromium	0.5	31.5	
3050B	07/01/10	6010B	07/08/10	7440-50-8	Copper	0.2	24.6	
3050B	07/01/10	6010B	07/08/10	7439-92-1	Lead	2	46	
CLP	07/01/10	7471A	07/02/10	7439-97-6	Mercury	0.02	0.08	
3050B	07/01/10	6010B	07/08/10	7440-22-4	Silver	0.3	0.3	U
3050B	07/01/10	6010B	07/08/10	7440-66-6	Zinc	1	78	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: WW19-06
SAMPLE

Lab Sample ID: RC58D
LIMS ID: 10-15710
Matrix: Soil
Data Release Authorized:
Reported: 07/09/10

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020
Date Sampled: 06/30/10
Date Received: 06/30/10

Percent Total Solids: 79.6%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	07/01/10	6010B	07/08/10	7440-38-2	Arsenic	6	10	
3050B	07/01/10	6010B	07/08/10	7440-43-9	Cadmium	0.2	0.5	
3050B	07/01/10	6010B	07/08/10	7440-47-3	Chromium	0.6	29.2	
3050B	07/01/10	6010B	07/08/10	7440-50-8	Copper	0.2	26.1	
3050B	07/01/10	6010B	07/08/10	7439-92-1	Lead	2	98	
CLP	07/01/10	7471A	07/02/10	7439-97-6	Mercury	0.03	0.08	
3050B	07/01/10	6010B	07/08/10	7440-22-4	Silver	0.3	0.3	U
3050B	07/01/10	6010B	07/08/10	7440-66-6	Zinc	1	96	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: WW19-Dup
SAMPLE

Lab Sample ID: RC58E
LIMS ID: 10-15711
Matrix: Soil
Data Release Authorized:
Reported: 07/09/10

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020
Date Sampled: 06/30/10
Date Received: 06/30/10

Percent Total Solids: 77.6%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	07/01/10	6010B	07/08/10	7440-38-2	Arsenic	6	12	
3050B	07/01/10	6010B	07/08/10	7440-43-9	Cadmium	0.3	1.3	
3050B	07/01/10	6010B	07/08/10	7440-47-3	Chromium	0.6	26.5	
3050B	07/01/10	6010B	07/08/10	7440-50-8	Copper	0.3	56.9	
3050B	07/01/10	6010B	07/08/10	7439-92-1	Lead	3	177	
CLP	07/01/10	7471A	07/02/10	7439-97-6	Mercury	0.02	0.32	
3050B	07/01/10	6010B	07/08/10	7440-22-4	Silver	0.4	0.4	U
3050B	07/01/10	6010B	07/08/10	7440-66-6	Zinc	1	370	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: METHOD BLANK

Lab Sample ID: RC58MB
LIMS ID: 10-15708
Matrix: Soil
Data Release Authorized:
Reported: 07/09/10

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020
Date Sampled: NA
Date Received: NA

Percent Total Solids: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	07/01/10	6010B	07/08/10	7440-38-2	Arsenic	5	5	U
3050B	07/01/10	6010B	07/08/10	7440-43-9	Cadmium	0.2	0.2	U
3050B	07/01/10	6010B	07/08/10	7440-47-3	Chromium	0.5	0.5	U
3050B	07/01/10	6010B	07/08/10	7440-50-8	Copper	0.2	0.2	U
3050B	07/01/10	6010B	07/08/10	7439-92-1	Lead	2	2	U
CLP	07/01/10	7471A	07/02/10	7439-97-6	Mercury	0.02	0.02	U
3050B	07/01/10	6010B	07/08/10	7440-22-4	Silver	0.3	0.3	U
3050B	07/01/10	6010B	07/08/10	7440-66-6	Zinc	1	1	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: RC58LCS
LIMS ID: 10-15708
Matrix: Soil
Data Release Authorized:
Reported: 07/09/10

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	6010B	205	200	102%	
Cadmium	6010B	50.5	50.0	101%	
Chromium	6010B	51.7	50.0	103%	
Copper	6010B	48.9	50.0	97.8%	
Lead	6010B	197	200	98.5%	
Mercury	7471A	0.50	0.50	100%	
Silver	6010B	52.2	50.0	104%	
Zinc	6010B	49	50	98.0%	

Reported in mg/kg-dry

N-Control limit not met
NA-Not Applicable, Analyte Not Spiked
Control Limits: 80-120%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: Rinsate Blank
SAMPLE

Lab Sample ID: RC58F
LIMS ID: 10-15712
Matrix: Water
Data Release Authorized:
Reported: 07/09/10

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020
Date Sampled: 06/30/10
Date Received: 06/30/10

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
3010A	07/02/10	6010B	07/08/10	7440-38-2	Arsenic	0.05	0.05	U
3010A	07/02/10	6010B	07/08/10	7440-43-9	Cadmium	0.002	0.002	U
3010A	07/02/10	6010B	07/08/10	7440-47-3	Chromium	0.005	0.005	U
3010A	07/02/10	6010B	07/08/10	7440-50-8	Copper	0.002	0.002	U
3010A	07/02/10	6010B	07/08/10	7439-92-1	Lead	0.02	0.02	U
7470A	07/02/10	7470A	07/02/10	7439-97-6	Mercury	0.0001	0.0001	U
3010A	07/02/10	6010B	07/08/10	7440-22-4	Silver	0.003	0.003	U
3010A	07/02/10	6010B	07/08/10	7440-66-6	Zinc	0.01	0.01	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: METHOD BLANK

Lab Sample ID: RC58MB
LIMS ID: 10-15712
Matrix: Water
Data Release Authorized:
Reported: 07/09/10

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020
Date Sampled: NA
Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
3010A	07/02/10	6010B	07/08/10	7440-38-2	Arsenic	0.05	0.05	U
3010A	07/02/10	6010B	07/08/10	7440-43-9	Cadmium	0.002	0.002	U
3010A	07/02/10	6010B	07/08/10	7440-47-3	Chromium	0.005	0.005	U
3010A	07/02/10	6010B	07/08/10	7440-50-8	Copper	0.002	0.002	U
3010A	07/02/10	6010B	07/08/10	7439-92-1	Lead	0.02	0.02	U
7470A	07/02/10	7470A	07/02/10	7439-97-6	Mercury	0.0001	0.0001	U
3010A	07/02/10	6010B	07/08/10	7440-22-4	Silver	0.003	0.003	U
3010A	07/02/10	6010B	07/08/10	7440-66-6	Zinc	0.01	0.01	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: LAB CONTROL

Lab Sample ID: RC58LCS
LIMS ID: 10-15712
Matrix: Water
Data Release Authorized:
Reported: 07/09/10

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	6010B	1.98	2.00	99.0%	
Cadmium	6010B	0.503	0.500	101%	
Chromium	6010B	0.511	0.500	102%	
Copper	6010B	0.482	0.500	96.4%	
Lead	6010B	1.93	2.00	96.5%	
Mercury	7470A	0.0022	0.0020	110%	
Silver	6010B	0.499	0.500	99.8%	
Zinc	6010B	0.47	0.50	94.0%	

Reported in mg/L

N-Control limit not met
Control Limits: 80-120%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: MB-060710
METHOD BLANK

Lab Sample ID: MB-060710
LIMS ID: 10-15712
Matrix: Water
Data Release Authorized: VTS
Reported: 07/13/10

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020
Date Sampled: NA
Date Received: NA

Date Extracted: 06/07/10
Date Analyzed: 07/09/10 18:56
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes

Sample Amount: 500 mL
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: No
Acid Cleanup: Yes

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	0.20	< 0.20 U
53469-21-9	Aroclor 1242	0.20	< 0.20 U
12672-29-6	Aroclor 1248	0.20	< 0.20 U
11097-69-1	Aroclor 1254	0.20	< 0.20 U
11096-82-5	Aroclor 1260	0.20	< 0.20 U
11104-28-2	Aroclor 1221	0.20	< 0.20 U
11141-16-5	Aroclor 1232	0.20	< 0.20 U

Reported in µg/L (ppb)

PCB Surrogate Recovery	
Decachlorobiphenyl	65.8%
Tetrachlorometaxylene	77.5%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: Rinsate Blank
SAMPLE

Lab Sample ID: RC58F
LIMS ID: 10-15712
Matrix: Water
Data Release Authorized: VTS
Reported: 07/13/10

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020
Date Sampled: 06/30/10
Date Received: 06/30/10

Date Extracted: 06/07/10
Date Analyzed: 07/09/10 19:43
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes

Sample Amount: 500 mL
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: No
Acid Cleanup: Yes

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	0.20	< 0.20 U
53469-21-9	Aroclor 1242	0.20	< 0.20 U
12672-29-6	Aroclor 1248	0.20	< 0.20 U
11097-69-1	Aroclor 1254	0.20	< 0.20 U
11096-82-5	Aroclor 1260	0.20	< 0.20 U
11104-28-2	Aroclor 1221	0.20	< 0.20 U
11141-16-5	Aroclor 1232	0.20	< 0.20 U

Reported in µg/L (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	56.2%
Tetrachlorometaxylene	77.0%

SW8082/PCB WATER SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020

Client ID	DCBP % REC	DCBP LCL-UCL	TCMX % REC	TCMX LCL-UCL	TOT OUT
MB-060710	65.8%	41-111	77.5%	40-118	0
LCS-060710	58.2%	41-111	78.0%	40-118	0
Rinsate Blank	56.2%	29-118	77.0%	38-118	0

Prep Method: SW3510C
Log Number Range: 10-15712 to 10-15712

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: LCS-060710
LAB CONTROL

Lab Sample ID: LCS-060710
LIMS ID: 10-15712
Matrix: Water
Data Release Authorized: VTS
Reported: 07/13/10

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020
Date Sampled: NA
Date Received: NA

Date Extracted: 06/07/10
Date Analyzed: 07/09/10 19:19
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes

Sample Amount: 500 mL
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: No
Acid Cleanup: Yes

Analyte	Lab Control	Spike Added	Recovery
Aroclor 1016	4.10	5.00	82.0%
Aroclor 1260	3.95	5.00	79.0%

PCB Surrogate Recovery

Decachlorobiphenyl	58.2%
Tetrachlorometaxylene	78.0%

Results reported in µg/L

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: WW19-01
SAMPLE

Lab Sample ID: RC58A
LIMS ID: 10-15707
Matrix: Soil
Data Release Authorized: VB
Reported: 07/15/10

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020
Date Sampled: 06/30/10
Date Received: 06/30/10

Date Extracted: 07/09/10
Date Analyzed: 07/13/10 16:52
Instrument/Analyst: ECD7/AAR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.6 g-dry-wt
Final Extract Volume: 4.0 mL
Dilution Factor: 5.00
Silica Gel: Yes

Percent Moisture: 52.5%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	32	< 32 U
53469-21-9	Aroclor 1242	32	< 32 U
12672-29-6	Aroclor 1248	32	< 32 U
11097-69-1	**Aroclor 1254**	**32**	**42**
11096-82-5	Aroclor 1260	32	< 32 U
11104-28-2	Aroclor 1221	32	< 32 U
11141-16-5	Aroclor 1232	32	< 32 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	66.2%
Tetrachlorometaxylene	66.5%

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

Sample ID: WW19-03
SAMPLE

Lab Sample ID: RC58B
LIMS ID: 10-15708
Matrix: Soil
Data Release Authorized: WJ
Reported: 07/15/10

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020
Date Sampled: 06/30/10
Date Received: 06/30/10

Date Extracted: 07/09/10
Date Analyzed: 07/13/10 17:15
Instrument/Analyst: ECD7/AAR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 13.0 g-dry-wt
Final Extract Volume: 4.0 mL
Dilution Factor: 5.00
Silica Gel: Yes

Percent Moisture: 22.1%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	31	< 31 U
53469-21-9	Aroclor 1242	31	< 31 U
12672-29-6	Aroclor 1248	31	< 31 U
11097-69-1	Aroclor 1254	31	< 31 U
11096-82-5	Aroclor 1260	31	< 31 U
11104-28-2	Aroclor 1221	31	< 31 U
11141-16-5	Aroclor 1232	31	< 31 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	93.2%
Tetrachlorometaxylene	76.2%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: MB-070910
METHOD BLANK

Lab Sample ID: MB-070910
LIMS ID: 10-15709
Matrix: Soil
Data Release Authorized: WD
Reported: 07/15/10

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020
Date Sampled: NA
Date Received: NA

Date Extracted: 07/09/10
Date Analyzed: 07/13/10 16:05
Instrument/Analyst: ECD7/AAR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.0 g
Final Extract Volume: 4.0 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: NA

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	33	< 33 U
53469-21-9	Aroclor 1242	33	< 33 U
12672-29-6	Aroclor 1248	33	< 33 U
11097-69-1	Aroclor 1254	33	< 33 U
11096-82-5	Aroclor 1260	33	< 33 U
11104-28-2	Aroclor 1221	33	< 33 U
11141-16-5	Aroclor 1232	33	< 33 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	71.2%
Tetrachlorometaxylene	61.8%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: WW19-05
SAMPLE

Lab Sample ID: RC58C
LIMS ID: 10-15709
Matrix: Soil
Data Release Authorized: VD
Reported: 07/15/10

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020
Date Sampled: 06/30/10
Date Received: 06/30/10

Date Extracted: 07/09/10
Date Analyzed: 07/13/10 17:39
Instrument/Analyst: ECD7/AAR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.1 g-dry-wt
Final Extract Volume: 4.0 mL
Dilution Factor: 5.00
Silica Gel: Yes

Percent Moisture: 7.3%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	33	< 33 U
53469-21-9	Aroclor 1242	33	< 33 U
12672-29-6	Aroclor 1248	33	< 33 U
11097-69-1	Aroclor 1254	33	< 33 U
11096-82-5	Aroclor 1260	33	< 33 U
11104-28-2	Aroclor 1221	33	< 33 U
11141-16-5	Aroclor 1232	33	< 33 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	89.6%
Tetrachlorometaxylene	76.6%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: WW19-05
MATRIX SPIKE

Lab Sample ID: RC58C
LIMS ID: 10-15709
Matrix: Soil
Data Release Authorized: VTS
Reported: 07/15/10

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020
Date Sampled: 06/30/10
Date Received: 06/30/10

Date Extracted: 07/09/10
Date Analyzed: 07/13/10 18:03
Instrument/Analyst: ECD7/AAR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.2 g-dry-wt
Final Extract Volume: 4.0 mL
Dilution Factor: 5.00
Silica Gel: Yes

Percent Moisture: 7.3%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	33	---
53469-21-9	Aroclor 1242	33	< 33 U
12672-29-6	Aroclor 1248	33	< 33 U
11097-69-1	Aroclor 1254	33	< 33 U
11096-82-5	Aroclor 1260	33	---
11104-28-2	Aroclor 1221	33	< 33 U
11141-16-5	Aroclor 1232	33	< 33 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	88.8%
Tetrachlorometaxylene	76.8%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: WW19-05
MATRIX SPIKE DUP

Lab Sample ID: RC58C
LIMS ID: 10-15709
Matrix: Soil
Data Release Authorized: VTS
Reported: 07/15/10

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020
Date Sampled: 06/30/10
Date Received: 06/30/10

Date Extracted: 07/09/10
Date Analyzed: 07/13/10 18:26
Instrument/Analyst: ECD7/AAR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.4 g-dry-wt
Final Extract Volume: 4.0 mL
Dilution Factor: 5.00
Silica Gel: Yes

Percent Moisture: 7.3%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	32	---
53469-21-9	Aroclor 1242	32	< 32 U
12672-29-6	Aroclor 1248	32	< 32 U
11097-69-1	Aroclor 1254	32	< 32 U
11096-82-5	Aroclor 1260	32	---
11104-28-2	Aroclor 1221	32	< 32 U
11141-16-5	Aroclor 1232	32	< 32 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	89.9%
Tetrachlorometaxylene	77.1%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: WW19-06
SAMPLE

Lab Sample ID: RC58D
LIMS ID: 10-15710
Matrix: Soil
Data Release Authorized: VTS
Reported: 07/15/10

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020
Date Sampled: 06/30/10
Date Received: 06/30/10

Date Extracted: 07/09/10
Date Analyzed: 07/13/10 18:50
Instrument/Analyst: ECD7/AAR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.8 g-dry-wt
Final Extract Volume: 4.0 mL
Dilution Factor: 5.00
Silica Gel: Yes

Percent Moisture: 20.6%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	31	< 31 U
53469-21-9	Aroclor 1242	31	< 31 U
12672-29-6	Aroclor 1248	31	< 31 U
11097-69-1	Aroclor 1254	31	< 31 U
11096-82-5	Aroclor 1260	31	< 31 U
11104-28-2	Aroclor 1221	31	< 31 U
11141-16-5	Aroclor 1232	31	< 31 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	84.0%
Tetrachlorometaxylene	76.4%

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

Sample ID: WW19-Dup
SAMPLE

Lab Sample ID: RC58E
LIMS ID: 10-15711
Matrix: Soil
Data Release Authorized: VTJ
Reported: 07/15/10

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020
Date Sampled: 06/30/10
Date Received: 06/30/10

Date Extracted: 07/09/10
Date Analyzed: 07/13/10 19:13
Instrument/Analyst: ECD7/AAR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 13.0 g-dry-wt
Final Extract Volume: 4.0 mL
Dilution Factor: 5.00
Silica Gel: Yes

Percent Moisture: 20.2%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	31	< 31 U
53469-21-9	Aroclor 1242	31	< 31 U
12672-29-6	Aroclor 1248	31	< 31 U
11097-69-1	Aroclor 1254	31	< 31 U
11096-82-5	Aroclor 1260	31	< 31 U
11104-28-2	Aroclor 1221	31	< 31 U
11141-16-5	Aroclor 1232	31	< 31 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	91.2%
Tetrachlorometaxylene	74.0%

ANALYTICAL RESOURCES INCORPORATED

SW8082/PCB SOIL/SEDIMENT SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020

Client ID	DCBP % REC	DCBP LCL-UCL	TCMX % REC	TCMX LCL-UCL	TOT OUT
WW19-01	66.2%	42-127	66.5%	50-114	0
WW19-03	93.2%	42-127	76.2%	50-114	0
MB-070910	71.2%	51-112	61.8%	46-111	0
LCS-070910	79.0%	51-112	67.5%	46-111	0
WW19-05	89.6%	42-127	76.6%	50-114	0
WW19-05 MS	88.8%	42-127	76.8%	50-114	0
WW19-05 MSD	89.9%	42-127	77.1%	50-114	0
WW19-06	84.0%	42-127	76.4%	50-114	0
WW19-Dup	91.2%	42-127	74.0%	50-114	0

Standard Sonication Control Limits
Prep Method: SW3550B
Log Number Range: 10-15707 to 10-15711

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: WW19-05
MS/MSD

Lab Sample ID: RC58C
LIMS ID: 10-15709
Matrix: Soil
Data Release Authorized: VTS
Reported: 07/15/10

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020
Date Sampled: 06/30/10
Date Received: 06/30/10

Date Extracted MS/MSD: 07/09/10

Sample Amount MS: 12.2 g-dry-wt
MSD: 12.4 g-dry-wt

Date Analyzed MS: 07/13/10 18:03
MSD: 07/13/10 18:26
Instrument/Analyst MS: ECD7/AAR
MSD: ECD7/AAR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Final Extract Volume MS: 4.0 mL
MSD: 4.0 mL
Dilution Factor MS: 5.00
MSD: 5.00
Silica Gel: Yes

Percent Moisture: 7.3%

Analyte	Sample	MS	Spike Added-MS	MS Recovery	MSD	Spike Added-MSD	MSD Recovery	RPD
Aroclor 1016	< 33.1 U	143	163	87.7%	143	162	88.3%	0.0%
Aroclor 1260	< 33.1 U	126	163	77.3%	129	162	79.6%	2.4%

Results reported in µg/kg (ppb)
RPD calculated using sample concentrations per SW846.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: LCS-070910
LAB CONTROL

Lab Sample ID: LCS-070910
LIMS ID: 10-15709
Matrix: Soil
Data Release Authorized: VJ
Reported: 07/15/10

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020
Date Sampled: NA
Date Received: NA

Date Extracted: 07/09/10
Date Analyzed: 07/13/10 16:28
Instrument/Analyst: ECD7/AAR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.0 g-dry-wt
Final Extract Volume: 4.0 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: NA

Analyte	**Lab Control**	**Spike Added**	**Recovery**
Aroclor 1016	121	167	72.5%
Aroclor 1260	110	167	65.9%

PCB Surrogate Recovery	
Decachlorobiphenyl	79.0%
Tetrachlorometaxylene	67.5%

Results reported in µg/kg (ppb)

ANALYTICAL RESOURCES INCORPORATED

SW8270 SEMIVOLATILES SOIL/SEDIMENT SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020

Client ID	NBZ	FBP	TPH	DCB	PHL	2FP	TBP	2CP	TOT OUT
WW19-01	80.5%	96.7%	76.8%	71.6%	80.8%	71.0%	96.0%	78.6%	0
WW19-03	64.4%	76.8%	68.0%	62.8%	63.7%	57.6%	75.5%	62.7%	0
WW19-03 DL	70.0%	84.5%	87.2%	69.4%	70.6%	61.7%	81.6%	70.4%	0
WW19-05	67.2%	75.2%	94.8%	66.0%	64.5%	60.5%	50.7%	64.8%	0
WW19-06	61.6%	70.8%	75.2%	64.8%	64.8%	60.0%	80.5%	63.5%	0
MB-070910	68.8%	73.2%	88.4%	69.2%	68.5%	62.4%	72.8%	66.9%	0
LCS-070910	68.4%	74.8%	88.0%	66.4%	66.4%	64.3%	83.2%	65.9%	0
WW19-Dup	74.3%	89.0%	92.2%	70.9%	75.4%	67.9%	91.2%	75.0%	0
WW19-Dup MS	72.7%	84.5%	88.8%	71.8%	77.4%	68.1%	92.0%	74.0%	0
WW19-Dup MSD	70.2%	82.2%	85.8%	65.5%	74.8%	64.5%	84.8%	71.3%	0

	LCS/MB LIMITS	QC LIMITS
(NBZ) = d5-Nitrobenzene	(39-100)	(32-100)
(FBP) = 2-Fluorobiphenyl	(44-100)	(36-100)
(TPH) = d14-p-Terphenyl	(55-106)	(35-113)
(DCB) = d4-1,2-Dichlorobenzene	(34-100)	(30-100)
(PHL) = d5-Phenol	(39-100)	(31-100)
(2FP) = 2-Fluorophenol	(14-100)	(10-100)
(TBP) = 2,4,6-Tribromophenol	(47-109)	(28-116)
(2CP) = d4-2-Chlorophenol	(43-100)	(33-100)

Prep Method: SW3550B
Log Number Range: 10-15707 to 10-15711

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: WW19-01
SAMPLE

Lab Sample ID: RC58A
LIMS ID: 10-15707
Matrix: Soil
Data Release Authorized:
Reported: 07/20/10

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020
Date Sampled: 06/30/10
Date Received: 06/30/10

Date Extracted: 07/09/10
Date Analyzed: 07/15/10 18:39
Instrument/Analyst: NT6/JZ
GPC Cleanup: Yes

Sample Amount: 7.65 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 3.00
Percent Moisture: 52.5%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	200	< 200 U
111-44-4	Bis-(2-Chloroethyl) Ether	200	< 200 U
95-57-8	2-Chlorophenol	200	< 200 U
541-73-1	1,3-Dichlorobenzene	200	< 200 U
106-46-7	1,4-Dichlorobenzene	200	< 200 U
100-51-6	Benzyl Alcohol	980	< 980 U
95-50-1	1,2-Dichlorobenzene	200	< 200 U
95-48-7	2-Methylphenol	200	< 200 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	200	< 200 U
106-44-5	4-Methylphenol	200	< 200 U
621-64-7	N-Nitroso-Di-N-Propylamine	980	< 980 U
67-72-1	Hexachloroethane	200	< 200 U
98-95-3	Nitrobenzene	200	< 200 U
78-59-1	Isophorone	200	< 200 U
88-75-5	2-Nitrophenol	980	< 980 U
105-67-9	2,4-Dimethylphenol	200	< 200 U
65-85-0	Benzoic Acid	2,000	< 2,000 U
111-91-1	bis(2-Chloroethoxy) Methane	200	< 200 U
120-83-2	2,4-Dichlorophenol	980	< 980 U
120-82-1	1,2,4-Trichlorobenzene	200	< 200 U
91-20-3	**Naphthalene**	**200**	**250**
106-47-8	4-Chloroaniline	980	< 980 U
87-68-3	Hexachlorobutadiene	200	< 200 U
59-50-7	4-Chloro-3-methylphenol	980	< 980 U
91-57-6	2-Methylnaphthalene	200	< 200 U
77-47-4	Hexachlorocyclopentadiene	980	< 980 U
88-06-2	2,4,6-Trichlorophenol	980	< 980 U
95-95-4	2,4,5-Trichlorophenol	980	< 980 U
91-58-7	2-Chloronaphthalene	200	< 200 U
88-74-4	2-Nitroaniline	980	< 980 U
131-11-3	Dimethylphthalate	200	< 200 U
208-96-8	**Acenaphthylene**	**200**	**220**
99-09-2	3-Nitroaniline	980	< 980 U
83-32-9	Acenaphthene	200	< 200 U
51-28-5	2,4-Dinitrophenol	2,000	< 2,000 U
100-02-7	4-Nitrophenol	980	< 980 U
132-64-9	Dibenzofuran	200	< 200 U
606-20-2	2,6-Dinitrotoluene	980	< 980 U
121-14-2	2,4-Dinitrotoluene	980	< 980 U
84-66-2	Diethylphthalate	200	< 200 U
7005-72-3	4-Chlorophenyl-phenylether	200	< 200 U
86-73-7	Fluorene	200	< 200 U
100-01-6	4-Nitroaniline	980	< 980 U
534-52-1	4,6-Dinitro-2-Methylphenol	2,000	< 2,000 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: WW19-01
SAMPLE

Lab Sample ID: RC58A
LIMS ID: 10-15707
Matrix: Soil
Date Analyzed: 07/15/10 18:39

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020

CAS Number	Analyte	RL	Result
86-30-6	N-Nitrosodiphenylamine	200	< 200 U
101-55-3	4-Bromophenyl-phenylether	200	< 200 U
118-74-1	Hexachlorobenzene	200	< 200 U
87-86-5	Pentachlorophenol	980	< 980 U
85-01-8	**Phenanthrene**	**200**	**1,100**
86-74-8	Carbazole	200	< 200 U
120-12-7	Anthracene	200	< 200 U
84-74-2	**Di-n-Butylphthalate**	**200**	**310**
206-44-0	**Fluoranthene**	**200**	**1,800**
129-00-0	**Pyrene**	**200**	**1,300**
85-68-7	**Butylbenzylphthalate**	**200**	**470**
91-94-1	3,3'-Dichlorobenzidine	980	< 980 U
56-55-3	**Benzo(a)anthracene**	**200**	**500**
117-81-7	**bis(2-Ethylhexyl)phthalate**	**200**	**12,000 B**
218-01-9	**Chrysene**	**200**	**1,100**
117-84-0	**Di-n-Octyl phthalate**	**200**	**910**
205-99-2	**Benzo(b)fluoranthene**	**200**	**910**
207-08-9	**Benzo(k)fluoranthene**	**200**	**1,700**
50-32-8	**Benzo(a)pyrene**	**200**	**930**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**200**	**630**
53-70-3	Dibenz(a,h)anthracene	200	< 200 U
191-24-2	**Benzo(g,h,i)perylene**	**200**	**880**
90-12-0	1-Methylnaphthalene	200	< 200 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	80.5%	2-Fluorobiphenyl	96.7%
d14-p-Terphenyl	76.8%	d4-1,2-Dichlorobenzene	71.6%
d5-Phenol	80.8%	2-Fluorophenol	71.0%
2,4,6-Tribromophenol	96.0%	d4-2-Chlorophenol	78.6%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Page 1 of 2

Sample ID: WW19-03
SAMPLE

Lab Sample ID: RC58B
LIMS ID: 10-15708
Matrix: Soil
Data Release Authorized:
Reported: 07/20/10

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020
Date Sampled: 06/30/10
Date Received: 06/30/10

Date Extracted: 07/09/10
Date Analyzed: 07/15/10 19:12
Instrument/Analyst: NT6/JZ
GPC Cleanup: Yes

Sample Amount: 7.84 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00
Percent Moisture: 22.1%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	64	< 64 U
111-44-4	Bis-(2-Chloroethyl) Ether	64	< 64 U
95-57-8	2-Chlorophenol	64	< 64 U
541-73-1	1,3-Dichlorobenzene	64	< 64 U
106-46-7	1,4-Dichlorobenzene	64	< 64 U
100-51-6	Benzyl Alcohol	320	< 320 U
95-50-1	1,2-Dichlorobenzene	64	< 64 U
95-48-7	2-Methylphenol	64	< 64 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	64	< 64 U
106-44-5	4-Methylphenol	64	< 64 U
621-64-7	N-Nitroso-Di-N-Propylamine	320	< 320 U
67-72-1	Hexachloroethane	64	< 64 U
98-95-3	Nitrobenzene	64	< 64 U
78-59-1	Isophorone	64	< 64 U
88-75-5	2-Nitrophenol	320	< 320 U
105-67-9	2,4-Dimethylphenol	64	< 64 U
65-85-0	Benzoic Acid	640	< 640 U
111-91-1	bis(2-Chloroethoxy) Methane	64	< 64 U
120-83-2	2,4-Dichlorophenol	320	< 320 U
120-82-1	1,2,4-Trichlorobenzene	64	< 64 U
91-20-3	**Naphthalene**	**64**	**600**
106-47-8	4-Chloroaniline	320	< 320 U
87-68-3	Hexachlorobutadiene	64	< 64 U
59-50-7	4-Chloro-3-methylphenol	320	< 320 U
91-57-6	**2-Methylnaphthalene**	**64**	**260**
77-47-4	Hexachlorocyclopentadiene	320	< 320 U
88-06-2	2,4,6-Trichlorophenol	320	< 320 U
95-95-4	2,4,5-Trichlorophenol	320	< 320 U
91-58-7	2-Chloronaphthalene	64	< 64 U
88-74-4	2-Nitroaniline	320	< 320 U
131-11-3	Dimethylphthalate	64	< 64 U
208-96-8	**Acenaphthylene**	**64**	**710**
99-09-2	3-Nitroaniline	320	< 320 U
83-32-9	Acenaphthene	64	< 64 U
51-28-5	2,4-Dinitrophenol	640	< 640 U
100-02-7	4-Nitrophenol	320	< 320 U
132-64-9	**Dibenzofuran**	**64**	**91**
606-20-2	2,6-Dinitrotoluene	320	< 320 U
121-14-2	2,4-Dinitrotoluene	320	< 320 U
84-66-2	Diethylphthalate	64	< 64 U
7005-72-3	4-Chlorophenyl-phenylether	64	< 64 U
86-73-7	**Fluorene**	**64**	**210**
100-01-6	4-Nitroaniline	320	< 320 U
534-52-1	4,6-Dinitro-2-Methylphenol	640	< 640 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: WW19-03
SAMPLE

Lab Sample ID: RC58B
LIMS ID: 10-15708
Matrix: Soil
Date Analyzed: 07/15/10 19:12

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020

CAS Number	Analyte	RL	Result
86-30-6	N-Nitrosodiphenylamine	64	< 64 U
101-55-3	4-Bromophenyl-phenylether	64	< 64 U
118-74-1	Hexachlorobenzene	64	< 64 U
87-86-5	Pentachlorophenol	320	< 320 U
85-01-8	**Phenanthrene**	**64**	**3,300**
86-74-8	**Carbazole**	**64**	**240**
120-12-7	**Anthracene**	**64**	**760**
84-74-2	Di-n-Butylphthalate	64	< 64 U
206-44-0	**Fluoranthene**	**64**	**7,000 ES**
129-00-0	**Pyrene**	**64**	**6,000 ES**
85-68-7	Butylbenzylphthalate	64	< 64 U
91-94-1	3,3'-Dichlorobenzidine	320	< 320 U
56-55-3	**Benzo(a)anthracene**	**64**	**3,200**
117-81-7	**bis(2-Ethylhexyl)phthalate**	**64**	**270 B**
218-01-9	**Chrysene**	**64**	**4,000**
117-84-0	Di-n-Octyl phthalate	64	< 64 U
205-99-2	**Benzo(b)fluoranthene**	**64**	**3,700**
207-08-9	**Benzo(k)fluoranthene**	**64**	**3,700**
50-32-8	**Benzo(a)pyrene**	**64**	**4,700**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**64**	**4,200**
53-70-3	**Dibenz(a,h)anthracene**	**64**	**1,200**
191-24-2	**Benzo(g,h,i)perylene**	**64**	**5,100 E**
90-12-0	**1-Methylnaphthalene**	**64**	**200**

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	64.4%	2-Fluorobiphenyl	76.8%
d14-p-Terphenyl	68.0%	d4-1,2-Dichlorobenzene	62.8%
d5-Phenol	63.7%	2-Fluorophenol	57.6%
2,4,6-Tribromophenol	75.5%	d4-2-Chlorophenol	62.7%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: WW19-03
DILUTION

Lab Sample ID: RC58B
LIMS ID: 10-15708
Matrix: Soil
Data Release Authorized:
Reported: 07/20/10

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020
Date Sampled: 06/30/10
Date Received: 06/30/10

Date Extracted: 07/09/10
Date Analyzed: 07/17/10 10:53
Instrument/Analyst: NT6/JZ
GPC Cleanup: Yes

Sample Amount: 7.84 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 3.00
Percent Moisture: 22.1%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	190	< 190 U
111-44-4	Bis-(2-Chloroethyl) Ether	190	< 190 U
95-57-8	2-Chlorophenol	190	< 190 U
541-73-1	1,3-Dichlorobenzene	190	< 190 U
106-46-7	1,4-Dichlorobenzene	190	< 190 U
100-51-6	Benzyl Alcohol	960	< 960 U
95-50-1	1,2-Dichlorobenzene	190	< 190 U
95-48-7	2-Methylphenol	190	< 190 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	190	< 190 U
106-44-5	4-Methylphenol	190	< 190 U
621-64-7	N-Nitroso-Di-N-Propylamine	960	< 960 U
67-72-1	Hexachloroethane	190	< 190 U
98-95-3	Nitrobenzene	190	< 190 U
78-59-1	Isophorone	190	< 190 U
88-75-5	2-Nitrophenol	960	< 960 U
105-67-9	2,4-Dimethylphenol	190	< 190 U
65-85-0	Benzoic Acid	1,900	< 1,900 U
111-91-1	bis(2-Chloroethoxy) Methane	190	< 190 U
120-83-2	2,4-Dichlorophenol	960	< 960 U
120-82-1	1,2,4-Trichlorobenzene	190	< 190 U
91-20-3	**Naphthalene**	**190**	**660**
106-47-8	4-Chloroaniline	960	< 960 U
87-68-3	Hexachlorobutadiene	190	< 190 U
59-50-7	4-Chloro-3-methylphenol	960	< 960 U
91-57-6	**2-Methylnaphthalene**	**190**	**280**
77-47-4	Hexachlorocyclopentadiene	960	< 960 U
88-06-2	2,4,6-Trichlorophenol	960	< 960 U
95-95-4	2,4,5-Trichlorophenol	960	< 960 U
91-58-7	2-Chloronaphthalene	190	< 190 U
88-74-4	2-Nitroaniline	960	< 960 U
131-11-3	Dimethylphthalate	190	< 190 U
208-96-8	**Acenaphthylene**	**190**	**770**
99-09-2	3-Nitroaniline	960	< 960 U
83-32-9	Acenaphthene	190	< 190 U
51-28-5	2,4-Dinitrophenol	1,900	< 1,900 U
100-02-7	4-Nitrophenol	960	< 960 U
132-64-9	Dibenzofuran	190	< 190 U
606-20-2	2,6-Dinitrotoluene	960	< 960 U
121-14-2	2,4-Dinitrotoluene	960	< 960 U
84-66-2	Diethylphthalate	190	< 190 U
7005-72-3	4-Chlorophenyl-phenylether	190	< 190 U
86-73-7	**Fluorene**	**190**	**250**
100-01-6	4-Nitroaniline	960	< 960 U
534-52-1	4,6-Dinitro-2-Methylphenol	1,900	< 1,900 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: WW19-03
DILUTION

Lab Sample ID: RC58B
LIMS ID: 10-15708
Matrix: Soil
Date Analyzed: 07/17/10 10:53

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020

CAS Number	Analyte	RL	Result
86-30-6	N-Nitrosodiphenylamine	190	< 190 U
101-55-3	4-Bromophenyl-phenylether	190	< 190 U
118-74-1	Hexachlorobenzene	190	< 190 U
87-86-5	Pentachlorophenol	960	< 960 U
85-01-8	**Phenanthrene**	**190**	**4,000**
86-74-8	**Carbazole**	**190**	**260**
120-12-7	**Anthracene**	**190**	**770**
84-74-2	Di-n-Butylphthalate	190	< 190 U
206-44-0	**Fluoranthene**	**190**	**9,500**
129-00-0	**Pyrene**	**190**	**10,000**
85-68-7	Butylbenzylphthalate	190	< 190 U
91-94-1	3,3'-Dichlorobenzidine	960	< 960 U
56-55-3	**Benzo(a)anthracene**	**190**	**4,000**
117-81-7	**bis(2-Ethylhexyl)phthalate**	**190**	**320 B**
218-01-9	**Chrysene**	**190**	**5,400**
117-84-0	Di-n-Octyl phthalate	190	< 190 U
205-99-2	**Benzo(b)fluoranthene**	**190**	**5,300**
207-08-9	**Benzo(k)fluoranthene**	**190**	**5,300**
50-32-8	**Benzo(a)pyrene**	**190**	**6,400**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**190**	**5,700**
53-70-3	**Dibenz(a,h)anthracene**	**190**	**1,400**
191-24-2	**Benzo(g,h,i)perylene**	**190**	**7,800**
90-12-0	1-Methylnaphthalene	190	< 190 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	70.0%	2-Fluorobiphenyl	84.5%
d14-p-Terphenyl	87.2%	d4-1,2-Dichlorobenzene	69.4%
d5-Phenol	70.6%	2-Fluorophenol	61.7%
2,4,6-Tribromophenol	81.6%	d4-2-Chlorophenol	70.4%

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

ANALYTICAL RESOURCES INCORPORATED

Sample ID: WW19-05
SAMPLE

Lab Sample ID: RC58C
LIMS ID: 10-15709
Matrix: Soil
Data Release Authorized:
Reported: 07/20/10

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020
Date Sampled: 06/30/10
Date Received: 06/30/10

Date Extracted: 07/09/10
Date Analyzed: 07/16/10 20:11
Instrument/Analyst: NT6/JZ
GPC Cleanup: Yes

Sample Amount: 8.54 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00
Percent Moisture: 7.3%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	58	< 58 U
111-44-4	Bis-(2-Chloroethyl) Ether	58	< 58 U
95-57-8	2-Chlorophenol	58	< 58 U
541-73-1	1,3-Dichlorobenzene	58	< 58 U
106-46-7	1,4-Dichlorobenzene	58	< 58 U
100-51-6	Benzyl Alcohol	290	< 290 U
95-50-1	1,2-Dichlorobenzene	58	< 58 U
95-48-7	2-Methylphenol	58	< 58 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	58	< 58 U
106-44-5	4-Methylphenol	58	< 58 U
621-64-7	N-Nitroso-Di-N-Propylamine	290	< 290 U
67-72-1	Hexachloroethane	58	< 58 U
98-95-3	Nitrobenzene	58	< 58 U
78-59-1	Isophorone	58	< 58 U
88-75-5	2-Nitrophenol	290	< 290 U
105-67-9	2,4-Dimethylphenol	58	< 58 U
65-85-0	Benzoic Acid	580	< 580 U
111-91-1	bis(2-Chloroethoxy) Methane	58	< 58 U
120-83-2	2,4-Dichlorophenol	290	< 290 U
120-82-1	1,2,4-Trichlorobenzene	58	< 58 U
91-20-3	Naphthalene	58	< 58 U
106-47-8	4-Chloroaniline	290	< 290 U
87-68-3	Hexachlorobutadiene	58	< 58 U
59-50-7	4-Chloro-3-methylphenol	290	< 290 U
91-57-6	2-Methylnaphthalene	58	< 58 U
77-47-4	Hexachlorocyclopentadiene	290	< 290 U
88-06-2	2,4,6-Trichlorophenol	290	< 290 U
95-95-4	2,4,5-Trichlorophenol	290	< 290 U
91-58-7	2-Chloronaphthalene	58	< 58 U
88-74-4	2-Nitroaniline	290	< 290 U
131-11-3	Dimethylphthalate	58	< 58 U
208-96-8	Acenaphthylene	58	< 58 U
99-09-2	3-Nitroaniline	290	< 290 U
83-32-9	Acenaphthene	58	< 58 U
51-28-5	2,4-Dinitrophenol	580	< 580 U
100-02-7	4-Nitrophenol	290	< 290 U
132-64-9	Dibenzofuran	58	< 58 U
606-20-2	2,6-Dinitrotoluene	290	< 290 U
121-14-2	2,4-Dinitrotoluene	290	< 290 U
84-66-2	Diethylphthalate	58	< 58 U
7005-72-3	4-Chlorophenyl-phenylether	58	< 58 U
86-73-7	Fluorene	58	< 58 U
100-01-6	4-Nitroaniline	290	< 290 U
534-52-1	4,6-Dinitro-2-Methylphenol	580	< 580 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: WW19-05
SAMPLE

Lab Sample ID: RC58C
LIMS ID: 10-15709
Matrix: Soil
Date Analyzed: 07/16/10 20:11

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020

CAS Number	Analyte	RL	Result
86-30-6	N-Nitrosodiphenylamine	58	< 58 U
101-55-3	4-Bromophenyl-phenylether	58	< 58 U
118-74-1	Hexachlorobenzene	58	< 58 U
87-86-5	Pentachlorophenol	290	< 290 U
85-01-8	**Phenanthrene**	**58**	**160**
86-74-8	Carbazole	58	< 58 U
120-12-7	Anthracene	58	< 58 U
84-74-2	Di-n-Butylphthalate	58	< 58 U
206-44-0	**Fluoranthene**	**58**	**280**
129-00-0	**Pyrene**	**58**	**340**
85-68-7	Butylbenzylphthalate	58	< 58 U
91-94-1	3,3'-Dichlorobenzidine	290	< 290 U
56-55-3	**Benzo(a)anthracene**	**58**	**110**
117-81-7	**bis(2-Ethylhexyl)phthalate**	**58**	**210 B**
218-01-9	**Chrysene**	**58**	**170**
117-84-0	Di-n-Octyl phthalate	58	< 58 U
205-99-2	**Benzo(b)fluoranthene**	**58**	**140**
207-08-9	**Benzo(k)fluoranthene**	**58**	**140**
50-32-8	**Benzo(a)pyrene**	**58**	**130**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**58**	**120**
53-70-3	Dibenz(a,h)anthracene	58	< 58 U
191-24-2	**Benzo(g,h,i)perylene**	**58**	**170**
90-12-0	1-Methylnaphthalene	58	< 58 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	67.2%	2-Fluorobiphenyl	75.2%
d14-p-Terphenyl	94.8%	d4-1,2-Dichlorobenzene	66.0%
d5-Phenol	64.5%	2-Fluorophenol	60.5%
2,4,6-Tribromophenol	50.7%	d4-2-Chlorophenol	64.8%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: WW19-06
SAMPLE

Lab Sample ID: RC58D
LIMS ID: 10-15710
Matrix: Soil
Data Release Authorized:
Reported: 07/20/10

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020
Date Sampled: 06/30/10
Date Received: 06/30/10

Date Extracted: 07/09/10
Date Analyzed: 07/17/10 11:31
Instrument/Analyst: NT6/JZ
GPC Cleanup: Yes

Sample Amount: 7.97 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00
Percent Moisture: 20.6%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	63	< 63 U
111-44-4	Bis-(2-Chloroethyl) Ether	63	< 63 U
95-57-8	2-Chlorophenol	63	< 63 U
541-73-1	1,3-Dichlorobenzene	63	< 63 U
106-46-7	1,4-Dichlorobenzene	63	< 63 U
100-51-6	Benzyl Alcohol	310	< 310 U
95-50-1	1,2-Dichlorobenzene	63	< 63 U
95-48-7	2-Methylphenol	63	< 63 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	63	< 63 U
106-44-5	4-Methylphenol	63	< 63 U
621-64-7	N-Nitroso-Di-N-Propylamine	310	< 310 U
67-72-1	Hexachloroethane	63	< 63 U
98-95-3	Nitrobenzene	63	< 63 U
78-59-1	Isophorone	63	< 63 U
88-75-5	2-Nitrophenol	310	< 310 U
105-67-9	2,4-Dimethylphenol	63	< 63 U
65-85-0	Benzoic Acid	630	< 630 U
111-91-1	bis(2-Chloroethoxy) Methane	63	< 63 U
120-83-2	2,4-Dichlorophenol	310	< 310 U
120-82-1	1,2,4-Trichlorobenzene	63	< 63 U
91-20-3	Naphthalene	63	< 63 U
106-47-8	4-Chloroaniline	310	< 310 U
87-68-3	Hexachlorobutadiene	63	< 63 U
59-50-7	4-Chloro-3-methylphenol	310	< 310 U
91-57-6	2-Methylnaphthalene	63	< 63 U
77-47-4	Hexachlorocyclopentadiene	310	< 310 U
88-06-2	2,4,6-Trichlorophenol	310	< 310 U
95-95-4	2,4,5-Trichlorophenol	310	< 310 U
91-58-7	2-Chloronaphthalene	63	< 63 U
88-74-4	2-Nitroaniline	310	< 310 U
131-11-3	Dimethylphthalate	63	< 63 U
208-96-8	Acenaphthylene	63	< 63 U
99-09-2	3-Nitroaniline	310	< 310 U
83-32-9	Acenaphthene	63	< 63 U
51-28-5	2,4-Dinitrophenol	630	< 630 U
100-02-7	4-Nitrophenol	310	< 310 U
132-64-9	Dibenzofuran	63	< 63 U
606-20-2	2,6-Dinitrotoluene	310	< 310 U
121-14-2	2,4-Dinitrotoluene	310	< 310 U
84-66-2	Diethylphthalate	63	< 63 U
7005-72-3	4-Chlorophenyl-phenylether	63	< 63 U
86-73-7	Fluorene	63	< 63 U
100-01-6	4-Nitroaniline	310	< 310 U
534-52-1	4,6-Dinitro-2-Methylphenol	630	< 630 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: WW19-06
SAMPLE

Lab Sample ID: RC58D
LIMS ID: 10-15710
Matrix: Soil
Date Analyzed: 07/17/10 11:31

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020

CAS Number	Analyte	RL	Result
86-30-6	N-Nitrosodiphenylamine	63	< 63 U
101-55-3	4-Bromophenyl-phenylether	63	< 63 U
118-74-1	Hexachlorobenzene	63	< 63 U
87-86-5	Pentachlorophenol	310	< 310 U
85-01-8	**Phenanthrene**	**63**	**150**
86-74-8	Carbazole	63	< 63 U
120-12-7	Anthracene	63	< 63 U
84-74-2	Di-n-Butylphthalate	63	< 63 U
206-44-0	**Fluoranthene**	**63**	**280**
129-00-0	**Pyrene**	**63**	**310**
85-68-7	Butylbenzylphthalate	63	< 63 U
91-94-1	3,3'-Dichlorobenzidine	310	< 310 U
56-55-3	**Benzo(a)anthracene**	**63**	**100**
117-81-7	**bis(2-Ethylhexyl)phthalate**	**63**	**270 B**
218-01-9	**Chrysene**	**63**	**170**
117-84-0	Di-n-Octyl phthalate	63	< 63 U
205-99-2	**Benzo(b)fluoranthene**	**63**	**180**
207-08-9	**Benzo(k)fluoranthene**	**63**	**180**
50-32-8	**Benzo(a)pyrene**	**63**	**160**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**63**	**160**
53-70-3	Dibenz(a,h)anthracene	63	< 63 U
191-24-2	**Benzo(g,h,i)perylene**	**63**	**220**
90-12-0	1-Methylnaphthalene	63	< 63 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	61.6%	2-Fluorobiphenyl	70.8%
d14-p-Terphenyl	75.2%	d4-1,2-Dichlorobenzene	64.8%
d5-Phenol	64.8%	2-Fluorophenol	60.0%
2,4,6-Tribromophenol	80.5%	d4-2-Chlorophenol	63.5%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: WW19-Dup
SAMPLE

Lab Sample ID: RC58E
LIMS ID: 10-15711
Matrix: Soil
Data Release Authorized:
Reported: 07/20/10

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020
Date Sampled: 06/30/10
Date Received: 06/30/10

Date Extracted: 07/09/10
Date Analyzed: 07/19/10 20:24
Instrument/Analyst: NT6/JZ
GPC Cleanup: Yes

Sample Amount: 8.06 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 3.00
Percent Moisture: 20.2%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	190	< 190 U
111-44-4	Bis-(2-Chloroethyl) Ether	190	< 190 U
95-57-8	2-Chlorophenol	190	< 190 U
541-73-1	1,3-Dichlorobenzene	190	< 190 U
106-46-7	1,4-Dichlorobenzene	190	< 190 U
100-51-6	Benzyl Alcohol	930	< 930 U
95-50-1	1,2-Dichlorobenzene	190	< 190 U
95-48-7	2-Methylphenol	190	< 190 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	190	< 190 U
106-44-5	4-Methylphenol	190	< 190 U
621-64-7	N-Nitroso-Di-N-Propylamine	930	< 930 U
67-72-1	Hexachloroethane	190	< 190 U
98-95-3	Nitrobenzene	190	< 190 U
78-59-1	Isophorone	190	< 190 U
88-75-5	2-Nitrophenol	930	< 930 U
105-67-9	2,4-Dimethylphenol	190	< 190 U
65-85-0	Benzoic Acid	1,900	< 1,900 U
111-91-1	bis(2-Chloroethoxy) Methane	190	< 190 U
120-83-2	2,4-Dichlorophenol	930	< 930 U
120-82-1	1,2,4-Trichlorobenzene	190	< 190 U
91-20-3	**Naphthalene**	**190**	**630**
106-47-8	4-Chloroaniline	930	< 930 U
87-68-3	Hexachlorobutadiene	190	< 190 U
59-50-7	4-Chloro-3-methylphenol	930	< 930 U
91-57-6	**2-Methylnaphthalene**	**190**	**300**
77-47-4	Hexachlorocyclopentadiene	930	< 930 U
88-06-2	2,4,6-Trichlorophenol	930	< 930 U
95-95-4	2,4,5-Trichlorophenol	930	< 930 U
91-58-7	2-Chloronaphthalene	190	< 190 U
88-74-4	2-Nitroaniline	930	< 930 U
131-11-3	Dimethylphthalate	190	< 190 U
208-96-8	**Acenaphthylene**	**190**	**720**
99-09-2	3-Nitroaniline	930	< 930 U
83-32-9	Acenaphthene	190	< 190 U
51-28-5	2,4-Dinitrophenol	1,900	< 1,900 U
100-02-7	4-Nitrophenol	930	< 930 U
132-64-9	Dibenzofuran	190	< 190 U
606-20-2	2,6-Dinitrotoluene	930	< 930 U
121-14-2	2,4-Dinitrotoluene	930	< 930 U
84-66-2	Diethylphthalate	190	< 190 U
7005-72-3	4-Chlorophenyl-phenylether	190	< 190 U
86-73-7	**Fluorene**	**190**	**320**
100-01-6	4-Nitroaniline	930	< 930 U
534-52-1	4,6-Dinitro-2-Methylphenol	1,900	< 1,900 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: WW19-Dup
SAMPLE

Lab Sample ID: RC58E
LIMS ID: 10-15711
Matrix: Soil
Date Analyzed: 07/19/10 20:24

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020

CAS Number	Analyte	RL	Result
86-30-6	N-Nitrosodiphenylamine	190	< 190 U
101-55-3	4-Bromophenyl-phenylether	190	< 190 U
118-74-1	Hexachlorobenzene	190	< 190 U
87-86-5	Pentachlorophenol	930	< 930 U
85-01-8	**Phenanthrene**	**190**	**4,500**
86-74-8	**Carbazole**	**190**	**290**
120-12-7	**Anthracene**	**190**	**710**
84-74-2	Di-n-Butylphthalate	190	< 190 U
206-44-0	**Fluoranthene**	**190**	**7,100**
129-00-0	**Pyrene**	**190**	**7,500**
85-68-7	Butylbenzylphthalate	190	< 190 U
91-94-1	3,3'-Dichlorobenzidine	930	< 930 U
56-55-3	**Benzo(a)anthracene**	**190**	**3,100**
117-81-7	**bis(2-Ethylhexyl)phthalate**	**190**	**220 B**
218-01-9	**Chrysene**	**190**	**4,400**
117-84-0	Di-n-Octyl phthalate	190	< 190 U
205-99-2	**Benzo(b)fluoranthene**	**190**	**4,600**
207-08-9	**Benzo(k)fluoranthene**	**190**	**4,600**
50-32-8	**Benzo(a)pyrene**	**190**	**5,500**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**190**	**5,200**
53-70-3	**Dibenz(a,h)anthracene**	**190**	**1,400**
191-24-2	**Benzo(g,h,i)perylene**	**190**	**7,000**
90-12-0	**1-Methylnaphthalene**	**190**	**230**

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	74.3%	2-Fluorobiphenyl	89.0%
d14-p-Terphenyl	92.2%	d4-1,2-Dichlorobenzene	70.9%
d5-Phenol	75.4%	2-Fluorophenol	67.9%
2,4,6-Tribromophenol	91.2%	d4-2-Chlorophenol	75.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: WW19-Dup
MS/MSD

Lab Sample ID: RC58E
LIMS ID: 10-15711
Matrix: Soil
Data Release Authorized:
Reported: 07/20/10

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020
Date Sampled: 06/30/10
Date Received: 06/30/10

Date Extracted MS/MSD: 07/09/10

Date Analyzed MS: 07/19/10 20:57
MSD: 07/20/10 11:45
Instrument/Analyst MS: NT6/JZ
MSD: NT6/JZ
GPC Cleanup: Yes

Sample Amount MS: 8.03 g-dry-wt
MSD: 8.08 g-dry-wt
Final Extract Volume MS: 0.5 mL
MSD: 0.5 mL
Dilution Factor MS: 3.00
MSD: 3.00
Percent Moisture: 20.2 %

Analyte	Sample	MS	Spike Added-MS	MS Recovery	MSD	Spike Added-MSD	MSD Recovery	RPD
Phenol	< 186 U	1180	1560	75.6%	1120	1550	72.3%	5.2%
Bis-(2-Chloroethyl) Ether	< 186 U	1030	1560	66.0%	1040	1550	67.1%	1.0%
2-Chlorophenol	< 186 U	1180	1560	75.6%	1130	1550	72.9%	4.3%
1,3-Dichlorobenzene	< 186 U	996	1560	63.8%	925	1550	59.7%	7.4%
1,4-Dichlorobenzene	< 186 U	1010	1560	64.7%	936	1550	60.4%	7.6%
Benzyl Alcohol	< 931 U	2530	3110	81.4%	2560	3090	82.8%	1.2%
1,2-Dichlorobenzene	< 186 U	1060	1560	67.9%	993	1550	64.1%	6.5%
2-Methylphenol	< 186 U	1130	1560	72.4%	1100	1550	71.0%	2.7%
2,2'-Oxybis(1-Chloropropane)	< 186 U	1110	1560	71.2%	1110	1550	71.6%	0.0%
4-Methylphenol	< 186 U	2410	3110	77.5%	2360	3090	76.4%	2.1%
N-Nitroso-Di-N-Propylamine	< 931 U	1220	1560	78.2%	1200	1550	77.4%	1.7%
Hexachloroethane	< 186 U	1000	1560	64.1%	947	1550	61.1%	5.4%
Nitrobenzene	< 186 U	1160	1560	74.4%	1120	1550	72.3%	3.5%
Isophorone	< 186 U	1380	1560	88.5%	1270	1550	81.9%	8.3%
2-Nitrophenol	< 931 U	1180 Q	1560	75.6%	1150	1550	74.2%	2.6%
2,4-Dimethylphenol	< 186 U	796	1560	51.0%	895	1550	57.7%	11.7%
Benzoic Acid	< 1860 U	4080	4670	87.4%	3660	4640	78.9%	10.9%
bis(2-Chloroethoxy) Methane	< 186 U	1210	1560	77.6%	1140	1550	73.5%	6.0%
2,4-Dichlorophenol	< 931 U	1250	1560	80.1%	1230	1550	79.4%	1.6%
1,2,4-Trichlorobenzene	< 186 U	1140	1560	73.1%	1070	1550	69.0%	6.3%
Naphthalene	633	1660	1560	65.8%	1690	1550	68.2%	1.8%
4-Chloroaniline	< 931 U	< 934 U	3740	NA	< 928 U	3710	NA	NA
Hexachlorobutadiene	< 186 U	1100	1560	70.5%	1040	1550	67.1%	5.6%
4-Chloro-3-methylphenol	< 931 U	1430	1560	91.7%	1340	1550	86.5%	6.5%
2-Methylnaphthalene	300	1530	1560	78.8%	1500	1550	77.4%	2.0%
Hexachlorocyclopentadiene	< 931 U	2880	4670	61.7%	3550	4640	76.5%	20.8%
2,4,6-Trichlorophenol	< 931 U	1350	1560	86.5%	1310	1550	84.5%	3.0%
2,4,5-Trichlorophenol	< 931 U	1400	1560	89.7%	1320	1550	85.2%	5.9%
2-Chloronaphthalene	< 186 U	1310	1560	84.0%	1270	1550	81.9%	3.1%
2-Nitroaniline	< 931 U	1570	1560	101%	1430	1550	92.3%	9.3%
Dimethylphthalate	< 186 U	1340	1560	85.9%	1280	1550	82.6%	4.6%
Acenaphthylene	724	1850	1560	72.2%	1860	1550	73.3%	0.5%
3-Nitroaniline	< 931 U	1130 Q	3990	28.3%	1070 Q	3960	27.0%	5.5%
Acenaphthene	< 186 U	1380	1560	88.5%	1330	1550	85.8%	3.7%
2,4-Dinitrophenol	< 1860 U	1420 J	4670	30.4%	2610	4640	56.2%	59.1%
4-Nitrophenol	< 931 U	1270 Q	1560	81.4%	1260 Q	1550	81.3%	0.8%
Dibenzofuran	< 186 U	1560	1560	100%	1500	1550	96.8%	3.9%
2,6-Dinitrotoluene	< 931 U	1340	1560	85.9%	1320	1550	85.2%	1.5%
2,4-Dinitrotoluene	< 931 U	1040	1560	66.7%	1020	1550	65.8%	1.9%
Diethylphthalate	< 186 U	1370	1560	87.8%	1300	1550	83.9%	5.2%
4-Chlorophenyl-phenylether	< 186 U	1360	1560	87.2%	1270	1550	81.9%	6.8%
Fluorene	316	1600	1560	82.3%	1530	1550	78.3%	4.5%
4-Nitroaniline	< 931 U	650 J	1560	41.7%	527 J	1550	34.0%	20.9%
4,6-Dinitro-2-Methylphenol	< 1860 U	1880	4670	40.3%	3190	4640	68.8%	51.7%
N-Nitrosodiphenylamine	< 186 U	1240	1560	79.5%	1230	1550	79.4%	0.8%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: WW19-Dup
MS/MSD

Lab Sample ID: RC58E
LIMS ID: 10-15711
Matrix: Soil
Date Analyzed MS: 07/19/10 20:57
MSD: 07/20/10 11:45

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020

Analyte	**Sample**	**MS**	**Spike Added-MS**	**MS Recovery**	**MSD**	**Spike Added-MSD**	**MSD Recovery**	**RPD**
4-Bromophenyl-phenylether	< 186 U	1300	1560	83.3%	1260	1550	81.3%	3.1%
Hexachlorobenzene	< 186 U	1340	1560	85.9%	1270	1550	81.9%	5.4%
Pentachlorophenol	< 931 U	1310	1560	84.0%	1200	1550	77.4%	8.8%
Phenanthrene	4460	4270	1560	NA	4680	1550	14.2%	9.2%
Carbazole	290	1640	1560	86.5%	1620	1550	85.8%	1.2%
Anthracene	713	1640	1560	59.4%	1680	1550	62.4%	2.4%
Di-n-Butylphthalate	< 186 U	1580	1560	101%	1510	1550	97.4%	4.5%
Fluoranthene	7140	7310	1560	NA	7460	1550	NA	2.0%
Pyrene	7460	7560	1560	NA	7760	1550	NA	2.6%
Butylbenzylphthalate	< 186 U	1430	1560	91.7%	1410	1550	91.0%	1.4%
3,3'-Dichlorobenzidine	< 931 U	< 934 U	3990	NA	< 928 U	3960	NA	NA
Benzo(a)anthracene	3140	3980	1560	53.8%	4120	1550	63.2%	3.5%
bis(2-Ethylhexyl)phthalate	221 B	1740 B	1560	97.4%	1720 B	1550	96.7%	1.2%
Chrysene	4410	4960	1560	35.3%	5440	1550	66.5%	9.2%
Di-n-Octyl phthalate	< 186 U	1460	1560	93.6%	1370	1550	88.4%	6.4%
Benzo(b)fluoranthene	4610	5120	1560	32.7%	5150	1550	34.8%	0.6%
Benzo(k)fluoranthene	4610	5120	1560	32.7%	5150	1550	34.8%	0.6%
Benzo(a)pyrene	5460	5520	1560	3.8%	5960	1550	32.3%	7.7%
Indeno(1,2,3-cd)pyrene	5190	5410	1560	14.1%	6070	1550	56.8%	11.5%
Dibenz(a,h)anthracene	1360	2510	1560	73.7%	2590	1550	79.4%	3.1%
Benzo(g,h,i)perylene	7030	6630	1560	NA	7640	1550	NA	14.2%
1-Methylnaphthalene	227	1510	1560	82.2%	1450	1550	78.9%	4.1%

Reported in µg/kg (ppb)
RPD calculated using sample concentrations per SW846.
NA-No recovery due to high concentration of analyte in original sample and/or calculated negative recovery.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: WW19-Dup
MATRIX SPIKE

Lab Sample ID: RC58E
LIMS ID: 10-15711
Matrix: Soil
Data Release Authorized:
Reported: 07/20/10

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020
Date Sampled: 06/30/10
Date Received: 06/30/10

Date Extracted: 07/09/10
Date Analyzed: 07/19/10 20:57
Instrument/Analyst: NT6/JZ
GPC Cleanup: Yes

Sample Amount: 8.03 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 3.00
Percent Moisture: 20.2%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	190	---
111-44-4	Bis-(2-Chloroethyl) Ether	190	---
95-57-8	2-Chlorophenol	190	---
541-73-1	1,3-Dichlorobenzene	190	---
106-46-7	1,4-Dichlorobenzene	190	---
100-51-6	Benzyl Alcohol	930	---
95-50-1	1,2-Dichlorobenzene	190	---
95-48-7	2-Methylphenol	190	---
108-60-1	2,2'-Oxybis(1-Chloropropane)	190	---
106-44-5	4-Methylphenol	190	---
621-64-7	N-Nitroso-Di-N-Propylamine	930	---
67-72-1	Hexachloroethane	190	---
98-95-3	Nitrobenzene	190	---
78-59-1	Isophorone	190	---
88-75-5	2-Nitrophenol	930	---
105-67-9	2,4-Dimethylphenol	190	---
65-85-0	Benzoic Acid	1,900	---
111-91-1	bis(2-Chloroethoxy) Methane	190	---
120-83-2	2,4-Dichlorophenol	930	---
120-82-1	1,2,4-Trichlorobenzene	190	---
91-20-3	Naphthalene	190	---
106-47-8	4-Chloroaniline	930	---
87-68-3	Hexachlorobutadiene	190	---
59-50-7	4-Chloro-3-methylphenol	930	---
91-57-6	2-Methylnaphthalene	190	---
77-47-4	Hexachlorocyclopentadiene	930	---
88-06-2	2,4,6-Trichlorophenol	930	---
95-95-4	2,4,5-Trichlorophenol	930	---
91-58-7	2-Chloronaphthalene	190	---
88-74-4	2-Nitroaniline	930	---
131-11-3	Dimethylphthalate	190	---
208-96-8	Acenaphthylene	190	---
99-09-2	3-Nitroaniline	930	---
83-32-9	Acenaphthene	190	---
51-28-5	2,4-Dinitrophenol	1,900	---
100-02-7	4-Nitrophenol	930	---
132-64-9	Dibenzofuran	190	---
606-20-2	2,6-Dinitrotoluene	930	---
121-14-2	2,4-Dinitrotoluene	930	---
84-66-2	Diethylphthalate	190	---
7005-72-3	4-Chlorophenyl-phenylether	190	---
86-73-7	Fluorene	190	---
100-01-6	4-Nitroaniline	930	---
534-52-1	4,6-Dinitro-2-Methylphenol	1,900	---

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: WW19-Dup
MATRIX SPIKE

Lab Sample ID: RC58E
LIMS ID: 10-15711
Matrix: Soil
Date Analyzed: 07/19/10 20:57

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020

CAS Number	Analyte	RL	Result
86-30-6	N-Nitrosodiphenylamine	190	---
101-55-3	4-Bromophenyl-phenylether	190	---
118-74-1	Hexachlorobenzene	190	---
87-86-5	Pentachlorophenol	930	---
85-01-8	Phenanthrene	190	---
86-74-8	Carbazole	190	---
120-12-7	Anthracene	190	---
84-74-2	Di-n-Butylphthalate	190	---
206-44-0	Fluoranthene	190	---
129-00-0	Pyrene	190	---
85-68-7	Butylbenzylphthalate	190	---
91-94-1	3,3'-Dichlorobenzidine	930	---
56-55-3	Benzo(a)anthracene	190	---
117-81-7	bis(2-Ethylhexyl)phthalate	190	---
218-01-9	Chrysene	190	---
117-84-0	Di-n-Octyl phthalate	190	---
205-99-2	Benzo(b)fluoranthene	190	---
207-08-9	Benzo(k)fluoranthene	190	---
50-32-8	Benzo(a)pyrene	190	---
193-39-5	Indeno(1,2,3-cd)pyrene	190	---
53-70-3	Dibenz(a,h)anthracene	190	---
191-24-2	Benzo(g,h,i)perylene	190	---
90-12-0	1-Methylnaphthalene	190	---

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	72.7%	2-Fluorobiphenyl	84.5%
d14-p-Terphenyl	88.8%	d4-1,2-Dichlorobenzene	71.8%
d5-Phenol	77.4%	2-Fluorophenol	68.1%
2,4,6-Tribromophenol	92.0%	d4-2-Chlorophenol	74.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: WW19-Dup
MATRIX SPIKE DUPLICATE

Lab Sample ID: RC58E
LIMS ID: 10-15711
Matrix: Soil
Data Release Authorized:
Reported: 07/20/10

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020
Date Sampled: 06/30/10
Date Received: 06/30/10

Date Extracted: 07/09/10
Date Analyzed: 07/20/10 11:45
Instrument/Analyst: NT6/JZ
GPC Cleanup: Yes

Sample Amount: 8.08 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 3.00
Percent Moisture: 20.2%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	190	---
111-44-4	Bis-(2-Chloroethyl) Ether	190	---
95-57-8	2-Chlorophenol	190	---
541-73-1	1,3-Dichlorobenzene	190	---
106-46-7	1,4-Dichlorobenzene	190	---
100-51-6	Benzyl Alcohol	930	---
95-50-1	1,2-Dichlorobenzene	190	---
95-48-7	2-Methylphenol	190	---
108-60-1	2,2'-Oxybis(1-Chloropropane)	190	---
106-44-5	4-Methylphenol	190	---
621-64-7	N-Nitroso-Di-N-Propylamine	930	---
67-72-1	Hexachloroethane	190	---
98-95-3	Nitrobenzene	190	---
78-59-1	Isophorone	190	---
88-75-5	2-Nitrophenol	930	---
105-67-9	2,4-Dimethylphenol	190	---
65-85-0	Benzoic Acid	1,900	---
111-91-1	bis(2-Chloroethoxy) Methane	190	---
120-83-2	2,4-Dichlorophenol	930	---
120-82-1	1,2,4-Trichlorobenzene	190	---
91-20-3	Naphthalene	190	---
106-47-8	4-Chloroaniline	930	---
87-68-3	Hexachlorobutadiene	190	---
59-50-7	4-Chloro-3-methylphenol	930	---
91-57-6	2-Methylnaphthalene	190	---
77-47-4	Hexachlorocyclopentadiene	930	---
88-06-2	2,4,6-Trichlorophenol	930	---
95-95-4	2,4,5-Trichlorophenol	930	---
91-58-7	2-Chloronaphthalene	190	---
88-74-4	2-Nitroaniline	930	---
131-11-3	Dimethylphthalate	190	---
208-96-8	Acenaphthylene	190	---
99-09-2	3-Nitroaniline	930	---
83-32-9	Acenaphthene	190	---
51-28-5	2,4-Dinitrophenol	1,900	---
100-02-7	4-Nitrophenol	930	---
132-64-9	Dibenzofuran	190	---
606-20-2	2,6-Dinitrotoluene	930	---
121-14-2	2,4-Dinitrotoluene	930	---
84-66-2	Diethylphthalate	190	---
7005-72-3	4-Chlorophenyl-phenylether	190	---
86-73-7	Fluorene	190	---
100-01-6	4-Nitroaniline	930	---
534-52-1	4,6-Dinitro-2-Methylphenol	1,900	---

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: WW19-Dup
MATRIX SPIKE DUPLICATE

Lab Sample ID: RC58E
LIMS ID: 10-15711
Matrix: Soil
Date Analyzed: 07/20/10 11:45

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020

CAS Number	Analyte	RL	Result
86-30-6	N-Nitrosodiphenylamine	190	---
101-55-3	4-Bromophenyl-phenylether	190	---
118-74-1	Hexachlorobenzene	190	---
87-86-5	Pentachlorophenol	930	---
85-01-8	Phenanthrene	190	---
86-74-8	Carbazole	190	---
120-12-7	Anthracene	190	---
84-74-2	Di-n-Butylphthalate	190	---
206-44-0	Fluoranthene	190	---
129-00-0	Pyrene	190	---
85-68-7	Butylbenzylphthalate	190	---
91-94-1	3,3'-Dichlorobenzidine	930	---
56-55-3	Benzo(a)anthracene	190	---
117-81-7	bis(2-Ethylhexyl)phthalate	190	---
218-01-9	Chrysene	190	---
117-84-0	Di-n-Octyl phthalate	190	---
205-99-2	Benzo(b)fluoranthene	190	---
207-08-9	Benzo(k)fluoranthene	190	---
50-32-8	Benzo(a)pyrene	190	---
193-39-5	Indeno(1,2,3-cd)pyrene	190	---
53-70-3	Dibenz(a,h)anthracene	190	---
191-24-2	Benzo(g,h,i)perylene	190	---
90-12-0	1-Methylnaphthalene	190	---

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	70.2%	2-Fluorobiphenyl	82.2%
d14-p-Terphenyl	85.8%	d4-1,2-Dichlorobenzene	65.5%
d5-Phenol	74.8%	2-Fluorophenol	64.5%
2,4,6-Tribromophenol	84.8%	d4-2-Chlorophenol	71.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: MB-070910
METHOD BLANK

Lab Sample ID: MB-070910
LIMS ID: 10-15711
Matrix: Soil
Data Release Authorized:
Reported: 07/20/10

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020
Date Sampled: NA
Date Received: NA

Date Extracted: 07/09/10
Date Analyzed: 07/15/10 15:52
Instrument/Analyst: NT6/JZ
GPC Cleanup: Yes

Sample Amount: 7.50 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00
Percent Moisture: NA

CAS Number	Analyte	RL	Result
108-95-2	Phenol	67	< 67 U
111-44-4	Bis-(2-Chloroethyl) Ether	67	< 67 U
95-57-8	2-Chlorophenol	67	< 67 U
541-73-1	1,3-Dichlorobenzene	67	< 67 U
106-46-7	1,4-Dichlorobenzene	67	< 67 U
100-51-6	Benzyl Alcohol	330	< 330 U
95-50-1	1,2-Dichlorobenzene	67	< 67 U
95-48-7	2-Methylphenol	67	< 67 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	67	< 67 U
106-44-5	4-Methylphenol	67	< 67 U
621-64-7	N-Nitroso-Di-N-Propylamine	330	< 330 U
67-72-1	Hexachloroethane	67	< 67 U
98-95-3	Nitrobenzene	67	< 67 U
78-59-1	Isophorone	67	< 67 U
88-75-5	2-Nitrophenol	330	< 330 U
105-67-9	2,4-Dimethylphenol	67	< 67 U
65-85-0	Benzoic Acid	670	< 670 U
111-91-1	bis(2-Chloroethoxy) Methane	67	< 67 U
120-83-2	2,4-Dichlorophenol	330	< 330 U
120-82-1	1,2,4-Trichlorobenzene	67	< 67 U
91-20-3	Naphthalene	67	< 67 U
106-47-8	4-Chloroaniline	330	< 330 U
87-68-3	Hexachlorobutadiene	67	< 67 U
59-50-7	4-Chloro-3-methylphenol	330	< 330 U
91-57-6	2-Methylnaphthalene	67	< 67 U
77-47-4	Hexachlorocyclopentadiene	330	< 330 U
88-06-2	2,4,6-Trichlorophenol	330	< 330 U
95-95-4	2,4,5-Trichlorophenol	330	< 330 U
91-58-7	2-Chloronaphthalene	67	< 67 U
88-74-4	2-Nitroaniline	330	< 330 U
131-11-3	Dimethylphthalate	67	< 67 U
208-96-8	Acenaphthylene	67	< 67 U
99-09-2	3-Nitroaniline	330	< 330 U
83-32-9	Acenaphthene	67	< 67 U
51-28-5	2,4-Dinitrophenol	670	< 670 U
100-02-7	4-Nitrophenol	330	< 330 U
132-64-9	Dibenzofuran	67	< 67 U
606-20-2	2,6-Dinitrotoluene	330	< 330 U
121-14-2	2,4-Dinitrotoluene	330	< 330 U
84-66-2	Diethylphthalate	67	< 67 U
7005-72-3	4-Chlorophenyl-phenylether	67	< 67 U
86-73-7	Fluorene	67	< 67 U
100-01-6	4-Nitroaniline	330	< 330 U
534-52-1	4,6-Dinitro-2-Methylphenol	670	< 670 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: MB-070910
METHOD BLANK

Lab Sample ID: MB-070910
LIMS ID: 10-15711
Matrix: Soil
Date Analyzed: 07/15/10 15:52

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020

CAS Number	Analyte	RL	Result
86-30-6	N-Nitrosodiphenylamine	67	< 67 U
101-55-3	4-Bromophenyl-phenylether	67	< 67 U
118-74-1	Hexachlorobenzene	67	< 67 U
87-86-5	Pentachlorophenol	330	< 330 U
85-01-8	Phenanthrene	67	< 67 U
86-74-8	Carbazole	67	< 67 U
120-12-7	Anthracene	67	< 67 U
84-74-2	Di-n-Butylphthalate	67	< 67 U
206-44-0	Fluoranthene	67	< 67 U
129-00-0	Pyrene	67	< 67 U
85-68-7	Butylbenzylphthalate	67	< 67 U
91-94-1	3,3'-Dichlorobenzidine	330	< 330 U
56-55-3	Benzo(a)anthracene	67	< 67 U
117-81-7	**bis(2-Ethylhexyl)phthalate**	**67**	**1,100**
218-01-9	Chrysene	67	< 67 U
117-84-0	Di-n-Octyl phthalate	67	< 67 U
205-99-2	Benzo(b)fluoranthene	67	< 67 U
207-08-9	Benzo(k)fluoranthene	67	< 67 U
50-32-8	Benzo(a)pyrene	67	< 67 U
193-39-5	Indeno(1,2,3-cd)pyrene	67	< 67 U
53-70-3	Dibenz(a,h)anthracene	67	< 67 U
191-24-2	Benzo(g,h,i)perylene	67	< 67 U
90-12-0	1-Methylnaphthalene	67	< 67 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	68.8%	2-Fluorobiphenyl	73.2%
d14-p-Terphenyl	88.4%	d4-1,2-Dichlorobenzene	69.2%
d5-Phenol	68.5%	2-Fluorophenol	62.4%
2,4,6-Tribromophenol	72.8%	d4-2-Chlorophenol	66.9%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: LCS-070910
LAB CONTROL

Lab Sample ID: LCS-070910
LIMS ID: 10-15711
Matrix: Soil
Data Release Authorized:
Reported: 07/20/10

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020
Date Sampled: 06/30/10
Date Received: 06/30/10

Date Extracted: 07/09/10
Date Analyzed: 07/15/10 16:25
Instrument/Analyst: NT6/JZ
GPC Cleanup: Yes

Sample Amount: 7.50 g
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00
Percent Moisture: NA

Analyte	Lab Control	Spike Added	Recovery
Phenol	1050	1670	62.9%
Bis-(2-Chloroethyl) Ether	1050	1670	62.9%
2-Chlorophenol	1100	1670	65.9%
1,3-Dichlorobenzene	1030	1670	61.7%
1,4-Dichlorobenzene	1030	1670	61.7%
Benzyl Alcohol	1970	3330	59.2%
1,2-Dichlorobenzene	1050	1670	62.9%
2-Methylphenol	1110	1670	66.5%
2,2'-Oxybis(1-Chloropropane)	1070	1670	64.1%
4-Methylphenol	2240	3330	67.3%
N-Nitroso-Di-N-Propylamine	1010	1670	60.5%
Hexachloroethane	1010	1670	60.5%
Nitrobenzene	1140	1670	68.3%
Isophorone	1310	1670	78.4%
2-Nitrophenol	1220	1670	73.1%
2,4-Dimethylphenol	1020	1670	61.1%
Benzoic Acid	3610	5000	72.2%
bis(2-Chloroethoxy) Methane	1120	1670	67.1%
2,4-Dichlorophenol	1170	1670	70.1%
1,2,4-Trichlorobenzene	1110	1670	66.5%
Naphthalene	1180	1670	70.7%
4-Chloroaniline	1890	4000	47.2%
Hexachlorobutadiene	1100	1670	65.9%
4-Chloro-3-methylphenol	1300	1670	77.8%
2-Methylnaphthalene	1220	1670	73.1%
Hexachlorocyclopentadiene	4330	5000	86.6%
2,4,6-Trichlorophenol	1280	1670	76.6%
2,4,5-Trichlorophenol	1290	1670	77.2%
2-Chloronaphthalene	1230	1670	73.7%
2-Nitroaniline	1500	1670	89.8%
Dimethylphthalate	1290	1670	77.2%
Acenaphthylene	1260	1670	75.4%
3-Nitroaniline	3190	4270	74.7%
Acenaphthene	1240	1670	74.3%
2,4-Dinitrophenol	2910 Q	5000	58.2%
4-Nitrophenol	1100	1670	65.9%
Dibenzofuran	1360	1670	81.4%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: LCS-070910
LAB CONTROL

Lab Sample ID: LCS-070910
LIMS ID: 10-15711
Matrix: Soil
Date Analyzed: 07/15/10 16:25

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020

Analyte	Lab Control	Spike Added	Recovery
2,6-Dinitrotoluene	1350	1670	80.8%
2,4-Dinitrotoluene	1040	1670	62.3%
Diethylphthalate	1330	1670	79.6%
4-Chlorophenyl-phenylether	1220	1670	73.1%
Fluorene	1280	1670	76.6%
4-Nitroaniline	1090	1670	65.3%
4,6-Dinitro-2-Methylphenol	3650	5000	73.0%
N-Nitrosodiphenylamine	1190	1670	71.3%
4-Bromophenyl-phenylether	1240	1670	74.3%
Hexachlorobenzene	1250	1670	74.9%
Pentachlorophenol	1160	1670	69.5%
Phenanthrene	1310	1670	78.4%
Carbazole	1210	1670	72.5%
Anthracene	1210	1670	72.5%
Di-n-Butylphthalate	1400	1670	83.8%
Fluoranthene	1380	1670	82.6%
Pyrene	1420	1670	85.0%
Butylbenzylphthalate	1510	1670	90.4%
3,3'-Dichlorobenzidine	2100 Q	4270	49.2%
Benzo(a)anthracene	1420	1670	85.0%
bis(2-Ethylhexyl)phthalate	1580 B	1670	94.6%
Chrysene	1390	1670	83.2%
Di-n-Octyl phthalate	1390	1670	83.2%
Benzo(b)fluoranthene	1480	1670	88.6%
Benzo(k)fluoranthene	1450	1670	86.8%
Benzo(a)pyrene	1240	1670	74.3%
Indeno(1,2,3-cd)pyrene	1570	1670	94.0%
Dibenz(a,h)anthracene	1570	1670	94.0%
Benzo(g,h,i)perylene	1500	1670	89.8%
1-Methylnaphthalene	1250	1670	74.9%

Semivolatile Surrogate Recovery

d5-Nitrobenzene	68.4%
2-Fluorobiphenyl	74.8%
d14-p-Terphenyl	88.0%
d4-1,2-Dichlorobenzene	66.4%
d5-Phenol	66.4%
2-Fluorophenol	64.3%
2,4,6-Tribromophenol	83.2%
d4-2-Chlorophenol	65.9%

Reported in µg/kg (ppb)

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: MB-070610
METHOD BLANK

Lab Sample ID: MB-070610
LIMS ID: 10-15712
Matrix: Water
Data Release Authorized: VTS
Reported: 07/08/10

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020
Date Sampled: NA
Date Received: NA

Date Extracted: 07/06/10
Date Analyzed: 07/07/10 19:47
Instrument/Analyst: NT4/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
108-95-2	Phenol	1.0	< 1.0 U
111-44-4	Bis-(2-Chloroethyl) Ether	1.0	< 1.0 U
95-57-8	2-Chlorophenol	1.0	< 1.0 U
541-73-1	1,3-Dichlorobenzene	1.0	< 1.0 U
106-46-7	1,4-Dichlorobenzene	1.0	< 1.0 U
100-51-6	Benzyl Alcohol	5.0	< 5.0 U
95-50-1	1,2-Dichlorobenzene	1.0	< 1.0 U
95-48-7	2-Methylphenol	1.0	< 1.0 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	1.0	< 1.0 U
106-44-5	4-Methylphenol	1.0	< 1.0 U
621-64-7	N-Nitroso-Di-N-Propylamine	1.0	< 1.0 U
67-72-1	Hexachloroethane	1.0	< 1.0 U
98-95-3	Nitrobenzene	1.0	< 1.0 U
78-59-1	Isophorone	1.0	< 1.0 U
88-75-5	2-Nitrophenol	5.0	< 5.0 U
105-67-9	2,4-Dimethylphenol	1.0	< 1.0 U
65-85-0	Benzoic Acid	10	< 10 U
111-91-1	bis(2-Chloroethoxy) Methane	1.0	< 1.0 U
120-83-2	2,4-Dichlorophenol	5.0	< 5.0 U
120-82-1	1,2,4-Trichlorobenzene	1.0	< 1.0 U
91-20-3	Naphthalene	1.0	< 1.0 U
106-47-8	4-Chloroaniline	5.0	< 5.0 U
87-68-3	Hexachlorobutadiene	1.0	< 1.0 U
59-50-7	4-Chloro-3-methylphenol	5.0	< 5.0 U
91-57-6	2-Methylnaphthalene	1.0	< 1.0 U
77-47-4	Hexachlorocyclopentadiene	5.0	< 5.0 U
88-06-2	2,4,6-Trichlorophenol	5.0	< 5.0 U
95-95-4	2,4,5-Trichlorophenol	5.0	< 5.0 U
91-58-7	2-Chloronaphthalene	1.0	< 1.0 U
88-74-4	2-Nitroaniline	5.0	< 5.0 U
131-11-3	Dimethylphthalate	1.0	< 1.0 U
208-96-8	Acenaphthylene	1.0	< 1.0 U
99-09-2	3-Nitroaniline	5.0	< 5.0 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: MB-070610
METHOD BLANK

Lab Sample ID: MB-070610
LIMS ID: 10-15712
Matrix: Water
Date Analyzed: 07/07/10 19:47

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020

CAS Number	Analyte	RL	Result
83-32-9	Acenaphthene	1.0	< 1.0 U
51-28-5	2,4-Dinitrophenol	10	< 10 U
100-02-7	4-Nitrophenol	5.0	< 5.0 U
132-64-9	Dibenzofuran	1.0	< 1.0 U
606-20-2	2,6-Dinitrotoluene	5.0	< 5.0 U
121-14-2	2,4-Dinitrotoluene	5.0	< 5.0 U
84-66-2	Diethylphthalate	1.0	< 1.0 U
7005-72-3	4-Chlorophenyl-phenylether	1.0	< 1.0 U
86-73-7	Fluorene	1.0	< 1.0 U
100-01-6	4-Nitroaniline	5.0	< 5.0 U
534-52-1	4,6-Dinitro-2-Methylphenol	10	< 10 U
86-30-6	N-Nitrosodiphenylamine	5.0	< 5.0 U
101-55-3	4-Bromophenyl-phenylether	1.0	< 1.0 U
118-74-1	Hexachlorobenzene	1.0	< 1.0 U
87-86-5	Pentachlorophenol	5.0	< 5.0 U
85-01-8	Phenanthrene	1.0	< 1.0 U
86-74-8	Carbazole	1.0	< 1.0 U
120-12-7	Anthracene	1.0	< 1.0 U
84-74-2	Di-n-Butylphthalate	1.0	< 1.0 U
206-44-0	Fluoranthene	1.0	< 1.0 U
129-00-0	Pyrene	1.0	< 1.0 U
85-68-7	Butylbenzylphthalate	1.0	< 1.0 U
91-94-1	3,3'-Dichlorobenzidine	5.0	< 5.0 U
56-55-3	Benzo(a)anthracene	1.0	< 1.0 U
117-81-7	**bis(2-Ethylhexyl)phthalate**	**1.0**	**2.4**
218-01-9	Chrysene	1.0	< 1.0 U
117-84-0	Di-n-Octyl phthalate	1.0	< 1.0 U
205-99-2	Benzo(b)fluoranthene	1.0	< 1.0 U
207-08-9	Benzo(k)fluoranthene	1.0	< 1.0 U
50-32-8	Benzo(a)pyrene	1.0	< 1.0 U
193-39-5	Indeno(1,2,3-cd)pyrene	1.0	< 1.0 U
53-70-3	Dibenz(a,h)anthracene	1.0	< 1.0 U
191-24-2	Benzo(g,h,i)perylene	1.0	< 1.0 U
90-12-0	1-Methylnaphthalene	1.0	< 1.0 U

Reported in µg/L (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	78.4%	2-Fluorobiphenyl	73.6%
d14-p-Terphenyl	91.6%	d4-1,2-Dichlorobenzene	61.6%
d5-Phenol	78.7%	2-Fluorophenol	86.1%
2,4,6-Tribromophenol	103%	d4-2-Chlorophenol	81.1%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: Rinsate Blank
SAMPLE

Lab Sample ID: RC58F
LIMS ID: 10-15712
Matrix: Water
Data Release Authorized: VB
Reported: 07/08/10

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020
Date Sampled: 06/30/10
Date Received: 06/30/10

Date Extracted: 07/06/10
Date Analyzed: 07/07/10 22:03
Instrument/Analyst: NT4/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
108-95-2	Phenol	1.0	< 1.0 U
111-44-4	Bis-(2-Chloroethyl) Ether	1.0	< 1.0 U
95-57-8	2-Chlorophenol	1.0	< 1.0 U
541-73-1	1,3-Dichlorobenzene	1.0	< 1.0 U
106-46-7	1,4-Dichlorobenzene	1.0	< 1.0 U
100-51-6	Benzyl Alcohol	5.0	< 5.0 U
95-50-1	1,2-Dichlorobenzene	1.0	< 1.0 U
95-48-7	2-Methylphenol	1.0	< 1.0 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	1.0	< 1.0 U
106-44-5	4-Methylphenol	1.0	< 1.0 U
621-64-7	N-Nitroso-Di-N-Propylamine	1.0	< 1.0 U
67-72-1	Hexachloroethane	1.0	< 1.0 U
98-95-3	Nitrobenzene	1.0	< 1.0 U
78-59-1	Isophorone	1.0	< 1.0 U
88-75-5	2-Nitrophenol	5.0	< 5.0 U
105-67-9	2,4-Dimethylphenol	1.0	< 1.0 U
65-85-0	Benzoic Acid	10	< 10 U
111-91-1	bis(2-Chloroethoxy) Methane	1.0	< 1.0 U
120-83-2	2,4-Dichlorophenol	5.0	< 5.0 U
120-82-1	1,2,4-Trichlorobenzene	1.0	< 1.0 U
91-20-3	Naphthalene	1.0	< 1.0 U
106-47-8	4-Chloroaniline	5.0	< 5.0 U
87-68-3	Hexachlorobutadiene	1.0	< 1.0 U
59-50-7	4-Chloro-3-methylphenol	5.0	< 5.0 U
91-57-6	2-Methylnaphthalene	1.0	< 1.0 U
77-47-4	Hexachlorocyclopentadiene	5.0	< 5.0 U
88-06-2	2,4,6-Trichlorophenol	5.0	< 5.0 U
95-95-4	2,4,5-Trichlorophenol	5.0	< 5.0 U
91-58-7	2-Chloronaphthalene	1.0	< 1.0 U
88-74-4	2-Nitroaniline	5.0	< 5.0 U
131-11-3	Dimethylphthalate	1.0	< 1.0 U
208-96-8	Acenaphthylene	1.0	< 1.0 U
99-09-2	3-Nitroaniline	5.0	< 5.0 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: Rinsate Blank
SAMPLE

Lab Sample ID: RC58F
LIMS ID: 10-15712
Matrix: Water
Date Analyzed: 07/07/10 22:03

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020

CAS Number	Analyte	RL	Result
83-32-9	Acenaphthene	1.0	< 1.0 U
51-28-5	2,4-Dinitrophenol	10	< 10 U
100-02-7	4-Nitrophenol	5.0	< 5.0 U
132-64-9	Dibenzofuran	1.0	< 1.0 U
606-20-2	2,6-Dinitrotoluene	5.0	< 5.0 U
121-14-2	2,4-Dinitrotoluene	5.0	< 5.0 U
84-66-2	**Diethylphthalate**	**1.0**	**4.0**
7005-72-3	4-Chlorophenyl-phenylether	1.0	< 1.0 U
86-73-7	Fluorene	1.0	< 1.0 U
100-01-6	4-Nitroaniline	5.0	< 5.0 U
534-52-1	4,6-Dinitro-2-Methylphenol	10	< 10 U
86-30-6	N-Nitrosodiphenylamine	5.0	< 5.0 U
101-55-3	4-Bromophenyl-phenylether	1.0	< 1.0 U
118-74-1	Hexachlorobenzene	1.0	< 1.0 U
87-86-5	Pentachlorophenol	5.0	< 5.0 U
85-01-8	Phenanthrene	1.0	< 1.0 U
86-74-8	Carbazole	1.0	< 1.0 U
120-12-7	Anthracene	1.0	< 1.0 U
84-74-2	Di-n-Butylphthalate	1.0	< 1.0 U
206-44-0	Fluoranthene	1.0	< 1.0 U
129-00-0	Pyrene	1.0	< 1.0 U
85-68-7	Butylbenzylphthalate	1.0	< 1.0 U
91-94-1	3,3'-Dichlorobenzidine	5.0	< 5.0 U
56-55-3	Benzo(a)anthracene	1.0	< 1.0 U
117-81-7	bis(2-Ethylhexyl)phthalate	1.0	< 1.0 U
218-01-9	Chrysene	1.0	< 1.0 U
117-84-0	Di-n-Octyl phthalate	1.0	< 1.0 U
205-99-2	Benzo(b)fluoranthene	1.0	< 1.0 U
207-08-9	Benzo(k)fluoranthene	1.0	< 1.0 U
50-32-8	Benzo(a)pyrene	1.0	< 1.0 U
193-39-5	Indeno(1,2,3-cd)pyrene	1.0	< 1.0 U
53-70-3	Dibenz(a,h)anthracene	1.0	< 1.0 U
191-24-2	Benzo(g,h,i)perylene	1.0	< 1.0 U
90-12-0	1-Methylnaphthalene	1.0	< 1.0 U

Reported in µg/L (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	79.2%	2-Fluorobiphenyl	73.2%
d14-p-Terphenyl	87.6%	d4-1,2-Dichlorobenzene	67.2%
d5-Phenol	85.9%	2-Fluorophenol	88.0%
2,4,6-Tribromophenol	95.2%	d4-2-Chlorophenol	81.9%

ANALYTICAL RESOURCES INCORPORATED

SW8270 SEMIVOLATILES WATER SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020

Client ID	NBZ	FBP	TPH	DCB	PHL	2FP	TBP	2CP	TOT OUT
MB-070610	78.4%	73.6%	91.6%	61.6%	78.7%	86.1%	103%	81.1%	0
LCS-070610	92.0%	80.8%	94.8%	70.0%	97.9%	97.6%	109%	93.9%	0
LCSD-070610	88.0%	83.2%	89.6%	70.4%	96.5%	102%*	108%	92.3%	1
Rinsate Blank	79.2%	73.2%	87.6%	67.2%	85.9%	88.0%	95.2%	81.9%	0

	LCS/MB LIMITS	QC LIMITS
(NBZ) = d5-Nitrobenzene	(46-100)	(39-100)
(FBP) = 2-Fluorobiphenyl	(49-100)	(42-100)
(TPH) = d14-p-Terphenyl	(53-119)	(26-114)
(DCB) = d4-1,2-Dichlorobenzene	(38-100)	(32-100)
(PHL) = d5-Phenol	(50-100)	(41-100)
(2FP) = 2-Fluorophenol	(46-100)	(38-100)
(TBP) = 2,4,6-Tribromophenol	(52-123)	(48-118)
(2CP) = d4-2-Chlorophenol	(53-100)	(44-100)

Prep Method: SW3520C
Log Number Range: 10-15712 to 10-15712

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: LCS-070610
LCS/LCSD

Lab Sample ID: LCS-070610
LIMS ID: 10-15712
Matrix: Water
Data Release Authorized: VJS
Reported: 07/08/10

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020
Date Sampled: 06/30/10
Date Received: 06/30/10

Date Extracted LCS/LCSD: 07/06/10

Sample Amount LCS: 500 mL
LCSD: 500 mL

Date Analyzed LCS: 07/07/10 20:21
LCSD: 07/07/10 20:55
Instrument/Analyst LCS: NT4/JZ
LCSD: NT4/JZ
GPC Cleanup: NO

Final Extract Volume LCS: 0.50 mL
LCSD: 0.50 mL
Dilution Factor LCS: 1.00
LCSD: 1.00

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Phenol	22.0	25.0	88.0%	21.7	25.0	86.8%	1.4%
Bis-(2-Chloroethyl) Ether	20.9	25.0	83.6%	20.8	25.0	83.2%	0.5%
2-Chlorophenol	21.5	25.0	86.0%	21.5	25.0	86.0%	0.0%
1,3-Dichlorobenzene	14.8	25.0	59.2%	15.3	25.0	61.2%	3.3%
1,4-Dichlorobenzene	14.2	25.0	56.8%	15.1	25.0	60.4%	6.1%
Benzyl Alcohol	55.0	50.0	110%	55.4	50.0	111%	0.7%
1,2-Dichlorobenzene	15.6	25.0	62.4%	16.0	25.0	64.0%	2.5%
2-Methylphenol	19.8	25.0	79.2%	19.8	25.0	79.2%	0.0%
2,2'-Oxybis(1-Chloropropane)	18.0	25.0	72.0%	18.4	25.0	73.6%	2.2%
4-Methylphenol	40.3	50.0	80.6%	41.6	50.0	83.2%	3.2%
N-Nitroso-Di-N-Propylamine	18.1	25.0	72.4%	18.6	25.0	74.4%	2.7%
Hexachloroethane	13.0	25.0	52.0%	13.2	25.0	52.8%	1.5%
Nitrobenzene	16.6 Q	25.0	66.4%	16.5 Q	25.0	66.0%	0.6%
Isophorone	23.0	25.0	92.0%	23.0	25.0	92.0%	0.0%
2-Nitrophenol	20.9	25.0	83.6%	20.5	25.0	82.0%	1.9%
2,4-Dimethylphenol	15.2	25.0	60.8%	15.6	25.0	62.4%	2.6%
Benzoic Acid	65.8	75.0	87.7%	66.9	75.0	89.2%	1.7%
bis(2-Chloroethoxy) Methane	20.8	25.0	83.2%	20.7	25.0	82.8%	0.5%
2,4-Dichlorophenol	21.4	25.0	85.6%	21.4	25.0	85.6%	0.0%
1,2,4-Trichlorobenzene	15.8	25.0	63.2%	16.4	25.0	65.6%	3.7%
Naphthalene	19.5	25.0	78.0%	20.2	25.0	80.8%	3.5%
4-Chloroaniline	65.5	60.0	109%	69.6	60.0	116%	6.1%
Hexachlorobutadiene	13.4	25.0	53.6%	14.0	25.0	56.0%	4.4%
4-Chloro-3-methylphenol	21.1	25.0	84.4%	21.7	25.0	86.8%	2.8%
2-Methylnaphthalene	18.6	25.0	74.4%	20.2	25.0	80.8%	8.2%
Hexachlorocyclopentadiene	51.4	75.0	68.5%	52.9	75.0	70.5%	2.9%
2,4,6-Trichlorophenol	22.8	25.0	91.2%	23.6	25.0	94.4%	3.4%
2,4,5-Trichlorophenol	23.4	25.0	93.6%	23.5	25.0	94.0%	0.4%
2-Chloronaphthalene	18.5	25.0	74.0%	19.2	25.0	76.8%	3.7%
2-Nitroaniline	23.9	25.0	95.6%	24.9	25.0	99.6%	4.1%
Dimethylphthalate	21.2	25.0	84.8%	21.3	25.0	85.2%	0.5%
Acenaphthylene	20.7	25.0	82.8%	21.3	25.0	85.2%	2.9%
3-Nitroaniline	82.0 E	64.0	128%	82.7 E	64.0	129%	0.9%
Acenaphthene	19.0	25.0	76.0%	19.2	25.0	76.8%	1.0%
2,4-Dinitrophenol	85.2	75.0	114%	83.6	75.0	111%	1.9%
4-Nitrophenol	25.2	25.0	101%	22.9	25.0	91.6%	9.6%
Dibenzofuran	21.7	25.0	86.8%	21.9	25.0	87.6%	0.9%
2,6-Dinitrotoluene	29.7	25.0	119%	30.8	25.0	123%	3.6%

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

ANALYTICAL RESOURCES INCORPORATED

Sample ID: LCS-070610
LCS/LCSD

Lab Sample ID: LCS-070610
LIMS ID: 10-15712
Matrix: Water
Date Analyzed LCS: 07/07/10 20:21
LCSD: 07/07/10 20:55

QC Report No: RC58-Floyd/Snider
Project: Phase 3
COSGWSA6020

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
2,4-Dinitrotoluene	21.3	25.0	85.2%	21.8	25.0	87.2%	2.3%
Diethylphthalate	20.5	25.0	82.0%	20.5	25.0	82.0%	0.0%
4-Chlorophenyl-phenylether	18.5	25.0	74.0%	19.1	25.0	76.4%	3.2%
Fluorene	20.2	25.0	80.8%	20.4	25.0	81.6%	1.0%
4-Nitroaniline	25.6	25.0	102%	26.8	25.0	107%	4.6%
4,6-Dinitro-2-Methylphenol	74.0	75.0	98.7%	73.9	75.0	98.5%	0.1%
N-Nitrosodiphenylamine	20.4	25.0	81.6%	20.6	25.0	82.4%	1.0%
4-Bromophenyl-phenylether	21.1	25.0	84.4%	20.6	25.0	82.4%	2.4%
Hexachlorobenzene	20.3	25.0	81.2%	20.1	25.0	80.4%	1.0%
Pentachlorophenol	25.0	25.0	100%	23.4	25.0	93.6%	6.6%
Phenanthrene	22.6	25.0	90.4%	22.5	25.0	90.0%	0.4%
Carbazole	23.7	25.0	94.8%	24.1	25.0	96.4%	1.7%
Anthracene	21.7	25.0	86.8%	21.6	25.0	86.4%	0.5%
Di-n-Butylphthalate	21.8	25.0	87.2%	22.9	25.0	91.6%	4.9%
Fluoranthene	22.9	25.0	91.6%	23.8	25.0	95.2%	3.9%
Pyrene	22.2	25.0	88.8%	22.6	25.0	90.4%	1.8%
Butylbenzylphthalate	22.1	25.0	88.4%	21.9	25.0	87.6%	0.9%
3,3'-Dichlorobenzidine	58.3	64.0	91.1%	59.4	64.0	92.8%	1.9%
Benzo(a)anthracene	22.6	25.0	90.4%	22.1	25.0	88.4%	2.2%
bis(2-Ethylhexyl)phthalate	23.6 B	25.0	94.4%	23.5 B	25.0	94.0%	0.4%
Chrysene	22.1	25.0	88.4%	22.5	25.0	90.0%	1.8%
Di-n-Octyl phthalate	21.9	25.0	87.6%	21.8	25.0	87.2%	0.5%
Benzo(b)fluoranthene	20.3	25.0	81.2%	20.2	25.0	80.8%	0.5%
Benzo(k)fluoranthene	20.3	25.0	81.2%	20.2	25.0	80.8%	0.5%
Benzo(a)pyrene	18.2	25.0	72.8%	18.4	25.0	73.6%	1.1%
Indeno(1,2,3-cd)pyrene	21.5	25.0	86.0%	22.1	25.0	88.4%	2.8%
Dibenz(a,h)anthracene	21.0	25.0	84.0%	21.8	25.0	87.2%	3.7%
Benzo(g,h,i)perylene	21.2	25.0	84.8%	21.8	25.0	87.2%	2.8%
1-Methylnaphthalene	28.1 Q	25.0	112%	29.8 Q	25.0	119%	5.9%

Semivolatile Surrogate Recovery

	LCS	LCSD
d5-Nitrobenzene	92.0%	88.0%
2-Fluorobiphenyl	80.8%	83.2%
d14-p-Terphenyl	94.8%	89.6%
d4-1,2-Dichlorobenzene	70.0%	70.4%
d5-Phenol	97.9%	96.5%
2-Fluorophenol	97.6%	102%
2,4,6-Tribromophenol	109%	108%
d4-2-Chlorophenol	93.9%	92.3%

Results reported in µg/L
RPD calculated using sample concentrations per SW846.

SAMPLE RESULTS-CONVENTIONALS
RK08-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Soil
Data Release Authorized:
Reported: 09/03/10

Project: Phase 3
Event: COS-GWSA 6020
Date Sampled: 08/23/10
Date Received: 08/23/10

Client ID: WW19-02-082310
ARI ID: 10-21168 RK08A

Analyte	Date	Method	Units	RL	Sample
Total Solids	08/27/10 082710#1	EPA 160.3	Percent	0.01	53.70
Total Organic Carbon	08/31/10 083110#1	Plumb,1981	Percent	0.124	14.5

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RK08-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Soil
Data Release Authorized:
Reported: 09/03/10

Project: Phase 3
Event: COS-GWSA 6020
Date Sampled: 08/23/10
Date Received: 08/23/10

Client ID: WW19-04-082310
ARI ID: 10-21169 RK08B

Analyte	Date	Method	Units	RL	Sample
Total Solids	08/27/10 082710#1	EPA 160.3	Percent	0.01	85.90
Total Organic Carbon	08/31/10 083110#1	Plumb,1981	Percent	0.176	10.6

RL Analytical reporting limit
U Undetected at reported detection limit

METHOD BLANK RESULTS-CONVENTIONALS
RK08-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Soil
Data Release Authorized:
Reported: 09/03/10

Project: Phase 3
Event: COS-GWSA 6020
Date Sampled: NA
Date Received: NA

Analyte	Date	Units	Blank
Total Solids	08/27/10	Percent	< 0.01 U
Total Organic Carbon	08/31/10	Percent	< 0.020 U

LAB CONTROL RESULTS-CONVENTIONALS
RK08-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Soil
Data Release Authorized:
Reported: 09/03/10

Project: Phase 3
Event: COS-GWSA 6020
Date Sampled: NA
Date Received: NA

Analyte/Method	QC ID	Date	Units	LCS	Spike Added	Recovery
Total Organic Carbon Plumb,1981	ICVL	08/31/10	Percent	0.094	0.100	94.0%

STANDARD REFERENCE RESULTS-CONVENTIONALS
RK08-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Soil
Data Release Authorized:
Reported: 09/03/10

Project: Phase 3
Event: COS-GWSA 6020
Date Sampled: NA
Date Received: NA

Analyte/SRM ID	Date	Units	SRM	True Value	Recovery
Total Organic Carbon NIST #8704	08/31/10	Percent	3.31	3.35	98.8%

REPLICATE RESULTS-CONVENTIONALS
RK08-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Soil
Data Release Authorized:
Reported: 09/03/10

Project: Phase 3
Event: COS-GWSA 6020
Date Sampled: 08/23/10
Date Received: 08/23/10

Analyte	Date	Units	Sample	Replicate(s)	RPD/RSD
ARI ID: RK08B Client ID: WW19-04-082310					
Total Solids	08/27/10	Percent	85.90	85.80 85.60	0.2%
Total Organic Carbon	08/31/10	Percent	10.6	9.54 9.36	6.8%

MS/MSD RESULTS-CONVENTIONALS
RK08-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Soil
Data Release Authorized:
Reported: 09/03/10

Project: Phase 3
Event: COS-GWSA 6020
Date Sampled: 08/23/10
Date Received: 08/23/10

Analyte	Date	Units	Sample	Spike	Spike Added	Recovery
ARI ID: RK08B Client ID: WW19-04-082310						
Total Organic Carbon	08/31/10	Percent	10.6	19.6	10.7	84.4%

Analytical Resources, Incorporated
Analytical Chemists and Consultants

September 24, 2010

Allison Geiselbrecht
Floyd Snider, Inc.
601 Union Street, Suite 600
Seattle, WA 98101-2341

RE: Client Project: Phase 3: COS-GWSA 6020
ARI Job No: RK08

Dear Ms. Geiselbrecht:

Please find enclosed the Chain-of-Custody (COC) records, receipt documentation, and the final analytical results for the samples from the project referenced above. Analytical Resources, Inc. (ARI) accepted three soil samples on August 23, 2010 under ARI job number RK08. Samples were received within a short time of sampling and transferred to refrigerated storage until they could be logged on 08/24/10. For details regarding sample receipt, refer to the enclosed Cooler Receipt Form.

The samples were analyzed for semivolatiles, TOC, grainsize, metals and aroclor PCBs as requested on the COC.

Due to analyst error, surrogate was not added to the sample aliquots for PCB analysis. All samples were re-extracted and re-analyzed within the recommended holding time for samples stored frozen. Only the results for the re-extract are reported.

A matrix spike (MS) was prepared and analyzed for semivolatiles in conjunction with sample **WW19-04-082310.** Several compounds were outside of advisory control limits. LCS recoveries were within limits. No corrective action is required for matrix QC.

A matrix spike (MS) was prepared and analyzed for total metals with sample **WW19-04-082310.** The percent recovery for zinc was high following the initial analysis of the MS. Since the percent recovery was within acceptable QC limits for the corresponding LCS, it was concluded that the sample matrix was the cause of the high MS recovery. No corrective actions were taken.

There were no further anomalies associated with these analyses.

An electronic copy of this report and all associated raw data will remain on file with ARI. Should you have any questions or problems, feel free to contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Susan D. Dunnihoo
Director, Client Services
sue@arilabs.com
206-695-6207

Enclosures

cc: eFile RK08

SD/esj

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: RK08	Turn-around Requested: Standard	Page: 1 of 1	
ARI Client Company: Floyd Snider	Phone: 206-292-2078	Date: 8/23/10	Ice Present? Y
Client Contact: Allison Geiselbrecht		No. of Coolers: 1	Cooler Temps: 13.5
Client Project Name: Phase 3			
Client Project #: COS-GWSA 6020	Samplers: AM		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	SVOCs 8270	TOC 415.1	Grain size ASTM 421/422	Metals 6010/7471	PCB 8082				Notes/Comments
WW19-02-082310	8/23/10	9:30	soil	3	✓	✓	✓	✓	✓				
WW19-04-082310	↓	9:15	soil	~~3~~ 4	✓	✓	✓	✓	✓				run MS/MSD
WW19-04-082310-DUP	↓	9:15	soil	1	✓								

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
	(Signature) [signature]	(Signature) [signature]	(Signature)	(Signature)
	Printed Name: Amanda McKay	Printed Name: A. Volgardsen	Printed Name:	Printed Name:
	Company: Floyd Snider	Company: ARI	Company:	Company:
	Date & Time: 8/23/10 10:25	Date & Time: 8/23/10 1025	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

RK08:00002

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Floyd Snider

COC No(s): ______ NA

Assigned ARI Job No: RK08

Project Name: Phase 3

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: ______

Tracking No: ______ NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	NO
Were custody papers included with the cooler?	YES	NO
Were custody papers properly filled out (ink, signed, etc.)	YES	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)........ 13.5 ____ ____ ____ ____

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: 90941169

Cooler Accepted by: AV Date: 8/23/10 Time: 1035

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	NO
What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: ______			
Was sufficient ice used (if appropriate)?	NA	YES	NO
Were all bottles sealed in individual plastic bags?		YES	NO
Did all bottles arrive in good condition (unbroken)?		YES	NO
Were all bottle labels complete and legible?		YES	NO
Did the number of containers listed on COC match with the number of containers received?		YES	NO
Did all bottle labels and tags agree with custody papers?		YES	NO
Were all bottles used correct for the requested analyses?		YES	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...	NA	YES	NO
Were all VOC vials free of air bubbles?	NA	YES	NO
Was sufficient amount of sample sent in each bottle?		YES	NO
Date VOC Trip Blank was made at ARI	NA	______	

Was Sample Split by ARI : NA YES Date/Time: ______ Equipment: ______ Split by: ______

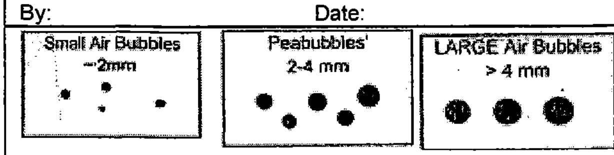
Samples Logged by: AV Date: 8/24/10 Time: 1155

***** Notify Project Manager of discrepancies or concerns *****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:



Small → "sm"	
Peabubbles → "pb"	
Large → "lg"	
Headspace → "hs"	

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Temperature Compliance Form

RK08

Cooler#: 1	Temperature(°C): 13.5	
Sample ID	**Bottle Count**	**Bottle Type**
All Samples associated with this job arrived out of temp. compliance		

Cooler#:	Temperature(°C):	
Sample ID	**Bottle Count**	**Bottle Type**

Cooler#:	Temperature(°C):	
Sample ID	**Bottle Count**	**Bottle Type**

Cooler#:	Temperature(°C):	
Sample ID	**Bottle Count**	**Bottle Type**

Completed by: AV Date: 8/24/10 Time: 1156

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Data Reporting Qualifiers

Effective 7/10/2009

Inorganic Data

U Indicates that the target analyte was not detected at the reported concentration

* Duplicate RPD is not within established control limits

B Reported value is less than the CRDL but ≥ the Reporting Limit

N Matrix Spike recovery not within established control limits

NA Not Applicable, analyte not spiked

H The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible

L Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U Indicates that the target analyte was not detected at the reported concentration

* Flagged value is not within established control limits

B Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.

J Estimated concentration when the value is less than ARI's established reporting limits

D The spiked compound was not detected due to sample extract dilution

E Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

Q Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20%Drift or minimum RRF).

S Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Data Reporting Qualifiers

Effective 7/10/2009

NA The flagged analyte was not analyzed for

NR Spiked compound recovery is not reported due to chromatographic interference

NS The flagged analyte was not spiked into the sample

M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses

M2 The sample contains PCB congeners that do not match any standard Aroclor pattern. The PCBs are identified and quantified as the Aroclor whose pattern most closely matches that of the sample. The reported value is an estimate.

N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"

Y The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.

C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column

P The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference

Geotechnical Data

A The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.

F Samples were frozen prior to particle size determination

SM Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations

SS Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis

W Weight of sample in some pipette aliquots was below the level required for accurate weighting

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Client: Floyd Snider	**ARI Job No.:** RK08
Client Project: Phase 3	**Client Project No.:** COS-GWSA 6020

Case Narrative

1. Two samples were submitted on August 24, 2010, and were in good condition.
2. The samples were submitted for grain size distribution according to ASTM D422. The samples were prepared according to ASTM D421.
3. An assumed specific gravity of 2.65 was used in the hydrometer calculations.
4. A standard milkshake mixer type device was used to disperse the fine fraction sample.
5. One sample from this job, WW19-04-082310 was chosen for triplicate analysis. The triplicate data can be found on the QA summary table.
6. The data is provided in summary tables and plots.
7. There were no further anomalies in the samples or test method.

Approved by: ______________________ Date: 9/9/10
Geotechnical Laboratory Manager

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

ANALYTICAL RESOURCES INCORPORATED

Sample ID: MB-090310
METHOD BLANK

Lab Sample ID: MB-090310
LIMS ID: 10-21168
Matrix: Soil
Data Release Authorized:
Reported: 10/12/10

QC Report No: RK08-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: NA
Date Received: NA

Date Extracted: 09/03/10
Date Analyzed: 09/20/10 19:38
Instrument/Analyst: NT6/PK
GPC Cleanup: Yes

Sample Amount: 7.50 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00
Percent Moisture: NA

CAS Number	Analyte	RL	Result
108-95-2	Phenol	67	< 67 U
111-44-4	Bis-(2-Chloroethyl) Ether	67	< 67 U
95-57-8	2-Chlorophenol	67	< 67 U
541-73-1	1,3-Dichlorobenzene	67	< 67 U
106-46-7	1,4-Dichlorobenzene	67	< 67 U
100-51-6	Benzyl Alcohol	330	< 330 U
95-50-1	1,2-Dichlorobenzene	67	< 67 U
95-48-7	2-Methylphenol	67	< 67 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	67	< 67 U
106-44-5	4-Methylphenol	67	< 67 U
621-64-7	N-Nitroso-Di-N-Propylamine	330	< 330 U
67-72-1	Hexachloroethane	67	< 67 U
98-95-3	Nitrobenzene	67	< 67 U
78-59-1	Isophorone	67	< 67 U
88-75-5	2-Nitrophenol	330	< 330 U
105-67-9	2,4-Dimethylphenol	67	< 67 U
65-85-0	Benzoic Acid	670	< 670 U
111-91-1	bis(2-Chloroethoxy) Methane	67	< 67 U
120-83-2	2,4-Dichlorophenol	330	< 330 U
120-82-1	1,2,4-Trichlorobenzene	67	< 67 U
91-20-3	Naphthalene	67	< 67 U
106-47-8	4-Chloroaniline	330	< 330 U
87-68-3	Hexachlorobutadiene	67	< 67 U
59-50-7	4-Chloro-3-methylphenol	330	< 330 U
91-57-6	2-Methylnaphthalene	67	< 67 U
77-47-4	Hexachlorocyclopentadiene	330	< 330 U
88-06-2	2,4,6-Trichlorophenol	330	< 330 U
95-95-4	2,4,5-Trichlorophenol	330	< 330 U
91-58-7	2-Chloronaphthalene	67	< 67 U
88-74-4	2-Nitroaniline	330	< 330 U
131-11-3	Dimethylphthalate	67	< 67 U
208-96-8	Acenaphthylene	67	< 67 U
99-09-2	3-Nitroaniline	330	< 330 U
83-32-9	Acenaphthene	67	< 67 U
51-28-5	2,4-Dinitrophenol	670	< 670 U
100-02-7	4-Nitrophenol	330	< 330 U
132-64-9	Dibenzofuran	67	< 67 U
606-20-2	2,6-Dinitrotoluene	330	< 330 U
121-14-2	2,4-Dinitrotoluene	330	< 330 U
84-66-2	Diethylphthalate	67	< 67 U
7005-72-3	4-Chlorophenyl-phenylether	67	< 67 U
86-73-7	Fluorene	67	< 67 U
100-01-6	4-Nitroaniline	330	< 330 U
534-52-1	4,6-Dinitro-2-Methylphenol	670	< 670 U

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: MB-090310
METHOD BLANK

Lab Sample ID: MB-090310
LIMS ID: 10-21168
Matrix: Soil
Date Analyzed: 09/20/10 19:38

QC Report No: RK08-Floyd/Snider
Project: Phase 3
COS-GWSA 6020

CAS Number	Analyte	RL	Result
86-30-6	N-Nitrosodiphenylamine	67	< 67 U
101-55-3	4-Bromophenyl-phenylether	67	< 67 U
118-74-1	Hexachlorobenzene	67	< 67 U
87-86-5	Pentachlorophenol	330	< 330 U
85-01-8	Phenanthrene	67	< 67 U
86-74-8	Carbazole	67	< 67 U
120-12-7	Anthracene	67	< 67 U
84-74-2	Di-n-Butylphthalate	67	< 67 U
206-44-0	Fluoranthene	67	< 67 U
129-00-0	Pyrene	67	< 67 U
85-68-7	Butylbenzylphthalate	67	< 67 U
91-94-1	3,3'-Dichlorobenzidine	330	< 330 U
56-55-3	Benzo(a)anthracene	67	< 67 U
117-81-7	bis(2-Ethylhexyl)phthalate	67	< 67 U
218-01-9	Chrysene	67	< 67 U
117-84-0	Di-n-Octyl phthalate	67	< 67 U
205-99-2	Benzo(b)fluoranthene	67	< 67 U
207-08-9	Benzo(k)fluoranthene	67	< 67 U
50-32-8	Benzo(a)pyrene	67	< 67 U
193-39-5	Indeno(1,2,3-cd)pyrene	67	< 67 U
53-70-3	Dibenz(a,h)anthracene	67	< 67 U
191-24-2	Benzo(g,h,i)perylene	67	< 67 U
90-12-0	1-Methylnaphthalene	67	< 67 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	62.0%	2-Fluorobiphenyl	62.8%
d14-p-Terphenyl	70.8%	d4-1,2-Dichlorobenzene	62.0%
d5-Phenol	58.9%	2-Fluorophenol	58.1%
2,4,6-Tribromophenol	70.4%	d4-2-Chlorophenol	62.7%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Page 1 of 2

Sample ID: WW19-02-082310
SAMPLE

Lab Sample ID: RK08A
LIMS ID: 10-21168
Matrix: Soil
Data Release Authorized:
Reported: 10/12/10

QC Report No: RK08-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 08/23/10
Date Received: 08/23/10

Date Extracted: 09/03/10
Date Analyzed: 09/20/10 20:43
Instrument/Analyst: NT6/PK
GPC Cleanup: Yes

Sample Amount: 7.86 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00
Percent Moisture: 47.6%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	64	< 64 U
111-44-4	Bis-(2-Chloroethyl) Ether	64	< 64 U
95-57-8	2-Chlorophenol	64	< 64 U
541-73-1	1,3-Dichlorobenzene	64	< 64 U
106-46-7	1,4-Dichlorobenzene	64	< 64 U
100-51-6	Benzyl Alcohol	320	< 320 U
95-50-1	1,2-Dichlorobenzene	64	< 64 U
95-48-7	2-Methylphenol	64	< 64 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	64	< 64 U
106-44-5	4-Methylphenol	64	< 64 U
621-64-7	N-Nitroso-Di-N-Propylamine	320	< 320 U
67-72-1	Hexachloroethane	64	< 64 U
98-95-3	Nitrobenzene	64	< 64 U
78-59-1	Isophorone	64	< 64 U
88-75-5	2-Nitrophenol	320	< 320 U
105-67-9	2,4-Dimethylphenol	64	< 64 U
65-85-0	Benzoic Acid	640	< 640 U
111-91-1	bis(2-Chloroethoxy) Methane	64	< 64 U
120-83-2	2,4-Dichlorophenol	320	< 320 U
120-82-1	1,2,4-Trichlorobenzene	64	< 64 U
91-20-3	**Naphthalene**	**64**	**160**
106-47-8	4-Chloroaniline	320	< 320 U
87-68-3	Hexachlorobutadiene	64	< 64 U
59-50-7	4-Chloro-3-methylphenol	320	< 320 U
91-57-6	**2-Methylnaphthalene**	**64**	**89**
77-47-4	Hexachlorocyclopentadiene	320	< 320 U
88-06-2	2,4,6-Trichlorophenol	320	< 320 U
95-95-4	2,4,5-Trichlorophenol	320	< 320 U
91-58-7	2-Chloronaphthalene	64	< 64 U
88-74-4	2-Nitroaniline	320	< 320 U
131-11-3	**Dimethylphthalate**	**64**	**85**
208-96-8	**Acenaphthylene**	**64**	**200**
99-09-2	3-Nitroaniline	320	< 320 U
83-32-9	Acenaphthene	64	< 64 U
51-28-5	2,4-Dinitrophenol	640	< 640 U
100-02-7	4-Nitrophenol	320	< 320 U
132-64-9	Dibenzofuran	64	< 64 U
606-20-2	2,6-Dinitrotoluene	320	< 320 U
121-14-2	2,4-Dinitrotoluene	320	< 320 U
84-66-2	Diethylphthalate	64	< 64 U
7005-72-3	4-Chlorophenyl-phenylether	64	< 64 U
86-73-7	Fluorene	64	< 64 U
100-01-6	4-Nitroaniline	320	< 320 U
534-52-1	4,6-Dinitro-2-Methylphenol	640	< 640 U

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: WW19-02-082310
SAMPLE

Lab Sample ID: RK08A
LIMS ID: 10-21168
Matrix: Soil
Date Analyzed: 09/20/10 20:43

QC Report No: RK08-Floyd/Snider
Project: Phase 3
COS-GWSA 6020

CAS Number	Analyte	RL	Result
86-30-6	N-Nitrosodiphenylamine	64	< 64 U
101-55-3	4-Bromophenyl-phenylether	64	< 64 U
118-74-1	Hexachlorobenzene	64	< 64 U
87-86-5	Pentachlorophenol	320	< 320 U
85-01-8	**Phenanthrene**	**64**	**920**
86-74-8	Carbazole	64	< 64 U
120-12-7	**Anthracene**	**64**	**150**
84-74-2	**Di-n-Butylphthalate**	**64**	**160**
206-44-0	**Fluoranthene**	**64**	**1,500**
129-00-0	**Pyrene**	**64**	**1,400**
85-68-7	**Butylbenzylphthalate**	**64**	**200**
91-94-1	3,3'-Dichlorobenzidine	320	< 320 U
56-55-3	**Benzo(a)anthracene**	**64**	**390**
117-81-7	**bis(2-Ethylhexyl)phthalate**	**64**	**1,800**
218-01-9	**Chrysene**	**64**	**1,100**
117-84-0	Di-n-Octyl phthalate	64	< 64 U
205-99-2	**Benzo(b)fluoranthene**	**64**	**830**
207-08-9	**Benzo(k)fluoranthene**	**64**	**830**
50-32-8	**Benzo(a)pyrene**	**64**	**1,100**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**64**	**680**
53-70-3	**Dibenz(a,h)anthracene**	**64**	**120**
191-24-2	**Benzo(g,h,i)perylene**	**64**	**1,100**
90-12-0	1-Methylnaphthalene	64	< 64 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	48.8%	2-Fluorobiphenyl	60.0%
d14-p-Terphenyl	48.0%	d4-1,2-Dichlorobenzene	44.8%
d5-Phenol	48.5%	2-Fluorophenol	45.6%
2,4,6-Tribromophenol	63.7%	d4-2-Chlorophenol	48.8%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: WW19-02-082310
DILUTION

Lab Sample ID: RK08A
LIMS ID: 10-21168
Matrix: Soil
Data Release Authorized:
Reported: 10/12/10

QC Report No: RK08-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 08/23/10
Date Received: 08/23/10

Date Extracted: 09/03/10
Date Analyzed: 09/23/10 11:56
Instrument/Analyst: NT6/PK
GPC Cleanup: Yes

Sample Amount: 7.86 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 5.00
Percent Moisture: 47.6%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	320	< 320 U
111-44-4	Bis-(2-Chloroethyl) Ether	320	< 320 U
95-57-8	2-Chlorophenol	320	< 320 U
541-73-1	1,3-Dichlorobenzene	320	< 320 U
106-46-7	1,4-Dichlorobenzene	320	< 320 U
100-51-6	Benzyl Alcohol	1,600	< 1,600 U
95-50-1	1,2-Dichlorobenzene	320	< 320 U
95-48-7	2-Methylphenol	320	< 320 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	320	< 320 U
106-44-5	4-Methylphenol	320	< 320 U
621-64-7	N-Nitroso-Di-N-Propylamine	1,600	< 1,600 U
67-72-1	Hexachloroethane	320	< 320 U
98-95-3	Nitrobenzene	320	< 320 U
78-59-1	Isophorone	320	< 320 U
88-75-5	2-Nitrophenol	1,600	< 1,600 U
105-67-9	2,4-Dimethylphenol	320	< 320 U
65-85-0	Benzoic Acid	3,200	< 3,200 U
111-91-1	bis(2-Chloroethoxy) Methane	320	< 320 U
120-83-2	2,4-Dichlorophenol	1,600	< 1,600 U
120-82-1	1,2,4-Trichlorobenzene	320	< 320 U
91-20-3	Naphthalene	320	< 320 U
106-47-8	4-Chloroaniline	1,600	< 1,600 U
87-68-3	Hexachlorobutadiene	320	< 320 U
59-50-7	4-Chloro-3-methylphenol	1,600	< 1,600 U
91-57-6	2-Methylnaphthalene	320	< 320 U
77-47-4	Hexachlorocyclopentadiene	1,600	< 1,600 U
88-06-2	2,4,6-Trichlorophenol	1,600	< 1,600 U
95-95-4	2,4,5-Trichlorophenol	1,600	< 1,600 U
91-58-7	2-Chloronaphthalene	320	< 320 U
88-74-4	2-Nitroaniline	1,600	< 1,600 U
131-11-3	Dimethylphthalate	320	< 320 U
208-96-8	Acenaphthylene	320	< 320 U
99-09-2	3-Nitroaniline	1,600	< 1,600 U
83-32-9	Acenaphthene	320	< 320 U
51-28-5	2,4-Dinitrophenol	3,200	< 3,200 U
100-02-7	4-Nitrophenol	1,600	< 1,600 U
132-64-9	Dibenzofuran	320	< 320 U
606-20-2	2,6-Dinitrotoluene	1,600	< 1,600 U
121-14-2	2,4-Dinitrotoluene	1,600	< 1,600 U
84-66-2	Diethylphthalate	320	< 320 U
7005-72-3	4-Chlorophenyl-phenylether	320	< 320 U
86-73-7	Fluorene	320	< 320 U
100-01-6	4-Nitroaniline	1,600	< 1,600 U
534-52-1	4,6-Dinitro-2-Methylphenol	3,200	< 3,200 U

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

ANALYTICAL RESOURCES INCORPORATED

Sample ID: WW19-02-082310
DILUTION

Lab Sample ID: RK08A
LIMS ID: 10-21168
Matrix: Soil
Date Analyzed: 09/23/10 11:56

QC Report No: RK08-Floyd/Snider
Project: Phase 3
COS-GWSA 6020

CAS Number	Analyte	RL	Result
86-30-6	N-Nitrosodiphenylamine	320	< 320 U
101-55-3	4-Bromophenyl-phenylether	320	< 320 U
118-74-1	Hexachlorobenzene	320	< 320 U
87-86-5	Pentachlorophenol	1,600	< 1,600 U
85-01-8	**Phenanthrene**	**320**	**800**
86-74-8	Carbazole	320	< 320 U
120-12-7	Anthracene	320	< 320 U
84-74-2	Di-n-Butylphthalate	320	< 320 U
206-44-0	**Fluoranthene**	**320**	**1,300**
129-00-0	**Pyrene**	**320**	**1,300**
85-68-7	Butylbenzylphthalate	320	< 320 U
91-94-1	3,3'-Dichlorobenzidine	1,600	< 1,600 U
56-55-3	**Benzo(a)anthracene**	**320**	**450**
117-81-7	**bis(2-Ethylhexyl)phthalate**	**320**	**1,700**
218-01-9	**Chrysene**	**320**	**810**
117-84-0	Di-n-Octyl phthalate	320	< 320 U
205-99-2	**Benzo(b)fluoranthene**	**320**	**680**
207-08-9	**Benzo(k)fluoranthene**	**320**	**680**
50-32-8	**Benzo(a)pyrene**	**320**	**660**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**320**	**670**
53-70-3	Dibenz(a,h)anthracene	320	< 320 U
191-24-2	**Benzo(g,h,i)perylene**	**320**	**1,100**
90-12-0	1-Methylnaphthalene	320	< 320 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	37.0%	2-Fluorobiphenyl	49.6%
d14-p-Terphenyl	43.2%	d4-1,2-Dichlorobenzene	39.8%
d5-Phenol	48.0%	2-Fluorophenol	39.9%
2,4,6-Tribromophenol	56.1%	d4-2-Chlorophenol	45.7%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: WW19-04-082310
SAMPLE

Lab Sample ID: RK08B
LIMS ID: 10-21169
Matrix: Soil
Data Release Authorized:
Reported: 10/12/10

QC Report No: RK08-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 08/23/10
Date Received: 08/23/10

Date Extracted: 09/03/10
Date Analyzed: 09/20/10 21:16
Instrument/Analyst: NT6/PK
GPC Cleanup: Yes

Sample Amount: 8.23 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 3.00
Percent Moisture: 14.5%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	180	< 180 U
111-44-4	Bis-(2-Chloroethyl) Ether	180	< 180 U
95-57-8	2-Chlorophenol	180	< 180 U
541-73-1	1,3-Dichlorobenzene	180	< 180 U
106-46-7	1,4-Dichlorobenzene	180	< 180 U
100-51-6	Benzyl Alcohol	910	< 910 U
95-50-1	1,2-Dichlorobenzene	180	< 180 U
95-48-7	2-Methylphenol	180	< 180 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	180	< 180 U
106-44-5	4-Methylphenol	180	< 180 U
621-64-7	N-Nitroso-Di-N-Propylamine	910	< 910 U
67-72-1	Hexachloroethane	180	< 180 U
98-95-3	Nitrobenzene	180	< 180 U
78-59-1	Isophorone	180	< 180 U
88-75-5	2-Nitrophenol	910	< 910 U
105-67-9	2,4-Dimethylphenol	180	< 180 U
65-85-0	Benzoic Acid	1,800	< 1,800 U
111-91-1	bis(2-Chloroethoxy) Methane	180	< 180 U
120-83-2	2,4-Dichlorophenol	910	< 910 U
120-82-1	1,2,4-Trichlorobenzene	180	< 180 U
91-20-3	**Naphthalene**	**180**	**680**
106-47-8	4-Chloroaniline	910	< 910 U
87-68-3	Hexachlorobutadiene	180	< 180 U
59-50-7	4-Chloro-3-methylphenol	910	< 910 U
91-57-6	**2-Methylnaphthalene**	**180**	**270**
77-47-4	Hexachlorocyclopentadiene	910	< 910 U
88-06-2	2,4,6-Trichlorophenol	910	< 910 U
95-95-4	2,4,5-Trichlorophenol	910	< 910 U
91-58-7	2-Chloronaphthalene	180	< 180 U
88-74-4	2-Nitroaniline	910	< 910 U
131-11-3	Dimethylphthalate	180	< 180 U
208-96-8	**Acenaphthylene**	**180**	**1,500**
99-09-2	3-Nitroaniline	910	< 910 U
83-32-9	Acenaphthene	180	< 180 U
51-28-5	2,4-Dinitrophenol	1,800	< 1,800 U
100-02-7	4-Nitrophenol	910	< 910 U
132-64-9	Dibenzofuran	180	< 180 U
606-20-2	2,6-Dinitrotoluene	910	< 910 U
121-14-2	2,4-Dinitrotoluene	910	< 910 U
84-66-2	Diethylphthalate	180	< 180 U
7005-72-3	4-Chlorophenyl-phenylether	180	< 180 U
86-73-7	**Fluorene**	**180**	**480**
100-01-6	4-Nitroaniline	910	< 910 U
534-52-1	4,6-Dinitro-2-Methylphenol	1,800	< 1,800 U

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: WW19-04-082310
SAMPLE

Lab Sample ID: RK08B
LIMS ID: 10-21169
Matrix: Soil
Date Analyzed: 09/20/10 21:16

QC Report No: RK08-Floyd/Snider
Project: Phase 3
COS-GWSA 6020

CAS Number	Analyte	RL	Result
86-30-6	N-Nitrosodiphenylamine	180	< 180 U
101-55-3	4-Bromophenyl-phenylether	180	< 180 U
118-74-1	Hexachlorobenzene	180	< 180 U
87-86-5	Pentachlorophenol	910	< 910 U
85-01-8	**Phenanthrene**	**180**	**6,200**
86-74-8	**Carbazole**	**180**	**230**
120-12-7	**Anthracene**	**180**	**1,300**
84-74-2	Di-n-Butylphthalate	180	< 180 U
206-44-0	**Fluoranthene**	**180**	**14,000**
129-00-0	**Pyrene**	**180**	**15,000 E**
85-68-7	Butylbenzylphthalate	180	< 180 U
91-94-1	3,3'-Dichlorobenzidine	910	< 910 U
56-55-3	**Benzo(a)anthracene**	**180**	**6,100**
117-81-7	**bis(2-Ethylhexyl)phthalate**	**180**	**1,500**
218-01-9	**Chrysene**	**180**	**8,000**
117-84-0	Di-n-Octyl phthalate	180	< 180 U
205-99-2	**Benzo(b)fluoranthene**	**180**	**6,400**
207-08-9	**Benzo(k)fluoranthene**	**180**	**6,400**
50-32-8	**Benzo(a)pyrene**	**180**	**7,800**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**180**	**6,500**
53-70-3	**Dibenz(a,h)anthracene**	**180**	**1,900**
191-24-2	**Benzo(g,h,i)perylene**	**180**	**8,100**
90-12-0	1-Methylnaphthalene	180	< 180 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	64.2%	2-Fluorobiphenyl	75.7%
d14-p-Terphenyl	69.4%	d4-1,2-Dichlorobenzene	62.2%
d5-Phenol	62.0%	2-Fluorophenol	59.1%
2,4,6-Tribromophenol	79.4%	d4-2-Chlorophenol	65.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: WW19-04-082310
DILUTION

Lab Sample ID: RK08B
LIMS ID: 10-21169
Matrix: Soil
Data Release Authorized:
Reported: 10/12/10

QC Report No: RK08-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 08/23/10
Date Received: 08/23/10

Date Extracted: 09/03/10
Date Analyzed: 09/23/10 12:28
Instrument/Analyst: NT6/PK
GPC Cleanup: Yes

Sample Amount: 8.23 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 10.0
Percent Moisture: 14.5%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	610	< 610 U
111-44-4	Bis-(2-Chloroethyl) Ether	610	< 610 U
95-57-8	2-Chlorophenol	610	< 610 U
541-73-1	1,3-Dichlorobenzene	610	< 610 U
106-46-7	1,4-Dichlorobenzene	610	< 610 U
100-51-6	Benzyl Alcohol	3,000	< 3,000 U
95-50-1	1,2-Dichlorobenzene	610	< 610 U
95-48-7	2-Methylphenol	610	< 610 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	610	< 610 U
106-44-5	4-Methylphenol	610	< 610 U
621-64-7	N-Nitroso-Di-N-Propylamine	3,000	< 3,000 U
67-72-1	Hexachloroethane	610	< 610 U
98-95-3	Nitrobenzene	610	< 610 U
78-59-1	Isophorone	610	< 610 U
88-75-5	2-Nitrophenol	3,000	< 3,000 U
105-67-9	2,4-Dimethylphenol	610	< 610 U
65-85-0	Benzoic Acid	6,100	< 6,100 U
111-91-1	bis(2-Chloroethoxy) Methane	610	< 610 U
120-83-2	2,4-Dichlorophenol	3,000	< 3,000 U
120-82-1	1,2,4-Trichlorobenzene	610	< 610 U
91-20-3	**Naphthalene**	**610**	**620**
106-47-8	4-Chloroaniline	3,000	< 3,000 U
87-68-3	Hexachlorobutadiene	610	< 610 U
59-50-7	4-Chloro-3-methylphenol	3,000	< 3,000 U
91-57-6	2-Methylnaphthalene	610	< 610 U
77-47-4	Hexachlorocyclopentadiene	3,000	< 3,000 U
88-06-2	2,4,6-Trichlorophenol	3,000	< 3,000 U
95-95-4	2,4,5-Trichlorophenol	3,000	< 3,000 U
91-58-7	2-Chloronaphthalene	610	< 610 U
88-74-4	2-Nitroaniline	3,000	< 3,000 U
131-11-3	Dimethylphthalate	610	< 610 U
208-96-8	**Acenaphthylene**	**610**	**1,100**
99-09-2	3-Nitroaniline	3,000	< 3,000 U
83-32-9	Acenaphthene	610	< 610 U
51-28-5	2,4-Dinitrophenol	6,100	< 6,100 U
100-02-7	4-Nitrophenol	3,000	< 3,000 U
132-64-9	Dibenzofuran	610	< 610 U
606-20-2	2,6-Dinitrotoluene	3,000	< 3,000 U
121-14-2	2,4-Dinitrotoluene	3,000	< 3,000 U
84-66-2	Diethylphthalate	610	< 610 U
7005-72-3	4-Chlorophenyl-phenylether	610	< 610 U
86-73-7	Fluorene	610	< 610 U
100-01-6	4-Nitroaniline	3,000	< 3,000 U
534-52-1	4,6-Dinitro-2-Methylphenol	6,100	< 6,100 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: WW19-04-082310
DILUTION

Lab Sample ID: RK08B
LIMS ID: 10-21169
Matrix: Soil
Date Analyzed: 09/23/10 12:28

QC Report No: RK08-Floyd/Snider
Project: Phase 3
COS-GWSA 6020

CAS Number	Analyte	RL	Result
86-30-6	N-Nitrosodiphenylamine	610	< 610 U
101-55-3	4-Bromophenyl-phenylether	610	< 610 U
118-74-1	Hexachlorobenzene	610	< 610 U
87-86-5	Pentachlorophenol	3,000	< 3,000 U
85-01-8	**Phenanthrene**	**610**	**5,600**
86-74-8	Carbazole	610	< 610 U
120-12-7	**Anthracene**	**610**	**1,000**
84-74-2	Di-n-Butylphthalate	610	< 610 U
206-44-0	**Fluoranthene**	**610**	**14,000**
129-00-0	**Pyrene**	**610**	**17,000**
85-68-7	Butylbenzylphthalate	610	< 610 U
91-94-1	3,3'-Dichlorobenzidine	3,000	< 3,000 U
56-55-3	**Benzo(a)anthracene**	**610**	**5,300**
117-81-7	**bis(2-Ethylhexyl)phthalate**	**610**	**1,300**
218-01-9	**Chrysene**	**610**	**7,300**
117-84-0	Di-n-Octyl phthalate	610	< 610 U
205-99-2	**Benzo(b)fluoranthene**	**610**	**6,000**
207-08-9	**Benzo(k)fluoranthene**	**610**	**6,000**
50-32-8	**Benzo(a)pyrene**	**610**	**6,900**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**610**	**6,600**
53-70-3	**Dibenz(a,h)anthracene**	**610**	**1,800**
191-24-2	**Benzo(g,h,i)perylene**	**610**	**9,200**
90-12-0	1-Methylnaphthalene	610	< 610 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	50.0%	2-Fluorobiphenyl	60.8%
d14-p-Terphenyl	62.4%	d4-1,2-Dichlorobenzene	55.2%
d5-Phenol	57.3%	2-Fluorophenol	53.1%
2,4,6-Tribromophenol	76.0%	d4-2-Chlorophenol	61.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: WW19-04-082310-DUP
SAMPLE

Lab Sample ID: RK08C
LIMS ID: 10-21170
Matrix: Soil
Data Release Authorized:
Reported: 10/12/10

QC Report No: RK08-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 08/23/10
Date Received: 08/23/10

Date Extracted: 09/03/10
Date Analyzed: 09/23/10 13:01
Instrument/Analyst: NT6/PK
GPC Cleanup: Yes

Sample Amount: 7.88 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 3.00
Percent Moisture: 14.4%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	190	< 190 U
111-44-4	Bis-(2-Chloroethyl) Ether	190	< 190 U
95-57-8	2-Chlorophenol	190	< 190 U
541-73-1	1,3-Dichlorobenzene	190	< 190 U
106-46-7	1,4-Dichlorobenzene	190	< 190 U
100-51-6	Benzyl Alcohol	950	< 950 U
95-50-1	1,2-Dichlorobenzene	190	< 190 U
95-48-7	2-Methylphenol	190	< 190 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	190	< 190 U
106-44-5	4-Methylphenol	190	< 190 U
621-64-7	N-Nitroso-Di-N-Propylamine	950	< 950 U
67-72-1	Hexachloroethane	190	< 190 U
98-95-3	Nitrobenzene	190	< 190 U
78-59-1	Isophorone	190	< 190 U
88-75-5	2-Nitrophenol	950	< 950 U
105-67-9	2,4-Dimethylphenol	190	< 190 U
65-85-0	Benzoic Acid	1,900	< 1,900 U
111-91-1	bis(2-Chloroethoxy) Methane	190	< 190 U
120-83-2	2,4-Dichlorophenol	950	< 950 U
120-82-1	1,2,4-Trichlorobenzene	190	< 190 U
91-20-3	**Naphthalene**	**190**	**910**
106-47-8	4-Chloroaniline	950	< 950 U
87-68-3	Hexachlorobutadiene	190	< 190 U
59-50-7	4-Chloro-3-methylphenol	950	< 950 U
91-57-6	**2-Methylnaphthalene**	**190**	**340**
77-47-4	Hexachlorocyclopentadiene	950	< 950 U
88-06-2	2,4,6-Trichlorophenol	950	< 950 U
95-95-4	2,4,5-Trichlorophenol	950	< 950 U
91-58-7	2-Chloronaphthalene	190	< 190 U
88-74-4	2-Nitroaniline	950	< 950 U
131-11-3	Dimethylphthalate	190	< 190 U
208-96-8	**Acenaphthylene**	**190**	**1,400**
99-09-2	3-Nitroaniline	950	< 950 U
83-32-9	Acenaphthene	190	< 190 U
51-28-5	2,4-Dinitrophenol	1,900	< 1,900 U
100-02-7	4-Nitrophenol	950	< 950 U
132-64-9	Dibenzofuran	190	< 190 U
606-20-2	2,6-Dinitrotoluene	950	< 950 U
121-14-2	2,4-Dinitrotoluene	950	< 950 U
84-66-2	Diethylphthalate	190	< 190 U
7005-72-3	4-Chlorophenyl-phenylether	190	< 190 U
86-73-7	**Fluorene**	**190**	**530**
100-01-6	4-Nitroaniline	950	< 950 U
534-52-1	4,6-Dinitro-2-Methylphenol	1,900	< 1,900 U

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: WW19-04-082310-DUP
SAMPLE

Lab Sample ID: RK08C
LIMS ID: 10-21170
Matrix: Soil
Date Analyzed: 09/23/10 13:01

QC Report No: RK08-Floyd/Snider
Project: Phase 3
COS-GWSA 6020

CAS Number	Analyte	RL	Result
86-30-6	N-Nitrosodiphenylamine	190	< 190 U
101-55-3	4-Bromophenyl-phenylether	190	< 190 U
118-74-1	Hexachlorobenzene	190	< 190 U
87-86-5	Pentachlorophenol	950	< 950 U
85-01-8	**Phenanthrene**	**190**	**6,200**
86-74-8	**Carbazole**	**190**	**220**
120-12-7	**Anthracene**	**190**	**1,300**
84-74-2	Di-n-Butylphthalate	190	< 190 U
206-44-0	**Fluoranthene**	**190**	**15,000**
129-00-0	**Pyrene**	**190**	**15,000**
85-68-7	Butylbenzylphthalate	190	< 190 U
91-94-1	3,3'-Dichlorobenzidine	950	< 950 U
56-55-3	**Benzo(a)anthracene**	**190**	**5,800**
117-81-7	bis(2-Ethylhexyl)phthalate	190	< 190 U
218-01-9	**Chrysene**	**190**	**7,400**
117-84-0	Di-n-Octyl phthalate	190	< 190 U
205-99-2	**Benzo(b)fluoranthene**	**190**	**6,400**
207-08-9	**Benzo(k)fluoranthene**	**190**	**6,400**
50-32-8	**Benzo(a)pyrene**	**190**	**7,700**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**190**	**7,200**
53-70-3	**Dibenz(a,h)anthracene**	**190**	**2,000**
191-24-2	**Benzo(g,h,i)perylene**	**190**	**9,600**
90-12-0	**1-Methylnaphthalene**	**190**	**230**

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	51.2%	2-Fluorobiphenyl	63.4%
d14-p-Terphenyl	62.0%	d4-1,2-Dichlorobenzene	54.2%
d5-Phenol	62.2%	2-Fluorophenol	51.9%
2,4,6-Tribromophenol	87.2%	d4-2-Chlorophenol	60.1%

ANALYTICAL RESOURCES INCORPORATED

SW8270 SEMIVOLATILES SOIL/SEDIMENT SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: RK08-Floyd/Snider
Project: Phase 3
COS-GWSA 6020

Client ID	NBZ	FBP	TPH	DCB	PHL	2FP	TBP	2CP	TOT OUT
MB-090310	62.0%	62.8%	70.8%	62.0%	58.9%	58.1%	70.4%	62.7%	0
WW19-02-082310	48.8%	60.0%	48.0%	44.8%	48.5%	45.6%	63.7%	48.8%	0
WW19-02-082310 DL	37.0%	49.6%	43.2%	39.8%	48.0%	39.9%	56.1%	45.7%	0
LCS-090310	61.2%	64.0%	68.0%	60.8%	61.6%	59.7%	70.1%	64.0%	0
WW19-04-082310	64.2%	75.7%	69.4%	62.2%	62.0%	59.1%	79.4%	65.0%	0
WW19-04-082310 DL	50.0%	60.8%	62.4%	55.2%	57.3%	53.1%	76.0%	61.3%	0
WW19-04-082310 MS	61.3%	72.2%	68.5%	58.0%	61.8%	59.8%	85.6%	63.2%	0
WW19-04-082310 MSD	61.6%	71.8%	68.5%	58.1%	65.5%	59.4%	88.0%	65.0%	0
WW19-04-082310-DUP	51.2%	63.4%	62.0%	54.2%	62.2%	51.9%	87.2%	60.1%	0

	LCS/MB LIMITS	QC LIMITS
(NBZ) = d5-Nitrobenzene	(39-100)	(32-100)
(FBP) = 2-Fluorobiphenyl	(44-100)	(36-100)
(TPH) = d14-p-Terphenyl	(55-106)	(35-113)
(DCB) = d4-1,2-Dichlorobenzene	(34-100)	(30-100)
(PHL) = d5-Phenol	(39-100)	(31-100)
(2FP) = 2-Fluorophenol	(14-100)	(10-100)
(TBP) = 2,4,6-Tribromophenol	(47-109)	(28-116)
(2CP) = d4-2-Chlorophenol	(43-100)	(33-100)

Prep Method: SW3550C
Log Number Range: 10-21168 to 10-21170

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: WW19-04-082310
MS/MSD

Lab Sample ID: RK08B
LIMS ID: 10-21169
Matrix: Soil
Data Release Authorized:
Reported: 10/12/10

QC Report No: RK08-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 08/23/10
Date Received: 08/23/10

Date Extracted MS/MSD: 09/03/10

Sample Amount MS: 7.75 g-dry-wt
MSD: 8.30 g-dry-wt

Date Analyzed MS: 09/20/10 21:49
MSD: 09/20/10 22:21
Instrument/Analyst MS: NT6/PK
MSD: NT6/PK
GPC Cleanup: Yes

Final Extract Volume MS: 0.5 mL
MSD: 0.5 mL
Dilution Factor MS: 3.00
MSD: 3.00
Percent Moisture: 14.5 %

Analyte	Sample	MS	Spike Added-MS	MS Recovery	MSD	Spike Added-MSD	MSD Recovery	RPD
Phenol	< 182 U	993	1610	61.7%	927	1510	61.4%	6.9%
Bis-(2-Chloroethyl) Ether	< 182 U	859	1610	53.4%	846	1510	56.0%	1.5%
2-Chlorophenol	< 182 U	979	1610	60.8%	954	1510	63.2%	2.6%
1,3-Dichlorobenzene	< 182 U	861	1610	53.5%	811	1510	53.7%	6.0%
1,4-Dichlorobenzene	< 182 U	817	1610	50.7%	786	1510	52.1%	3.9%
Benzyl Alcohol	< 911 U	1400	3230	43.3%	1350	3010	44.9%	3.6%
1,2-Dichlorobenzene	< 182 U	923	1610	57.3%	875	1510	57.9%	5.3%
2-Methylphenol	< 182 U	925	1610	57.5%	914	1510	60.5%	1.2%
2,2'-Oxybis(1-Chloropropane)	< 182 U	890	1610	55.3%	831	1510	55.0%	6.9%
4-Methylphenol	< 182 U	1760	3230	54.5%	1760	3010	58.5%	0.0%
N-Nitroso-Di-N-Propylamine	< 911 U	< 968 U	1610	NA	< 904 U	1510	NA	NA
Hexachloroethane	< 182 U	896	1610	55.7%	828	1510	54.8%	7.9%
Nitrobenzene	< 182 U	1470	1610	91.3%	1390	1510	92.1%	5.6%
Isophorone	< 182 U	1000	1610	62.1%	1010	1510	66.9%	1.0%
2-Nitrophenol	< 911 U	< 968 U	1610	NA	< 904 U	1510	NA	NA
2,4-Dimethylphenol	< 182 U	312	1610	19.4%	428	1510	28.3%	31.4%
Benzoic Acid	< 1820 U	4500	4840	93.0%	4240	4520	93.8%	5.9%
bis(2-Chloroethoxy) Methane	< 182 U	929	1610	57.7%	909	1510	60.2%	2.2%
2,4-Dichlorophenol	< 911 U	972	1610	60.4%	952	1510	63.0%	2.1%
1,2,4-Trichlorobenzene	< 182 U	991	1610	61.6%	938	1510	62.1%	5.5%
Naphthalene	685	1850	1610	72.4%	2110	1510	94.4%	13.1%
4-Chloroaniline	< 911 U	< 968 U	3870	NA	< 904 U	3610	NA	NA
Hexachlorobutadiene	< 182 U	985	1610	61.2%	929	1510	61.5%	5.9%
4-Chloro-3-methylphenol	< 911 U	< 968 U	1610	NA	< 904 U	1510	NA	NA
2-Methylnaphthalene	273	1330	1610	65.7%	1400	1510	74.6%	5.1%
Hexachlorocyclopentadiene	< 911 U	1550	4840	32.0%	1460	4520	32.3%	6.0%
2,4,6-Trichlorophenol	< 911 U	1030	1610	64.0%	976	1510	64.6%	5.4%
2,4,5-Trichlorophenol	< 911 U	1150	1610	71.4%	1090	1510	72.2%	5.4%
2-Chloronaphthalene	< 182 U	1130	1610	70.2%	1030	1510	68.2%	9.3%
2-Nitroaniline	< 911 U	1160	1610	72.0%	1090	1510	72.2%	6.2%
Dimethylphthalate	< 182 U	1080	1610	67.1%	1030	1510	68.2%	4.7%
Acenaphthylene	1540	2780	1610	77.0%	2990	1510	96.0%	7.3%
3-Nitroaniline	< 911 U	1190	4130	28.8%	1300	3860	33.7%	8.8%
Acenaphthene	< 182 U	1180	1610	73.3%	1150	1510	76.2%	2.6%
2,4-Dinitrophenol	< 1820 U	3640	4840	75.2%	3230	4520	71.5%	11.9%
4-Nitrophenol	< 911 U	1180	1610	73.3%	1050	1510	69.5%	11.7%
Dibenzofuran	< 182 U	1310	1610	81.4%	1280	1510	84.8%	2.3%
2,6-Dinitrotoluene	< 911 U	1060	1610	65.8%	909	1510	60.2%	15.3%
2,4-Dinitrotoluene	< 911 U	999	1610	62.0%	938	1510	62.1%	6.3%
Diethylphthalate	< 182 U	2440	1610	152%	1130	1510	74.8%	73.4%
4-Chlorophenyl-phenylether	< 182 U	1120	1610	69.6%	1100	1510	72.8%	1.8%
Fluorene	476	1690	1610	75.4%	1780	1510	86.4%	5.2%
4-Nitroaniline	< 911 U	< 968 U	1610	NA	< 904 U	1510	NA	NA
4,6-Dinitro-2-Methylphenol	< 1820 U	2760	4840	57.0%	2570	4520	56.9%	7.1%
N-Nitrosodiphenylamine	< 182 U	1020	1610	63.4%	1000	1510	66.2%	2.0%

FORM III

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

ANALYTICAL RESOURCES INCORPORATED

Sample ID: WW19-04-082310
MS/MSD

Lab Sample ID: RK08B
LIMS ID: 10-21169
Matrix: Soil
Date Analyzed MS: 09/20/10 21:49
MSD: 09/20/10 22:21

QC Report No: RK08-Floyd/Snider
Project: Phase 3
COS-GWSA 6020

Analyte	Sample	MS	Spike Added-MS	MS Recovery	MSD	Spike Added-MSD	MSD Recovery	RPD
4-Bromophenyl-phenylether	< 182 U	1060	1610	65.8%	1010	1510	66.9%	4.8%
Hexachlorobenzene	< 182 U	1140	1610	70.8%	1070	1510	70.9%	6.3%
Pentachlorophenol	< 911 U	1220	1610	75.8%	1070	1510	70.9%	13.1%
Phenanthrene	6190	6290	1610	6.2%	7880	1510	NA	22.4%
Carbazole	233	993	1610	47.2%	983	1510	49.7%	1.0%
Anthracene	1310	2150	1610	52.2%	2390	1510	71.5%	10.6%
Di-n-Butylphthalate	< 182 U	1080	1610	67.1%	1020	1510	67.5%	5.7%
Fluoranthene	14100	14900	1610	NA	15300	1510	NA	2.6%
Pyrene	15200 E	16200	1610	NA	16000	1510	NA	1.2%
Butylbenzylphthalate	< 182 U	1060	1610	65.8%	945	1510	62.6%	11.5%
3,3'-Dichlorobenzidine	< 911 U	< 968 U	4130	NA	< 904 U	3860	NA	NA
Benzo(a)anthracene	6090	7080	1610	61.5%	8100	1510	NA	13.4%
bis(2-Ethylhexyl)phthalate	1540	1120	1610	NA	1050	1510	NA	6.5%
Chrysene	8020	8960	1610	NA	8850	1510	NA	1.2%
Di-n-Octyl phthalate	< 182 U	900	1610	55.9%	857	1510	56.8%	4.9%
Benzo(b)fluoranthene	6450	7410	1610	59.6%	7080	1510	NA	4.6%
Benzo(k)fluoranthene	6450	7410	1610	59.6%	7080	1510	NA	4.6%
Benzo(a)pyrene	7770	8820	1610	NA	8540	1510	NA	3.2%
Indeno(1,2,3-cd)pyrene	6480	7860	1610	NA	7350	1510	NA	6.7%
Dibenz(a,h)anthracene	1940	3150	1610	75.2%	2980	1510	68.9%	5.5%
Benzo(g,h,i)perylene	8100	9840	1610	NA	9050	1510	NA	8.4%
1-Methylnaphthalene	< 182 U	1290	1610	80.1%	1270	1510	84.1%	1.6%

Reported in µg/kg (ppb)
RPD calculated using sample concentrations per SW846.
NA-No recovery due to high concentration of analyte in original sample and/or calculated negative recovery.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: WW19-04-082310
MATRIX SPIKE

Lab Sample ID: RK08B
LIMS ID: 10-21169
Matrix: Soil
Data Release Authorized:
Reported: 10/12/10

QC Report No: RK08-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 08/23/10
Date Received: 08/23/10

Date Extracted: 09/03/10
Date Analyzed: 09/20/10 21:49
Instrument/Analyst: NT6/PK
GPC Cleanup: Yes

Sample Amount: 7.75 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 3.00
Percent Moisture: 14.5%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	190	---
111-44-4	Bis-(2-Chloroethyl) Ether	190	---
95-57-8	2-Chlorophenol	190	---
541-73-1	1,3-Dichlorobenzene	190	---
106-46-7	1,4-Dichlorobenzene	190	---
100-51-6	Benzyl Alcohol	970	---
95-50-1	1,2-Dichlorobenzene	190	---
95-48-7	2-Methylphenol	190	---
108-60-1	2,2'-Oxybis(1-Chloropropane)	190	---
106-44-5	4-Methylphenol	190	---
621-64-7	N-Nitroso-Di-N-Propylamine	970	---
67-72-1	Hexachloroethane	190	---
98-95-3	Nitrobenzene	190	---
78-59-1	Isophorone	190	---
88-75-5	2-Nitrophenol	970	---
105-67-9	2,4-Dimethylphenol	190	---
65-85-0	Benzoic Acid	1,900	---
111-91-1	bis(2-Chloroethoxy) Methane	190	---
120-83-2	2,4-Dichlorophenol	970	---
120-82-1	1,2,4-Trichlorobenzene	190	---
91-20-3	Naphthalene	190	---
106-47-8	4-Chloroaniline	970	---
87-68-3	Hexachlorobutadiene	190	---
59-50-7	4-Chloro-3-methylphenol	970	---
91-57-6	2-Methylnaphthalene	190	---
77-47-4	Hexachlorocyclopentadiene	970	---
88-06-2	2,4,6-Trichlorophenol	970	---
95-95-4	2,4,5-Trichlorophenol	970	---
91-58-7	2-Chloronaphthalene	190	---
88-74-4	2-Nitroaniline	970	---
131-11-3	Dimethylphthalate	190	---
208-96-8	Acenaphthylene	190	---
99-09-2	3-Nitroaniline	970	---
83-32-9	Acenaphthene	190	---
51-28-5	2,4-Dinitrophenol	1,900	---
100-02-7	4-Nitrophenol	970	---
132-64-9	Dibenzofuran	190	---
606-20-2	2,6-Dinitrotoluene	970	---
121-14-2	2,4-Dinitrotoluene	970	---
84-66-2	Diethylphthalate	190	---
7005-72-3	4-Chlorophenyl-phenylether	190	---
86-73-7	Fluorene	190	---
100-01-6	4-Nitroaniline	970	---
534-52-1	4,6-Dinitro-2-Methylphenol	1,900	---

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

ANALYTICAL RESOURCES INCORPORATED

Sample ID: WW19-04-082310
MATRIX SPIKE

Lab Sample ID: RK08B
LIMS ID: 10-21169
Matrix: Soil
Date Analyzed: 09/20/10 21:49

QC Report No: RK08-Floyd/Snider
Project: Phase 3
COS-GWSA 6020

CAS Number	Analyte	RL	Result
86-30-6	N-Nitrosodiphenylamine	190	---
101-55-3	4-Bromophenyl-phenylether	190	---
118-74-1	Hexachlorobenzene	190	---
87-86-5	Pentachlorophenol	970	---
85-01-8	Phenanthrene	190	---
86-74-8	Carbazole	190	---
120-12-7	Anthracene	190	---
84-74-2	Di-n-Butylphthalate	190	---
206-44-0	Fluoranthene	190	---
129-00-0	Pyrene	190	---
85-68-7	Butylbenzylphthalate	190	---
91-94-1	3,3'-Dichlorobenzidine	970	---
56-55-3	Benzo(a)anthracene	190	---
117-81-7	bis(2-Ethylhexyl)phthalate	190	---
218-01-9	Chrysene	190	---
117-84-0	Di-n-Octyl phthalate	190	---
205-99-2	Benzo(b)fluoranthene	190	---
207-08-9	Benzo(k)fluoranthene	190	---
50-32-8	Benzo(a)pyrene	190	---
193-39-5	Indeno(1,2,3-cd)pyrene	190	---
53-70-3	Dibenz(a,h)anthracene	190	---
191-24-2	Benzo(g,h,i)perylene	190	---
90-12-0	1-Methylnaphthalene	190	---

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	61.3%	2-Fluorobiphenyl	72.2%
d14-p-Terphenyl	68.5%	d4-1,2-Dichlorobenzene	58.0%
d5-Phenol	61.8%	2-Fluorophenol	59.8%
2,4,6-Tribromophenol	85.6%	d4-2-Chlorophenol	63.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: WW19-04-082310
MATRIX SPIKE DUPLICATE

Lab Sample ID: RK08B
LIMS ID: 10-21169
Matrix: Soil
Data Release Authorized:
Reported: 10/12/10

QC Report No: RK08-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 08/23/10
Date Received: 08/23/10

Date Extracted: 09/03/10
Date Analyzed: 09/20/10 22:21
Instrument/Analyst: NT6/PK
GPC Cleanup: Yes

Sample Amount: 8.30 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 3.00
Percent Moisture: 14.5%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	180	---
111-44-4	Bis-(2-Chloroethyl) Ether	180	---
95-57-8	2-Chlorophenol	180	---
541-73-1	1,3-Dichlorobenzene	180	---
106-46-7	1,4-Dichlorobenzene	180	---
100-51-6	Benzyl Alcohol	900	---
95-50-1	1,2-Dichlorobenzene	180	---
95-48-7	2-Methylphenol	180	---
108-60-1	2,2'-Oxybis(1-Chloropropane)	180	---
106-44-5	4-Methylphenol	180	---
621-64-7	N-Nitroso-Di-N-Propylamine	900	---
67-72-1	Hexachloroethane	180	---
98-95-3	Nitrobenzene	180	---
78-59-1	Isophorone	180	---
88-75-5	2-Nitrophenol	900	---
105-67-9	2,4-Dimethylphenol	180	---
65-85-0	Benzoic Acid	1,800	---
111-91-1	bis(2-Chloroethoxy) Methane	180	---
120-83-2	2,4-Dichlorophenol	900	---
120-82-1	1,2,4-Trichlorobenzene	180	---
91-20-3	Naphthalene	180	---
106-47-8	4-Chloroaniline	900	---
87-68-3	Hexachlorobutadiene	180	---
59-50-7	4-Chloro-3-methylphenol	900	---
91-57-6	2-Methylnaphthalene	180	---
77-47-4	Hexachlorocyclopentadiene	900	---
88-06-2	2,4,6-Trichlorophenol	900	---
95-95-4	2,4,5-Trichlorophenol	900	---
91-58-7	2-Chloronaphthalene	180	---
88-74-4	2-Nitroaniline	900	---
131-11-3	Dimethylphthalate	180	---
208-96-8	Acenaphthylene	180	---
99-09-2	3-Nitroaniline	900	---
83-32-9	Acenaphthene	180	---
51-28-5	2,4-Dinitrophenol	1,800	---
100-02-7	4-Nitrophenol	900	---
132-64-9	Dibenzofuran	180	---
606-20-2	2,6-Dinitrotoluene	900	---
121-14-2	2,4-Dinitrotoluene	900	---
84-66-2	Diethylphthalate	180	---
7005-72-3	4-Chlorophenyl-phenylether	180	---
86-73-7	Fluorene	180	---
100-01-6	4-Nitroaniline	900	---
534-52-1	4,6-Dinitro-2-Methylphenol	1,800	---

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: WW19-04-082310
MATRIX SPIKE DUPLICATE

Lab Sample ID: RK08B
LIMS ID: 10-21169
Matrix: Soil
Date Analyzed: 09/20/10 22:21

QC Report No: RK08-Floyd/Snider
Project: Phase 3
COS-GWSA 6020

CAS Number	Analyte	RL	Result
86-30-6	N-Nitrosodiphenylamine	180	---
101-55-3	4-Bromophenyl-phenylether	180	---
118-74-1	Hexachlorobenzene	180	---
87-86-5	Pentachlorophenol	900	---
85-01-8	Phenanthrene	180	---
86-74-8	Carbazole	180	---
120-12-7	Anthracene	180	---
84-74-2	Di-n-Butylphthalate	180	---
206-44-0	Fluoranthene	180	---
129-00-0	Pyrene	180	---
85-68-7	Butylbenzylphthalate	180	---
91-94-1	3,3'-Dichlorobenzidine	900	---
56-55-3	Benzo(a)anthracene	180	---
117-81-7	bis(2-Ethylhexyl)phthalate	180	---
218-01-9	Chrysene	180	---
117-84-0	Di-n-Octyl phthalate	180	---
205-99-2	Benzo(b)fluoranthene	180	---
207-08-9	Benzo(k)fluoranthene	180	---
50-32-8	Benzo(a)pyrene	180	---
193-39-5	Indeno(1,2,3-cd)pyrene	180	---
53-70-3	Dibenz(a,h)anthracene	180	---
191-24-2	Benzo(g,h,i)perylene	180	---
90-12-0	1-Methylnaphthalene	180	---

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	61.6%	2-Fluorobiphenyl	71.8%
d14-p-Terphenyl	68.5%	d4-1,2-Dichlorobenzene	58.1%
d5-Phenol	65.5%	2-Fluorophenol	59.4%
2,4,6-Tribromophenol	88.0%	d4-2-Chlorophenol	65.0%

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

ANALYTICAL RESOURCES INCORPORATED

Sample ID: LCS-090310
LAB CONTROL

Lab Sample ID: LCS-090310
LIMS ID: 10-21169
Matrix: Soil
Data Release Authorized:
Reported: 10/12/10

QC Report No: RK08-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 08/23/10
Date Received: 08/23/10

Date Extracted: 09/03/10
Date Analyzed: 09/20/10 20:11
Instrument/Analyst: NT6/PK
GPC Cleanup: Yes

Sample Amount: 7.50 g
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00
Percent Moisture: NA

Analyte	Lab Control	Spike Added	Recovery
Phenol	961	1670	57.5%
Bis-(2-Chloroethyl) Ether	941	1670	56.3%
2-Chlorophenol	1010	1670	60.5%
1,3-Dichlorobenzene	943	1670	56.5%
1,4-Dichlorobenzene	977	1670	58.5%
Benzyl Alcohol	939	3330	28.2%
1,2-Dichlorobenzene	1000	1670	59.9%
2-Methylphenol	917	1670	54.9%
2,2'-Oxybis(1-Chloropropane)	963	1670	57.7%
4-Methylphenol	1890	3330	56.8%
N-Nitroso-Di-N-Propylamine	827	1670	49.5%
Hexachloroethane	973	1670	58.3%
Nitrobenzene	1490	1670	89.2%
Isophorone	1090	1670	65.3%
2-Nitrophenol	978	1670	58.6%
2,4-Dimethylphenol	387	1670	23.2%
Benzoic Acid	4870	5000	97.4%
bis(2-Chloroethoxy) Methane	953	1670	57.1%
2,4-Dichlorophenol	1020	1670	61.1%
1,2,4-Trichlorobenzene	1000	1670	59.9%
Naphthalene	1060	1670	63.5%
4-Chloroaniline	1810	4000	45.2%
Hexachlorobutadiene	1020	1670	61.1%
4-Chloro-3-methylphenol	923	1670	55.3%
2-Methylnaphthalene	1070	1670	64.1%
Hexachlorocyclopentadiene	2720	5000	54.4%
2,4,6-Trichlorophenol	880	1670	52.7%
2,4,5-Trichlorophenol	1130	1670	67.7%
2-Chloronaphthalene	1020	1670	61.1%
2-Nitroaniline	1050	1670	62.9%
Dimethylphthalate	1070	1670	64.1%
Acenaphthylene	1100	1670	65.9%
3-Nitroaniline	2880	4270	67.4%
Acenaphthene	1030	1670	61.7%
2,4-Dinitrophenol	6550	5000	131%
4-Nitrophenol	1590	1670	95.2%
Dibenzofuran	1090	1670	65.3%

FORM III

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: LCS-090310
LAB CONTROL

Lab Sample ID: LCS-090310
LIMS ID: 10-21169
Matrix: Soil
Date Analyzed: 09/20/10 20:11

QC Report No: RK08-Floyd/Snider
Project: Phase 3
COS-GWSA 6020

Analyte	Lab Control	Spike Added	Recovery
2,6-Dinitrotoluene	969	1670	58.0%
2,4-Dinitrotoluene	1080	1670	64.7%
Diethylphthalate	1100	1670	65.9%
4-Chlorophenyl-phenylether	1060	1670	63.5%
Fluorene	1130	1670	67.7%
4-Nitroaniline	923	1670	55.3%
4,6-Dinitro-2-Methylphenol	4380	5000	87.6%
N-Nitrosodiphenylamine	967	1670	57.9%
4-Bromophenyl-phenylether	1090	1670	65.3%
Hexachlorobenzene	1140	1670	68.3%
Pentachlorophenol	1130	1670	67.7%
Phenanthrene	1260	1670	75.4%
Carbazole	788	1670	47.2%
Anthracene	1070	1670	64.1%
Di-n-Butylphthalate	1160	1670	69.5%
Fluoranthene	1350	1670	80.8%
Pyrene	1200	1670	71.9%
Butylbenzylphthalate	1080	1670	64.7%
3,3'-Dichlorobenzidine	2310	4270	54.1%
Benzo(a)anthracene	1220	1670	73.1%
bis(2-Ethylhexyl)phthalate	1060	1670	63.5%
Chrysene	1320	1670	79.0%
Di-n-Octyl phthalate	972	1670	58.2%
Benzo(b)fluoranthene	1330	1670	79.6%
Benzo(k)fluoranthene	1300	1670	77.8%
Benzo(a)pyrene	985	1670	59.0%
Indeno(1,2,3-cd)pyrene	1230	1670	73.7%
Dibenz(a,h)anthracene	1260	1670	75.4%
Benzo(g,h,i)perylene	1150	1670	68.9%
1-Methylnaphthalene	1050	1670	62.9%

Semivolatile Surrogate Recovery

d5-Nitrobenzene	61.2%
2-Fluorobiphenyl	64.0%
d14-p-Terphenyl	68.0%
d4-1,2-Dichlorobenzene	60.8%
d5-Phenol	61.6%
2-Fluorophenol	59.7%
2,4,6-Tribromophenol	70.1%
d4-2-Chlorophenol	64.0%

Reported in µg/kg (ppb)

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: MB-091410
METHOD BLANK

Lab Sample ID: MB-091410
LIMS ID: 10-21169
Matrix: Soil
Data Release Authorized:
Reported: 09/17/10

QC Report No: RK08-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: NA
Date Received: NA

Date Extracted: 09/14/10
Date Analyzed: 09/15/10 17:33
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.0 g
Final Extract Volume: 4.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: NA

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	33	< 33 U
53469-21-9	Aroclor 1242	33	< 33 U
12672-29-6	Aroclor 1248	33	< 33 U
11097-69-1	Aroclor 1254	33	< 33 U
11096-82-5	Aroclor 1260	33	< 33 U
11104-28-2	Aroclor 1221	33	< 33 U
11141-16-5	Aroclor 1232	33	< 33 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	92.0%
Tetrachlorometaxylene	78.5%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: WW19-02-082310
SAMPLE

Lab Sample ID: RK08A
LIMS ID: 10-21168
Matrix: Soil
Data Release Authorized:
Reported: 09/17/10

QC Report No: RK08-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 08/23/10
Date Received: 08/23/10

Date Extracted: 09/14/10
Date Analyzed: 09/15/10 18:20
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.1 g-dry-wt
Final Extract Volume: 4.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 47.6%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	33	< 33 U
53469-21-9	Aroclor 1242	33	< 33 U
12672-29-6	Aroclor 1248	50	< 50 Y
11097-69-1	**Aroclor 1254**	**33**	**87**
11096-82-5	**Aroclor 1260**	**33**	**69**
11104-28-2	Aroclor 1221	33	< 33 U
11141-16-5	Aroclor 1232	33	< 33 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	120%
Tetrachlorometaxylene	89.4%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: WW19-04-082310
SAMPLE

Lab Sample ID: RK08B
LIMS ID: 10-21169
Matrix: Soil
Data Release Authorized:
Reported: 09/17/10

QC Report No: RK08-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 08/23/10
Date Received: 08/23/10

Date Extracted: 09/14/10
Date Analyzed: 09/15/10 18:44
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.9 g-dry-wt
Final Extract Volume: 4.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 14.5%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	31	< 31 U
53469-21-9	Aroclor 1242	31	< 31 U
12672-29-6	Aroclor 1248	78	< 78 Y
11097-69-1	**Aroclor 1254**	**31**	**190**
11096-82-5	**Aroclor 1260**	**31**	**200**
11104-28-2	Aroclor 1221	31	< 31 U
11141-16-5	Aroclor 1232	31	< 31 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	107%
Tetrachlorometaxylene	82.9%

FORM I

ANALYTICAL RESOURCES INCORPORATED

SW8082/PCB SOIL/SEDIMENT SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: RK08-Floyd/Snider
Project: Phase 3
COS-GWSA 6020

Client ID	DCBP % REC	DCBP LCL-UCL	TCMX % REC	TCMX LCL-UCL	TOT OUT
WW19-02-082310	120%	42-127	89.4%	50-114	0
MB-091410	92.0%	51-112	78.5%	46-111	0
LCS-091410	91.1%	51-112	75.6%	46-111	0
WW19-04-082310	107%	42-127	82.9%	50-114	0
WW19-04-082310 MS	98.2%	42-127	77.2%	50-114	0
WW19-04-082310 MSD	101%	42-127	80.0%	50-114	0

Standard Sonication Control Limits
Prep Method: SW3550C
Log Number Range: 10-21168 to 10-21169

FORM-II SW8082

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: WW19-04-082310
MS/MSD

Lab Sample ID: RK08B
LIMS ID: 10-21169
Matrix: Soil
Data Release Authorized:
Reported: 09/17/10

QC Report No: RK08-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 08/23/10
Date Received: 08/23/10

Date Extracted MS/MSD: 09/14/10

Date Analyzed MS: 09/15/10 19:07
MSD: 09/15/10 19:31
Instrument/Analyst MS: ECD7/JGR
MSD: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount MS: 12.9 g-dry-wt
MSD: 12.9 g-dry-wt
Final Extract Volume MS: 4.0 mL
MSD: 4.0 mL
Dilution Factor MS: 5.00
MSD: 5.00
Silica Gel: No

Percent Moisture: 14.5%

Analyte	Sample	MS	Spike Added-MS	MS Recovery	MSD	Spike Added-MSD	MSD Recovery	RPD
Aroclor 1016	< 31.0 U	161	155	104%	175	155	113%	8.3%
Aroclor 1260	201	312	155	71.6%	309	155	69.7%	1.0%

Results reported in µg/kg (ppb)
RPD calculated using sample concentrations per SW846.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: WW19-04-082310
MATRIX SPIKE

Lab Sample ID: RK08B
LIMS ID: 10-21169
Matrix: Soil
Data Release Authorized:
Reported: 09/17/10

QC Report No: RK08-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 08/23/10
Date Received: 08/23/10

Date Extracted: 09/14/10
Date Analyzed: 09/15/10 19:07
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.9 g-dry-wt
Final Extract Volume: 4.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 14.5%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	31	---
53469-21-9	Aroclor 1242	31	< 31 U
12672-29-6	Aroclor 1248	31	< 31 U
11097-69-1	**Aroclor 1254**	**31**	**240**
11096-82-5	Aroclor 1260	31	---
11104-28-2	Aroclor 1221	31	< 31 U
11141-16-5	Aroclor 1232	31	< 31 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	98.2%
Tetrachlorometaxylene	77.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: WW19-04-082310
MATRIX SPIKE DUP

Lab Sample ID: RK08B
LIMS ID: 10-21169
Matrix: Soil
Data Release Authorized:
Reported: 09/17/10

QC Report No: RK08-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 08/23/10
Date Received: 08/23/10

Date Extracted: 09/14/10
Date Analyzed: 09/15/10 19:31
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.9 g-dry-wt
Final Extract Volume: 4.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 14.5%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	31	---
53469-21-9	Aroclor 1242	31	< 31 U
12672-29-6	Aroclor 1248	31	< 31 U
11097-69-1	**Aroclor 1254**	**31**	**230**
11096-82-5	Aroclor 1260	31	---
11104-28-2	Aroclor 1221	31	< 31 U
11141-16-5	Aroclor 1232	31	< 31 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	101%
Tetrachlorometaxylene	80.0%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: LCS-091410
LAB CONTROL

Lab Sample ID: LCS-091410
LIMS ID: 10-21169
Matrix: Soil
Data Release Authorized:
Reported: 09/17/10

QC Report No: RK08-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: NA
Date Received: NA

Date Extracted: 09/14/10
Date Analyzed: 09/15/10 17:56
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.0 g-dry-wt
Final Extract Volume: 4.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: NA

Analyte	Lab Control	Spike Added	Recovery
Aroclor 1016	156	167	93.4%
Aroclor 1260	185	167	111%

PCB Surrogate Recovery	
Decachlorobiphenyl	91.1%
Tetrachlorometaxylene	75.6%

Results reported in µg/kg (ppb)

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: METHOD BLANK

Lab Sample ID: RK08MB
LIMS ID: 10-21168
Matrix: Soil
Data Release Authorized:
Reported: 09/06/10

QC Report No: RK08-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: NA
Date Received: NA

Percent Total Solids: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	08/31/10	6010B	09/02/10	7440-38-2	Arsenic	5	5	U
3050B	08/31/10	6010B	09/02/10	7440-43-9	Cadmium	0.2	0.2	U
3050B	08/31/10	6010B	09/02/10	7440-47-3	Chromium	0.5	0.5	U
3050B	08/31/10	6010B	09/02/10	7440-50-8	Copper	0.2	0.2	U
3050B	08/31/10	6010B	09/02/10	7439-92-1	Lead	2	2	U
CLP	08/31/10	7471A	09/03/10	7439-97-6	Mercury	0.02	0.02	U
3050B	08/31/10	6010B	09/02/10	7440-22-4	Silver	0.3	0.3	U
3050B	08/31/10	6010B	09/02/10	7440-66-6	Zinc	1	1	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: WW19-02-082310
SAMPLE

Lab Sample ID: RK08A
LIMS ID: 10-21168
Matrix: Soil
Data Release Authorized:
Reported: 09/06/10

QC Report No: RK08-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 08/23/10
Date Received: 08/23/10

Percent Total Solids: 53.3%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	08/31/10	6010B	09/02/10	7440-38-2	Arsenic	9	9	
3050B	08/31/10	6010B	09/02/10	7440-43-9	Cadmium	0.3	4.1	
3050B	08/31/10	6010B	09/02/10	7440-47-3	Chromium	0.9	77.9	
3050B	08/31/10	6010B	09/02/10	7440-50-8	Copper	0.3	330	
3050B	08/31/10	6010B	09/02/10	7439-92-1	Lead	3	203	
CLP	08/31/10	7471A	09/03/10	7439-97-6	Mercury	0.03	0.42	
3050B	08/31/10	6010B	09/02/10	7440-22-4	Silver	0.5	0.8	
3050B	08/31/10	6010B	09/02/10	7440-66-6	Zinc	2	1,490	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: WW19-04-082310
SAMPLE

Lab Sample ID: RK08B
LIMS ID: 10-21169
Matrix: Soil
Data Release Authorized:
Reported: 09/06/10

QC Report No: RK08-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 08/23/10
Date Received: 08/23/10

Percent Total Solids: 85.9%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	08/31/10	6010B	09/02/10	7440-38-2	Arsenic	6	14	
3050B	08/31/10	6010B	09/02/10	7440-43-9	Cadmium	0.2	1.6	
3050B	08/31/10	6010B	09/02/10	7440-47-3	Chromium	0.6	44.9	
3050B	08/31/10	6010B	09/02/10	7440-50-8	Copper	0.2	57.2	
3050B	08/31/10	6010B	09/02/10	7439-92-1	Lead	2	142	
CLP	08/31/10	7471A	09/03/10	7439-97-6	Mercury	0.02	0.46	
3050B	08/31/10	6010B	09/02/10	7440-22-4	Silver	0.3	2.4	
3050B	08/31/10	6010B	09/02/10	7440-66-6	Zinc	1	198	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: WW19-04-082310
DUPLICATE

Lab Sample ID: RK08B
LIMS ID: 10-21169
Matrix: Soil
Data Release Authorized:
Reported: 09/06/10

QC Report No: RK08-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 08/23/10
Date Received: 08/23/10

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Arsenic	6010B	14	15	6.9%	+/- 6	L
Cadmium	6010B	1.6	1.7	6.1%	+/- 20%	
Chromium	6010B	44.9	46.8	4.1%	+/- 20%	
Copper	6010B	57.2	58.9	2.9%	+/- 20%	
Lead	6010B	142	142	0.0%	+/- 20%	
Mercury	7471A	0.46	0.47	2.2%	+/- 20%	
Silver	6010B	2.4	2.4	0.0%	+/- 20%	
Zinc	6010B	198	207	4.4%	+/- 20%	

Reported in mg/kg-dry

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: WW19-04-082310
MATRIX SPIKE

Lab Sample ID: RK08B
LIMS ID: 10-21169
Matrix: Soil
Data Release Authorized:
Reported: 09/06/10

QC Report No: RK08-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: 08/23/10
Date Received: 08/23/10

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Arsenic	6010B	14	242	231	98.7%	
Cadmium	6010B	1.6	58.9	57.9	99.0%	
Chromium	6010B	44.9	102	57.9	98.6%	
Copper	6010B	57.2	114	57.9	98.1%	
Lead	6010B	142	363	231	95.7%	
Mercury	7471A	0.46	0.65	0.222	85.6%	
Silver	6010B	2.4	56.2	57.9	92.9%	
Zinc	6010B	198	283	57.9	147%	N

Reported in mg/kg-dry

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: RK08LCS
LIMS ID: 10-21168
Matrix: Soil
Data Release Authorized:
Reported: 09/06/10

QC Report No: RK08-Floyd/Snider
Project: Phase 3
COS-GWSA 6020
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	6010B	203	200	102%	
Cadmium	6010B	48.8	50.0	97.6%	
Chromium	6010B	49.2	50.0	98.4%	
Copper	6010B	48.7	50.0	97.4%	
Lead	6010B	197	200	98.5%	
Mercury	7471A	0.52	0.50	104%	
Silver	6010B	49.4	50.0	98.8%	
Zinc	6010B	48	50	96.0%	

Reported in mg/kg-dry

N-Control limit not met
NA-Not Applicable, Analyte Not Spiked
Control Limits: 80-120%

METHOD BLANK RESULTS-CONVENTIONALS
RK08-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Soil
Data Release Authorized:
Reported: 09/03/10

Project: Phase 3
Event: COS-GWSA 6020
Date Sampled: NA
Date Received: NA

Analyte	Date	Units	Blank
Total Solids	08/27/10	Percent	< 0.01 U
Total Organic Carbon	08/31/10	Percent	< 0.020 U

SAMPLE RESULTS-CONVENTIONALS
RK08-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Soil
Data Release Authorized:
Reported: 09/03/10

Project: Phase 3
Event: COS-GWSA 6020
Date Sampled: 08/23/10
Date Received: 08/23/10

Client ID: WW19-02-082310
ARI ID: 10-21168 RK08A

Analyte	Date	Method	Units	RL	Sample
Total Solids	08/27/10 082710#1	EPA 160.3	Percent	0.01	53.70
Total Organic Carbon	08/31/10 083110#1	Plumb,1981	Percent	0.124	14.5

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RK08-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Soil
Data Release Authorized:
Reported: 09/03/10

Project: Phase 3
Event: COS-GWSA 6020
Date Sampled: 08/23/10
Date Received: 08/23/10

Client ID: WW19-04-082310
ARI ID: 10-21169 RK08B

Analyte	Date	Method	Units	RL	Sample
Total Solids	08/27/10 082710#1	EPA 160.3	Percent	0.01	85.90
Total Organic Carbon	08/31/10 083110#1	Plumb,1981	Percent	0.176	10.6

RL Analytical reporting limit
U Undetected at reported detection limit

LAB CONTROL RESULTS-CONVENTIONALS
RK08-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Soil
Data Release Authorized:
Reported: 09/03/10

Project: Phase 3
Event: COS-GWSA 6020
Date Sampled: NA
Date Received: NA

Analyte/Method	QC ID	Date	Units	LCS	Spike Added	Recovery
Total Organic Carbon Plumb,1981	ICVL	08/31/10	Percent	0.094	0.100	94.0%

STANDARD REFERENCE RESULTS-CONVENTIONALS
RK08-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Soil
Data Release Authorized:
Reported: 09/03/10

Project: Phase 3
Event: COS-GWSA 6020
Date Sampled: NA
Date Received: NA

Analyte/SRM ID	Date	Units	SRM	True Value	Recovery
Total Organic Carbon NIST #8704	08/31/10	Percent	3.31	3.35	98.8%

REPLICATE RESULTS-CONVENTIONALS
RK08-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Soil
Data Release Authorized:
Reported: 09/03/10

Project: Phase 3
Event: COS-GWSA 6020
Date Sampled: 08/23/10
Date Received: 08/23/10

Analyte	Date	Units	Sample	Replicate(s)	RPD/RSD
ARI ID: RK08B Client ID: WW19-04-082310					
Total Solids	08/27/10	Percent	85.90	85.80 85.60	0.2%
Total Organic Carbon	08/31/10	Percent	10.6	9.54 9.36	6.8%

MS/MSD RESULTS-CONVENTIONALS
RK08-Floyd/Snider

ANALYTICAL RESOURCES INCORPORATED

Matrix: Soil
Data Release Authorized:
Reported: 09/03/10

Project: Phase 3
Event: COS-GWSA 6020
Date Sampled: 08/23/10
Date Received: 08/23/10

Analyte	Date	Units	Sample	Spike	Spike Added	Recovery
ARI ID: RK08B Client ID: WW19-04-082310						
Total Organic Carbon	08/31/10	Percent	10.6	19.6	10.7	84.4%

Floyd Snider
Phase 3
COS-GWSA 6020

Percent Finer (Passing) Than the Indicated Size

Sieve Size (microns)	3"	2"	1 1/2"	1"	3/4"	1/2"	3/8"	#4 (4750)	#10 (2000)	#20 (850)	#40 (425)	#60 (250)	#100 (150)	#200 (75)	32	22	13	9	7	3.2	1.3
WW19-04-082310	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.4	97.4	94.2	83.5	68.4	54.9	44.8	39.6	32.5	26.9	22.3	19.3	14.2	6.1
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.0	96.4	93.0	82.2	66.6	53.2	43.0	36.2	31.2	26.6	22.6	18.1	13.6	5.5
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.1	97.7	94.6	83.4	67.8	54.0	43.8	36.0	31.0	24.4	22.3	17.3	9.1	5.1
WW19-02-082310	100.0	100.0	100.0	100.0	100.0	100.0	97.5	97.5	97.1	94.7	90.2	83.4	75.4	66.1	50.8	35.2	23.4	20.3	15.6	8.6	5.5

Testing performed according to ASTM D421/D422

Floyd Snider
Phase 3
COS-GWSA 6020

Percent Retained in Each Size Fraction

Description	%Coarse Gravel				% Gravel			% Coarse Sand	% Medium Sand		% Fine Sand			% Very Coarse Silt	% Coarse Silt	% Medium Silt	% Fine Silt	% Fine Silt	% Very Fine Silt	% Clay
Particle Size (microns)	3-2"	2-1 1/2"	1 1/2"-1"	1-3/4"	3/4-1/2"	1/2-3/8"	3/8"-4750	4750-2000	2000-850	850-425	425-250	250-150	150-75	75-32	32-22	22-13	13-9	9-7	7-3.2	<3.2
WW19-04-082310	0.0	0.0	0.0	0.0	0.0	0.0	1.6	1.0	3.2	10.8	15.1	13.5	10.1	5.2	7.1	5.6	4.6	3.0	5.1	14.2
	0.0	0.0	0.0	0.0	0.0	0.0	2.0	1.6	3.4	10.9	15.6	13.5	10.1	6.8	5.0	4.5	4.0	4.5	4.5	13.6
	0.0	0.0	0.0	0.0	0.0	0.0	0.9	1.3	3.2	11.2	15.6	13.8	10.2	7.7	5.1	6.6	2.0	5.1	8.1	9.1
WW19-02-082310	0.0	0.0	0.0	0.0	0.0	2.5	0.0	0.4	2.3	4.5	6.8	8.0	9.3	15.3	15.6	11.7	3.1	4.7	7.0	8.6

Client:	Floyd Snider	Project No.:	Phase 3
		Project:	COS-GWSA 6020
ARI Triplicate Sample ID:	RK08 B	Batch No.:	RK08-01
Client Triplicate Sample ID:	WW19-04-082310	Page:	1 of 1

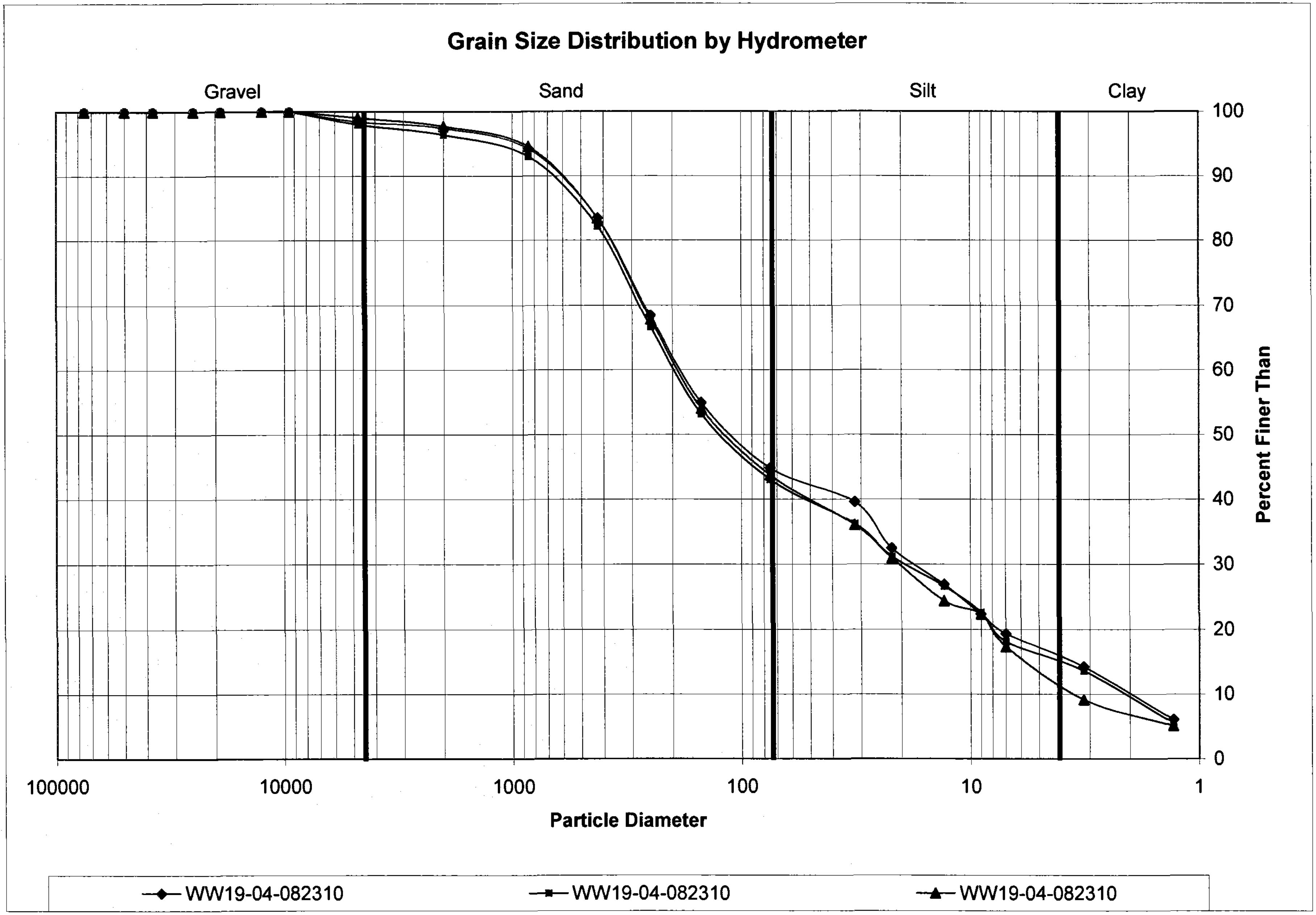
Relative Standard Deviation, By Size

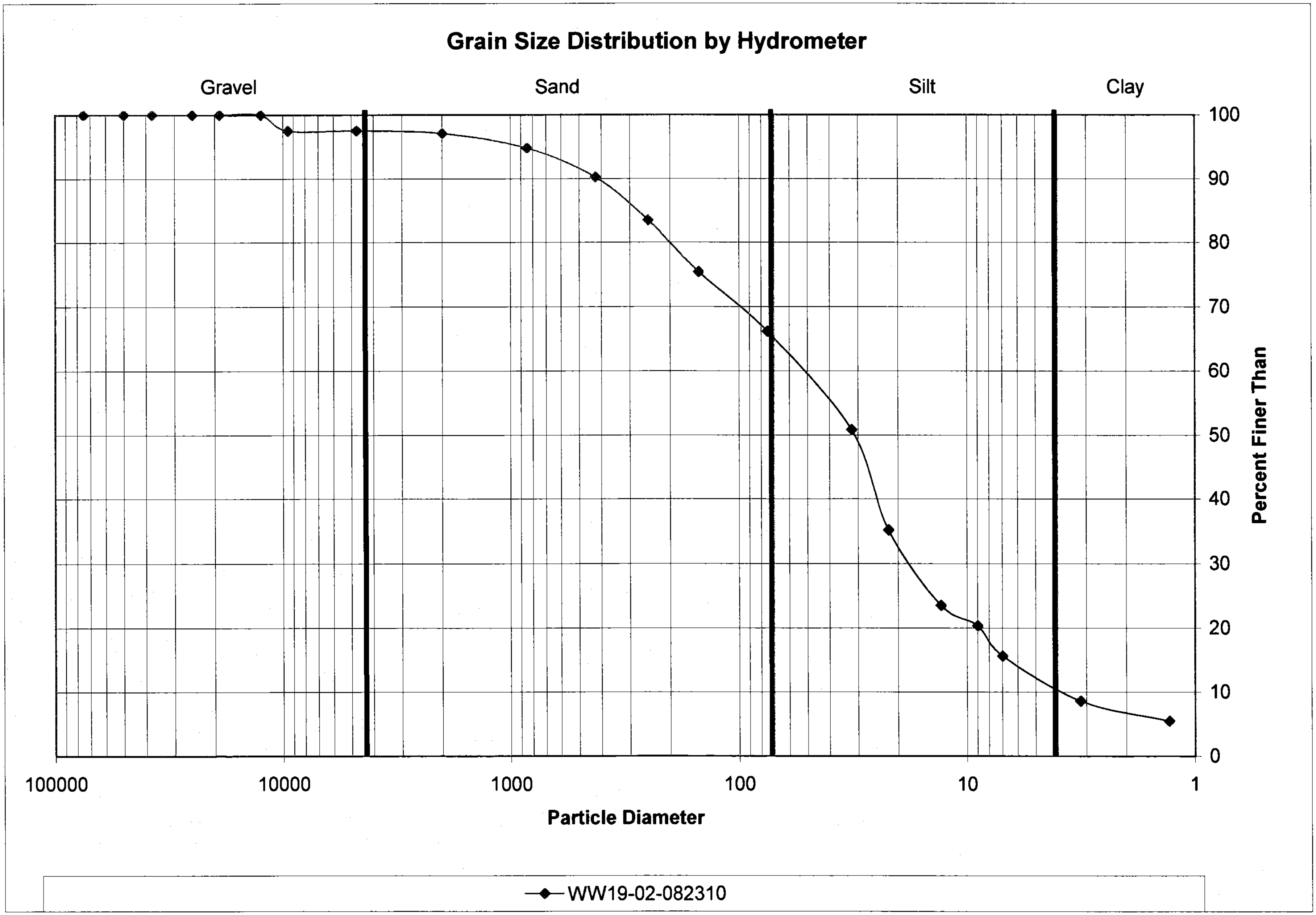
Sample ID	75000	50000	37500	25000	19000	12500	9500	4750	2000	850	425	250	150	75	32	22	13	9	7	3.2	1.3
VW19-04-08231	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.4	97.4	94.2	83.5	68.4	54.9	44.8	39.6	32.5	26.9	22.3	19.3	14.2	6.1
VW19-04-08231	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.0	96.4	93.0	82.2	66.6	53.2	43.0	36.2	31.2	26.6	22.6	18.1	13.6	5.5
VW19-04-08231	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.1	97.7	94.6	83.4	67.8	54.0	43.8	36.0	31.0	24.4	22.3	17.3	9.1	5.1
AVE	100.00	100.00	100.00	100.00	100.00	100.00	100.00	98.50	97.18	93.94	83.01	67.61	54.01	43.87	37.27	31.54	25.97	22.43	18.21	12.31	5.57
STDEV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.53	0.70	0.82	0.74	0.92	0.87	0.90	1.99	0.81	1.39	0.17	1.01	2.76	0.51
%RSD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.54	0.72	0.88	0.89	1.36	1.61	2.05	5.34	2.58	5.35	0.76	5.56	22.44	9.10

This Triplicate applies to the Batch Containing the Following Samples

Sample ID	Date Sampled	Date Set up	Date Started	Date Complete	Data Qualifiers
WW19-04-082310	8/23/2010	9/3/2010	9/7/2010	9/9/2010	
	8/23/2010	9/3/2010	9/7/2010	9/9/2010	
	8/23/2010	9/3/2010	9/7/2010	9/9/2010	
WW19-02-082310	8/23/2010	9/3/2010	9/7/2010	9/9/2010	

RK08 : 00052


Grain Size Distribution by Hydrometer
Gravel
Sand
Silt
Clay
100
90
80
70
60
50
40
30
20
10
0
Percent Finer Than
100000
10000
1000
100
10
1
Particle Diameter
WW19-04-082310
WW19-04-082310
WW19-04-082310


Grain Size Distribution by Hydrometer
Gravel
Sand
Silt
Clay
100
90
80
70
60
50
40
30
20
10
0
Percent Finer Than
100000
10000
1000
100
10
1
Particle Diameter
WW19-02-082310

RK08:00054

Floyd Snider
Phase 3
COS-GWSA 6020

Percent Finer (Passing) Than the Indicated Size

Sieve Size (microns)	3"	2"	1 1/2"	1"	3/4"	1/2"	3/8"	#4 (4750)	#10 (2000)	#20 (850)	#40 (425)	#60 (250)	#100 (150)	#200 (75)	32	22	13	9	7	3.2	1.3
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.4	97.4	94.2	83.5	68.4	54.9	44.8	39.6	32.5	26.9	22.3	19.3	14.2	6.1
WW19-04-082310	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.0	96.4	93.0	82.2	66.6	53.2	43.0	36.2	31.2	26.6	22.6	18.1	13.6	5.5
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.1	97.7	94.6	83.4	67.8	54.0	43.8	36.0	31.0	24.4	22.3	17.3	9.1	5.1
WW19-02-082310	100.0	100.0	100.0	100.0	100.0	100.0	97.5	97.5	97.1	94.7	90.2	83.4	75.4	66.1	50.8	35.2	23.4	20.3	15.6	8.6	5.5

Testing performed according to ASTM D421/D422

Floyd Snider
Phase 3
COS-GWSA 6020

Percent Retained in Each Size Fraction

Description	%Coarse Gravel				% Gravel			% Coarse Sand	% Medium Sand		% Fine Sand			% Very Coarse Silt	% Coarse Silt	% Medium Silt	% Fine Silt	% Fine Silt	% Very Fine Silt	% Clay
Particle Size (microns)	3-2"	2-1 1/2"	1 1/2"-1"	1-3/4"	3/4-1/2"	1/2-3/8"	3/8"-4750	4750-2000	2000-850	850-425	425-250	250-150	150-75	75-32	32-22	22-13	13-9	9-7	7-3.2	<3.2
WW19-04-082310	0.0	0.0	0.0	0.0	0.0	0.0	1.6	1.0	3.2	10.8	15.1	13.5	10.1	5.2	7.1	5.6	4.6	3.0	5.1	14.2
	0.0	0.0	0.0	0.0	0.0	0.0	2.0	1.6	3.4	10.9	15.6	13.5	10.1	6.8	5.0	4.5	4.0	4.5	4.5	13.6
	0.0	0.0	0.0	0.0	0.0	0.0	0.9	1.3	3.2	11.2	15.6	13.8	10.2	7.7	5.1	6.6	2.0	5.1	8.1	9.1
WW19-02-082310	0.0	0.0	0.0	0.0	0.0	2.5	0.0	0.4	2.3	4.5	6.8	8.0	9.3	15.3	15.6	11.7	3.1	4.7	7.0	8.6

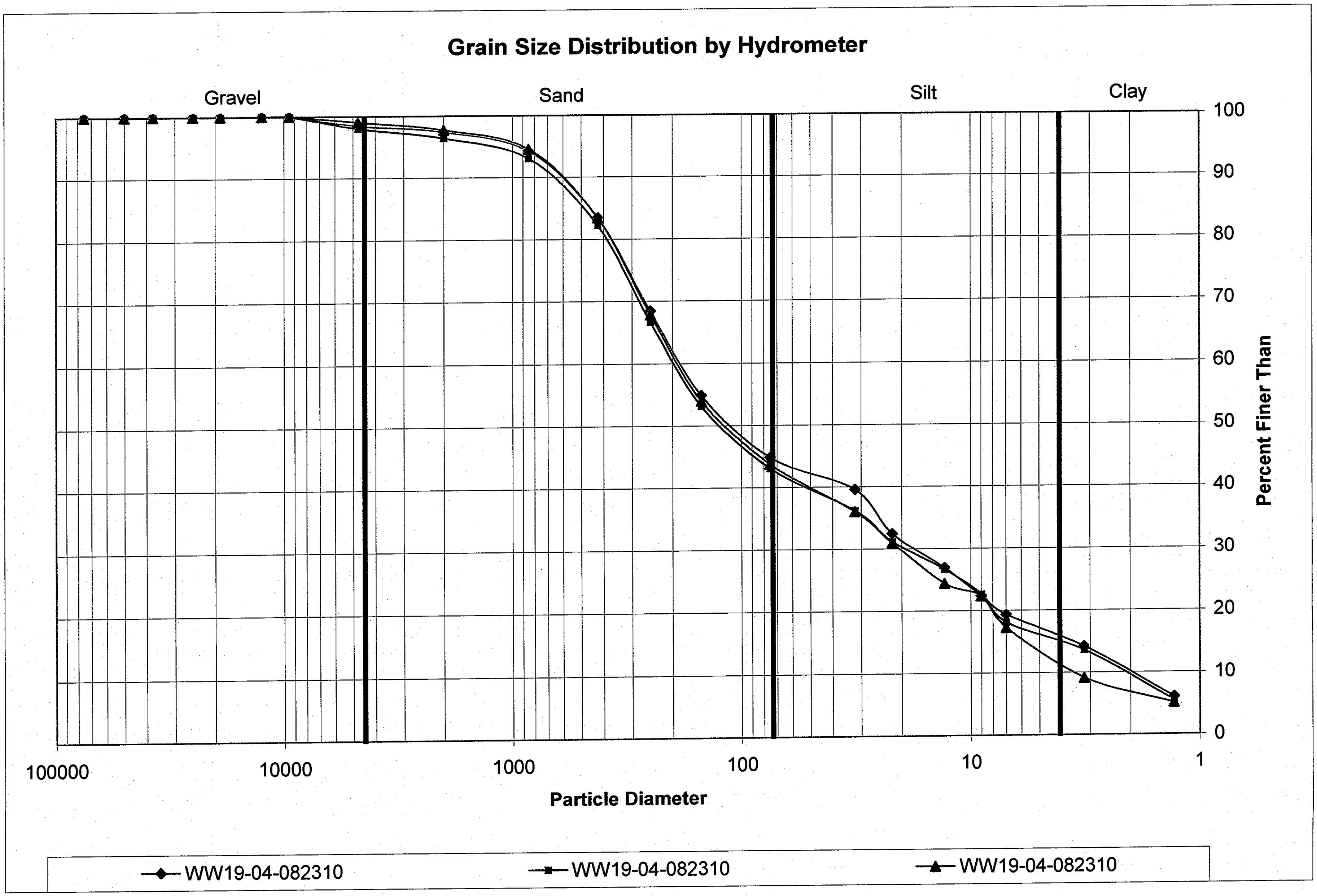
Client:	Floyd Snider	Project No.:	Phase 3
		Project:	COS-GWSA 6020
ARI Triplicate Sample ID:	RK08 B	Batch No.:	RK08-01
Client Triplicate Sample ID:	WW19-04-082310	Page:	1 of 1

Relative Standard Deviation, By Size

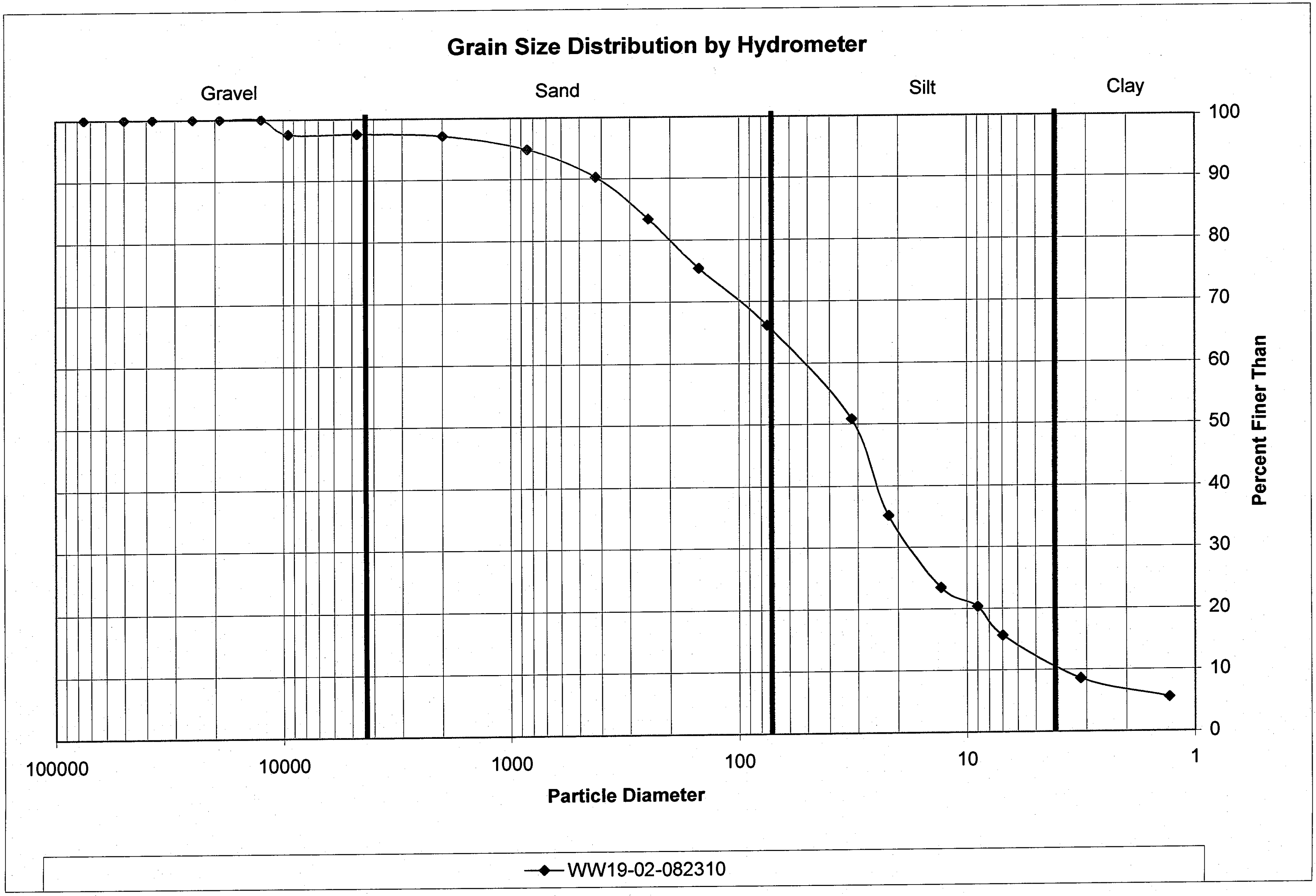
Sample ID	75000	50000	37500	25000	19000	12500	9500	4750	2000	850	425	250	150	75	32	22	13	9	7	3.2	1.3
VW19-04-08231	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.4	97.4	94.2	83.5	68.4	54.9	44.8	39.6	32.5	26.9	22.3	19.3	14.2	6.1
VW19-04-08231	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.0	96.4	93.0	82.2	66.6	53.2	43.0	36.2	31.2	26.6	22.6	18.1	13.6	5.5
VW19-04-08231	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.1	97.7	94.6	83.4	67.8	54.0	43.8	36.0	31.0	24.4	22.3	17.3	9.1	5.1
AVE	100.00	100.00	100.00	100.00	100.00	100.00	100.00	98.50	97.18	93.94	83.01	67.61	54.01	43.87	37.27	31.54	25.97	22.43	18.21	12.31	5.57
STDEV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.53	0.70	0.82	0.74	0.92	0.87	0.90	1.99	0.81	1.39	0.17	1.01	2.76	0.51
%RSD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.54	0.72	0.88	0.89	1.36	1.61	2.05	5.34	2.58	5.35	0.76	5.56	22.44	9.10

This Triplicate applies to the Batch Containing the Following Samples

Sample ID	Date Sampled	Date Set up	Date Started	Date Complete	Data Qualifiers
WW19-04-082310	8/23/2010	9/3/2010	9/7/2010	9/9/2010	
	8/23/2010	9/3/2010	9/7/2010	9/9/2010	
	8/23/2010	9/3/2010	9/7/2010	9/9/2010	
WW19-02-082310	8/23/2010	9/3/2010	9/7/2010	9/9/2010	



Grain Size Distribution by Hydrometer
Gravel
Sand
Silt
Clay
100
90
80
70
60
50
40
30
20
10
0
Percent Finer Than
100000
10000
1000
100
10
1
Particle Diameter
WW19-04-082310
WW19-04-082310
WW19-04-082310


Grain Size Distribution by Hydrometer
Gravel
Sand
Silt
Clay
100
90
80
70
60
50
40
30
20
10
0
Percent Finer Than
100000
10000
1000
100
10
1
Particle Diameter
WW19-02-082310

Gas Works Park

Storm Drain Source Control Evaluation
Phase 3 Data Report

Appendix C
Data Validation Reports

FINAL

Compliance Screening – Tier 1 Data Validation
May 2010 NE Corner Source Control – Gas Works

Data Validation of SDG QX55

I. INTRODUCTION

A total of two filter-bag samples were collected on May 19, 2010 and submitted to ARI Laboratory, Inc. (ARI; Tukwila, Washington) for analyses and archival. The following samples were submitted to ARI for analyses and received the associated laboratory batch number:

SDG	Sample ID	Submittal Date
QX55	SL7-051910	5/19/2010
QX55	SL8-051910	5/19/2010

Samples were submitted for analysis of SVOCs, PCBs, selected Metals, Total Organic Carbon (TOC), and grain size. The laboratory removed sediment material from each filter-bag for analysis, avoiding grass and leafy material; this resulted in a limited sample volume in SL8-051910, restricting analysis for this sample to only SVOCs and Metals. An empty filter was also submitted as a filter blank, as the filter material itself was analyzed. The filter blank was assigned a separate batch number by the laboratory (QX11) and the data validation will be summarized in a separate memorandum. A compliance screening or Tier 1 data quality review was performed on all SVOC, PCB, metal, and TOC analytical results, by Chell Black. No validation was performed on the grain size results.

The data quality review showed that the results are appropriate for use as reported by the laboratory without additional qualifiers. Details of the data quality review are presented in the following sections. A filled bullet (●) indicates that the data requirements were met, and an empty bullet (○) indicates that the data required further evaluation.

II. SVOC ANALYSES

QX55

Analyses were performed by SW8270D. Samples were extracted on 5/25/2010 and analyzed for SVOCs on 5/27/2010. The following requirements were reviewed:

- Sample and quality control analysis frequencies
- Extraction and analysis holding times
- Blank contamination
- Surrogate recoveries

- o Laboratory control sample (LCS) and LCS duplicate (LCSD) recoveries
- LCS/LCSD relative percent differences (RPDs)

All analyses were completed within the required holding times. No contamination was detected in the method blank. The sample, LCS and LCSD surrogate recoveries were within control limits. The LCS/LCSD RPDs were within control limits.

The percent recoveries for 4-methylphenol were outside control limits (45 to 100%); low for the LCS (30.6%) and LCSD (31.5%) samples. The RPD is within control limits, and all sample results were non-detect for this parameter. It is with professional judgment that no qualifiers be added to the results based on the LCS recovery alone.

The percent recovery for 3-nitroaniline was outside control limits (22 to 117%); high for the LCSD (118%) sample. The percent recovery for the LCS sample was within limits, the RPD was within control limits, and all sample results were undetected for this parameter. It is with professional judgment that no qualifiers be added to the results based on the LCS recovery alone.

The data are determined to be of acceptable quality for use; no data quality qualifiers were added.

III. PCB ANALYSES

QX55

Analyses were performed by SW8082. SL7-051910 was extracted on 6/1/2010 and analyzed for PCBs on 6/3/2010. The following requirements were reviewed:

- Sample and quality control analysis frequencies
- Extraction and analysis holding times
- Blank contamination
- Surrogate recoveries
- Laboratory control sample (LCS) and LCS duplicate (LCSD) recoveries
- LCS/LCSD relative percent differences (RPDs)

The analysis was completed within the required holding times. No contamination was detected in the method blank. The sample surrogate, LCS and LCSD recoveries were within control limits. The LCS/LCSD RPD was within control limits.

The data are determined to be of acceptable quality for use; no data quality qualifiers were added.

IV. METALS ANALYSES

QX55

Analyses were performed for selected metals by USEPA 6010B, and for mercury by USEPA 7471A. Samples were extracted on 5/25/2010 and analyzed for metals on 5/28/2010. The following requirements were reviewed:

- Sample and quality control analysis frequencies
- Extraction and analysis holding times
- Blank contamination
- Laboratory control sample (LCS) recoveries
- Sample and Laboratory Duplicate Sample relative percent differences (RPDs)

All analyses were completed within the required holding times. No contamination was detected in the method blanks. The LCS recoveries were within control limits.

No laboratory duplicate sample were analyzed by the laboratory, possibly due to the low sample count, and as noted earlier, the limited volume of sample SL8-051910. Per Functional Guidelines professional judgment should be used when laboratory duplicates are not present. Due to adequate surrogate and LCS analyses, it is with professional judgment that no qualifiers be added to the metals data.

The data are determined to be of acceptable quality for use; no data quality qualifiers were added.

V. CONVENTIONALS ANALYSES

QX55

Analyses were performed for Total Organic Carbon by Plumb, 1981. SL7-051910 was analyzed on 5/24/2010. The following requirements were reviewed:

- Sample and quality control analysis frequencies
- Extraction and analysis holding times
- Blank contamination
- Matrix Spike (MS) recoveries
- Laboratory control sample (LCS) recoveries
- Standard Reference Material recoveries
- Sample and Laboratory Replicate Sample relative percent differences (RPDs)

The analysis was completed within the required holding times. No contamination was detected in the method blanks. The MS, LCS, and Standard Reference Material recoveries were within control limits. The Sample and Laboratory Replicate Sample RPD was within control limits.

The data are determined to be of acceptable quality for use; no data quality qualifiers were added.

VI. QUALIFIER SUMMARY

No Data Qualifiers were added.

VII. REFERENCES

"U.S. Environmental Protection Agency (USEPA), 1999. *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, OSWER 9240.1-05A-P.* EPA540/R-99/008. October.

U.S. Environmental Protection Agency (USEPA). 2004. *USEPA National Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, OSWER 9240.1-45, EPA 540-R-04-004.* Office of Superfund Remediation and Technology Innovation (OSRTI), Washington, D.C. October.

Compliance Screening – Tier 1 Data Validation
May 2010 NE Corner Source Control – Gas Works

Data Validation of SDG QX11

I. INTRODUCTION

A total of two filter-bag samples were collected on May 19, 2010 and submitted to ARI Laboratory, Inc. (ARI; Tukwila, Washington) along with a filter blank sample, for analyses and archival. The filter-bag blank was analyzed under a separate sample delivery group than the filter-bag samples, which was SDG QX55, and the data validation of QX55 has been summarized in a separate memorandum. The filter blank sample was submitted to ARI for analyses and received the associated laboratory batch number:

SDG	Sample ID	Submittal Date
QX11	Filter Blank	5/19/2010

The filter blank was submitted for SVOC, PCB, metal, and TOC analysis. The laboratory performed a Synthetic Precipitation Leaching Procedure (SPLP) on 200 grams of filter material, which had been cut into squares approximately 10cm by 10cm in size. The resulting extract of the filter material was used for the analysis. A compliance screening or Tier 1 data quality review was performed on all SVOC, PCB, metal, and TOC analytical results, by Chell Black. No validation was performed on the grain size results.

The data quality review showed that the SVOC, Metals, and TOC results are appropriate for use as qualified in this memorandum. The PCB results were determined to be of unacceptable quality for use. Details of the data quality review are presented in the following sections. A filled bullet (●) indicates that the data requirements were met, and an empty bullet (○) indicates that the data required further evaluation.

II. SVOC ANALYSES

QX55

Analyses were performed by SW8270D. The sample was extracted on 5/25/2010 and analyzed for SVOCs on 5/26/2010. The following requirements were reviewed:

- Sample and quality control analysis frequencies
- Extraction and analysis holding times
- Blank contamination
- Surrogate recoveries

- Laboratory control sample (LCS) recoveries
- LCS/LCSD relative percent differences (RPDs)

All analyses were completed within the required holding times. No contamination was detected in the method blank. The sample and LCS surrogate recoveries were within USEPA Guidelines. No RPD information was available, as no Laboratory Control Sample Duplicate was analyzed. Per USEPA Guidelines, data should not qualified base on RPD information alone; therefore, it is with professional judgment that no data be qualified based on this lack of RPD information.

The laboratory advised that during the initial sample run the internal standards of Phenanthrene-d10 and Perylene-d12 were outside laboratory control limits high. The sample was re-analyzed at a dilution and all internal standards were within control limits. It is with professional judgment that the dilution results for the Filter Blank sample are considered the valid chemistry results, and the original results are flagged as “DNR” (do not report).

The data are determined to be of acceptable quality for use; no additional data quality qualifiers besides those previously mentioned were added.

III. PCB ANALYSES

QX55

Analyses were performed by SW8082. The sample was extracted on 5/26/2010 and analyzed for PCBs on 5/27/2010. The following requirements were reviewed:

- Sample and quality control analysis frequencies
- Extraction and analysis holding times
- Blank contamination
  - Surrogate recoveries
- Laboratory control sample (LCS) recoveries
- LCS/LCSD relative percent differences (RPDs)

The analysis was completed within the required holding times. No contamination was detected in the method blank. The LCS surrogate recoveries were within control limits.

The sample recovery of decachlorobiphenyl (8.2%) was outside laboratory control limits (29 to 118%); low by 20.8%. The laboratory did re-extract and re-analyze the sample with comparable recovery results. Per USEPA guidelines surrogate recoveries below 10% for non-detected compound results should be qualified as unusable for the target analytes of the surrogate. Therefore because the sample results were non-detects and Aroclors are among the target analytes of decachlorobiphenyl, all Aroclor results have been qualified as “R” and rejected.

The data are determined to be of unacceptable quality for use.

IV. METALS ANALYSES

QX55

Analyses were performed for selected metals by EPA 6010B, and for mercury by USEPA 7471A. The sample was extracted on 5/25/2010 and analyzed for selected metals on 5/26/2010 and mercury on 5/25/2010. The following requirements were reviewed:

- Sample and quality control analysis frequencies
- Extraction and analysis holding times
- Blank contamination
- Laboratory control sample (LCS) recoveries
- Sample and Laboratory Duplicate Sample relative percent differences (RPDs)

All analyses were completed within the required holding times. No contamination was detected in the method blanks. The LCS recoveries and RPD results were within USEPA guidelines.

The data are determined to be of acceptable quality for use; no data quality qualifiers were added.

V. CONVENTIONALS ANALYSES

QX55

Analyses were performed for Total Organic Carbon by USEPA 415.1. The sample was analyzed on 5/26/2010. The following requirements were reviewed:

- Sample and quality control analysis frequencies
- Extraction and analysis holding times
- Blank contamination
- Matrix Spike (MS) recoveries
- Laboratory control sample (LCS) recoveries
- Standard Reference Material recoveries
- Sample and Laboratory Replicate Sample relative percent differences (RPDs)

The analysis was completed within the required holding times. No contamination was detected in the method blanks. The LCS, and Standard Reference Material recoveries were within control limits. The MS recovery (71%) fell outside laboratory control limits (75 to 125%); low by 4%. Per USEPA Guidelines, no data should be qualified on MS data alone; therefore, it is with professional judgment that no data be qualified based on this MS recovery information alone. The Sample and Laboratory Replicate Sample RPD was within control limits.

The data are determined to be of acceptable quality for use; no data quality qualifiers were added.

VI. QUALIFIER SUMMARY

Sample ID	Analyte	Qualifier	Reason
Filter Blank	All SVOCs	DNR	Are not being reported in favor of better data from the dilution analysis
Filter Blank	All Aroclors	R	Are being rejected due to low surrogate recovery of decachlorobiphenyl

VII. REFERENCES

U.S. Environmental Protection Agency (USEPA), 1999. *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, OSWER 9240.1-05A-P.* EPA540/R-99/008. October.

U.S. Environmental Protection Agency (USEPA). 2004. *USEPA National Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, OSWER 9240.1-45, EPA 540-R-04-004.* Office of Superfund Remediation and Technology Innovation (OSRTI), Washington, D.C. October.

Gas Works Park

Storm Drain Source Control Evaluation
Phase 3 Data Report

Data Validation Report

Prepared for

City of Seattle

Seattle Public Utilities

Prepared by

FLOYD | SNIDER

601 Union Street

Suite 600

Seattle, Washington 98101

December 2010

FINAL

Table of Contents

List of Appendices

1.0 Project Narrative

1.1 OVERVIEW OF DATA VALIDATION

This report summarizes the results of the Compliance Screening (Level I) performed on the soil and catch basin sediment sample data for the Phase 3 Storm Drain Source Control Evaluation Sampling Event. A complete list of samples is provided below.

Project Sample Index

Sample ID	Lab ID	SVOCs 8270D	PAHs 8270D-SIM	PCBs 8082	Metals 6010B	Mercury 7471A	TOC Plumb, 1981
HP-CB-01	ARI	RB73	RF64	RB73	RB73	RB73	RB73
HP-CB-02	ARI	RB73	RF64	RB73	RB73	RB73	RB73
HB-CB-03	ARI	RB73	RF64	RB73	RB73	RB73	RB73
HP-OWS-Inlet	ARI	RB73	RF64	RB73	RB73/RK54	RB73/RK54	RB73
HP-OWS-Outlet	ARI	RB73	RF64	RB73	RB73/RK54	RB73/RK54	RB73
PA-CB-01	ARI	RB73	RF64	RB73	RB73	RB73	RB73
PA-CB-02	ARI	RB73	RF64	RB73	RB73	RB73	RB73
PA-CB-03	ARI	RB73	RF64	RB73	RB73	RB73	RB73
PA-CB-04	ARI	RB73	RF64	RB73	RB73	RB73	RB73
PA-CB-05	ARI	RB73	RF64	RB73	RB73	RB73	RB73
PA-CB-06	ARI	RB73	RF64	RB73	RB73	RB73	RB73
PA-CB-07	ARI	RB73	RF64	RB73	RB73	RB73	RB73
PA-CB-DUP	ARI	RB73	RF64	RB73	RB73	RB73	RB73
SL6.1	ARI	RB73		RB73	RB73	RB73	RB73
SL6.2	ARI	RB73		RB73	RB73	RB73	RB73
SL6-BASE	ARI	RB73		RB73	RB73	RB73	RB73
Rinsate Blank	ARI	RB73		RB73	RB73	RB73	RB73
WW19-01	ARI	RC58		RC58	RC58	RC58	RC58
WW19-03	ARI	RC58		RC58	RC58	RC58	RC58
WW19-05	ARI	RC58		RC58	RC58	RC58	RC58
WW19-06	ARI	RC58		RC58	RC58	RC58	RC58
WW19-DUP	ARI	RC58		RC58	RC58	RC58	RC58
Rinsate Blank 2	ARI	RC58		RC58	RC58	RC58	RC58
WW19-02-082310	ARI	RK08		RK08	RK08	RK08	RK08
WW19-04-082310	ARI	RK08		RK08	RK08	RK08	RK08
WW19-04-082310-DUP	ARI	RK08					

The chemical analyses were performed by Analytical Resources, Inc. (ARI) Laboratory (Tukwila, Washington). During the first field effort for the sampling event, 16 catch basin sediment samples and one rinsate blank were collected on June 23, 2010 and submitted to ARI for chemical analyses, receiving a Sample Delivery Group (SDG) of RB73. Upon receipt of the preliminary data for the first field effort, it was requested that 13 of the samples be removed from archived storage and reanalyzed for PAHs using the 8270D-SIM method, this was done under a new SDG of RF64. It was then later requested that two samples be removed again from archived storage and reanalyzed for total metals and mercury, this was done under a new SDG of RK54. During the second field effort five soil samples and one rinsate blank were collected on June 30, 2010 and submitted to ARI for chemical analysis, receiving the SDG RC58. During the third and final field effort three soil samples were collected on August 23, 2010 and submitted to ARI for chemical analysis, receiving the SDG of RK08. The analytical methods included the following:

- SVOCs—USEPA Method 8270D
- PAHs—USEPA Method 8370D-SIM
- PCBs—USEPA Method 8082
- Selected Metals—USEPA Method 6010B
- Mercury—USEPA Method 7471A
- Total Organic Carbon (TOC)—Plumb, 1981

The data were reviewed using guidance and quality control criteria documented in the analytical methods*; National Functional Guidelines for Inorganic data Review* (USEPA 1994 and 2004), and *National Functional Guidelines for Organic data Review* (USEPA 1999 and 2008).

Floyd|Snider's goal in assigning data assessment qualifiers is to assist in proper data interpretation. If values are estimated (J or UJ), data may be used for site evaluation and risk assessment purposes, but reasons for data qualification should be taken into consideration when interpreting sample concentrations. If values are assigned an R, the data are to be rejected and should not be used for any site evaluation purposes. If values have no data qualifier assigned, then the data meet the data quality objectives as stated in the documents and methods referenced above.

Data qualifier definitions, reasons, and validation criteria are included as Attachment A. The Qualified Data Summary Table is included in Appendix B. Data validation worksheets (Excel worksheets) will be kept on file at Floyd|Snider.

2.0 Data Validation Report SVOCs by USEPA 8270D

This report documents the review of analytical data from the analyses of groundwater samples and the associated laboratory quality control (QC) samples. Samples were analyzed by ARI. Compliance Screening (Level I) was performed on all analytical results by Chell Black as the primary data reviewer, and secondary review was performed by Jessi Massingale.

2.1 DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

2.2 TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

QC Requirements

1	Cooler temperature and preservation	1	Matrix spike (MS) and MS Duplicate (MSD)
	Extraction and analysis holding times		Field duplicates
2	Blank contamination		Reporting limits and reported results
	Surrogate recoveries		Target analyte list
	Laboratory control sample (LCS) and LCS duplicate (LCSD)	1	Other

Notes:
1 Quality control results are discussed below, but no data were qualified.
2 Quality control outliers that impact the reported data were noted. Data qualifiers were issued, as discussed below.

Appendix A presents data validation criteria tables for organic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and had exceptions to the validation criteria are discussed below.

2.2.1 Cooler Temperature and Preservation

For SDG RK08 the laboratory noted that the samples arrived out of temperature compliance at 13.5°C. However, the cooler arrived within one hour of sampling, and samples were put directly into the freezer for preservation. Therefore with professional judgment, no data will be qualified based on this information, as there was insufficient time between sampling and delivery for the cooler temperature to drop within compliance range.

2.2.2 Blank Contamination

For SDG RC58 bis(2-Ethylhexyl)phthalate was detected at 1,100 µg/kg in the Method Blank. Per USEPA guidelines, bis(2-Ethylhexyl)phthalate is considered a common phthalate contaminant and any detected result less than 10 times the blank concentration (11,000 µg/kg) are qualified "U" by elevating the sample quantitation limit to the sample concentration. Any detected results equal to or above 10 times the blank concentration were not qualified per guidelines. See Appendix B for a list of qualified results.

2.2.3 Matrix Spike and Matrix Spike Duplicate

For SDG RC58 the MS/MSD RPDs for two compounds were outside the QAPP precision requirement of ±50% (2,4-dinitrophenol at 59.1%, and 2,6-dinitro-2-methylphenol at 51.7%). Per USEPA guidelines data should not be qualified based on MS/MSD data alone, therefore since all other QA objectives for these compounds were met, it is with professional judgment that the data not be qualified on the MS/MSD RPD information alone.

2.2.4 Other

For SDG RC58 diethylphthalate was detected in the rinsate blank sample at 4.0 µg/L. Diethylphthalate is considered a common phthalate contaminant, and was not detected in any soil sample results associated with the rinsate blank. Therefore with professional judgment no qualifiers have been added to the data based on this information.

2.3 OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the laboratory control sample percent recovery values. All data are acceptable for use as qualified, see Appendix B for details.

3.0 Data Validation Report
PAHs by USEPA 8270D-SIM

This report documents the review of analytical data from the analyses of groundwater samples and the associated laboratory QC samples. Samples were analyzed by ARI. Compliance Screening (Level I) was performed on all analytical results by Chell Black as the primary data reviewer, and secondary review was performed by Jessi Massingale.

3.1 DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

3.2 TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

QC Requirements

	Cooler temperature and preservation	Matrix spike (MS) and MS Duplicate (MSD)
1	Extraction and analysis holding times	Field duplicates
	Blank contamination	Reporting limits and reported results
	Surrogate recoveries	Target analyte list
	Laboratory control sample (LCS) and LCS duplicate (LCSD)	

Note:
1 Quality control outliers that impact the reported data were noted. Data qualifiers were issued, as discussed below.

Appendix A presents data validation criteria tables for organic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and had exceptions to the validation criteria are discussed below.

3.2.1 Extraction and Analysis Holding Times

For SDG RF64 all samples were extracted and analyzed outside of the SW8270D-SIM SVOC method holding time of 14 days. Therefore, all SVOC results for samples in this batch received a “J” qualifier indicating estimated values. See Appendix B for a list of qualified results.

3.3 OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the matrix spike and laboratory control sample percent recovery values. All data are acceptable for use as qualified, please see Appendix B for details.

4.0 Data Validation Report
PCBs by USEPA 8082

This report documents the review of analytical data from the analyses of groundwater samples and the associated laboratory QC samples. Samples were analyzed by ARI. Compliance Screening (Level I) was performed on all analytical results by Chell Black as the primary data reviewer, and secondary review was performed by Jessi Massingale.

4.1 DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

4.2 TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

QC Requirements

1	Cooler temperature and preservation	Matrix spike (MS) and MS Duplicate (MSD)
	Extraction and analysis holding times	Field duplicates
	Blank contamination	Reporting limits and reported results
	Surrogate recoveries	Target analyte list
	Laboratory control sample (LCS) and LCS duplicate (LCSD)	

Note:
1 Quality control results are discussed below, but no data were qualified.

Appendix A presents data validation criteria tables for organic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and had exceptions to the validation criteria are discussed below.

4.2.1 Cooler Temperature and Preservation

For SDG RK08 the lab noted that the samples arrived out of temperature compliance at 13.5°C. However, the cooler arrived within 1 hour of sampling, and samples were put directly into the freezer for preservation. Therefore with professional judgment, no data will be qualified based on this information, as there was insufficient time between sampling and delivery for the cooler temperature to drop within compliance range.

4.3 OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the matrix spike and laboratory control sample percent recovery values. All data, as reported by the lab, are acceptable for use.

5.0 Data Validation Report
Selected Metals by USEPA 6010B

This report documents the review of analytical data from the analyses of groundwater samples and the associated laboratory QC samples. Samples were analyzed by ARI. Compliance Screening (Level I) was performed on all analytical results by Chell Black as the primary data reviewer, and secondary review was performed by Jessi Massingale.

5.1 DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

5.2 TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

QC Requirements

[1] Cooler temperature and preservation	[1,2] Lab sample duplicates
Extraction and analysis holding times	Field duplicates
Blank contamination	Reporting limits and reported results
Laboratory control sample (LCS)	Target analyte list
[1,2] Matrix spike (MS)	

Notes:
1 Quality control results are discussed below, but no data were qualified.
2 Quality control outliers that impact the reported data were noted. Data qualifiers were issued, as discussed below.

Appendix A presents data validation criteria tables for inorganic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and had exceptions to the validation criteria are discussed below.

5.2.1 Cooler Temperature and Preservation

For SDG RK08 the lab noted that the samples arrived out of temperature compliance at 13.5°C. However, the cooler arrived within 1 hour of sampling, and samples were put directly into the freezer for preservation. Therefore with professional judgment, no data will be qualified based on this information, as there was insufficient time between sampling and delivery for the cooler temperature to drop within compliance range.

5.2.2 Matrix Spike

For SDG RK54 no Matrix Spikes were performed. Per USEPA Guidelines if the appropriate number of Matrix Spike samples were not analyzed, professional judgment is to be used to determine if the associated sample data should be qualified. It is with professional judgment that the LCS sample be considered sufficient for assessment of accuracy for this SDG and no data will be qualified based on the lack of Matrix Spike data.

For SDG RB73 sample PA-CB-01 was used for the Matrix Spike. The recovery for zinc (71.4%) was outside laboratory and QAPP control limits (75 to 125%) low by 3.6%. The laboratory ran digests twice to confirm, and attributed the outliers to sample heterogeneity. All sample results for zinc were detects. Per USEPA Guidelines the detected results are to be qualified as estimated; however, professional judgment is used to determine sample similarity. Therefore, due to the noted heterogeneity of the samples, only the detected zinc result for sample PA-CB-01 will be "J" qualified based on this information.

For SDG RK08 sample WW19-04-082310 was used for the Matrix Spike. The recovery for zinc (147%) was outside laboratory and QAPP control limits (75 to125%); high by 22%. Per USEPA Guidelines the detected results are to be qualified as estimated; however, professional judgment is used to determine sample similarity. Therefore, due to a notation by the laboratory that the nature of the sample matrix was potentially responsible for the high recovery, it is with professional judgment that only the detected zinc result for sample WW19-04-082310 will be "J" qualified based on this information.

5.2.3 Laboratory Sample Duplicates

For RK54 no laboratory sample duplicate was analyzed. Per USEPA Guidelines, if the appropriate number of duplicate samples were not analyzed, professional judgment is to be used to determine if the associated sample data should be qualified. It is with professional judgment that no data be qualified based on the lack of RPD data available for this method in this SDG due to the small sample size resulting in a request for re-analysis of two archived samples, and appropriate lab duplicates being run during the initial analysis.

For RB73 the RPD for the PA-CB-01/PA-CB-01 Lab Duplicate analysis of lead (28.6%) was outside the laboratory control limit (20%) and QAPP defined precision of 25%. The laboratory attributed the outliers to sample heterogeneity. All sample results for lead were detects. Per USEPA guidelines the detected results are to be qualified as estimated; however, professional judgment is to be used to determine sample similarity. Therefore, due to the noted heterogeneity of the sample only the detected lead result for PA-CB-01 will be "J" qualified based on this information.

5.3 OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the laboratory control sample percent recovery values. All data are acceptable for use as qualified; please see Appendix B for details.

6.0 Data Validation Report
Mercury by USEPA 7471A

This report documents the review of analytical data from the analyses of groundwater samples and the associated laboratory QC samples. Samples were analyzed by ARI. Compliance Screening (Level I) was performed on all analytical results by Chell Black as the primary data reviewer, and secondary review was performed by Jessi Massingale.

6.1 DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

6.2 TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

QC Requirements

1	Cooler temperature and preservation	2	Lab sample duplicates
2	Extraction and analysis holding times		Field duplicates
	Blank contamination		Reporting limits and reported results
	Laboratory control sample (LCS)		Target analyte list
2	Matrix spike (MS)		

Notes:
1 Quality control results are discussed below, but no data were qualified.
2 Quality control outliers that impact the reported data were noted. Data qualifiers were issued, as discussed below.

Appendix A presents data validation criteria tables for inorganic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and had exceptions to the validation criteria are discussed below.

6.2.1 Cooler Temperature and Preservation

For SDG RK08 the laboratory noted that the samples arrived out of temperature compliance at 13.5°C. However, the cooler arrived within 1 hour of sampling, and samples were put directly into the freezer for preservation. Therefore with professional judgment, no data will be qualified based on this information, as there was insufficient time between sampling and delivery for the cooler temperature to drop within compliance range.

6.2.2 Extraction and Analysis Holding Times

For SDG RK54 all samples were outside the 28 day holding time for extraction and analysis of Mercury. The re-analysis request was made 64 days after the sample date. All results were detects for mercury, and will be "J" qualified as estimates. See Appendix B for a complete list of samples.

6.2.3 Matrix Spike

For SDG RC58 sample WW19-01 was used for the Matrix Spike, and the recovery for mercury (42.5%) was outside the laboratory and QAPP control limits (75 to 125%); low by 32.5%. All sample results for mercury in this SDG were detects. Per USEPA Guidelines the detected results are to be qualified as estimated; however, professional judgment is to be used to determine sample similarity. Therefore, due to the nature of the matrix and the possible heterogeneity of the sample only the mercury results for WW19-01 will be "J" qualified based on this information.

6.2.4 Laboratory Sample Duplicates

For SDG RC58 the RPD for the WW19-01/WW19-01 Lab Duplicate (27.2%) was outside of the laboratory control limits (20%) and the QAPP defined precision of 25%. All sample results for mercury in this SDG were detects. Per USEPA Guidelines the detected results are to be qualified as estimated; however, professional judgment is to be used to determine sample similarity. Therefore, due to the nature of the matrix and possible heterogeneity of the sample only the mercury results for WW19-01 will be "J" qualified based on this information.

6.3 OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the matrix spike and laboratory control sample percent recovery values. All data are acceptable for use as qualified, please see Appendix B for details.

7.0 Data Validation Report
Total Organic Carbon by Plumb, 1981

This report documents the review of analytical data from the analyses of groundwater samples and the associated laboratory QC samples. Samples were analyzed by ARI. Compliance Screening (Level I) was performed on all analytical results by Chell Black as the primary data reviewer, and secondary review was performed by Jessi Massingale.

7.1 DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and any anomalies were discussed in the case narrative.

7.2 TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

QC Requirements

1	Cooler temperature and preservation	Lab sample duplicates
	Extraction and analysis holding times	Field duplicates
	Blank contamination	Reporting limits and reported results
	Matrix spike (MS)	Target analyte list
	Standard reference material	

Note:
1 Quality control results are discussed below, but no data were qualified.

QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and had exceptions to the validation criteria are discussed below.

7.2.1 Cooler Temperature and Preservation

For SDG RK08 the laboratory noted that the samples arrived out of temperature compliance at 13.5°C. However, the cooler arrived within 1 hour of sampling, and samples were put directly into the freezer for preservation. Therefore with professional judgment, no data will be qualified based on this information, as there was insufficient time between sampling and delivery for the cooler temperature to drop within compliance range.

7.3 OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the matrix spike and standard reference material percent recovery values. All data, as reported by the lab, are acceptable for use.

Gas Works Park

Storm Drain Source Control Evaluation
Phase 3 Data Report

Data Validation Report

Appendix A
Data Qualifier Definitions and Criteria Tables

FINAL

DATA VALIDATION QUALIFIER CODES
National Functional Guidelines

The following definitions provide brief explanations of the qualifiers assigned to results in the data review process.

U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".
NJ	The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents the approximate concentration.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

The following is a Floyd|Snider qualifier that may also be assigned during the data review process:

DNR	Do not report; a more appropriate result is reported from another analysis or dilution.

Floyd|Snider Validation Guidelines for Metals Analysis by ICP-MS (Based on Inorganic NFG 1994 & 2004)

Validation QC Element	Acceptance Criteria	Action
Cooler Temperature and Preservation	Cooler temperature: 4°C ±2° Waters: Nitric Acid to pH < 2 For Dissolved Metals: 0.45um filter & preserve after filtration	Floyd|Snider Professional Judgment—no qualification based on cooler temperature outliers J/UJ if pH preservation requirements are not met
Holding Time	180 days from date sampled Frozen tissues—HT extended to 2 years	J/UJ if holding time exceeded
Tune	Prior to ICAL monitoring compounds analyzed 5 times wih Std Dev. < 5% mass calibration <0.1 amu from True Value Resolution < 0.9 AMU @ 10% peak height or <0.75 amu @ 5% peak height	Use Professional Judgment to evaluate tune J/UJ if tune criteria not met
Initial Calibration	Blank + minimum 1 standard If more than 1 standard, r>0.995	J/UJ if r<0.995 (for multi point cal)
Initial Calibration Verification (ICV)	Independent source analyzed immediately after calibration %R within ±10% of true value	J/UJ if %R 75–89% J if %R = 111-125% R if %R > 125% R if %R < 75%
Continuing Calibration Verification (CCV)	Every ten samples, immediately following ICV/ICB and at end of run ±10% of true value	J/UJ if %R = 75–89% J if %R 111-125% R if %R > 125% R if %R < 75%

Initial and Continuing Calibration Blanks (ICB/CCB)	After each ICV and CCV
	every ten samples and end of run
	| blank | < IDL (MDL)
		Action level is 5x absolute value of blank conc.
		For (+)blanks, U results < action level
		For (-) blanks, J/UJ results < action level

Validation QC Element	**Acceptance Criteria**	**Action**
Reporting Limit Standard (CRI)	2x RL analyzed beginning of run Not required for Al, Ba, Ca, Fe, Mg, Na, K %R = 70%-130% (50%-150% Co,Mn, Zn)	R, < 2x RL if %R < 50% (< 30% Co,Mn, Zn) J < 2x RL, UJ if %R 50-69% (30%-49% Co,Mn, Zn) J < 2x RL if %R 130%-180% (150%-200% Co,Mn, Zn) R < 2x RL if %R > 180% (200% Co, Mn, Zn)
Interference Check Samples (ICSA/ICSAB)	Required by SW 6020, but not 200.8 ICSAB %R 80% - 120% for all spiked elements | ICSA | < IDL (MDL) for all unspiked elements	For samples with Al, Ca, Fe, or Mg > ICS levels R if %R < 50% J if %R >120% J/UJ if %R = 50% to 79% Use Professional Judgment for ICSA to determine if bias is present
Method Blank	One per matrix per batch (batch not to exceed 20 samples) blank < MDL	Action level is 5x blank concentration U results < action level
Laboratory Control Sample (LCS)	One per matrix per batch Blank Spike: %R within 80%-120%	R if %R < 50% J/UJ if %R = 50-79% J if %R >120%
	CRM: Result within manufacturer's certified acceptance range or project guidelines	J/UJ if < LCL, J if > UCL
Matrix Spike/ Matrix Spike Duplicate (MS/MSD)	One per matrix per batch 75-125% for samples where results do not exceed 4x spike level	J if %R>125% J/UJ if %R <75% J/R if %R<30% or J/UJ if Post Spike %R 75%-125% Qualify all samples in batch
Post-digestion Spike	If Matrix Spike is outside 75-125%, Spike parent sample at 2x the sample conc.	No qualifiers assigned based on this element
Laboratory Duplicate (or MS/MSD)	One per matrix per batch RPD < 20% for samples > 5x RL Diff < RL for samples > RL and < 5 x RL (Diff < 2x RL for solids)	J/UJ if RPD > 20% or diff > RL All samples in batch
Serial Dilution	5x dilution one per matrix %D < 10% for original sample values > 50x MDL	J/UJ if %D >10% All samples in batch

Validation QC Element	**Acceptance Criteria**	**Action**
Internal Standards	Every sample SW6020: 60%-125% of cal blank IS 200.8: 30%-120% of cal blank IS	J /UJ all analytes associated with IS outlier
Field Blank	Blank < MDL	Action level is 5x blank conc. U sample values < AL in associated field samples only
Field Duplicate	For results > 5x RL: Water: RPD < 35% Solid: RPD < 50% For results < 5 x RL: Water: Diff < RL Solid: Diff < 2x RL	J/UJ in parent samples only
Linear Range	Sample concentrations must fall within range	J values over range

Floyd|Snider Validation Guidelines for Semivolatile Analysis by GC/MS (Based on Organic NFG 1999)

Validation QC Element	Acceptance Criteria	Action
Cooler Temperature	4°C ± 2°	J/UJ if greater than 6 deg. C (Floyd|Snider PJ)
Holding Time	Water: 7 days from collection Soil: 14 days from collection Analysis: 40 days from extraction	Water: J/UJ if ext. > 7 and < 21 days J/R if ext > 21 days (Floyd|Snider PJ) Solids/Wastes: J/UJ if ext. > 14 and < 42 days J/R if ext. > 42 days (Floyd|Snider PJ) J/UJ if analysis >40 days
Tuning	DFTPP Beginning of each 12 hour period Method acceptance criteria	R all analytes in all samples associated with the tune
Initial Calibration (Minimum 5 stds.)	RRF > 0.05	(Floyd|Snider PJ) If MDL= reporting limit: J/R if RRF < 0.05 If reporting limit > MDL: note in worksheet if RRF <0.05
	%RSD < 30%	(Floyd|Snider PJ) J if %RSD > 30%
Continuing Calibration (Prior to each 12 hr. shift)	RRF > 0.05	(Floyd|Snider PJ) If MDL= reporting limit: J/R if RRF < 0.05 If reporting limit > MDL: note in worksheet if RRF < 0.05
	%D <25%	(Floyd|Snider PJ) If > +/-90%: J/RIf -90% to -26%: J (high bias) If 26% to 90%: J/UJ (low bias)
Method Blank	One per matrix per batch No results > CRQL	U if sample result is less than CRQL and less than appropriate 5X or 10X rule (raise sample value to CRQL)
		U if sample result is greater than or equal to CRQL and less than appropriate 5X and 10X rule (at reported sample value)

Validation QC Element	Acceptance Criteria	Action
Method Blank (continued)	No TICs present	RTICs using 10X rule
Field Blanks (Not Required)	No results > CRQL	Apply 5X/10X rule; U < action level
MS/MSD (recovery)	One per matrix per batch Use method acceptance criteria	Qualify parent only unless other QC indicates systematic problems: J if both %R > UCL J/UJ if both %R < LCL J/R if both %R < 10% Floyd|Snider PJ if only one %R outlier
MS/MSD (RPD)	One per matrix per batch Use method acceptance criteria	J in parent sample if RPD > CL
LCS CLP **low conc. H2O only**	One per lab batch Within method control limits	J assoc. cmpd if > UCL J/R assoc. cmpd if < LCL J/R all cmpds if half are < LCL
LCS **regular SVOA (H2O & solid)**	One per lab batch Lab or method control limits	J if %R > UCL J/UJ if %R <LCL J /R if %R < 10% (Floyd|Snider PJ)
LCS/LCSD *(if required)*	One set per matrix and batch of 20 samples RPD < 35%	J/UJ associated compounds in all samples
Surrogates	Minimum of 3 acid and 3 base/neutral compounds Use method acceptance criteria	Do not qualify if only 1 acid and/or 1 B/N surrogate is out unless <10% J if %R > UCL J/UJ if %R < LCL J/R if %R < 10%
Internal Standards	Added to all samples Acceptable Range: IS area 50% to 200% of CCAL area RT within 30 seconds of CC RT	J if > 200% J/UJ if < 50% J/R if < 25% RT>30 seconds, narrate and Notify PM
Field Duplicates	Use QAPP limits. If no QAPP: Solids: RPD <50% OR absolute diff. < 2X RL (for results < 5X RL) Aqueous: RPD <35% OR absolute diff. < 1X RL (for results < 5X RL)	Narrate and qualify if required by project (Floyd|Snider PJ)

Validation QC Element	Acceptance Criteria	Action
TICs	Major ions (>10%) in reference must be present in sample; intensities agree within 20%; check identification	NJ the TIC unless: R common laboratory contaminants See Technical Director for ID issues
Quantitation/ Identification	RRT within 0.06 of standard RRT Ion relative intensity within 20% of standard All ions in std. at > 10% intensity must be present in sample	See Technical Director if outliers

Abbreviation:
PJ Professional judgment

Floyd|Snider Validation Guidelines for Volatile Analysis by GC/MS (Based on Organic NFG 1999)

Validation QC Element	Acceptance Criteria	Action
Cooler Temperature	4°C±2°C Water: HCl to pH < 2	J/UJ if greater than 6 deg. C (Floyd|Snider PJ)
Hold Time	Waters: 14 days preserved 7 Days: unpreserved (for aromatics) Solids: 14 Days	J/UJ if hold times exceeded If exceeded by > 3X HT: J/R (Floyd|Snider PJ)
Tuning	BFB Beginning of each 12 hour period Method acceptance criteria	R all analytes in all samples associated with the tune
Initial Calibration (Minimum 5 stds.)	RRF > 0.05	(Floyd|Snider PJ) If MDL= reporting limit: J/R if RRF < 0.05 If reporting limit > MDL: note in worksheet if RRF <0.05
	%RSD < 30%	(Floyd|Snider PJ) J if %RSD > 30%
Continuing Calibration (Prior to each 12 hr. shift)	RRF > 0.05	(Floyd|Snider PJ) If MDL= reporting limit: J/R if RRF < 0.05 If reporting limit > MDL: note in worksheet if RRF <0.05
	%D <25%	(Floyd|Snider PJ) If > +/-90%: J/RIf -90% to -26%: J (high bias) If 26% to 90%: J/UJ (low bias)
Method Blank	One per matrix per batch No results > CRQL	U if sample result is less than CRQL and less than appropriate 5X or 10X rule (raise sample value to CRQL)
		U if sample result is greater than or equal to CRQL and less than appropriate 5X and 10X rule (at reported sample value)
	No TICs present	R TICs using 10X rule
Storage Blank	One per SDG <CRQL	U the specific analyte(s) results in all assoc. samples using the 5x or 10x rule

Validation QC Element	**Acceptance Criteria**	**Action**
Trip Blank	Frequency as per project QAPP	Same as method blank for positive results remaining in trip blank after method blank qualifiers are assigned
Field Blanks (if required in QAPP)	No results > CRQL	Apply 5X/10X rule; U < action level
MS/MSD (recovery)	One per matrix per batch Use method acceptance criteria	Qualify parent only unless other QC indicates systematic problems: J if both %R > UCL J/UJ if both %R < LCL J/R if both %R < 10% PJ if only one %R outlier
MS/MSD (RPD)	One per matrix per batch Use method acceptance criteria	J in parent sample if RPD > CL
LCS *low conc. H2O VOA*	One per lab batch Within method control limits	J assoc. cmpd if > UCL J/R assoc. cmpd if < LCL J/R all cmpds if half are < LCL
LCS *regular VOA (H2O & solid)*	One per lab batch Lab or method control limits	J if %R > UCL J/UJ if %R <LCL J/R if %R < 10% (Floyd|Snider PJ)
LCS/LCSD *(if required)*	One set per matrix and batch of 20 samples RPD < 35%	J/UJ assoc. cmpd. in all samples
Surrogates	Added to all samples Within method control limits	J if %R >UCL J/UJ if %R <LCL but >10% J/R if <10%
Internal Standard (IS)	Added to all samples Acceptable Range: IS area 50% to 200% of CCAL area RT within 30 seconds of CC RT	J if > 200% J/UJ if < 50% J/R if < 25% RT>30 seconds, narrate and Notify PM
Field Duplicates	Use QAPP limits. If no QAPP: Solids: RPD <50% OR absolute diff. < 2X RL (for results < 5X RL) Aqueous: RPD <35% OR absolute diff. < 1X RL (for results < 5X RL)	Narrate and qualify if required by project (Floyd|Snider PJ)
TICs	Major ions (>10%) in reference must be present in sample; intensities agree within 20%; check identification	NJ the TIC unless: R common laboratory contaminants See Technical Director for ID issues

Validation QC Element	Acceptance Criteria	Action
Quantitation/ Identification	RRT within 0.06 of standard RRT Ion relative intensity within 20% of standard All ions in std. at > 10% intensity must be present in sample	See Technical Director if outliers

Notes:

PJ[1] No action if there are 4+ surrogates and only 1 outlier

Gas Works Park

Storm Drain Source Control Evaluation
Phase 3 Data Report

Data Validation Report

Appendix B
Qualified Data Summary Table

FINAL

Qualified Data Summary Table
Phase 3 Storm Drain Source Control Evaluation Sampling Event

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Qual	DV Qual
RF64	HP-CB-01	10-17495-RF64I	SW8270D	1-Methylnaphthalene	260	ug/kg		J
RF64	HP-CB-01	10-17495-RF64I	SW8270D	2-Methylnaphthalene	350	ug/kg		J
RF64	HP-CB-01	10-17495-RF64I	SW8270D	Acenaphthene	190	ug/kg	U	J
RF64	HP-CB-01	10-17495-RF64I	SW8270D	Acenaphthylene	190	ug/kg	U	J
RF64	HP-CB-01	10-17495-RF64I	SW8270D	Anthracene	240	ug/kg		J
RF64	HP-CB-01	10-17495-RF64I	SW8270D	Benzo(a)anthracene	620	ug/kg		J
RF64	HP-CB-01	10-17495-RF64I	SW8270D	Benzo(a)pyrene	700	ug/kg		J
RF64	HP-CB-01	10-17495-RF64I	SW8270D	Benzo(g,h,i)perylene	380	ug/kg		J
RF64	HP-CB-01	10-17495-RF64I	SW8270D	Chrysene	1000	ug/kg		J
RF64	HP-CB-01	10-17495-RF64I	SW8270D	Dibenz(a,h)anthracene	190	ug/kg	U	J
RF64	HP-CB-01	10-17495-RF64I	SW8270D	Dibenzofuran	190	ug/kg	U	J
RF64	HP-CB-01	10-17495-RF64I	SW8270D	Fluoranthene	1800	ug/kg		J
RF64	HP-CB-01	10-17495-RF64I	SW8270D	Fluorene	200	ug/kg		J
RF64	HP-CB-01	10-17495-RF64I	SW8270D	Indeno(1,2,3-cd)pyrene	260	ug/kg		J
RF64	HP-CB-01	10-17495-RF64I	SW8270D	Naphthalene	240	ug/kg		J
RF64	HP-CB-01	10-17495-RF64I	SW8270D	Phenanthrene	1200	ug/kg		J
RF64	HP-CB-01	10-17495-RF64I	SW8270D	Pyrene	2300	ug/kg		J
RF64	HP-CB-01	10-17495-RF64I	SW8270D	Total Benzofluoranthenes	1500	ug/kg		J
RF64	HP-CB-02	10-17496-RF64J	SW8270D	1-Methylnaphthalene	540	ug/kg		J
RF64	HP-CB-02	10-17496-RF64J	SW8270D	2-Methylnaphthalene	690	ug/kg		J

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Qual	DV Qual
RF64	HP-CB-02	10-17496-RF64J	SW8270D	Acenaphthene	190	ug/kg	U	J
RF64	HP-CB-02	10-17496-RF64J	SW8270D	Acenaphthylene	190	ug/kg	U	J
RF64	HP-CB-02	10-17496-RF64J	SW8270D	Anthracene	270	ug/kg		J
RF64	HP-CB-02	10-17496-RF64J	SW8270D	Benzo(a)anthracene	810	ug/kg		J
RF64	HP-CB-02	10-17496-RF64J	SW8270D	Benzo(a)pyrene	910	ug/kg		J
RF64	HP-CB-02	10-17496-RF64J	SW8270D	Benzo(g,h,i)perylene	550	ug/kg		J
RF64	HP-CB-02	10-17496-RF64J	SW8270D	Chrysene	1400	ug/kg		J
RF64	HP-CB-02	10-17496-RF64J	SW8270D	Dibenz(a,h)anthracene	190	ug/kg	U	J
RF64	HP-CB-02	10-17496-RF64J	SW8270D	Dibenzofuran	240	ug/kg		J
RF64	HP-CB-02	10-17496-RF64J	SW8270D	Fluoranthene	2500	ug/kg		J
RF64	HP-CB-02	10-17496-RF64J	SW8270D	Fluorene	300	ug/kg		J
RF64	HP-CB-02	10-17496-RF64J	SW8270D	Indeno(1,2,3-cd)pyrene	370	ug/kg		J
RF64	HP-CB-02	10-17496-RF64J	SW8270D	Naphthalene	660	ug/kg		J
RF64	HP-CB-02	10-17496-RF64J	SW8270D	Phenanthrene	2000	ug/kg		J
RF64	HP-CB-02	10-17496-RF64J	SW8270D	Pyrene	3300	ug/kg		J
RF64	HP-CB-02	10-17496-RF64J	SW8270D	Total Benzofluoranthenes	2000	ug/kg		J
RF64	HP-CB-03	10-17497-RF64K	SW8270D	1-Methylnaphthalene	640	ug/kg	U	J
RF64	HP-CB-03	10-17497-RF64K	SW8270D	2-Methylnaphthalene	640	ug/kg	U	J
RF64	HP-CB-03	10-17497-RF64K	SW8270D	Acenaphthene	640	ug/kg	U	J
RF64	HP-CB-03	10-17497-RF64K	SW8270D	Acenaphthylene	640	ug/kg	U	J
RF64	HP-CB-03	10-17497-RF64K	SW8270D	Anthracene	640	ug/kg	U	J
RF64	HP-CB-03	10-17497-RF64K	SW8270D	Benzo(a)anthracene	640	ug/kg	U	J

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Qual	DV Qual
RF64	HP-CB-03	10-17497-RF64K	SW8270D	Benzo(a)pyrene	640	ug/kg	U	J
RF64	HP-CB-03	10-17497-RF64K	SW8270D	Benzo(g,h,i)perylene	640	ug/kg	U	J
RF64	HP-CB-03	10-17497-RF64K	SW8270D	Chrysene	1100	ug/kg		J
RF64	HP-CB-03	10-17497-RF64K	SW8270D	Dibenz(a,h)anthracene	640	ug/kg	U	J
RF64	HP-CB-03	10-17497-RF64K	SW8270D	Dibenzofuran	640	ug/kg	U	J
RF64	HP-CB-03	10-17497-RF64K	SW8270D	Fluoranthene	1800	ug/kg		J
RF64	HP-CB-03	10-17497-RF64K	SW8270D	Fluorene	640	ug/kg	U	J
RF64	HP-CB-03	10-17497-RF64K	SW8270D	Indeno(1,2,3-cd)pyrene	640	ug/kg	U	J
RF64	HP-CB-03	10-17497-RF64K	SW8270D	Naphthalene	640	ug/kg	U	J
RF64	HP-CB-03	10-17497-RF64K	SW8270D	Phenanthrene	1500	ug/kg		J
RF64	HP-CB-03	10-17497-RF64K	SW8270D	Pyrene	2100	ug/kg		J
RF64	HP-CB-03	10-17497-RF64K	SW8270D	Total Benzofluoranthenes	1700	ug/kg		J
RF64	HP-OWS-INLET	10-17498-RF64L	SW8270D	1-Methylnaphthalene	1400	ug/kg		J
RF64	HP-OWS-INLET	10-17498-RF64L	SW8270D	2-Methylnaphthalene	2300	ug/kg		J
RF64	HP-OWS-INLET	10-17498-RF64L	SW8270D	Acenaphthene	390	ug/kg	U	J
RF64	HP-OWS-INLET	10-17498-RF64L	SW8270D	Acenaphthylene	390	ug/kg	U	J
RF64	HP-OWS-INLET	10-17498-RF64L	SW8270D	Anthracene	390	ug/kg	U	J
RF64	HP-OWS-INLET	10-17498-RF64L	SW8270D	Benzo(a)anthracene	1100	ug/kg		J
RF64	HP-OWS-INLET	10-17498-RF64L	SW8270D	Benzo(a)pyrene	1400	ug/kg		J
RF64	HP-OWS-INLET	10-17498-RF64L	SW8270D	Benzo(g,h,i)perylene	730	ug/kg		J
RF64	HP-OWS-INLET	10-17498-RF64L	SW8270D	Chrysene	2300	ug/kg		J
RF64	HP-OWS-INLET	10-17498-RF64L	SW8270D	Dibenz(a,h)anthracene	390	ug/kg	U	J

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Qual	DV Qual
RF64	HP-OWS-INLET	10-17498-RF64L	SW8270D	Dibenzofuran	390	ug/kg	U	J
RF64	HP-OWS-INLET	10-17498-RF64L	SW8270D	Fluoranthene	3200	ug/kg		J
RF64	HP-OWS-INLET	10-17498-RF64L	SW8270D	Fluorene	440	ug/kg		J
RF64	HP-OWS-INLET	10-17498-RF64L	SW8270D	Indeno(1,2,3-cd)pyrene	500	ug/kg		J
RF64	HP-OWS-INLET	10-17498-RF64L	SW8270D	Naphthalene	1400	ug/kg		J
RF64	HP-OWS-INLET	10-17498-RF64L	SW8270D	Phenanthrene	2500	ug/kg		J
RF64	HP-OWS-INLET	10-17498-RF64L	SW8270D	Pyrene	3600	ug/kg		J
RF64	HP-OWS-INLET	10-17498-RF64L	SW8270D	Total Benzofluoranthenes	2900	ug/kg		J
RF64	HP-OWS-OUTLET	10-17499-RF64M	SW8270D	1-Methylnaphthalene	1300	ug/kg	U	J
RF64	HP-OWS-OUTLET	10-17499-RF64M	SW8270D	2-Methylnaphthalene	1300	ug/kg	U	J
RF64	HP-OWS-OUTLET	10-17499-RF64M	SW8270D	Acenaphthene	1300	ug/kg	U	J
RF64	HP-OWS-OUTLET	10-17499-RF64M	SW8270D	Acenaphthylene	1300	ug/kg	U	J
RF64	HP-OWS-OUTLET	10-17499-RF64M	SW8270D	Anthracene	1300	ug/kg	U	J
RF64	HP-OWS-OUTLET	10-17499-RF64M	SW8270D	Benzo(a)anthracene	1300	ug/kg		J
RF64	HP-OWS-OUTLET	10-17499-RF64M	SW8270D	Benzo(a)pyrene	1600	ug/kg		J
RF64	HP-OWS-OUTLET	10-17499-RF64M	SW8270D	Benzo(g,h,i)perylene	1300	ug/kg	U	J
RF64	HP-OWS-OUTLET	10-17499-RF64M	SW8270D	Chrysene	2800	ug/kg		J
RF64	HP-OWS-OUTLET	10-17499-RF64M	SW8270D	Dibenz(a,h)anthracene	1300	ug/kg	U	J
RF64	HP-OWS-OUTLET	10-17499-RF64M	SW8270D	Dibenzofuran	1300	ug/kg	U	J
RF64	HP-OWS-OUTLET	10-17499-RF64M	SW8270D	Fluoranthene	4300	ug/kg		J
RF64	HP-OWS-OUTLET	10-17499-RF64M	SW8270D	Fluorene	1300	ug/kg	U	J
RF64	HP-OWS-OUTLET	10-17499-RF64M	SW8270D	Indeno(1,2,3-cd)pyrene	1300	ug/kg	U	J

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Qual	DV Qual
RF64	HP-OWS-OUTLET	10-17499-RF64M	SW8270D	Naphthalene	1300	ug/kg	U	J
RF64	HP-OWS-OUTLET	10-17499-RF64M	SW8270D	Phenanthrene	3000	ug/kg		J
RF64	HP-OWS-OUTLET	10-17499-RF64M	SW8270D	Pyrene	5200	ug/kg		J
RF64	HP-OWS-OUTLET	10-17499-RF64M	SW8270D	Total Benzofluoranthenes	4300	ug/kg		J
RF64	PA-CB-01	10-17487-RF64A	SW8270D	1-Methylnaphthalene	200	ug/kg	U	J
RF64	PA-CB-01	10-17487-RF64A	SW8270D	2-Methylnaphthalene	200	ug/kg	U	J
RF64	PA-CB-01	10-17487-RF64A	SW8270D	Acenaphthene	200	ug/kg	U	J
RF64	PA-CB-01	10-17487-RF64A	SW8270D	Acenaphthylene	200	ug/kg	U	J
RF64	PA-CB-01	10-17487-RF64A	SW8270D	Anthracene	200	ug/kg	U	J
RF64	PA-CB-01	10-17487-RF64A	SW8270D	Benzo(a)anthracene	240	ug/kg		J
RF64	PA-CB-01	10-17487-RF64A	SW8270D	Benzo(a)pyrene	370	ug/kg		J
RF64	PA-CB-01	10-17487-RF64A	SW8270D	Benzo(g,h,i)perylene	320	ug/kg		J
RF64	PA-CB-01	10-17487-RF64A	SW8270D	Chrysene	670	ug/kg		J
RF64	PA-CB-01	10-17487-RF64A	SW8270D	Dibenz(a,h)anthracene	200	ug/kg	U	J
RF64	PA-CB-01	10-17487-RF64A	SW8270D	Dibenzofuran	200	ug/kg	U	J
RF64	PA-CB-01	10-17487-RF64A	SW8270D	Fluoranthene	850	ug/kg		J
RF64	PA-CB-01	10-17487-RF64A	SW8270D	Fluorene	200	ug/kg	U	J
RF64	PA-CB-01	10-17487-RF64A	SW8270D	Indeno(1,2,3-cd)pyrene	220	ug/kg		J
RB73	PA-CB-01	10-15141-RB73A	SW6010B	Lead	120	mg/kg		J
RF64	PA-CB-01	10-17487-RF64A	SW8270D	Naphthalene	200	ug/kg	U	J
RF64	PA-CB-01	10-17487-RF64A	SW8270D	Phenanthrene	590	ug/kg		J
RF64	PA-CB-01	10-17487-RF64A	SW8270D	Pyrene	1000	ug/kg		J

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Qual	DV Qual
RF64	PA-CB-01	10-17487-RF64A	SW8270D	Total Benzofluoranthenes	750	ug/kg		J
RB73	PA-CB-01	10-15141-RB73A	SW6010B	Zinc	446	mg/kg		J
RF64	PA-CB-02	10-17488-RF64B	SW8270D	1-Methylnaphthalene	190	ug/kg	U	J
RF64	PA-CB-02	10-17488-RF64B	SW8270D	2-Methylnaphthalene	190	ug/kg	U	J
RF64	PA-CB-02	10-17488-RF64B	SW8270D	Acenaphthene	190	ug/kg	U	J
RF64	PA-CB-02	10-17488-RF64B	SW8270D	Acenaphthylene	190	ug/kg	U	J
RF64	PA-CB-02	10-17488-RF64B	SW8270D	Anthracene	190	ug/kg	U	J
RF64	PA-CB-02	10-17488-RF64B	SW8270D	Benzo(a)anthracene	210	ug/kg		J
RF64	PA-CB-02	10-17488-RF64B	SW8270D	Benzo(a)pyrene	290	ug/kg		J
RF64	PA-CB-02	10-17488-RF64B	SW8270D	Benzo(g,h,i)perylene	240	ug/kg		J
RF64	PA-CB-02	10-17488-RF64B	SW8270D	Chrysene	540	ug/kg		J
RF64	PA-CB-02	10-17488-RF64B	SW8270D	Dibenz(a,h)anthracene	190	ug/kg	U	J
RF64	PA-CB-02	10-17488-RF64B	SW8270D	Dibenzofuran	190	ug/kg	U	J
RF64	PA-CB-02	10-17488-RF64B	SW8270D	Fluoranthene	710	ug/kg		J
RF64	PA-CB-02	10-17488-RF64B	SW8270D	Fluorene	190	ug/kg	U	J
RF64	PA-CB-02	10-17488-RF64B	SW8270D	Indeno(1,2,3-cd)pyrene	190	ug/kg	U	J
RF64	PA-CB-02	10-17488-RF64B	SW8270D	Naphthalene	190	ug/kg	U	J
RF64	PA-CB-02	10-17488-RF64B	SW8270D	Phenanthrene	460	ug/kg		J
RF64	PA-CB-02	10-17488-RF64B	SW8270D	Pyrene	780	ug/kg		J
RF64	PA-CB-02	10-17488-RF64B	SW8270D	Total Benzofluoranthenes	680	ug/kg		J
RF64	PA-CB-03	10-17489-RF64C	SW8270D	1-Methylnaphthalene	190	ug/kg	U	J
RF64	PA-CB-03	10-17489-RF64C	SW8270D	2-Methylnaphthalene	190	ug/kg	U	J

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Qual	DV Qual
RF64	PA-CB-03	10-17489-RF64C	SW8270D	Acenaphthene	190	ug/kg	U	J
RF64	PA-CB-03	10-17489-RF64C	SW8270D	Acenaphthylene	190	ug/kg	U	J
RF64	PA-CB-03	10-17489-RF64C	SW8270D	Anthracene	190	ug/kg	U	J
RF64	PA-CB-03	10-17489-RF64C	SW8270D	Benzo(a)anthracene	300	ug/kg		J
RF64	PA-CB-03	10-17489-RF64C	SW8270D	Benzo(a)pyrene	380	ug/kg		J
RF64	PA-CB-03	10-17489-RF64C	SW8270D	Benzo(g,h,i)perylene	310	ug/kg		J
RF64	PA-CB-03	10-17489-RF64C	SW8270D	Chrysene	700	ug/kg		J
RF64	PA-CB-03	10-17489-RF64C	SW8270D	Dibenz(a,h)anthracene	190	ug/kg	U	J
RF64	PA-CB-03	10-17489-RF64C	SW8270D	Dibenzofuran	190	ug/kg	U	J
RF64	PA-CB-03	10-17489-RF64C	SW8270D	Fluoranthene	1000	ug/kg		J
RF64	PA-CB-03	10-17489-RF64C	SW8270D	Fluorene	190	ug/kg	U	J
RF64	PA-CB-03	10-17489-RF64C	SW8270D	Indeno(1,2,3-cd)pyrene	200	ug/kg		J
RF64	PA-CB-03	10-17489-RF64C	SW8270D	Naphthalene	190	ug/kg	U	J
RF64	PA-CB-03	10-17489-RF64C	SW8270D	Phenanthrene	680	ug/kg		J
RF64	PA-CB-03	10-17489-RF64C	SW8270D	Pyrene	1300	ug/kg		J
RF64	PA-CB-03	10-17489-RF64C	SW8270D	Total Benzofluoranthenes	910	ug/kg		J
RF64	PA-CB-04	10-17490-RF64D	SW8270D	1-Methylnaphthalene	190	ug/kg	U	J
RF64	PA-CB-04	10-17490-RF64D	SW8270D	2-Methylnaphthalene	190	ug/kg	U	J
RF64	PA-CB-04	10-17490-RF64D	SW8270D	Acenaphthene	190	ug/kg	U	J
RF64	PA-CB-04	10-17490-RF64D	SW8270D	Acenaphthylene	190	ug/kg	U	J
RF64	PA-CB-04	10-17490-RF64D	SW8270D	Anthracene	190	ug/kg	U	J
RF64	PA-CB-04	10-17490-RF64D	SW8270D	Benzo(a)anthracene	400	ug/kg		J

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Qual	DV Qual
RF64	PA-CB-04	10-17490-RF64D	SW8270D	Benzo(a)pyrene	440	ug/kg		J
RF64	PA-CB-04	10-17490-RF64D	SW8270D	Benzo(g,h,i)perylene	220	ug/kg		J
RF64	PA-CB-04	10-17490-RF64D	SW8270D	Chrysene	570	ug/kg		J
RF64	PA-CB-04	10-17490-RF64D	SW8270D	Dibenz(a,h)anthracene	190	ug/kg	U	J
RF64	PA-CB-04	10-17490-RF64D	SW8270D	Dibenzofuran	190	ug/kg	U	J
RF64	PA-CB-04	10-17490-RF64D	SW8270D	Fluoranthene	960	ug/kg		J
RF64	PA-CB-04	10-17490-RF64D	SW8270D	Fluorene	190	ug/kg	U	J
RF64	PA-CB-04	10-17490-RF64D	SW8270D	Indeno(1,2,3-cd)pyrene	190	ug/kg	U	J
RF64	PA-CB-04	10-17490-RF64D	SW8270D	Naphthalene	190	ug/kg	U	J
RF64	PA-CB-04	10-17490-RF64D	SW8270D	Phenanthrene	440	ug/kg		J
RF64	PA-CB-04	10-17490-RF64D	SW8270D	Pyrene	910	ug/kg		J
RF64	PA-CB-04	10-17490-RF64D	SW8270D	Total Benzofluoranthenes	920	ug/kg		J
RF64	PA-CB-05	10-17491-RF64E	SW8270D	1-Methylnaphthalene	200	ug/kg	U	J
RF64	PA-CB-05	10-17491-RF64E	SW8270D	2-Methylnaphthalene	200	ug/kg	U	J
RF64	PA-CB-05	10-17491-RF64E	SW8270D	Acenaphthene	200	ug/kg	U	J
RF64	PA-CB-05	10-17491-RF64E	SW8270D	Acenaphthylene	200	ug/kg	U	J
RF64	PA-CB-05	10-17491-RF64E	SW8270D	Anthracene	200	ug/kg	U	J
RF64	PA-CB-05	10-17491-RF64E	SW8270D	Benzo(a)anthracene	200	ug/kg	U	J
RF64	PA-CB-05	10-17491-RF64E	SW8270D	Benzo(a)pyrene	230	ug/kg		J
RF64	PA-CB-05	10-17491-RF64E	SW8270D	Benzo(g,h,i)perylene	200	ug/kg	U	J
RF64	PA-CB-05	10-17491-RF64E	SW8270D	Chrysene	420	ug/kg		J
RF64	PA-CB-05	10-17491-RF64E	SW8270D	Dibenz(a,h)anthracene	200	ug/kg	U	J

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Qual	DV Qual
RF64	PA-CB-05	10-17491-RF64E	SW8270D	Dibenzofuran	200	ug/kg	U	J
RF64	PA-CB-05	10-17491-RF64E	SW8270D	Fluoranthene	580	ug/kg		J
RF64	PA-CB-05	10-17491-RF64E	SW8270D	Fluorene	200	ug/kg	U	J
RF64	PA-CB-05	10-17491-RF64E	SW8270D	Indeno(1,2,3-cd)pyrene	200	ug/kg	U	J
RF64	PA-CB-05	10-17491-RF64E	SW8270D	Naphthalene	200	ug/kg	U	J
RF64	PA-CB-05	10-17491-RF64E	SW8270D	Phenanthrene	390	ug/kg		J
RF64	PA-CB-05	10-17491-RF64E	SW8270D	Pyrene	710	ug/kg		J
RF64	PA-CB-05	10-17491-RF64E	SW8270D	Total Benzofluoranthenes	600	ug/kg		J
RF64	PA-CB-06	10-17492-RF64F	SW8270D	1-Methylnaphthalene	200	ug/kg	U	J
RF64	PA-CB-06	10-17492-RF64F	SW8270D	2-Methylnaphthalene	200	ug/kg	U	J
RF64	PA-CB-06	10-17492-RF64F	SW8270D	Acenaphthene	200	ug/kg	U	J
RF64	PA-CB-06	10-17492-RF64F	SW8270D	Acenaphthylene	200	ug/kg	U	J
RF64	PA-CB-06	10-17492-RF64F	SW8270D	Anthracene	200	ug/kg	U	J
RF64	PA-CB-06	10-17492-RF64F	SW8270D	Benzo(a)anthracene	220	ug/kg		J
RF64	PA-CB-06	10-17492-RF64F	SW8270D	Benzo(a)pyrene	310	ug/kg		J
RF64	PA-CB-06	10-17492-RF64F	SW8270D	Benzo(g,h,i)perylene	300	ug/kg		J
RF64	PA-CB-06	10-17492-RF64F	SW8270D	Chrysene	560	ug/kg		J
RF64	PA-CB-06	10-17492-RF64F	SW8270D	Dibenz(a,h)anthracene	200	ug/kg	U	J
RF64	PA-CB-06	10-17492-RF64F	SW8270D	Dibenzofuran	200	ug/kg	U	J
RF64	PA-CB-06	10-17492-RF64F	SW8270D	Fluoranthene	740	ug/kg		J
RF64	PA-CB-06	10-17492-RF64F	SW8270D	Fluorene	200	ug/kg	U	J
RF64	PA-CB-06	10-17492-RF64F	SW8270D	Indeno(1,2,3-cd)pyrene	200	ug/kg		J

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Qual	DV Qual
RF64	PA-CB-06	10-17492-RF64F	SW8270D	Naphthalene	200	ug/kg	U	J
RF64	PA-CB-06	10-17492-RF64F	SW8270D	Phenanthrene	470	ug/kg		J
RF64	PA-CB-06	10-17492-RF64F	SW8270D	Pyrene	1200	ug/kg		J
RF64	PA-CB-06	10-17492-RF64F	SW8270D	Total Benzofluoranthenes	790	ug/kg		J
RF64	PA-CB-07	10-17493-RF64G	SW8270D	1-Methylnaphthalene	390	ug/kg	U	J
RF64	PA-CB-07	10-17493-RF64G	SW8270D	2-Methylnaphthalene	390	ug/kg	U	J
RF64	PA-CB-07	10-17493-RF64G	SW8270D	Acenaphthene	390	ug/kg	U	J
RF64	PA-CB-07	10-17493-RF64G	SW8270D	Acenaphthylene	390	ug/kg	U	J
RF64	PA-CB-07	10-17493-RF64G	SW8270D	Anthracene	390	ug/kg	U	J
RF64	PA-CB-07	10-17493-RF64G	SW8270D	Benzo(a)anthracene	500	ug/kg		J
RF64	PA-CB-07	10-17493-RF64G	SW8270D	Benzo(a)pyrene	670	ug/kg		J
RF64	PA-CB-07	10-17493-RF64G	SW8270D	Benzo(g,h,i)perylene	450	ug/kg		J
RF64	PA-CB-07	10-17493-RF64G	SW8270D	Chrysene	1000	ug/kg		J
RF64	PA-CB-07	10-17493-RF64G	SW8270D	Dibenz(a,h)anthracene	390	ug/kg	U	J
RF64	PA-CB-07	10-17493-RF64G	SW8270D	Dibenzofuran	390	ug/kg	U	J
RF64	PA-CB-07	10-17493-RF64G	SW8270D	Fluoranthene	1400	ug/kg		J
RF64	PA-CB-07	10-17493-RF64G	SW8270D	Fluorene	390	ug/kg	U	J
RF64	PA-CB-07	10-17493-RF64G	SW8270D	Indeno(1,2,3-cd)pyrene	390	ug/kg	U	J
RF64	PA-CB-07	10-17493-RF64G	SW8270D	Naphthalene	390	ug/kg	U	J
RF64	PA-CB-07	10-17493-RF64G	SW8270D	Phenanthrene	840	ug/kg		J
RF64	PA-CB-07	10-17493-RF64G	SW8270D	Pyrene	1800	ug/kg		J
RF64	PA-CB-07	10-17493-RF64G	SW8270D	Total Benzofluoranthenes	1500	ug/kg		J

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Qual	DV Qual
RF64	PA-CB-DUP	10-17494-RF64H	SW8270D	1-Methylnaphthalene	200	ug/kg	U	J
RF64	PA-CB-DUP	10-17494-RF64H	SW8270D	2-Methylnaphthalene	200	ug/kg	U	J
RF64	PA-CB-DUP	10-17494-RF64H	SW8270D	Acenaphthene	200	ug/kg	U	J
RF64	PA-CB-DUP	10-17494-RF64H	SW8270D	Acenaphthylene	200	ug/kg	U	J
RF64	PA-CB-DUP	10-17494-RF64H	SW8270D	Anthracene	200	ug/kg	U	J
RF64	PA-CB-DUP	10-17494-RF64H	SW8270D	Benzo(a)anthracene	260	ug/kg		J
RF64	PA-CB-DUP	10-17494-RF64H	SW8270D	Benzo(a)pyrene	340	ug/kg		J
RF64	PA-CB-DUP	10-17494-RF64H	SW8270D	Benzo(g,h,i)perylene	250	ug/kg		J
RF64	PA-CB-DUP	10-17494-RF64H	SW8270D	Chrysene	550	ug/kg		J
RF64	PA-CB-DUP	10-17494-RF64H	SW8270D	Dibenz(a,h)anthracene	200	ug/kg	U	J
RF64	PA-CB-DUP	10-17494-RF64H	SW8270D	Dibenzofuran	200	ug/kg	U	J
RF64	PA-CB-DUP	10-17494-RF64H	SW8270D	Fluoranthene	820	ug/kg		J
RF64	PA-CB-DUP	10-17494-RF64H	SW8270D	Fluorene	200	ug/kg	U	J
RF64	PA-CB-DUP	10-17494-RF64H	SW8270D	Indeno(1,2,3-cd)pyrene	200	ug/kg	U	J
RF64	PA-CB-DUP	10-17494-RF64H	SW8270D	Naphthalene	200	ug/kg	U	J
RF64	PA-CB-DUP	10-17494-RF64H	SW8270D	Phenanthrene	680	ug/kg		J
RF64	PA-CB-DUP	10-17494-RF64H	SW8270D	Pyrene	1100	ug/kg		J
RF64	PA-CB-DUP	10-17494-RF64H	SW8270D	Total Benzofluoranthenes	840	ug/kg		J
RC58	WW19-01	10-15707-RC58A	SW7471A	Mercury	0.71	mg/kg		J
RK54	HP-OWS-INLET	10-21394-RK54A	SW7471A	Mercury	0.37	mg/kg		J
RK54	HP-OWS-OUTLAT	10-21395-RK54B	SW7471A	Mercury	0.39	mg/kg		J
RK08	WW19-04-082310	10-21169-RK08B	SW6010B	Zinc	198	mg/kg		J

Gas Works Park

Storm Drain Source Control Evaluation
Phase 3 Data Report

Appendix D
Video Inspection Reports

FINAL

Bravo Environmental

Kenmore
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E-mail:

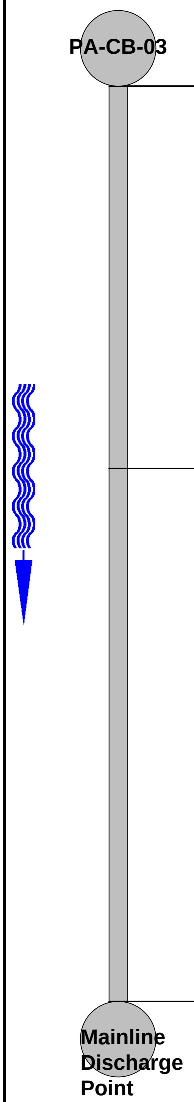
Inspection Report / Inspection: Gas Works Park Storm

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
6/25/2010		**Dry**	**Nirpaul**		**1**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
U-1208-7918				**No Pre-Cleaning**	

Street123	**2101 N Northlake Way**	Use of Sewer	**Stormwater**	Upstream MH	**PA-CB-03**
City	**Seattle**	Drainage Area		Dowstream MH	**Mainline Discharge Point**
Loc. details		Flow Control		Dir. of Survey	**Downstream**
Location Code		Length surveyed	**113.20 ft**	Section Length	**113.20 ft**

Purpose of Survey	**Maintenance Related**	Joint Length	
Year Laid		Dia./Height	**8 inch**
Year Rehabilitated		Material	**Concrete Pipe (non-reinforced)**
Tape / Media No.	**Floyd/Gas Works 06.25.2010**	Lining Method	

Add. Information :



1:285	Position	Observation	Photo
	0.00	Catch Basin / PA-CB-03	
	47.28	Water Level, Sag in pipe, 5 %of cross sectional area / 1/4" - Multiple sags	
	113.20	Discharge Point / Mainline	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**2100**	**0**	**2**	**2**	**0**	**2**	**2**

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Inspection Report / Inspection: Gas Works Park Storm

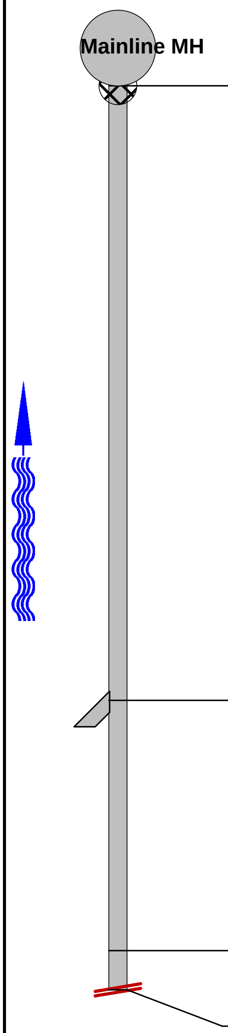
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
6/25/2010		**Light Rain**	**Nirpaul**		**2**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
U-1208-7918				**No Pre-Cleaning**	

Street123	**2101 N Northlake Way**	Use of Sewer	**Stormwater**	Upstream MH	**Mainline MH 2**
City	**Seattle**	Drainage Area		Dowstream MH	**Mainline MH**
Loc. details		Flow Control		Dir. of Survey	**Upstream**
Location Code		Length surveyed	**41.20 ft**	Section Length	**41.20 ft**

Purpose of Survey	**Maintenance Related**	Joint Length	
Year Laid		Dia./Height	**10 inch**
Year Rehabilitated		Material	**Concrete Pipe (non-reinforced)**
Tape / Media No.	**Floyd/Gas Works 06.25.2010**	Lining Method	

Add. Information : **Wrong U/S Struture Number on Overlay**

1:105	Position	Observation	Photo
	0.00	Manhole / Mainline MH	
	28.00	Tap Factory Made Active, at 02 o'clock, 8", within 8 inches of joint: YES	
	39.40	Joint Separated Medium	
	41.20	Survey Abandoned / Joint	



QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
1100	0000	1	0	1	1	0	1

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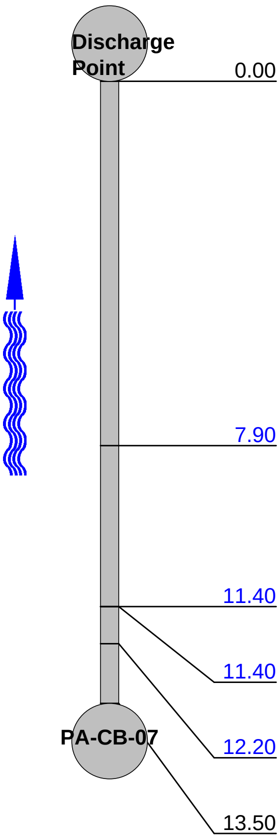
Inspection Report / Inspection: Gas Works Park Storm

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
6/25/2010		**Light Rain**	**Nirpaul**		**3**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
U-1208-7918				**No Pre-Cleaning**	

Street123	**2101 N Northlake Way**	Use of Sewer	**Stormwater**	Upstream MH	**PA-CB-07**
City	**Seattle**	Drainage Area		Dowstream MH	**Discharge Point**
Loc. details		Flow Control		Dir. of Survey	**Upstream**
Location Code		Length surveyed	**13.50 ft**	Section Length	**13.50 ft**

Purpose of Survey	**Maintenance Related**	Joint Length	
Year Laid		Dia./Height	**8 inch**
Year Rehabilitated		Material	**Concrete Pipe (non-reinforced)**
Tape / Media No.	**Floyd/Gas Works 06.25.2010**	Lining Method	

Add. Information :



1:50 Position	Observation	Photo
0.00	Discharge Point / Mainline	
7.90	Crack Longitudinal, at 07 o'clock, within 8 inches of joint: YES	PA-CB-07_Discharge Point095517_25062010_A.JPG
11.40	Crack Longitudinal, at 05 o'clock, within 8 inches of joint: YES	PA-CB-07_Discharge Point095656_25062010_A.JPG
11.40	Roots Fine Joint, from 06 to 07 o'clock, within 8 inches of joint: YES	PA-CB-07_Discharge Point095728_25062010_A.JPG
12.20	Roots Fine Joint, from 05 to 07 o'clock, within 8 inches of joint: NO	
13.50	Catch Basin / PA-CB-07	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
2200	**2200**	**4**	**4**	**8**	**2**	**2**	**2**

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Inspection photos / Inspection: Gas Works Park Storm

City :	Street :	Date :	Pipe Segment Reference :	Section No :
Seattle	**2101 N Northlake Way**			**3**

Photo: PA-CB-07_Discharge Point095517_25062010_A.JPG, VCR No.: Floyd/Gas Works 06.25.2010
7.9FT, Crack Longitudinal, at 07 o'clock, within 8 inches of joint: YES

Photo: PA-CB-07_Discharge Point095656_25062010_A.JPG, VCR No.: Floyd/Gas Works 06.25.2010
11.4FT, Crack Longitudinal, at 05 o'clock, within 8 inches of joint: YES

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Inspection photos / Inspection: Gas Works Park Storm

City :	Street :	Date :	Pipe Segment Reference :	Section No :
Seattle	**2101 N Northlake Way**			**3**

Photo: PA-CB-07_Discharge Point095728_25062010_A.JPG, VCR No.: Floyd/Gas Works 06.25.2010
11.4FT, Roots Fine Joint, from 06 to 07 o'clock, within 8 inches of joint: YES

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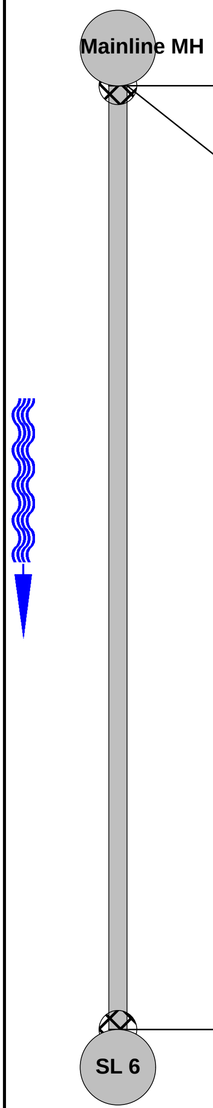
Inspection Report / Inspection: Gas Works Park Storm

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
6/25/2010		**Light Rain**	**Nirpaul**		**4**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
U-1208-7918				**No Pre-Cleaning**	

Street123	**2101 N Northlake Way**	Use of Sewer	**Stormwater**	Upstream MH	**Mainline MH**
City	**Seattle**	Drainage Area		Dowstream MH	**SL 6**
Loc. details		Flow Control		Dir. of Survey	**Downstream**
Location Code		Length surveyed	**110.60 ft**	Section Length	**110.60 ft**

Purpose of Survey	**Maintenance Related**	Joint Length	
Year Laid		Dia./Height	**10 inch**
Year Rehabilitated		Material	**Concrete Pipe (non-reinforced)**
Tape / Media No.	**Floyd/Gas Works 06.25.2010**	Lining Method	

Add. Information :



1:270 Position	Observation	Photo
0.00	Manhole / Mainline MH	
0.00	Roots Fine Joint, from 05 to 07 o'clock, within 8 inches of joint: YES / In MH	Mainline MH_SL 6101118_25062010_A.JPG
110.60	Manhole / SL 6	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**2100**	**0**	**2**	**2**	**0**	**2**	**2**

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Inspection photos / Inspection: Gas Works Park Storm

City :	Street :	Date :	Pipe Segment Reference :	Section No :
Seattle	**2101 N Northlake Way**			**4**

Photo: Mainline MH_SL 6101118_25062010_A.JPG, VCR No.: Floyd/Gas Works 06.25.2010
0FT, Roots Fine Joint, from 05 to 07 o'clock, within 8 inches of joint: YES / In MH

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Inspection Report / Inspection: Gas Works Park Storm

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
6/25/2010		**Light Rain**	**Nirpaul**		**5**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
U-1208-7918				**No Pre-Cleaning**	

Street123	**2101 N Northlake Way**	Use of Sewer	**Stormwater**	Upstream MH	**Mainline MH 2**
City	**Seattle**	Drainage Area		Dowstream MH	**Mainline MH**
Loc. details		Flow Control		Dir. of Survey	**Downstream**
Location Code		Length surveyed	**103.10 ft**	Section Length	**103.10 ft**

Purpose of Survey	**Maintenance Related**	Joint Length	
Year Laid		Dia./Height	**10 inch**
Year Rehabilitated		Material	**Concrete Pipe (non-reinforced)**
Tape / Media No.	**Floyd/Gas Works 06.25.2010**	Lining Method	

Add. Information : **Match to Section 3**

1:255	Position	Observation	Photo
Mainline MH 2	0.00	Manhole / Mainline MH 2	
	4.70	Water Level, Sag in pipe, 5 %of cross sectional area / 1/2"	
	20.30	Crack Circumferential, from 08 to 12 o'clock, within 8 inches of joint: YES	Mainline MH 2_Mainline MH104104_25062010_A.JPG
	28.80	Water Level, Sag in pipe, 5 %of cross sectional area / 3/4"	
	38.70	Tap Factory Made Active, at 10 o'clock, 8", within 8 inches of joint: YES / Roots	
	38.70	Roots Fine Lateral, from 03 to 09 o'clock	Mainline MH 2_Mainline MH104331_25062010_A.JPG
	103.10	Survey Abandoned / Match to Section 3	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
1100	**2300**	**1**	**6**	**7**	**1**	**2**	**1.75**

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Inspection photos / Inspection: Gas Works Park Storm

City :	Street :	Date :	Pipe Segment Reference :	Section No :
Seattle	**2101 N Northlake Way**			**5**

Photo: Mainline MH 2_Mainline MH104104_25062010_A.JPG, VCR No.: Floyd/Gas Works 06.25.2010
20.3FT, Crack Circumferential, from 08 to 12 o'clock, within 8 inches of joint: YES

Photo: Mainline MH 2_Mainline MH104331_25062010_A.JPG, VCR No.: Floyd/Gas Works 06.25.2010
38.7FT, Roots Fine Lateral, from 03 to 09 o'clock

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Inspection Report / Inspection: Gas Works Park Storm

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
6/25/2010		**Light Rain**	**Nirpaul**		**6**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
U-1208-7918				**No Pre-Cleaning**	

Street123	**2101 N Northlake Way**	Use of Sewer	**Stormwater**	Upstream MH	**PA-CB-01**
City	**Seattle**	Drainage Area		Dowstream MH	**Mainline MH2**
Loc. details		Flow Control		Dir. of Survey	**Upstream**
Location Code		Length surveyed	**38.70 ft**	Section Length	**38.70 ft**

Purpose of Survey	**Maintenance Related**	Joint Length	
Year Laid		Dia./Height	**8 inch**
Year Rehabilitated		Material	**Concrete Pipe (non-reinforced)**
Tape / Media No.	**Floyd/Gas Works 06.25.2010**	Lining Method	

Add. Information :

1:105	Position		Observation	Photo
Mainline MH2	0.00		Manhole / Mainline MH 2	
	30.40		Tap Factory Made Active, at 02 o'clock, 8", within 8 inches of joint: YES / PA-CB-04	
	33.80	S1	Roots Fine Barrell, from 04 to 07 o'clock, Start	PA-CB-01_Mainline MH2111028_25062010_A.JPG
	37.00	F1	Roots Fine Barrell, from 04 to 07 o'clock, Finish	
	37.30	S2	Roots Ball Barrell, from 02 to 09 o'clock, 50 %, within 8 inches of joint: YES, Start	PA-CB-01_Mainline MH2111128_25062010_A.JPG
	38.70	F2	Roots Ball Barrell, from 02 to 09 o'clock, 50 %, within 8 inches of joint: YES, Finish	
	38.70		Survey Abandoned / Roots	PA-CB-01_Mainline MH2111230_25062010_A.JPG

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**5222**	**0**	**14**	**14**	**0**	**3.5**	**3.5**

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Inspection photos / Inspection: Gas Works Park Storm

City :	Street :	Date :	Pipe Segment Reference :	Section No :
Seattle	**2101 N Northlake Way**			**6**

Photo: PA-CB-01_Mainline MH2111028_25062010_A.JPG, VCR No.: Floyd/Gas Works 06.25.2010
33.8FT, Roots Fine Barrell, from 04 to 07 o'clock, Start

Photo: PA-CB-01_Mainline MH2111128_25062010_A.JPG, VCR No.: Floyd/Gas Works 06.25.2010
37.3FT, Roots Ball Barrell, from 02 to 09 o'clock, 50 %, within 8 inches of joint: YES, Start

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Inspection photos / Inspection: Gas Works Park Storm

City :	Street :	Date :	Pipe Segment Reference :	Section No :
Seattle	**2101 N Northlake Way**			**6**

Photo: PA-CB-01_Mainline MH2111230_25062010_A.JPG, VCR No.: Floyd/Gas Works 06.25.2010
38.7FT, Survey Abandoned / Roots

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Inspection Report / Inspection: Gas Works Park Storm

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
6/25/2010		**Light Rain**	**Nirpaul**		**7**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
U-1208-7918				**No Pre-Cleaning**	

Street123	**2101 N Northlake Way**	Use of Sewer	**Stormwater**	Upstream MH	**PA-CB-04**
City	**Seattle**	Drainage Area		Dowstream MH	**Mainline Discharge Point**
Loc. details		Flow Control		Dir. of Survey	**Upstream**
Location Code		Length surveyed	**3.70 ft**	Section Length	**3.70 ft**

Purpose of Survey	**Maintenance Related**	Joint Length	
Year Laid		Dia./Height	**8 inch**
Year Rehabilitated		Material	**Concrete Pipe (non-reinforced)**
Tape / Media No.	**Floyd/Gas Works 06.25.2010**	Lining Method	

Add. Information :

1:50	Position	Observation	Photo
Mainline Discharge Point	0.00	Discharge Point / Mainline	
	2.30	Alignment Up, 25 %	
PA-CB-04	3.70	Catch Basin / PA-CB-04	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**4100**	**0**	**4**	**4**	**0**	**4**	**4**

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Inspection Report / Inspection: Gas Works Park Storm

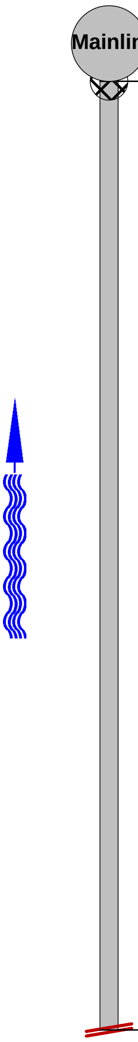
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
6/25/2010		**Dry**	**Nirpaul**		**8**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
U-1208-7918				**No Pre-Cleaning**	

Street123	**2101 N Northlake Way**	Use of Sewer	**Stormwater**	Upstream MH	**PA-CB-05**
City	**Seattle**	Drainage Area		Dowstream MH	**Mainline MH 2**
Loc. details		Flow Control		Dir. of Survey	**Upstream**
Location Code		Length surveyed	**49.40 ft**	Section Length	**49.40 ft**

Purpose of Survey	**Maintenance Related**	Joint Length	
Year Laid		Dia./Height	**8 inch**
Year Rehabilitated		Material	**Concrete Pipe (non-reinforced)**
Tape / Media No.	**Floyd/Gas Works 06.25.2010**	Lining Method	

Add. Information :

1:120	Position	Observation	Photo
Mainline MH 2	0.00	Manhole / Mainline MH 2	
	49.40	Survey Abandoned / Cable unable to push	



QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**0000**	**0**	**0**	**0**	**0**	**0**	**0**

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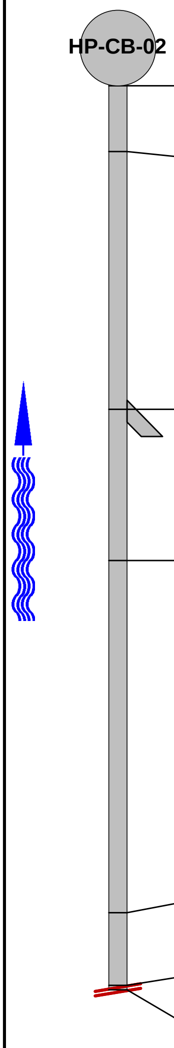
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
6/25/2010		**Dry**	**Nirpaul**		**9**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
U-1208-7918				**No Pre-Cleaning**	

Street123	**Harbor Patrol**	Use of Sewer	**Stormwater**	Upstream MH	**HP-CB-03**
City	**Seattle**	Drainage Area		Dowstream MH	**HP-CB-02**
Loc. details		Flow Control		Dir. of Survey	**Upstream**
Location Code		Length surveyed	**41.19 ft**	Section Length	**41.19 ft**

Purpose of Survey	**Maintenance Related**	Joint Length	
Year Laid		Dia./Height	**8 inch**
Year Rehabilitated		Material	**Polyvinyl Chloride**
Tape / Media No.	**Floyd/Gas Works 06.25.2010**	Lining Method	

Add. Information :



1:105	Position	Observation	Photo
	0.00	Catch Basin / HP-CB-02	
	2.99	Water Level, 15 %of cross sectional area	
	14.76	Tap Factory Made, at 11 o'clock, 4", within 8 inches of joint: YES	
	21.64	Water Level, 30 %of cross sectional area	
	37.70	Water Level, Sag in pipe, 35 %of cross sectional area	
	40.99	Alignment Left, 45 %	
	41.19	Survey Abandoned / Bends in Line	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**4131**	**0**	**7**	**7**	**0**	**3.5**	**3.5**

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Inspection Report / Inspection: Gas Works Park Storm

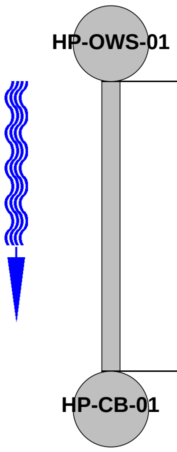
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
6/25/2010		**Dry**	**Nirpaul**		**10**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
U-1208-7918				**No Pre-Cleaning**	

Street123	**Harbor Patrol**	Use of Sewer	**Stormwater**	Upstream MH	**HP-OWS-01**
City	**Seattle**	Drainage Area		Dowstream MH	**HP-CB-01**
Loc. details		Flow Control		Dir. of Survey	**Downstream**
Location Code		Length surveyed	**6.28 ft**	Section Length	**6.28 ft**

Purpose of Survey	**Maintenance Related**	Joint Length	
Year Laid		Dia./Height	**8 inch**
Year Rehabilitated		Material	**Polyvinyl Chloride**
Tape / Media No.	**Floyd/Gas Works 06.25.2010**	Lining Method	

Add. Information :

1:50	Position	Observation	Photo
	0.00	Special Chamber / HP-OWS-01	
	6.28	Catch Basin / HP-CB-01	



QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**0000**	**0**	**0**	**0**	**0**	**0**	**0**

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Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
6/25/2010		**Dry**	**Nirpaul**		**11**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
U-1208-7918				**No Pre-Cleaning**	

Street123	**Gas Works Park**	Use of Sewer	**Stormwater**	Upstream MH	**Inlet PA-CB-03**
City	**Seattle**	Drainage Area		Dowstream MH	**PA-CB-03**
Loc. details		Flow Control		Dir. of Survey	**Downstream**
Location Code		Length surveyed	**28.82 ft**	Section Length	**28.82 ft**

Purpose of Survey	**Maintenance Related**	Joint Length	
Year Laid		Dia./Height	**6 inch**
Year Rehabilitated		Material	**Concrete Pipe (non-reinforced)**
Tape / Media No.	**Floyd/Gas Works 06.25.2010**	Lining Method	

Add. Information :

1:75	Position		Observation	Photo
Inlet PA-CB-03	0.00		Catch Basin / Inlet PA-CB-03	
	0.00	S1	Deposits Settled Fine, 5 %of cross sectional area, from 05 to 07 o'clock, , within 8 inches of joint: YES, Start	Inlet PA-CB-03_PA-CB-03041601_28062010_A.jpg
	18.85		Roots Fine Joint, from 03 to 09 o'clock, within 8 inches of joint: YES	
	21.64		Roots Fine Joint, from 02 to 10 o'clock, within 8 inches of joint: YES	Inlet PA-CB-03_PA-CB-03041931_28062010_A.jpg
	24.14		Crack Longitudinal, at 12 o'clock, within 8 inches of joint: YES / In Crown	
	24.24	F1	Deposits Settled Fine, 5 %of cross sectional area, from 05 to 07 o'clock, , within 8 inches of joint: YES, Finish	
PA-CB-03	28.82		Manhole / PA-CB-03	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
2100	**2700**	**2**	**14**	**16**	**2**	**2**	**2**

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City :	Street :	Date :	Pipe Segment Reference :	Section No :
Seattle	**Gas Works Park**			**11**

Photo: Inlet PA-CB-03_PA-CB-03041601_28062010_A.jpg, VCR No.: Floyd/Gas Works 06.25.2010
0FT, Deposits Settled Fine, 5 %of cross sectional area, from 05 to 07 o'clock, , within 8 inches of joint: YES, Start

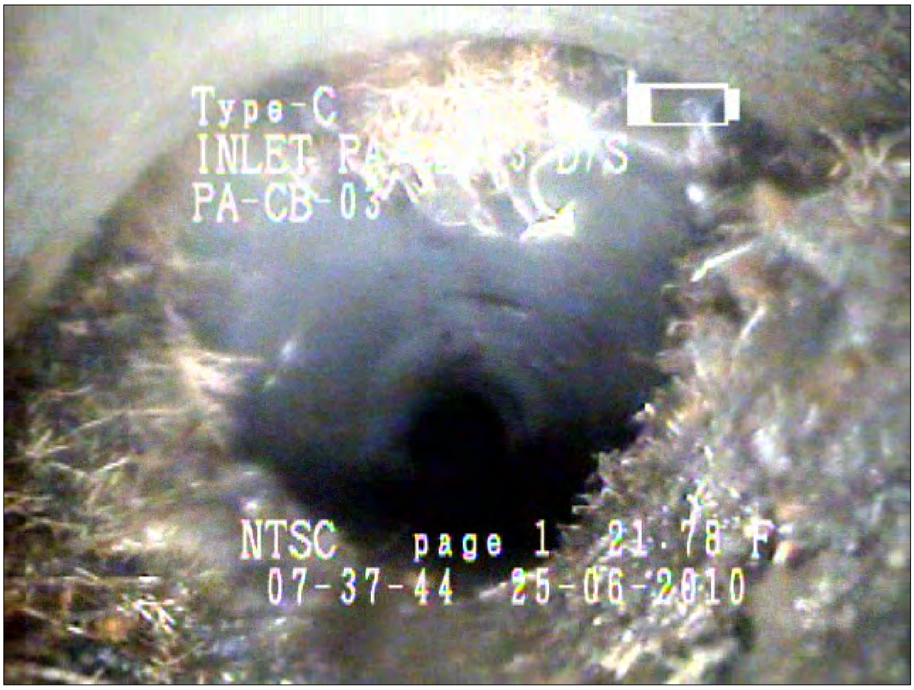

Photo: Inlet PA-CB-03_PA-CB-03041931_28062010_A.jpg, VCR No.: Floyd/Gas Works 06.25.2010
21.64FT, Roots Fine Joint, from 02 to 10 o'clock, within 8 inches of joint: YES

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Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
6/25/2010		**Dry**	**Nirpaul**		**12**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
U-1208-7918				**No Pre-Cleaning**	

Street123	**Gas Works Park**	Use of Sewer	**Stormwater**	Upstream MH	**Inlet PA-CB-01**
City	**Seattle**	Drainage Area		Dowstream MH	**PA-CB-01**
Loc. details		Flow Control		Dir. of Survey	**Downstream**
Location Code		Length surveyed	**0.00 ft**	Section Length	**0.00 ft**

Purpose of Survey	**Maintenance Related**	Joint Length	
Year Laid		Dia./Height	**6 inch**
Year Rehabilitated		Material	**Concrete Pipe (non-reinforced)**
Tape / Media No.	**Floyd/Gas Works 06.25.2010**	Lining Method	

Add. Information :

1:50	Position	Observation	Photo
Inlet PA-CB-01	0.00	Catch Basin / Inlet PA-CB-01	
	0.00	Deposits Settled Fine, 20 %of cross sectional area, from 03 to 09 o'clock, , within 8 inches of joint: YES	Inlet PA-CB-01_PA-CB-01042535_28062010_A.jpg
	0.00	Survey Abandoned / Roots & Debris	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**3100**	**0**	**3**	**3**	**0**	**3**	**3**

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Inspection photos / Inspection: Gas Works Park Storm

City :	Street :	Date :	Pipe Segment Reference :	Section No :
Seattle	**Gas Works Park**			**12**

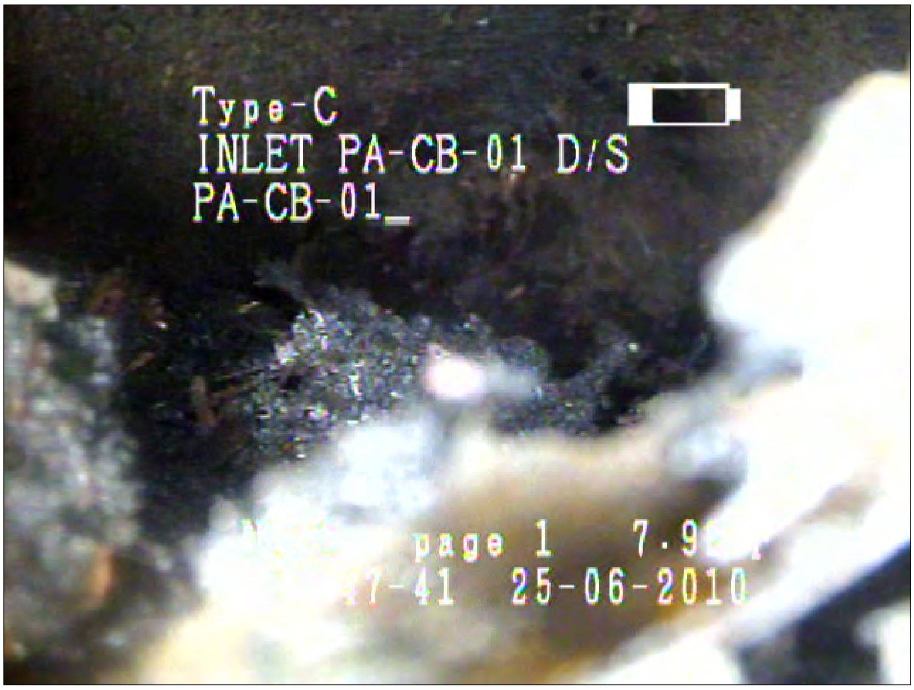

Photo: Inlet PA-CB-01_PA-CB-01042535_28062010_A.jpg, VCR No.: Floyd/Gas Works 06.25.2010
0FT, Deposits Settled Fine, 20 %of cross sectional area, from 03 to 09 o'clock, , within 8 inches of joint: YES

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Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
6/25/2010		**Light Rain**	**Nirpaul**		**13**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
U-1208-7918				**No Pre-Cleaning**	

Street123	**Gas Works Park**	Use of Sewer	**Stormwater**	Upstream MH	**Inlet PA-CB-04**
City	**Seattle**	Drainage Area		Dowstream MH	**PA-CB-04**
Loc. details		Flow Control		Dir. of Survey	**Downstream**
Location Code		Length surveyed	**17.95 ft**	Section Length	**17.95 ft**

Purpose of Survey	**Maintenance Related**	Joint Length	
Year Laid		Dia./Height	**6 inch**
Year Rehabilitated		Material	**Concrete Pipe (non-reinforced)**
Tape / Media No.	**Floyd/Gas Works 06.25.2010**	Lining Method	

Add. Information :

1:50	Position	Observation	Photo
Inlet PA-CB-04	0.00	Catch Basin / Inlet PA-CB-04	
	0.00	Deposits Settled Gravel, 10 %of cross sectional area, from 05 to 07 o'clock, , within 8 inches of joint: YES	
	5.59	Roots Fine Joint, from 03 to 09 o'clock, within 8 inches of joint: YES	Inlet PA-CB-04_PA-CB-04043034_28062010_A.jpg
PA-CB-04	17.95	Manhole / PA-CB-04	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**2200**	**0**	**4**	**4**	**0**	**2**	**2**

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Inspection photos / Inspection: Gas Works Park Storm

City :	Street :	Date :	Pipe Segment Reference :	Section No :
Seattle	**Gas Works Park**			**13**

Photo: Inlet PA-CB-04_PA-CB-04043034_28062010_A.jpg, VCR No.: Floyd/Gas Works 06.25.2010
5.59FT, Roots Fine Joint, from 03 to 09 o'clock, within 8 inches of joint: YES

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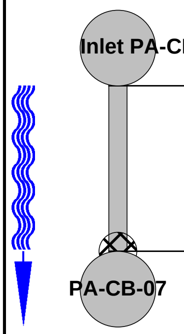
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
6/25/2010		**Light Rain**	**Nirpaul**		**14**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
U-1208-7918				**No Pre-Cleaning**	

Street123	**Gas Works Park**	Use of Sewer	**Stormwater**	Upstream MH	**Inlet PA-CB-07**
City	**Seattle**	Drainage Area		Dowstream MH	**PA-CB-07**
Loc. details		Flow Control		Dir. of Survey	**Downstream**
Location Code		Length surveyed	**3.59 ft**	Section Length	**3.59 ft**

Purpose of Survey	**Maintenance Related**	Joint Length	
Year Laid		Dia./Height	**6 inch**
Year Rehabilitated		Material	**Concrete Pipe (non-reinforced)**
Tape / Media No.	**Floyd/Gas Works 06.25.2010**	Lining Method	

Add. Information :



1:50	Position	Observation	Photo
	0.00	Catch Basin / Inlet PA-CB-07	
	3.59	Manhole / PA-CB-07	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**0000**	**0**	**0**	**0**	**0**	**0**	**0**

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Inspection Report / Inspection: Gas Works Park Storm

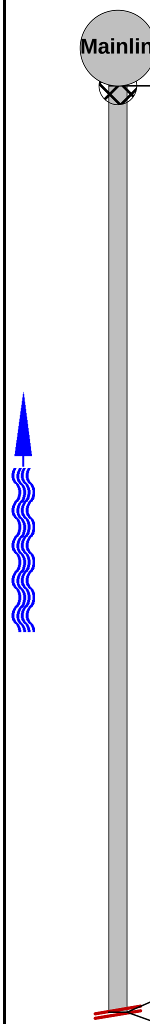
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
6/25/2010		**Light Rain**	**Nirpaul**		**15**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
U-1208-7918				**No Pre-Cleaning**	

Street123	**Gas Works Park**	Use of Sewer	**Stormwater**	Upstream MH	**PA-CB-01**
City	**Seattle**	Drainage Area		Dowstream MH	**Mainline MH 2**
Loc. details		Flow Control		Dir. of Survey	**Upstream**
Location Code		Length surveyed	**42.19 ft**	Section Length	**42.19 ft**

Purpose of Survey	**Maintenance Related**	Joint Length	
Year Laid		Dia./Height	**8 inch**
Year Rehabilitated		Material	**Concrete Pipe (non-reinforced)**
Tape / Media No.	**Floyd/Gas Works 06.25.2010**	Lining Method	

Add. Information :

1:105	Position	Observation	Photo
Mainline MH 2	0.00	Manhole / Mainline MH 2	
	42.19	Roots Ball Barrell, from 02 to 09 o'clock, 50 %, within 8 inches of joint: YES	
	42.19	Survey Abandoned / Roots	



QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**5100**	**0**	**5**	**5**	**0**	**5**	**5**

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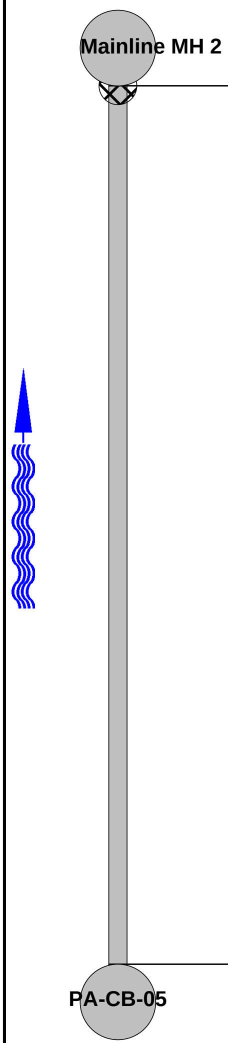
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
6/25/2010		**Light Rain**	**Nirpaul**		**16**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
U-1208-7918				**No Pre-Cleaning**	

Street123	**Gas Works Park**	Use of Sewer	**Stormwater**	Upstream MH	**PA-CB-05**
City	**Seattle**	Drainage Area		Dowstream MH	**Mainline MH 2**
Loc. details		Flow Control		Dir. of Survey	**Upstream**
Location Code		Length surveyed	**62.90 ft**	Section Length	**62.90 ft**

Purpose of Survey	**Maintenance Related**	Joint Length	
Year Laid		Dia./Height	**8 inch**
Year Rehabilitated		Material	**Concrete Pipe (non-reinforced)**
Tape / Media No.	**Floyd/Gas Works 06.25.2010**	Lining Method	

Add. Information :



1:165	Position	Observation	Photo
	0.00	Manhole / Mainline MH 2	
	62.90	Catch Basin / PA-CB-05	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**0000**	**0**	**0**	**0**	**0**	**0**	**0**

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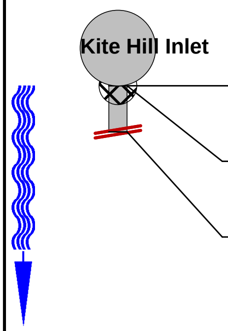
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
6/25/2010		**Light Rain**	**Nirpaul**		**17**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
U-1208-7918				**No Pre-Cleaning**	

Street123	**Gas Works Park**	Use of Sewer	**Stormwater**	Upstream MH	**Kite Hill Inlet**
City	**Seattle**	Drainage Area		Dowstream MH	**Outfall**
Loc. details		Flow Control		Dir. of Survey	**Downstream**
Location Code		Length surveyed	**1.00 ft**	Section Length	**1.00 ft**

Purpose of Survey	**Maintenance Related**	Joint Length	
Year Laid		Dia./Height	**6 inch**
Year Rehabilitated		Material	**Not Known**
Tape / Media No.	**Floyd/Gas Works 06.25.2010**	Lining Method	

Add. Information :

1:50 **Position** **Observation** **Photo**



Position	Observation
0.00	Manhole / Kite Hill Inlet
0.00	Deposits Settled Fine, 75 %of cross sectional area, from 02 to 10 o'clock, , within 8 inches of joint: YES / In pipe in MH
1.00	Survey Abandoned / Deposits

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**5100**	**0**	**5**	**5**	**0**	**5**	**5**

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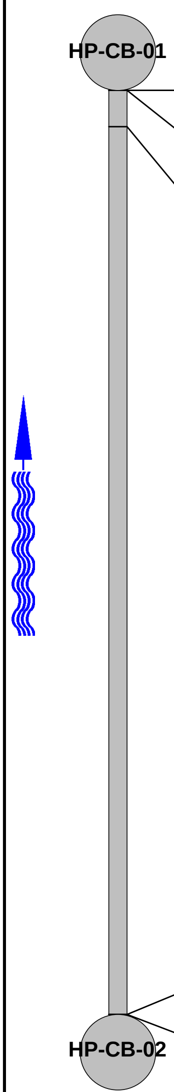
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
6/25/2010		**Light Rain**	**Nirpaul**		**18**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
U-1208-7918				**No Pre-Cleaning**	

Street123	**Gas Works Park**	Use of Sewer	**Stormwater**	Upstream MH	**HP-CB-02**
City	**Seattle**	Drainage Area		Dowstream MH	**HP-CB-01**
Loc. details		Flow Control		Dir. of Survey	**Upstream**
Location Code		Length surveyed	**84.20 ft**	Section Length	**84.20 ft**

Purpose of Survey	**Maintenance Related**	Joint Length	
Year Laid		Dia./Height	**8 inch**
Year Rehabilitated		Material	**Polyvinyl Chloride**
Tape / Media No.	**Floyd/Gas Works 06.25.2010**	Lining Method	

Add. Information :



1:210	Position		Observation	Photo
HP-CB-01	0.00		Catch Basin / HP-CB-01	
	0.00		Water Level, 65 %of cross sectional area	
	3.30	S1	Deposits Settled Fine, 5 %of cross sectional area, from 05 to 07 o'clock, , within 8 inches of joint: NO, Start	
	84.20	F1	Deposits Settled Fine, 5 %of cross sectional area, from 05 to 07 o'clock, , within 8 inches of joint: NO, Finish	
HP-CB-02	84.20		Catch Basin / HP-CB-02	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**2B00**	**0**	**32**	**32**	**0**	**2**	**2**

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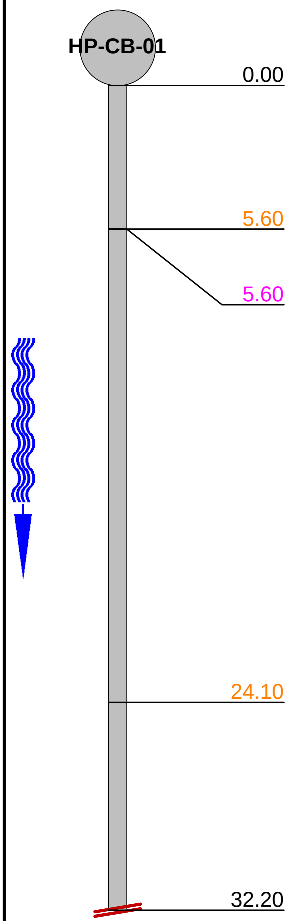
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
6/25/2010		**Light Rain**	**Nirpaul**		**19**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
U-1208-7918				**No Pre-Cleaning**	

Street123	**Gas Works Park**	Use of Sewer	**Stormwater**	Upstream MH	**HP-CB-01**
City	**Seattle**	Drainage Area		Dowstream MH	**HP Over flow**
Loc. details		Flow Control		Dir. of Survey	**Downstream**
Location Code		Length surveyed	**32.20 ft**	Section Length	**32.20 ft**

Purpose of Survey	**Maintenance Related**	Joint Length	
Year Laid		Dia./Height	**8 inch**
Year Rehabilitated		Material	**Polyvinyl Chloride**
Tape / Media No.	**Floyd/Gas Works 06.25.2010**	Lining Method	

Add. Information :



1:90 Position	Observation	Photo
0.00	Catch Basin / HP-CB-01	
5.60	Obstacles Rocks, 20 %of cross sectional area, from 04 to 08 o'clock	HP-CB-01_HP Over flow081251_30062010_A.jpg
5.60	Obstacles Other, 25 %of cross sectional area, from 04 to 08 o'clock / Plastic bag	HP-CB-01_HP Over flow081359_30062010_A.jpg
24.10	Obstacles Other, 15 %of cross sectional area, from 10 to 02 o'clock / Wood	HP-CB-01_HP Over flow081441_30062010_A.jpg
32.20	Survey Abandoned / Debris	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**4132**	**0**	**10**	**10**	**0**	**3.33**	**3.33**

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City : **Seattle**	Street : **Gas Works Park**	Date :	Pipe Segment Reference :	Section No : **19**

Photo: HP-CB-01_HP Over flow081251_30062010_A.jpg, VCR No.: Floyd/Gas Works 06.25.2010
5.6FT, Obstacles Rocks, 20 %of cross sectional area, from 04 to 08 o'clock

Photo: HP-CB-01_HP Over flow081359_30062010_A.jpg, VCR No.: Floyd/Gas Works 06.25.2010
5.6FT, Obstacles Other, 25 %of cross sectional area, from 04 to 08 o'clock / Plastic bag

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Inspection photos / Inspection: Gas Works Park Storm

City :	Street :	Date :	Pipe Segment Reference :	Section No :
Seattle	**Gas Works Park**			**19**

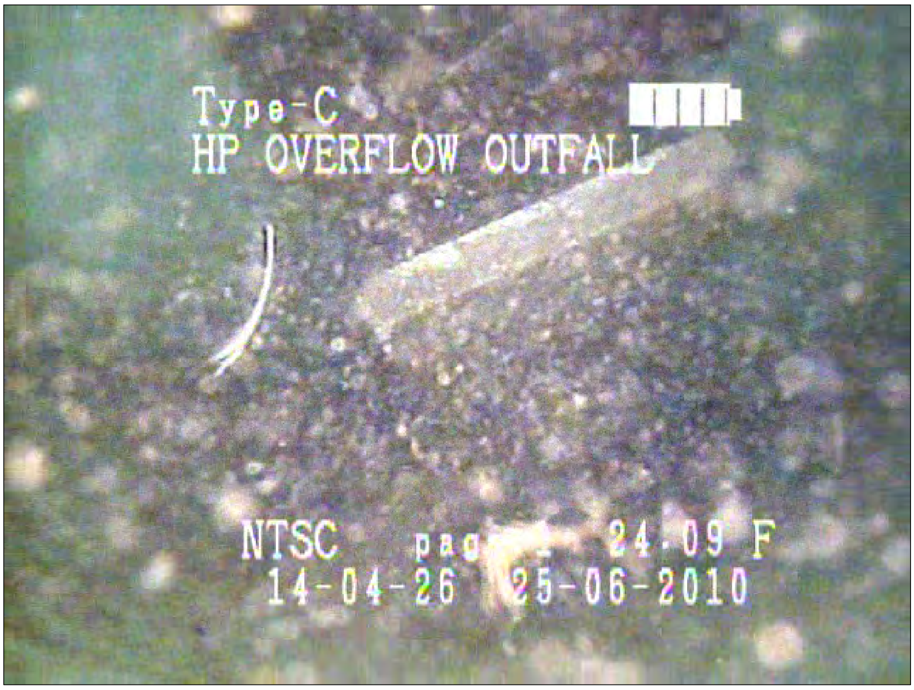

Photo: HP-CB-01_HP Over flow081441_30062010_A.jpg, VCR No.: Floyd/Gas Works 06.25.2010
24.1FT, Obstacles Other, 15 %of cross sectional area, from 10 to 02 o'clock / Wood

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Fax: 425-424-9002
E-mail:

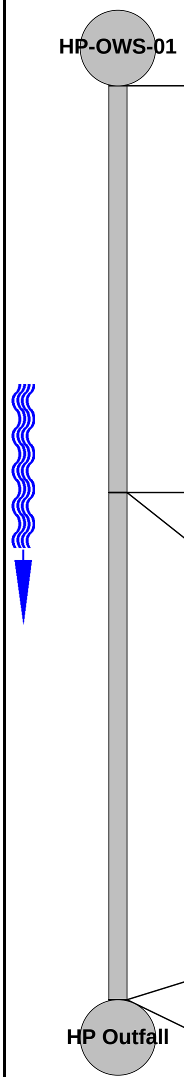
Inspection Report / Inspection: Gas Works Park Storm

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
6/25/2010		**Light Rain**	**Nirpaul**		**20**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
U-1208-7918				**No Pre-Cleaning**	

Street123	**Gas Works Park**	Use of Sewer	**Stormwater**	Upstream MH	**HP-OWS-01**
City	**Seattle**	Drainage Area		Dowstream MH	**HP Outfall**
Loc. details		Flow Control		Dir. of Survey	**Downstream**
Location Code		Length surveyed	**35.70 ft**	Section Length	**35.70 ft**

Purpose of Survey	**Maintenance Related**	Joint Length	
Year Laid		Dia./Height	**8 inch**
Year Rehabilitated		Material	**Polyvinyl Chloride**
Tape / Media No.	**Floyd/Gas Works 06.25.2010**	Lining Method	

Add. Information :



1:90	Position		Observation	Photo
HP-OWS-01	0.00		Special Chamber / HP-OWS-01	
	15.90		Water Level, 60 %of cross sectional area	
	15.90	S1	Camera Underwater, Start	
	35.70	F1	Camera Underwater, Finish	
HP Outfall	35.70		End of Pipe / HP Outfall	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**4400**	**0**	**16**	**16**	**0**	**4**	**4**

Gas Works Park

Storm Drain Source Control Evaluation
Phase 3 Data Report

Appendix E
Video Inspections
(Provided on DVD)

FINAL

ATTACHMENT 6B-5

Storm Drain Source Control Evaluation
Phase 3 Data Report Addendum

(Video files on DVD)

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Two Union Square
601 Union Street, Suite 600
Seattle, WA 98101
tel: 206.292.2078 fax: 206.682.7867

Memorandum

To: John Keeling, Washington State Department of Ecology

Copies: Pete Rude, Seattle Public Utilities
Dan Baker, GeoEngineers John Rork, Puget Sound Energy

From: Stephen Bentsen, P.E.
Allison Geiselbrecht, Ph.D.

Date: October 7, 2011

Project No: COS-GWSA.07020

Re: **Storm Drain Source Control Evaluation Phase 3 Data Report Addendum**

This memorandum describes the storm drain video inspections that were conducted at Gas Works Park on January 5, 2011. The inspections were conducted as part of the Phase 3 Source Control Investigation (Phase 3) and are an addendum to the *Storm Drain Source Control Evaluation Phase 3 Data Report* (Phase 3 Report; Floyd|Snider 2010). The storm drains inspected during this event (Kite Hill Outfall and Outfall F), were unable to be inspected during the initial June 25, 2010 Phase 3 investigation due to high water levels and debris, as described further below.

METHODOLOGY

In order to more accurately evaluate the condition of the storm drains and identify areas of concern, a video inspection of selected lines was conducted on January 5, 2011 by Bravo Environmental. Storm drains were not cleaned prior to inspection. Oversight of the storm drain system investigation was conducted by Floyd|Snider field staff who documented activities with photographs and field notes. During the video inspections, field staff documented the start and end time of each video inspection, and noted any observations of interest including type of observation, location along pipe, etc. Field staff were responsible for ensuring that video crews attempted to investigate all proposed storm drain lines and conducted the video survey according to the City of Seattle protocols.

The video inspection of the storm drains consisted of those drains not able to be previously inspected—Kite Hill Outfall and Outfall F. The video was recorded and narrated by the operator with distance markings and visual observations. These visual observations included blockages, laterals, cracks, and similar items. In addition to the video, a report was developed for each stretch of pipe inspected, which documented the observations including pictures of any items of interest. The video inspection reports, key photos of the inspection, and a DVD of the video inspections are included in Attachments 1, 2, and 3, respectively.

Storm drains are shown along with the associated structure ID on Figure 1. Note that Figure 1 also includes information on the inspection of storm drains performed during June 2010. The key points from each storm drain inspection are summarized below.

Kite Hill Outfall

Kite Hill Outfall is a 6-inch pipe that conveys runoff collected from three inlets located around the perimeter of the sculpture on top of Kite Hill to Lake Union. The runoff from the three inlets is conveyed to a manhole located on the south side of the sculpture at which point the runoff enters the 6-inch pipe. It should be noted that the Phase 3 Report identified four inlets that conveyed runoff to the manhole, but upon further inspection it was determined that there were only three inlets. Additionally, only two inlets are functional.

In June 2010, the camera was placed in the Kite Hill Manhole and was unable to go more than 1 foot towards the Kite Hill Outfall because of deposits occupying approximately 75 percent of the pipe. The outlet of this pipe was unable to be accessed safely and was likely underwater; therefore, this pipe was unable to be inspected at this time. This pipe was re-inspected in January 2011 when the water level in Lake Union had dropped and after removal of the deposits by Seattle Parks and Recreation staff. The results of that inspection are below:

- **Kite Hill Manhole to Kite Hill Outfall**. The 6-inch corrugated ABS pipe contains many twists and turns as it descends to Lake Union. It may not be bedded in sand and is not straight, but still appears functional where it was able to be inspected. At 5 feet from the manhole a low point was encountered where water had accumulated in the pipe. At approximately 160 feet from the manhole, significant debris, dirt, and rock were encountered and the inspection was unable to go any further. Up to that point, the pipe appeared in reasonable shape with no tears or cracks. This run is identified as Section No. 21 in the inspection report (Attachment 1).

  In order to fully inspect this pipe, the inspection was conducted from the outfall end of the pipe and is described in the following bullet.

- **Kite Hill Outfall to Kite Hill Manhole**. At approximately 20 feet from the outfall, the pipe was severely twisted and crushed and the camera was unable to go any further. The twisting was so significant that there was no visibility beyond the deformation. It is likely that the pipe is crushed beyond this point as well. This run is identified as Section No. 25 in the inspection report.

  It was noted by Pete Rude of Seattle Public Utilities that he has never observed any water coming out of this pipe, even during heavy storms.

There are also three influent pipes that enter the Kite Hill Manhole on top of Kite Hill, identified as East, West, and North. The descriptions of the inspections of these pipes are below:

- **Kite Hill Manhole to Eastern Inlet.** A 6-inch PVC pipe that comes from the Eastern Inlet, which is in the grass just to the east of the East marker on the sundial on top of Kite Hill. There was no evidence that the East marker, which appeared to be a stormwater inlet, is connected to this inlet. At approximately 30 feet from the manhole there were deposits that had filled in approximately 20 percent of the pipe. At 52 feet from the manhole, the Eastern Inlet was reached. Other than the debris at

30 feet, this run appeared to be in reasonable shape with no tears or cracks. This run is identified as Section No. 22 in the inspection report.

- **Kite Hill Manhole to Western Inlet.** A 6-inch PVC pipe that comes from the Western Inlet, which is in the grass just to the west of the West marker on the sundial on top of Kite Hill. There was no evidence that the West marker, which appeared to be a stormwater inlet, is connected to this inlet. At 17 feet from the manhole, the Western Inlet was reached. This run appeared to be in reasonable shape with no tears or cracks. This run is identified as Section No. 23 in the inspection report.
- **Kite Hill Manhole to Northern Inlet**. A 6-inch corrugated ABS pipe that enters the manhole from a northerly direction. At 5 feet from the manhole, the pipe was completely filled with debris, rocks, and soil and the inspection was abandoned. This pipe is assumed to continue to the northern portion of Kite Hill and the sundial sculpture, but is likely not active. This run is identified as Section No. 24 in the inspection report.

Outfall F

Outfall F is a 6-inch pipe that discharges into Lake Union on the south side of the park and is located at the west end of the prow along the southern portion of the park as shown on Figure 1. The Outfall F drain consists of a solid pipe that conveys subsurface water collected in an upgradient perforated pipe. The upstream portion of this system is a perforated pipe that is below the ground surface and collects subsurface drainage only. The perforated pipe is located in a low elevation area just north of a paved path and is approximately 40 feet long. Stormwater runoff from a northern area of the park that is between the main east-west path and the parking lot is conveyed to this area through an inlet and short pipe that conveys the runoff to the south underneath the paved path. This runoff then travels overland to the low area where the perforated pipe is located. Additional runoff from the eastern side of Kite Hill and the grassy area west of the cracking towers may also infiltrate and be collected by the perforated pipe.

Because of the high level of water in Lake Union in June 2010, this pipe was unable to be accessed safely and was therefore not inspected and was re-inspected in January 2011. The results of that inspection are below:

- **Outfall F Upstream**. Outfall F is a 6-inch corrugated ABS pipe. The camera went approximately 18 feet before the pipe was 100 percent filled with dirt and the inspection was abandoned. It was noted by Pete Rude of Seattle Public Utilities that he has never observed flow from Outfall F during several storms and based on the blockage observed during the video inspection it is unlikely that this pipe is operational. This run is identified as Section No. 26 in the inspection report.

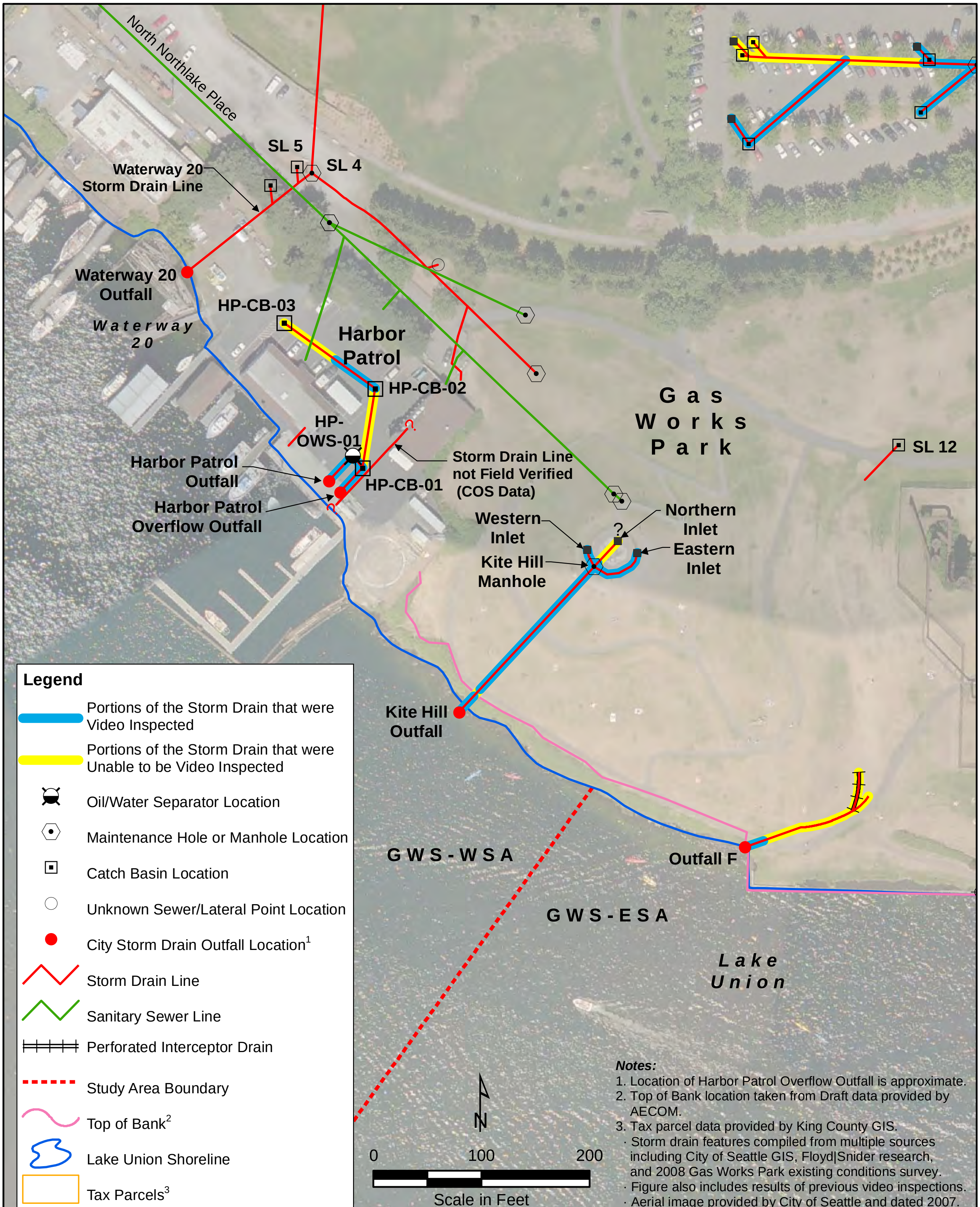
REFERENCES

Floyd|Snider. 2010. *Gas Works Park Final Storm Drain Source Control Evaluation Phase 3 Data Report.* Prepared for City of Seattle, Seattle Public Utilities. December.

ENCLOSURES

Figure 1	Video Inspection Locations, January 2011
Attachment 1	Outfall Inspection Reports
Attachment 2	Inspection Photos
Attachment 3	Outfall Inspection DVD

Figure



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Storm Drain Source Control Evaluation
Phase 3 Data Report Addendum
Gas Works Park
City of Seattle

Figure 1
Video Inspection Locations
January 2011

F:\projects\COS-GWSA\GIS\Task 7050\Phase 3 Addendum 2011\Figure 1 (Video Inspection Locations January 2011).mxd
8/11/2011

Attachment 1
Outfall Inspection Reports

Bravo Environmental

Kenmore
Tel: 425-424-9000
Fax: 425-424-9002
E-mail:

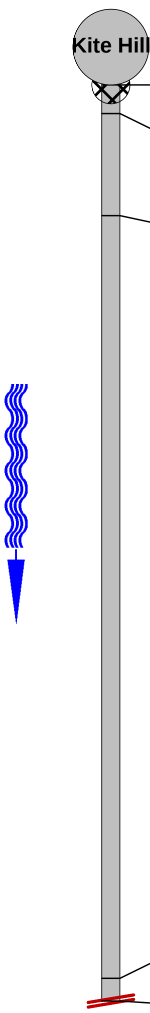
Inspection Report / Inspection: Gas Works Park Storm

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/5/2011		**Light Rain**	**Nirpaul**		**21**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
U-1208-7918				**No Pre-Cleaning**	

Street123	**Gas Works Park**	Use of Sewer	**Stormwater**	Upstream MH	**Kite Hill**
City	**Seattle**	Drainage Area		Dowstream MH	**outfall**
Loc. details		Flow Control		Dir. of Survey	**Downstream**
Location Code		Length surveyed	**161.00 ft**	Section Length	**161.00 ft**

Purpose of Survey	**Maintenance Related**	Joint Length	
Year Laid		Dia./Height	**6 inch**
Year Rehabilitated		Material	**Polyethylene**
Tape / Media No.	**Floyd/Gas Works 06.25.2010**	Lining Method	

Add. Information :



1:405	Position	Observation	Photo
	0.00	Manhole / Kite HIll	
	5.00	Water Level, Sag in pipe, 30 %of cross sectional area	
	23.00	Deformed, 20 %	
	157.00	Deposits Settled Other, 85 %of cross sectional area, from 02 to 10 o'clock, , within 8 inches of joint: YES / dirt/rocks/debris	
	161.00	Survey Abandoned / due to rocks/dirt/debris	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
5100	**5121**	**5**	**7**	**12**	**5**	**3.5**	**4**

Bravo Environmental

Kenmore
Tel: 425-424-9000
Fax: 425-424-9002
E-mail:

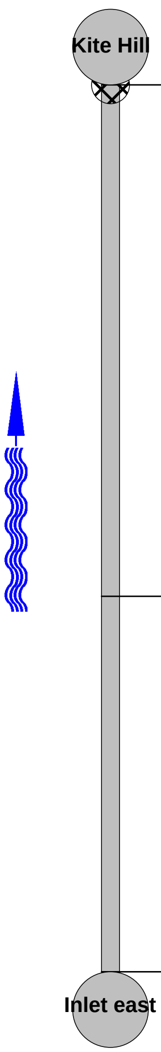
Inspection Report / Inspection: Gas Works Park Storm

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/5/2011		**Light Rain**	**Nirpaul**		**22**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
U-1208-7918				**No Pre-Cleaning**	

Street123	**Gas Works Park**	Use of Sewer	**Stormwater**	Upstream MH	**Inlet east**
City	**Seattle**	Drainage Area		Dowstream MH	**Kite Hill**
Loc. details		Flow Control		Dir. of Survey	**Upstream**
Location Code		Length surveyed	**52.00 ft**	Section Length	**52.00 ft**

Purpose of Survey	**Maintenance Related**	Joint Length	
Year Laid		Dia./Height	**6 inch**
Year Rehabilitated		Material	**Polyvinyl Chloride**
Tape / Media No.	**Floyd/Gas Works 06.25.2010**	Lining Method	

Add. Information :



1:135	Position	Observation	Photo
	0.00	Manhole / Kite Hill	
	30.00	Deposits Settled Other, 20 %of cross sectional area, from 04 to 08 o'clock, , within 8 inches of joint: YES / sludge	
	52.00	Catch Basin / inlet east	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**3100**	**0**	**3**	**3**	**0**	**3**	**3**

Bravo Environmental

Kenmore
Tel: 425-424-9000
Fax: 425-424-9002
E-mail:

Inspection Report / Inspection: Gas Works Park Storm

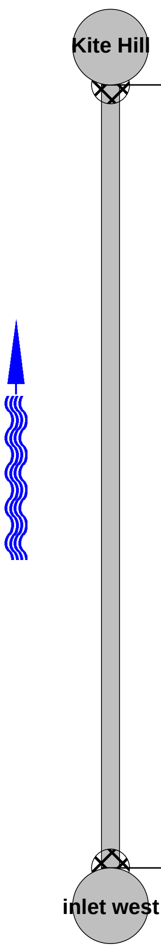
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/5/2011		**Light Rain**	**Nirpaul**		**23**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
U-1208-7918				**No Pre-Cleaning**	

Street123	**Gas Works Park**	Use of Sewer	**Stormwater**	Upstream MH	**inlet west**
City	**Seattle**	Drainage Area		Dowstream MH	**Kite Hill**
Loc. details		Flow Control		Dir. of Survey	**Upstream**
Location Code		Length surveyed	**17.00 ft**	Section Length	**17.00 ft**

Purpose of Survey	**Maintenance Related**	Joint Length	
Year Laid		Dia./Height	**6 inch**
Year Rehabilitated		Material	**Polyvinyl Chloride**
Tape / Media No.	**Floyd/Gas Works 06.25.2010**	Lining Method	

Add. Information :

1:50	Position	Observation	Photo
	0.00	Manhole / Kite Hill	
	17.00	Manhole / Inlet West	



QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**0000**	**0**	**0**	**0**	**0**	**0**	**0**

Bravo Environmental

Kenmore
Tel: 425-424-9000
Fax: 425-424-9002
E-mail:

Inspection Report / Inspection: Gas Works Park Storm

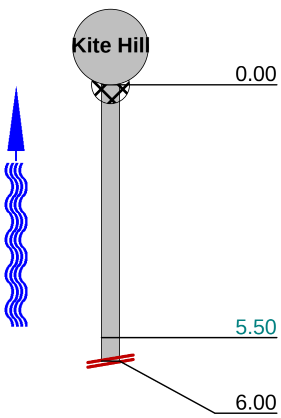
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/5/2011		**Light Rain**	**Nirpaul**		**24**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
U-1208-7918				**No Pre-Cleaning**	

Street123	**Gas Works Park**	Use of Sewer	**Stormwater**	Upstream MH	**Inlet North**
City	**Seattle**	Drainage Area		Dowstream MH	**Kite Hill**
Loc. details		Flow Control		Dir. of Survey	**Upstream**
Location Code		Length surveyed	**6.00 ft**	Section Length	**6.00 ft**

Purpose of Survey	**Maintenance Related**	Joint Length	
Year Laid		Dia./Height	**6 inch**
Year Rehabilitated		Material	**Polyethylene**
Tape / Media No.	**Floyd/Gas Works 06.25.2010**	Lining Method	

Add. Information :

1:50	Position	Observation	Photo
	0.00	Manhole / Kite Hill	
	5.50	Deposits Settled Other, 100 %of cross sectional area, from 12 to 12 o'clock, , within 8 inches of joint: YES / dirt/rocks/debris	
	6.00	Survey Abandoned / due to rocks/debris/dirt	



QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**5100**	**0**	**5**	**5**	**0**	**5**	**5**

Bravo Environmental

Kenmore
Tel: 425-424-9000
Fax: 425-424-9002
E-mail:

Inspection Report / Inspection: Gas Works Park Storm

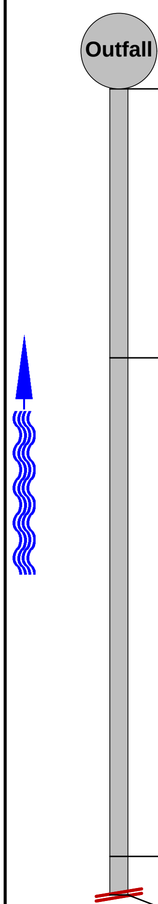
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/5/2011		**Light Rain**	**Nirpaul**		**25**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
U-1208-7918				**No Pre-Cleaning**	

Street123	**Gas Works Park**	Use of Sewer	**Stormwater**	Upstream MH	**Kite Hill**
City	**Seattle**	Drainage Area		Dowstream MH	**Outfall**
Loc. details		Flow Control		Dir. of Survey	**Upstream**
Location Code		Length surveyed	**21.00 ft**	Section Length	**21.00 ft**

Purpose of Survey	**Maintenance Related**	Joint Length	
Year Laid		Dia./Height	**6 inch**
Year Rehabilitated		Material	**Polyethylene**
Tape / Media No.	**Floyd/Gas Works 06.25.2010**	Lining Method	

Add. Information :

1:60	Position	Observation	Photo
	0.00	End of Pipe / OutFall	
	7.00	Deposits Settled Other, 5 %of cross sectional area, from 05 to 07 o'clock, , within 8 inches of joint: YES	
	20.00	Deformed, 100 %	
	21.00	Survey Abandoned / due to deformed pipe	



QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
5100	**2100**	**5**	**2**	**7**	**5**	**2**	**3.5**

Bravo Environmental

Kenmore
Tel: 425-424-9000
Fax: 425-424-9002
E-mail:

Inspection Report / Inspection: Gas Works Park Storm

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
1/5/2011		**Light Rain**	**Nirpaul**		**26**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
U-1208-7918				**No Pre-Cleaning**	

Street123	**Gas Works Park**	Use of Sewer	**Stormwater**	Upstream MH	**Unknown**
City	**Seattle**	Drainage Area		Dowstream MH	**Outfall F**
Loc. details		Flow Control		Dir. of Survey	**Upstream**
Location Code		Length surveyed	**17.50 ft**	Section Length	**17.50 ft**

Purpose of Survey	**Maintenance Related**	Joint Length	
Year Laid		Dia./Height	**6 inch**
Year Rehabilitated		Material	**Polyethylene**
Tape / Media No.	**Floyd/Gas Works 06.25.2010**	Lining Method	

Add. Information :

1:50	Position	Observation	Photo
Outfall F	0.00	End of Pipe / Outfall F	
	6.00	Deposits Settled Gravel, 10 %of cross sectional area, from 05 to 07 o'clock, , within 8 inches of joint: YES	
	17.00	Deposits Settled Other, 100 %of cross sectional area, from 12 to 12 o'clock, , within 8 inches of joint: YES / rocks/dirt/debris	
	17.50	Survey Abandoned / due to debris	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**5121**	**0**	**7**	**7**	**0**	**3.5**	**3.5**

Attachment 2
Inspection Photographs

Photograph 1. Kite Hill Outfall looking north. January 1, 2010.

Photograph 2. Video capture of crushed pipe 20 feet from Kite Hill Outfall. January 5, 2011.

Photograph 3. Eastern Inlet on Kite Hill. August 22, 2011.

Photograph 4. Western Inlet on Kite Hill. August 22, 2011.

Photograph 5. Video capture of Kite Hill Manhole to Eastern Inlet. January 5, 2011.

Photograph 6. Video capture of Kite Hill Manhole to completely filled Northern Inlet. January 5, 2011.

Photograph 7. Outfall F looking north. January 5, 2011.

Photograph 8. Video capture of filled pipe 18 feet from Outfall F. January 5, 2011.

Attachment 3
Outfall Inspection Video
(*provided on DVD*)

ATTACHMENT 6B-6
Storm Drain Source Control Evaluation
Phase 3 Data Report Addendum 2 – Waterway #20

(Video files on DVD)

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Two Union Square
601 Union Street, Suite 600
Seattle, WA 98101
tel: 206.292.2078 fax: 206.682.7867

Memorandum

To: Mr. Pete Rude, Seattle Public Utilities

Copies:

From: Stephen Bentsen, P.E.
Allison Geiselbrecht, Ph.D.

Date: March 5, 2012

Project No: COS-GWSA.07020

Re: **Storm Drain Source Control Evaluation Phase 3 Data Report Addendum 2 – Waterway #20**

This memorandum describes the inspections that were conducted at Gas Works Park since 2007 relating to the stormwater conveyance system that discharges into Waterway #20. This memorandum is intended to provide a summary of numerous investigations conducted on this conveyance system. The document provides a chronology of the events related to this Waterway #20 system and provides a description of the findings and a summary of the key issues related to this system.

BACKGROUND AND HISTORY

Waterway #20 is located between Harbor Patrol and the South Yard of King County Metro, at the foot of Densmore Avenue North (refer to Figure 1). The Waterway #20 storm drain was built prior to 1919 and currently discharges stormwater into Waterway #20 at the western end of the Harbor Patrol facility via an 8-inch stormwater outfall located near the shoreline.

The drainage basin for this outfall contributes stormwater from approximately 7.0 acres, with inputs primarily from street right-of-ways, Gas Works Park, a condominium complex, and the majority of the former Metro Lake Union North Yard currently planned for development. The location and size of this basin was developed using available maps and field verification conducted by Seattle Public Utilities (SPU). The Waterway #20 basin encompasses the majority of the former North Yard of the King County Metro Lake Union Facility, but does not include the South Yard. Available information indicates that no piped drainage system exists currently in the South Yard. The remainder of the stormwater runoff from the North Yard discharges into Waterway #21 (west of Northlake Shipyard), along with stormwater collected in a series of catch basins and inlets within the public right-of-way.

The conveyance system for Waterway #20 goes through the western portion of Gas Works Park, a Model Toxics Control Act (MTCA) site that may contain contaminated soil and associated groundwater in close proximity to the stormwater conveyance system. Because contaminated soils could infiltrate the stormwater conveyance system depending on its condition, the integrity of the stormwater conveyance system was identified as a potential source control and sediment recontamination concern for the Gas Works Sediment Area (GWSA).

METHODOLOGY

In order to evaluate the condition of the storm drains and identify areas of concern, video inspections of selected lines were conducted by Bravo Environmental and SPU. Oversight of the storm drain system investigation was conducted by Floyd|Snider field staff who documented activities with photographs and field notes. During the video inspections, field staff documented the start and end time of each video inspection and noted items of interest including location along the pipe, etc. Field staff were responsible for ensuring that video crews attempted to investigate all proposed storm drain lines and conducted the video survey according to the City of Seattle protocols.

Typically, video was recorded and narrated by the operator with distance markings and visual observations. These visual observations included blockages, laterals, joint conditions, cracks, and similar items. In addition to the video, a report was developed for each stretch of pipe inspected, which documented the observations including pictures of any items of interest. Video inspections conducted by SPU do not include narrations or a written report. In addition, technical difficulties occurred during the recording of some inspections and records are not available in a few cases. Table 1 identifies the dates and locations of the video inspections conducted within the Waterway #20 conveyance system.

Line cleaning was performed on select lines within the Waterway #20 conveyance system by Bravo Environmental and SPU. Floyd|Snider did not observe the line cleaning by SPU, but it is assumed that a similar methodology was used. Line cleaning consisted of plugging the downgradient lines to prevent cleaning water from discharging to Lake Union. A pressure washer was then used with various water nozzles to remove material within the pipe that was being cleaned. As the water entered the location where the cleaning was taking place, it was vacuumed and placed in a Vactor truck for disposal at an appropriate facility. If necessary, the cleaning was done in conjunction with a video inspection in order to identify the nature of blockages and determine the possibility of further line cleaning. Table 1 identifies the dates and locations of the line cleaning conducted within the Waterway #20 conveyance system.

EVENT CHRONOLOGY—2007 TO 2009

Numerous events and investigations have been conducted since 2007 in order to fully understand the nature and integrity of the Waterway #20 conveyance system. A summary of the events related to this conveyance system in chronological order is provided below and these events are summarized in Table 1. Analytical data, video inspections on a DVD, and written reports of the video inspections are provided in Attachments A, B, and C, respectively. Key photographs and field notes/event summaries from the events are provided in Attachments D and E, respectively.

It should be noted that there were several pipe sections that did not correspond with existing figures. Throughout the course of these inspections, the true nature of the conveyance system was better understood. The figures in this report reflect the most up-to-date understanding of site conditions as discovered during these multiple inspections. Figure 2 shows the locations of the samples and the sections of the conveyance system that have been inspected.

A summary of the events related to Waterway #20 is as follows:

- In 2007, a Joint Source Control Evaluation (JSCE) was conducted on the conveyance systems in the vicinity of Gas Works Park, including Waterway #20, which evaluated the nature of the facilities and areas that were part of the drainage basin, identified the potential for recontamination of the post-remedial sediments, and provided recommendations for additional data collection and actions related to source control. This information was presented to the Washington State Department of Ecology (Ecology) in the JSCE Report (Floyd|Snider 2007). Historical records and available information regarding the Waterway #20 conveyance system are included in Attachment F.
- In October 2008, a source control screening investigation was conducted on several conveyance systems in the vicinity of Gas Works Park based on the recommendations of the JSCE. Work performed related to Waterway #20 included sampling of solids in catch basins and manholes and an initial video inspection of the accessible pipes. The analytical results and a summary of the inspection results were provided to Ecology in the Initial Source Control Screening Investigation of Storm Drains Report in April 2009 (Floyd|Snider 2009).
- In June 2009, additional samples were collected from two locations, SL 4 and SL 3, to be used for disposal purposes for future cleaning. Video inspections were conducted by SPU in several pipes within this conveyance system. Due to technical difficulties, the inspections of several pipes were not recorded.
- In July 2009, video inspections were conducted on this conveyance system using a larger camera with a longer range in order to reach locations that were previously inaccessible. Additional samples were collected from newly exposed locations and from previous locations for disposal purposes.
- In August 2009, partial line cleaning was performed on the pipe from SL 4 to D029-003. Following cleaning, a video inspection was conducted on this line and additional lines in the SL 4 and SL 1 vicinities.
- In September and October 2009, several pipes within the Waterway #20 conveyance system were cleaned and video inspected by SPU maintenance crews. The locations of these pipes are identified in Table 1.
- In December 2009, several pipes within the Waterway #20 conveyance system were video inspected by SPU maintenance crews. The locations of these pipes are identified in Table 1.

KEY WATERWAY #20 FINDINGS

Most of the inspected pipe segments for Waterway #20 appeared to be in good condition. As noted above, several of the pipes did contain blockages, pipe changes, or structures that limited the video inspection of this area; however, it is believed that the investigations conducted have been conducted as thoroughly as possible. Disregarding small hairline cracks and minimal gaps, a summary of the key issues of the Waterway #20 conveyance system is below. The letters in the text correspond to the key locations as shown on Figure 2. Key photographs are shown in Attachment D.

- SL 1 to SL 4 Pipe – Approximately 135 feet from SL 4 and 65 feet from SL 1 (Location A), the material and diameter of the pipe changes. This may be a historical patch repair that is not in good shape. At this location, surrounding soil is visible and there are cracks in the vicinity. This pipe is in a historically industrial area and infiltration of contaminated soil and groundwater is a source control concern for the GWSA. There is also an obstruction near the SL 4 structure (Location B) consisting of wood and debris; however, water is able to travel past this obstruction.
- SL 4 to Waterway #20 Outfall – There are roots growing at the joints between the pipe segments at numerous locations throughout the pipe. There is also exposure to the soil at the location where the covered catch basin pipe connects to this pipe (approximately 44 feet from SL 4, Location C); the joint at that location is completely exposed to the soil. At approximately 90 to 95 feet from SL 4 (Location D) there are several holes in the pipe and soil is visible at this location. At 135 feet (Location E) there is a large gap at the pipe joints. These gaps may allow potentially contaminated soil and groundwater to enter the conveyance system. Additionally, the outfall for this pipe is located several feet offshore and is cracked. The outfall for this pipe was initially further out into Lake Union, but has broken off near the shoreline.
- SL 4 to D029-003 – This pipe has severe blockage and is not believed to be functional as no water has been observed discharging out of this pipe during storm events. Numerous cleaning events were performed on this pipe, but were unable to get further than approximately 100 feet (Location F) before hitting obstructions that the pressure washer could not pass.
- SL 1 to PE – The joint in between SL 1 and inlet PE (Location G) does not appear to be a standard connection point. Although it has been confirmed that these two points are connected, it is unclear as to what this structure is and the integrity of it has not been evaluated.
- Covered and inoperable conveyance structures – There are numerous covered catch basins or inlets (Locations G, H, I, and J) that are no longer functioning due to coverage with soil or pavement; however, it does not appear to be affecting drainage in this area.
- Inlet on North Northlake Way (Location K) – This outlet for this inlet was only able to be inspected for 8 feet until it was completely filled with material. In essence, this inlet is no longer active. This inlet may lead to the pipe that connects SL 4 and D029-003, but it is unknown.
- SL 2 to SL 1 – The pipe that leads from SL 2 to SL 1 was unable to be completely inspected due to the debris in the pipe (Location L); however, this does not appear to be affecting drainage in this area.

It should be noted that this evaluation does not identify stormwater capacity issues or ponding issues that may occur within this conveyance system. The key findings above only identify structural integrity issues or operational issues within the conveyance system. This evaluation also does not consider the analytical results associated with this area, such as catch basin sample results.

REFERENCES

Floyd|Snider. 2009. *Gas Works Sediment Area Initial Source Control Screening Investigation of Storm Drains*. Prepared for City of Seattle, Seattle Public Utilities. April.

———. 2007. *Gas Works Sediment Area Joint Source Control Evaluation Ecology Review Draft*. Prepared for City of Seattle and Seattle Public Utilities. 27 February.

ENCLOSURES

Table 1	Chronology of Waterway #20 Stormwater Conveyance Pipe Video Inspections and Cleaning
Figure 1	Vicinity Map
Figure 2	Video Inspection and Key Finding Locations Waterway #20 Conveyance System
Attachment A	Analytical Data
Attachment B	Video Inspections (provided on DVD)
Attachment C	Video Inspection Reports
Attachment D	Key Photographs
Attachment E	Field Notes/Event Summaries
Attachment F	Conveyance System Records (provided on DVD)

Table 1
Chronology of Waterway #20 Stormwater Conveyance Pipe Video Inspections and Cleaning[1,2]

Date	Conveyance Pipe	Event	Notes	Report No.	On DVD	Company
10/2/2008	SL 1 to D022-262	Video Inspection	Completed.	Section No. 10 in October 2008 Report	Yes	Bravo
10/2/2008	SL 1 to SL 4	Video Inspection	Partial inspection due to pipe change and joint offset.	Section No. 11 in October 2008 Report	Yes	Bravo
10/2/2008	SL 1 to Western CB	Video Inspection	Unable to conduct due to blockage. Unknown point identified as SL 3 on video inspection report. Location shown as unknown in April 2009 Report.	Section No. 12 in October 2008 Report	No	Bravo
10/2/2008	SL 1 to Eastern CB	Video Inspection	Partial inspection due to blockage. Western CB identified as CB on video inspection report. Actual location of CB unknown.	Section No. 13 in October 2008 Report	Yes	Bravo
10/2/2008	SL 1 to MH 3.1	Video Inspection	Completed. MH 3.1 incorrectly identified as SL 2 on video.	Section No. 14 in October 2008 Report	Yes	Bravo
10/2/2008	MH 3.1 to SL 3	Video Inspection	Completed.	Section No. 15 in October 2008 Report	No	Bravo
10/2/2008	SL 1 to PE	Video Inspection	Partial inspection due to material change and impassable joint. Actual location of PE unknown.	Section No. 16 in October 2008 Report	Yes	Bravo
10/2/2008	SL 5 to Catch Basin 1	Video Inspection	Partial inspection due to blockage. This section was incorrectly thought to be SL 4 to SL 1 at the time since SL 4 was buried.	Section No. 17 in October 2008 Report	Yes	Bravo
10/2/2008	SL 5 to Catch Basin 2	Video Inspection	Partial inspection due to blockage. This section was incorrectly thought to be SL 4 to D029-003 at the time since SL 4 was buried.	Section No. 18 in October 2008 Report	Yes	Bravo
10/2/2008	SL 5 to pipe from SL 4 to Waterway #20 Outfall	Video Inspection	Unable to access due to cover.	NA	NA	Bravo
6/15/2009	SL 5 to Catch Basin 1	Video Inspection	Completed.	NA	No	SPU
6/15/2009	SL 5 to Catch Basin 2	Video Inspection	Completed.	NA	No	SPU
6/15/2009	SL 5 to pipe from SL 4 to Waterway #20 Outfall	Video Inspection	Completed.	NA	No	SPU
6/15/2009	North Northlake Way CB to Unknown	Video Inspection	Only able to go 8 feet before completely clogged. Unknown where this pipe goes. Not shown on Figure 2.	NA	No	SPU
6/15/2009	SL 1 to SL 4	Video Inspection	Near complete inspection but stopped near end due to obstruction.	NA	No	SPU
7/14/2009	SL 4 to SL 1	Video Inspection	Partial inspection due to joint offset. SL 1 incorrectly identitfied as D022-262 on Inspection Report.	Section No. 1 in July 2009 Report	Yes	Bravo
7/14/2009	SL 4 to Waterway #20 Outfall	Video Inspection	Partial inspection due to hitting water and unable to see.	Section No. 2 in July 2009 Report	Yes	Bravo
7/14/2009	SL 4 to D029-003	Video Inspection	Unable to begin due to blockage.	Section No. 3 in July 2009 Report	Yes	Bravo
8/24/2009	SL 4 to D029-003	Line Cleaning	Approximately 120 feet of this pipe was cleaend until it was completely clogged.	NA	NA	Bravo
8/24/2009	SL 4 to D029-003	Video Inspection	Partial inspection to approximately 95 feet before stopping due to blockage. Report only goes to 33 feet but second video goes to 100 feet.	Section No. 1 in August 2009 Report	Yes	Bravo
8/24/2009	SL 1 to PE	Video Inspection	Partial inspection due to dropoff. PE was called Unknown on the video inspection report.	Section No. 3 in August 2009 Report	Yes	Bravo
8/24/2009	Inlet to PE	Video Inspection	Verified connection from inlet to SL 1.	NA	No	Bravo
8/24/2009	SL 2 to SL 2 Inlet	Video Inspection	Partial inspection due to blockage.	Section No. 4 in August 2009 Report	Yes	Bravo
8/24/2009	SL 2 to SL 1	Video Inspection	Partial inspection due to blockage.	Section No. 5 in August 2009 Report	Yes	Bravo
09/2009–10/2009	SL 1 to Western CB	Line Cleaning	Unknown if CB or end was found.	NA	NA	SPU

Table 1

Chronology of Waterway #20 Stormwater Conveyance Pipe Video Inspections and Cleaning[1,2]

Date	Conveyance Pipe	Event	Notes	Report No.	On DVD	Company
09/2009–10/2009	SL 1 to Eastern CB	Line Cleaning	End (suspected inlet) not reached.	NA	NA	SPU
09/2009–10/2009	SL 1 to PE	Line Cleaning	Unkown if PE was reached.	NA	NA	SPU
12/14/2009	SL 4 to Waterway #20 Outfall	Video Inspection	Completed.	NA	Yes	SPU
12/14/2009	SL 1 to D022-262	Video Inspection	Completed.	NA	No	SPU
12/14/2009	SL 1 to SL 4	Video Inspection	Partial inspection due to offset joint at 57 feet.	NA	Yes	SPU
12/14/2009	SL 1 to MH 3.1	Video Inspection	Completed.	NA	No	SPU
12/14/2009	SL 1 to Western CB	Video Inspection	Partial inspection due to blockage at 73 feet.	NA	Yes	SPU
12/14/2009	SL 1 to Eastern CB	Video Inspection	Partial inspection due to blockage at 149 feet. No inlet or end of pipe reached.	NA	Yes	SPU
12/14/2009	SL 2 to SL 1	Video Inspection	Unable to inspect due to blockage in pipe near SL 2.	NA	No	SPU

Notes:

1 Location SL 1 is also known as D-022-263 in the SPU GIS system.

2 Location SL 4 is also known as D-029-002 in the SPU GIS system.

Abbreviations:

Bravo Bravo Environmental

GIS Geographical Information Systems

NA Not applicable

SPU Seattle Public Utilities

Table

Figures

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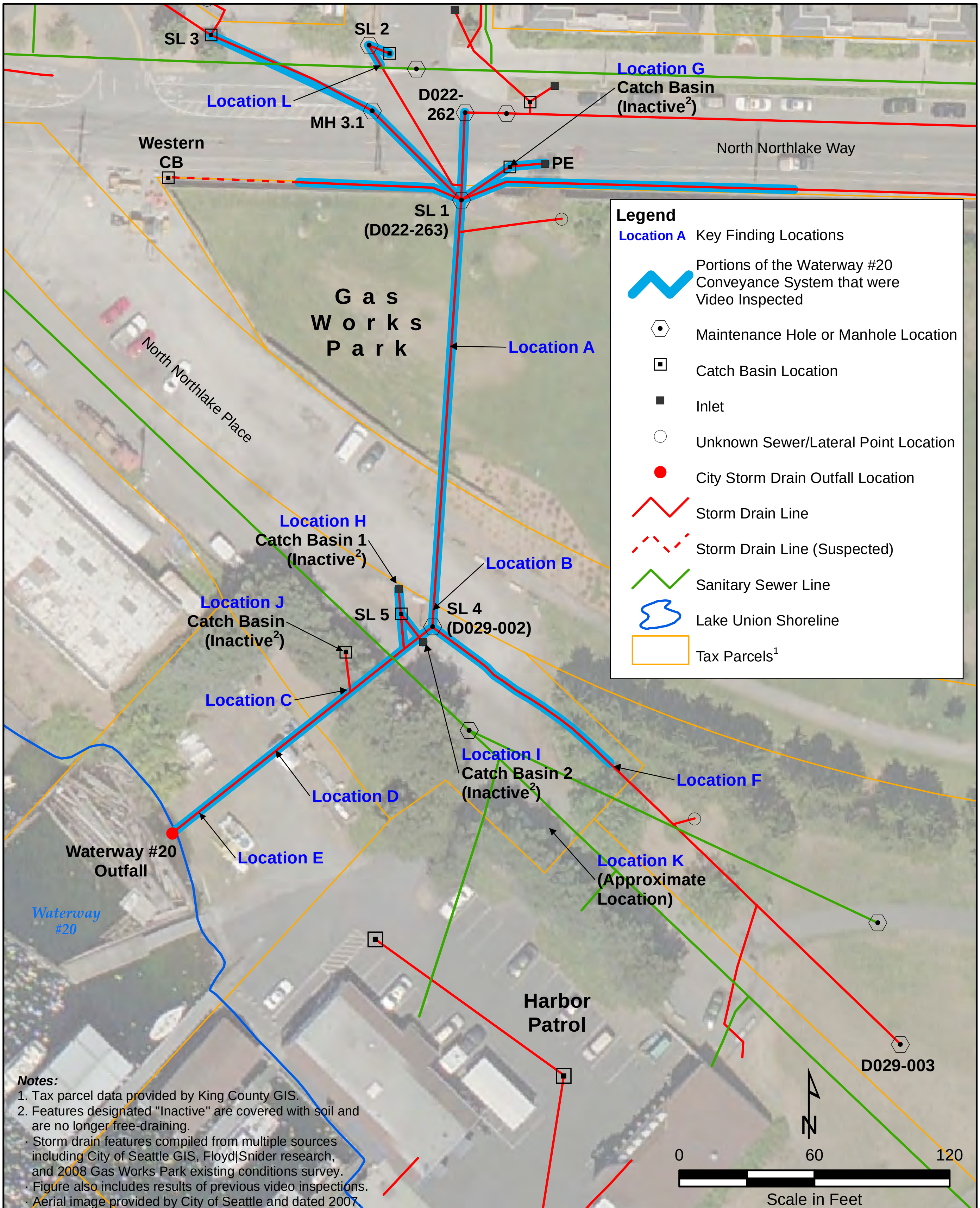
strategy • science • engineering

Storm Drain Source Control Evaluation
Phase 3 Data Report Addendum 2
Gas Works Sediment Area
City of Seattle

Figure 1
Vicinity Map

F:\projects\COS-GWSA\GIS\Task 07050\Phase 3 Addendum 2011\Figure 1 (Vicinity Map).mxd
3/5/2012



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Storm Drain Source Control Evaluation
Phase 3 Data Report Addendum 2
Gas Works Sediment Area
City of Seattle

Figure 2
Video Inspection and
Key Finding Locations
Waterway #20 Conveyance System

F:\projects\COS-GWSA\GIS\Task 07050\Phase 3 Addendum 2011\Figure 2 (Video Inspection and Key Finding Locations WW 20 Conveyance System).mxd
3/5/2012

Attachments

Attachment A
Analytical Data

Table A.1
Waterway #20 Conveyance System Structure Solids Analytical Results

Analytes (Testing Method)	Units	SL 2	SL 3	SL 4 Base	SL 4 Pipe to D029-003	SL 5[1]
Conventionals (USEPA Method 160.3)						
Total Solids	%	34	57.3	46.6	na	33.6
Total Organic Carbon[2]	%	13.3	10.8	12	na	18.1
Metals (USEPA Method 6010B)						
Arsenic	mg/kg	10 U	9 U	20	39	20
Cadmium	mg/kg	1.2	1.4	2.5	2.8	1.6
Chromium	mg/kg	28	56.9	69	43	51
Copper	mg/kg	117	191	301	159	184
Lead	mg/kg	56	137	183	456	187
Mercury[3]	mg/kg	0.1 U	0.11	0.2	0.22	0.3
Silver	mg/kg	0.8 U	0.5 U	0.6 U	0.4 U	0.8 U
Zinc	mg/kg	384	651	851	507	379
Polychlorinated Biphenyls (PCBs; USEPA Method 8082)						
Aroclor 1016	µg/kg	32 U	33 U	64 U	520	33 U
Aroclor 1221	µg/kg	32 U	33 U	64 U	64 U	33 U
Aroclor 1232	µg/kg	32 U	33 U	64 U	64 U	33 U
Aroclor 1242	µg/kg	32 U	33 U	64 U	64 U	33 U
Aroclor 1248	µg/kg	32 U	33 U	130 UY	480 UY	33 U
Aroclor 1254	µg/kg	32 U	39	160	330	51
Aroclor 1260	µg/kg	32 U	33 U	120	210 J	33 U
PCBs (Total)	µg/kg	32 U	39	280	1060 J	51
Semivolatile Organic Compounds (USEPA Method 8270D)						
2,4,5-Trichlorophenol	µg/kg	1,400 U	1,300 U	3,300 U	3,100 U	960 U
2,4,6-Trichlorophenol	µg/kg	1,400 U	1,300 U	3,300 U	3,100 U	960 U
2,4-Dichlorophenol	µg/kg	1,400 U	1,300 U	3,300 U	6,200 U	960 U
2,4-Dimethylphenol	µg/kg	280 U	260 U	650 U	620 U	190 U
2,4-Dinitrophenol	µg/kg	2,800 U	2,600 U	6,500 U	6,200 U	1,900 U
2-Chloronaphthalene	µg/kg	280 U	260 U	650 U	620 U	190 U
2-Chlorophenol	µg/kg	280 U	260 U	650 U	620 U	190 U
2-Methylphenol	µg/kg	280 U	260 U	650 U	620 U	190 U
2-Nitrophenol	µg/kg	1,400 U	1,300 U	3,300 U	3,100 U	960 U
4,6-Dinitro-o-cresol	µg/kg	2,800 U	2,600 U	6,500 U	6,200 U	1,900 U
4-Chloro-3-methylphenol	µg/kg	1,400 U	1,300 U	3,300 U	3,100 U	960 U
4-Methylphenol	µg/kg	280 U	260 U	650 U	620 U	380
4-Nitrophenol	µg/kg	1,400 U	1,300 U	3,300 U	3,100 U	960 U
Benzoic acid	µg/kg	2,800 U	2,600 U	6,500 U	6,200 U	1,900 U
Benzyl alcohol	µg/kg	1,400 U	1,300 U	3,300 U	3,100 U	960 U
bis(2-Chloroethoxy)methane	µg/kg	280 U	260 U	650 U	620 U	190 U
bis-Chloroisopropyl ether	µg/kg	280 U	260 U	650 U	620 U	190 U
Carbazole	µg/kg	280 U	260 U	330 J	1,300	190 U
Dibenzofuran	µg/kg	280 U	260 U	650 U	1,300	210
Hexachlorobutadiene	µg/kg	280 U	260 U	650 U	620 U	190 U
Hexachlorocyclopentadiene	µg/kg	1,400 U	1,300 U	3,300 U	3,100 U	960 U
Isophorone	µg/kg	280 U	260 U	650 U	620 U	190 U
N-Nitroso-di-n-propylamine	µg/kg	1,400 U	1,300 U	3,300 U	3,100 U	960 U
N-Nitrosodiphenylamine	µg/kg	280 U	260 U	650 U	620 U	190 U
Pentachlorophenol	µg/kg	1,400 U	1,300 U	3,300 U	3,100 U	960 U
Phenol	µg/kg	280 U	260 U	650 U	620 U	190 U
Low Molecular Weight Polycyclic Aromatic Hydrocarbon (LPAH)						
Naphthalene	µg/kg	280 U	260 U	460 J	1,200	430
Acenaphthylene	µg/kg	280 U	260 U	1,200	3,200	630
Acenaphthene	µg/kg	280 U	260 U	650 U	1,900	190 U
Fluorene	µg/kg	280 U	260 U	650 U	2,400	210
Phenanthrene	µg/kg	380	820	3,000	2,400	1,700
Anthracene	µg/kg	280 U	260 U	620 J	6,100	430
Total LPAH[4]	µg/kg	380	820	5,280 J	27,800	3,400
1-Methylnaphthalene	µg/kg	280 U	260 U	650 U	580 J	340
2-Methylnaphthalene	µg/kg	280 U	260 U	350 J	620	420
High Molecular Weight Polycyclic Aromatic Hydrocarbon (HPAH)						
Fluoranthene	µg/kg	780	1,500	5,600	27,000	3,000
Pyrene	µg/kg	620	1,100	7,300	27,000	2,800
Benzo(a)anthracene	µg/kg	280 U	470	2,800	13,000	1,300
Chrysene	µg/kg	550	780	5,300	17,000	1,700
Benzo(b)fluoranthene	µg/kg	280 U	730	2,800	11,000	2,000
Benzo(k)fluoranthene	µg/kg	470	560	2,800	11,000	1,200
Benzofluoranthenes (total)	µg/kg	470	1,290	5,600	22,000	3,200
Benzo(a)pyrene	µg/kg	280 U	490	3,400	15,000	1,600
Benzo(g,h,i)perylene	µg/kg	280 U	260 U	1,600	5,800	620
Indeno(1,2,3-cd)pyrene	µg/kg	280 U	260 U	1,400	5,700	540
Dibenzo(a,h)anthracene	µg/kg	280 U	260 U	650 U	1,100	190 U
Total HPAH[5]	µg/kg	2,420	5,630	33,000	134,000	14,800

Table A.1
Waterway #20 Conveyance System Structure Solids Analytical Results

Sampling Location		SL 2	SL 3	SL 4 Base	SL 4 Pipe to D029-003	SL 5[1]
Analytes (Testing Method)	**Units**					
Total Polycyclic Aromatic Hydrocarbons (PAHs)[6]						
Total PAH[6]	µg/kg	*2,800*	*6,450*	*38,300 J*	*151,000*	*17,600*
Phthalates						
bis(2-Ethylhexyl)phthalate	µg/kg	*12,000*	*7,800*	*16,000*	*4,100*	*1,500*
Butyl benzyl phthalate	µg/kg	280 U	260 U	*520 J*	620 U	190 U
Di-n-butyl phthalate	µg/kg	280 U	260 U	650 U	620 U	190 U
Di-n-octyl phthalate	µg/kg	*880*	260 U	*880*	620 U	190 U
Diethylphthalate	µg/kg	280 U	260 U	650 U	620 U	190 U
Dimethyl phthalate	µg/kg	280 U	260 U	650 U	620 U	190 U
Volatile Organic Compounds (USEPA Method 8270D)						
1,2,4-Trichlorobenzene	µg/kg	280 U	260 U	650 U	620 U	190 U
1,2-Dichlorobenzene	µg/kg	280 U	260 U	650 U	620 U	190 U
1,3-Dichlorobenzene	µg/kg	280 U	260 U	650 U	620 U	190 U
1,4-Dichlorobenzene	µg/kg	280 U	260 U	650 U	620 U	190 U
2,4-Dinitrotoluene	µg/kg	1,400 U	1,300 U	3,300 U	3,100 U	960 U
2,6-Dinitrotoluene	µg/kg	1,400 U	1,300 U	3,300 U	3,100 U	960 U
2-Nitroaniline	µg/kg	1,400 U	1,300 U	3,300 U	3,100 U	960 U
3,3'-Dichlorobenzidine	µg/kg	1,400 U	1,300 U	3,300 U	3,100 U	960 U
3-Nitroaniline	µg/kg	1,400 U	1,300 U	3,300 U	3,100 U	960 U
4-Bromophenyl phenyl ether	µg/kg	280 U	260 U	650 U	620 U	190 U
4-Chloroaniline	µg/kg	1,400 U	1,300 U	3,300 U	3,100 U	960 U
4-Chlorophenyl phenyl ether	µg/kg	280 U	260 U	650 U	620 U	190 U
4-Nitroaniline	µg/kg	1,400 U	1,300 U	3,300 U	3,100 U	960 U
bis(2-Chloroethyl)ether	µg/kg	280 U	260 U	650 U	620 U	190 U
Hexachlorobenzene	µg/kg	280 U	260 U	650 U	620 U	190 U
Hexachloroethane	µg/kg	280 U	260 U	650 U	620 U	190 U
Nitrobenzene	µg/kg	280 U	260 U	650 U	620 U	190 U

Notes:

Italics Indicates detected concentrations.
1 Incorrectly identified as SL 4 in Initial Investigation Report. Further investigation correctly identified it as SL 5.
2 Tested using the Plumb Method.
3 Tested using USEPA 7471A Method.
4 The total LPAH represents the sum of the following low molecular weight polynuclear aromatic compounds: naphthalene, acenapthylene, acenapthene, fluorene, phenanthrene, and anthracene. 1-Methylnaphthalene and 2-methylnapthalene are not included in the LPAH definition. The result has been rounded to three significant figures.
5 The total HPAH represents the sum of the following high molecular weight polynuclear aromatic compounds: fluroanthene, pyrene, benz(a)anthracene, chrysene, total benzofluoranthenes, benzo(a)pyrene, benzo(g,h,i)perylene, indeno(1,2,3-cd)pyrene, and dibenzo(a,h)anthracene. The result has been rounded to three significant figures.
6 The total PAH represents the sum of the LPAH and HPAH results rounded to three significant figures.

Abbreviations:

µg/kg Micrograms per kilogram
mg/kg Milligrams per kilogram
na Not analyzed
USEPA U.S. Environmental Protection Agency

Qualifiers:

J Indicates the compound was detected and the value shown is an estimate.
U Indicates the compound was undetected at the reported concentration.
UY Indicates the compounds was undetected at the raised reporting limit.

Attachment B
Video Inspections
(*provided on DVD*)

This page is a directory to the video inspections that are on the DVD. The video inspections on the DVD are described further in Table 1 and, if applicable, are described in the body of the memo. The folders and files on the attached DVD are as follows:

- Folder: October 2008 Video – video inspections of the following pipe sections are within this folder.
  - D022-263 (SL 1) to D029-002 (SL 4)
  - D022-263 (SL 1) to D022-262
  - D022-263 (SL 1) to Eastern CB
  - D022-263 to M 3.1
  - D022-263 to PE
  - SL 5 to Unused Catch Basin 1
  - SL 5 to Unused Catch Basin 2
- Folder: July 2009 Video – video inspections of the following pipe sections are within this folder.
  - SL 4 to D029-003
  - SL 4 to SL 1 071409
  - SL 4 to WW20 Outfall
- Folder: August 2009 Video – video inspections of the following pipe sections are within this folder.
  - SL 1 to PE
  - SL 2 to SL 2 Inlet
  - SL 4 to D029-003 mid-cleaning
  - SL 4 to S029-003 post cleaning
  - SL2 to SL 1
- Folder: December 2009 Video – video inspections of the following pipe sections are within this folder.
  - SL 1 to SL 4
  - SL 1 to Western CB
  - SL 4 to Eastern CB
  - SL 4 to WW20 OF Full
  - SL 4 to WW20 OF Partial

Attachment C
Video Inspection Reports

Bravo Environmental
_6705 NE 175th St_
Kenmore, WA 98028
Tel: 425-424-9000
Fax: 425-424-9002
E-mail: Al@Bravoenvironmental.com

Inspection Report / Inspection: COS-GWSA.06020

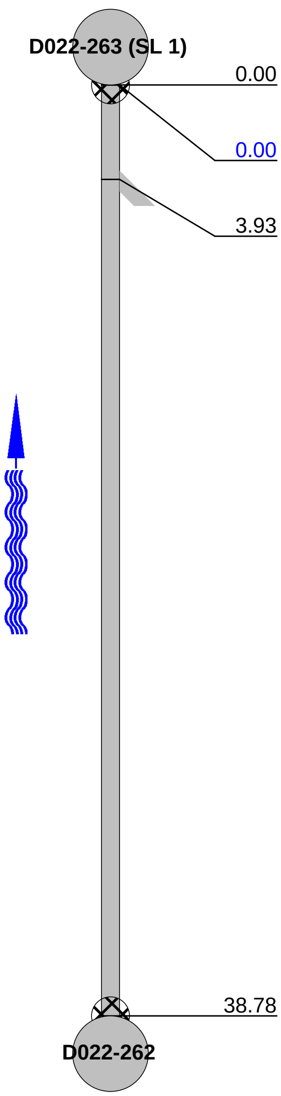
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
10/2/2008		**Dry**	**Al**		**10**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
T-007-083		**Seattle Parks**		**No Pre-Cleaning**	

Street123	**Gasworks Park**	Use of Sewer	**Stormwater**	Upstream MH	**D022-263 (SL 1)**
City	**Seattle**	Drainage Area		Dowstream MH	**D022-262**
Loc. details		Flow Control		Dir. of Survey	**Upstream**
Location Code		Length surveyed	**38.78 ft**	Section Length	**38.78 ft**

Purpose of Survey	**Routine Assessment**	Joint Length	
Year Laid		Dia./Height	**12 inch**
Year Rehabilitated		Material	**Ductile Iron Pipe**
Tape / Media No.	**GS-10.1.08**	Lining Method	

Add. Information :

1:96	Position	Observation	Photo
D022-263 (SL 1)	0.00	Manhole, REMARK: D022-263	
	0.00	Deposits Settled Other, 5 %of cross sectional area, from 10 to 02 o'clock, within 8 inches of joint: YES, REMARK: evidence of surcharge	
	3.93	Tap Factory Made Active, at 09 o'clock, 6", within 8 inches of joint: NO	
	38.78	Manhole, REMARK: D022-262	
D022-262			



QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**2100**	**0**	**2**	**2**	**0**	**2**	**2**

Bravo Environmental
6705 NE 175th St
Kenmore, WA 98028
Tel: 425-424-9000
Fax: 425-424-9002
E-mail: Al@Bravoenvironmental.com

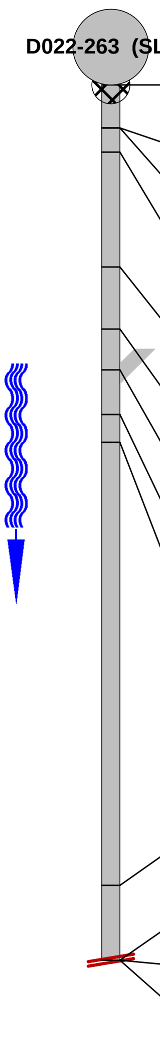
Inspection Report / Inspection: COS-GWSA.06020

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
10/2/2008		**Light Rain**	**Al**		**11**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
T-007-083		**Seattle Parks**		**No Pre-Cleaning**	

Street123	**Gasworks Park**	Use of Sewer	**Stormwater**	Upstream MH	**D022-263 (SL 1)**
City	**Seattle**	Drainage Area		Dowstream MH	**D029-002 (SL 4)**
Loc. details		Flow Control		Dir. of Survey	**Downstream**
Location Code		Length surveyed	**66.88 ft**	Section Length	**66.88 ft**

Purpose of Survey	**Routine Assessment**	Joint Length	
Year Laid		Dia./Height	**8 inch**
Year Rehabilitated		Material	**Vitrified Clay Pipe**
Tape / Media No.	**GS-10.1.08**	Lining Method	

Add. Information :



1:176 Position	Observation	Photo
D022-263 (SL 1) 0.00	Manhole, REMARK: D022-623	
3.32	Deposits Settled Other, 5 %of cross sectional area, from 11 to 01 o'clock, within 8 inches of joint: YES, REMARK: evidence of surcharge	
3.32	Infiltration Stain, from 07 to 09 o'clock, within 8 inches of joint: NO	
5.14	Infiltration Stain, from 07 to 09 o'clock, within 8 inches of joint: YES	
13.90	Material Change, Polyvinyl Chloride (PVC), REMARK:	
18.63	Material Change, Vitrified clay pipe, REMARK:	
21.76	Tap Factory Made Defective, at 09 o'clock, 6", within 8 inches of joint: NO, REMARK: Debris	D022-263 (SL 1)_D029-002 (SL 4)_100208_092533_A.JPG
25.18	Infiltration Stain, from 07 to 09 o'clock, within 8 inches of joint: NO	
27.30	Infiltration Stain, from 03 to 06 o'clock, within 8 inches of joint: NO	
61.14	Crack Circumferential, from 02 to 05 o'clock, within 8 inches of joint: YES	
66.88	Material Change, Steel pipe, REMARK:	D022-263 (SL 1)_D029-002 (SL 4)_100208_093301_A.JPG
66.88	Joint Offset Medium, REMARK:	
66.88	Survey Abandoned, REMARK: at change/offset	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
1200	2200	2	4	6	1	2	1.5

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Inspection photos / Inspection: COS-GWSA.06020

City :	Street :	Date :	Pipe Segment Reference :	Section No :
Seattle	**Gasworks Park**			**11**

Photo: D022-263 (SL 1)_D029-002 (SL 4)_100208_092533_A.JPG, VCR #: GS-10.1.08
21.76FT, Tap Factory Made Defective, at 09 o'clock, 6", within 8 inches of joint: NO, REMARK: Debris

Photo: D022-263 (SL 1)_D029-002 (SL 4)_100208_093301_A.JPG, VCR #: GS-10.1.08
66.88FT, Material Change, Steel pipe, REMARK:

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Inspection Report / Inspection: COS-GWSA.06020

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
10/2/2008		**Light Rain**	**Al**		**12**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
T-007-083		**Seattle Parks**		**No Pre-Cleaning**	

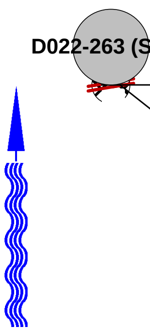
Street123	**Gasworks Park**	Use of Sewer	**Stormwater**	Upstream MH	**D022-263 (SL1)**
City	**Seattle**	Drainage Area		Dowstream MH	**SL 3**
Loc. details		Flow Control		Dir. of Survey	**Upstream**
Location Code		Length surveyed	**0.00 ft**	Section Length	**0.00 ft**

Actually Western CB

Purpose of Survey	**Routine Assessment**	Joint Length	
Year Laid		Dia./Height	**6 inch**
Year Rehabilitated		Material	**Vitrified Clay Pipe**
Tape / Media No.	**GS-10.1.08**	Lining Method	

Add. Information :

1:16	Position	Observation	Photo
D022-263 (SL1)			
	0.00	Manhole, REMARK:	
	0.00	Survey Abandoned, REMARK: Debris	D022-263 (SL1)_SL 3_100208_095549_A.JPG



QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**0000**	**0**	**0**	**0**	**0**	**0**	**0**

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Inspection photos / Inspection: COS-GWSA.06020

City :	Street :	Date :	Pipe Segment Reference :	Section No :
Seattle	**Gasworks Park**			**12**

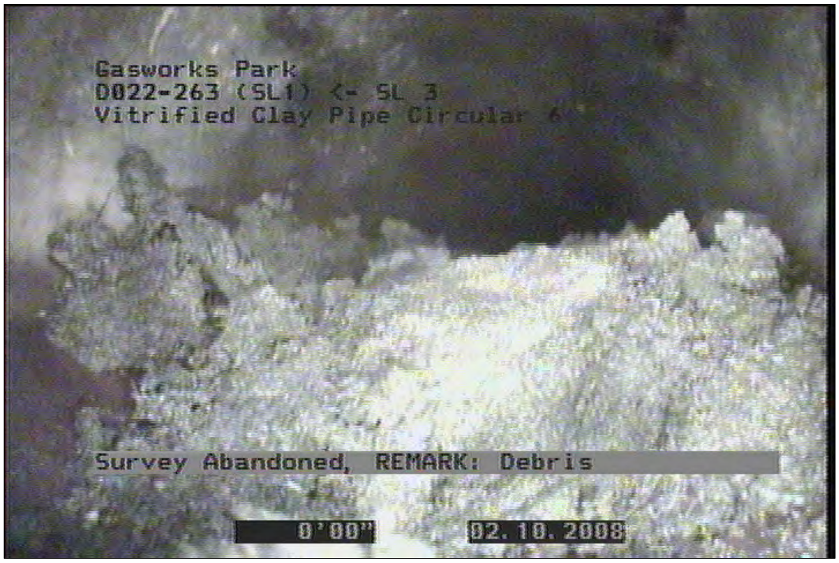

Photo: D022-263 (SL1)_SL 3_100208_095549_A.JPG, VCR #: GS-10.1.08
0FT, Survey Abandoned, REMARK: Debris

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Inspection Report / Inspection: COS-GWSA.06020

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
10/2/2008		**Light Rain**	**Al**		**13**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
T-007-083		**Seattle Parks**		**No Pre-Cleaning**	

Street123	**Gasworks Park**	Use of Sewer	**Stormwater**	Upstream MH	**D022-263 (SL 1)**
City	**Seattle**	Drainage Area		Dowstream MH	**CB** = Western CB
Loc. details		Flow Control		Dir. of Survey	**Upstream**
Location Code		Length surveyed	**10.17 ft**	Section Length	**10.17 ft**

Purpose of Survey	**Routine Assessment**	Joint Length	
Year Laid		Dia./Height	**6 inch**
Year Rehabilitated		Material	**Vitrified Clay Pipe**
Tape / Media No.	**GS-10.1.08**	Lining Method	

Add. Information :

1:32	Position	Observation	Photo
D022-263 (SL 1)	0.00	Manhole, REMARK: D022-263	
	0.00	Deposits Settled Fine, 10 %of cross sectional area, from 05 to 07 o'clock, within 8 inches of joint: YES	
	10.17	Survey Abandoned, REMARK: Debris	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**2100**	**0**	**2**	**2**	**0**	**2**	**2**

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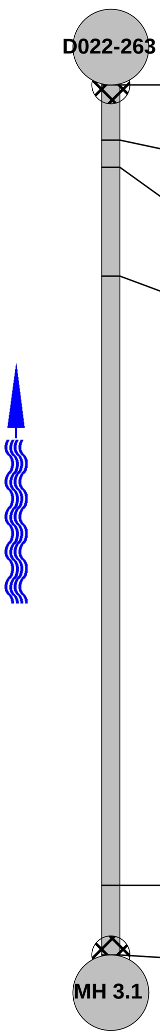
Inspection Report / Inspection: COS-GWSA.06020

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
10/2/2008		**Light Rain**	**Al**		**14**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
T-007-083		**Seattle Parks**		**No Pre-Cleaning**	

Street123	**Gasworks Park**	Use of Sewer	**Stormwater**	Upstream MH	**D022-263** = SL 1
City	**Seattle**	Drainage Area		Dowstream MH	**MH 3.1**
Loc. details		Flow Control		Dir. of Survey	**Upstream**
Location Code		Length surveyed	**60.43 ft**	Section Length	**60.43 ft**

Purpose of Survey	**Routine Assessment**	Joint Length	
Year Laid		Dia./Height	**8 inch**
Year Rehabilitated		Material	**Concrete Segments (unbolted)**
Tape / Media No.	**GS-10.1.08**	Lining Method	

Add. Information : **Overlay says SL 2 should be MH 3.1**



1:160 Position	Observation	Photo
0.00	Manhole, REMARK: D022-263	
3.83	Deposits Attached Other, 5 %of cross sectional area, from 11 to 01 o'clock, within 8 inches of joint: YES, REMARK: evidence of surchargeing	
5.74	Crack Longitudinal, at 06 o'clock, within 8 inches of joint: YES, Start	
13.30	Crack Circumferential, from 06 to 12 o'clock, within 8 inches of joint: YES	
55.60	Crack Longitudinal, at 06 o'clock, within 8 inches of joint: YES, Finish	
60.43	Manhole, REMARK: SL 2	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
2211	2100	5	2	7	1.67	2	1.75

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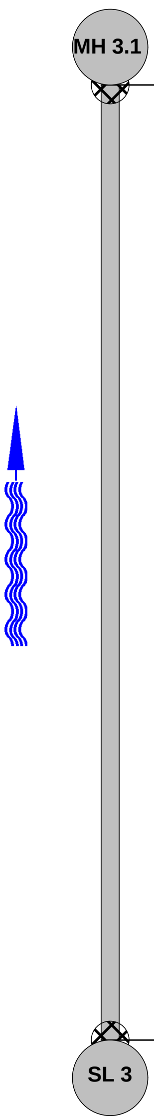
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
10/2/2008		**Light Rain**	**Al**		**15**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
T-007-083		**Seattle Parks**		**No Pre-Cleaning**	

Street123	**Gasworks Park**	Use of Sewer	**Stormwater**	Upstream MH	**MH 3.1**
City	**Seattle**	Drainage Area		Dowstream MH	**SL 3**
Loc. details		Flow Control		Dir. of Survey	**Upstream**
Location Code		Length surveyed	**79.57 ft**	Section Length	**79.57 ft**

Purpose of Survey	**Routine Assessment**	Joint Length	
Year Laid		Dia./Height	**8 inch**
Year Rehabilitated		Material	**Concrete Segments (unbolted)**
Tape / Media No.	**GS-10.1.08**	Lining Method	

Add. Information :

1:192	Position	Observation	Photo
	0.00	Manhole, REMARK: MH 3.1	
	79.57	Manhole, REMARK: SL 3	



QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**0000**	**0**	**0**	**0**	**0**	**0**	**0**

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Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
10/2/2008		**Light Rain**	**Al**		**16**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
T-007-083		**Seattle Parks**		**No Pre-Cleaning**	

Street123	**Gasworks Park**	Use of Sewer	**Stormwater**	Upstream MH	**D022-263** = SL 1
City	**Seattle**	Drainage Area		Dowstream MH	**PE**
Loc. details	**NE**	Flow Control		Dir. of Survey	**Upstream**
Location Code		Length surveyed	**27.80 ft**	Section Length	**27.80 ft**

Purpose of Survey	**Routine Assessment**	Joint Length	
Year Laid		Dia./Height	**6 inch**
Year Rehabilitated		Material	**Vitrified Clay Pipe**
Tape / Media No.	**GS-10.1.08**	Lining Method	

Add. Information :

1:80	Position	Observation	Photo
D022-263	0.00	Manhole, REMARK: D022-263	
	27.09	Material Change, Steel pipe, REMARK:	
	27.80	Survey Abandoned, REMARK:	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**0000**	**0**	**0**	**0**	**0**	**0**	**0**

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Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
10/2/2008		**Light Rain**	**Al**		**17**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Ca
T-007-083		**Seattle Parks**		**No Pre-Cleaning**	

Actually SL 5

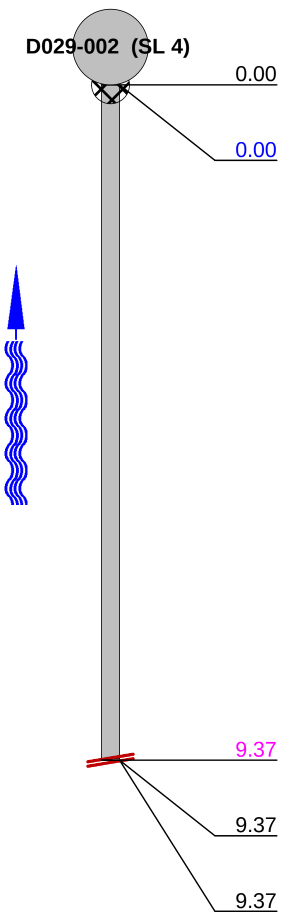
Street123	**Gasworks Park**	Use of Sewer	**Stormwater**	Upstream MH	**D029-002 (SL 4)**
City	**Seattle**	Drainage Area		Dowstream MH	**D022-263 (SL 1)**
Loc. details		Flow Control		Dir. of Survey	**Upstream**
Location Code		Length surveyed	**9.37 ft**	Section Length	**9.37 ft**

Actually Catch Basin 1

Purpose of Survey	**Routine Assessment**	Joint Length	
Year Laid		Dia./Height	**6 inch**
Year Rehabilitated		Material	**Vitrified Clay Pipe**
Tape / Media No.	**GS-10.1.08**	Lining Method	

Add. Information :

1:32	Position	Observation	Photo
D029-002 (SL 4)	0.00	Manhole, REMARK: D029-002	
	0.00	Deposits Settled Fine, 10 %of cross sectional area, from 05 to 07 o'clock, within 8 inches of joint: YES	
	9.37	Deposits Settled Fine, 25 %of cross sectional area, from 04 to 08 o'clock, within 8 inches of joint: YES	
	9.37	General Observation, within 8 inches of joint: YES, REMARK: grate?	
	9.37	Survey Abandoned, REMARK: debris	



QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**4121**	**0**	**6**	**6**	**0**	**3**	**3**

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Inspection Report / Inspection: COS-GWSA.06020

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
10/2/2008		**Light Rain**	**Al**		**18**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer C
T-007-083		**Seattle Parks**		**No Pre-Cleaning**	

Actually SL 5

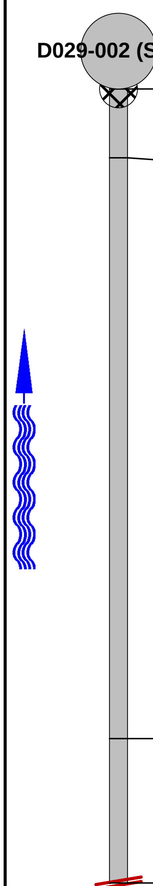
Street123	**Gasworks Park**	Use of Sewer	**Stormwater**	Upstream MH	**D029-002 (SL 4)**
City	**Seattle**	Drainage Area		Dowstream MH	**D029-003**
Loc. details		Flow Control		Dir. of Survey	**Upstream**
Location Code		Length surveyed	**22.06 ft**	Section Length	**22.06 ft**

Actually Catch Basin 2

Purpose of Survey	**Routine Assessment**	Joint Length	
Year Laid		Dia./Height	**6 inch**
Year Rehabilitated		Material	**Vitrified Clay Pipe**
Tape / Media No.	**GS-10.1.08**	Lining Method	

Add. Information :

1:64	Position	Observation	Photo



D029-002 (SL 4)

Position	Observation
0.00	Manhole, REMARK: D029-002
1.91	Deposits Settled Fine, 5 %of cross sectional area, from 05 to 07 o'clock, within 8 inches of joint: YES
18.03	Deposits Settled Gravel, 20 %of cross sectional area, from 04 to 08 o'clock, within 8 inches of joint: YES
22.06	Survey Abandoned, REMARK: due to debris

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**3121**	**0**	**5**	**5**	**0**	**2.5**	**2.5**

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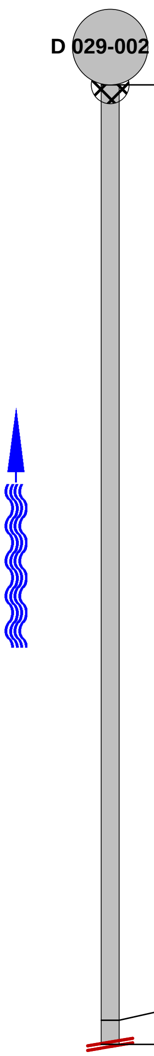
Inspection Report / Inspection: Gas works 7.14.09

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
7/14/2009		**Dry**	**Al**		**1**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
T007-83		**SPU**		**Jetting**	

Street123	**Gasworks**	Use of Sewer	**Stormwater**	Upstream MH	**D 022-262** Actually SL 1
City	**Seattle**	Drainage Area		Dowstream MH	**D 029-002** = SL 4
Loc. details		Flow Control		Dir. of Survey	**Upstream**
Location Code		Length surveyed	**135.37 ft**	Section Length	**135.37 ft**

Purpose of Survey	**Maintenance Related**	Joint Length	
Year Laid		Dia./Height	**8 inch**
Year Rehabilitated	**SPU**	Material	**Vitrified Clay Pipe**
Tape / Media No.	**7.14.09**	Lining Method	

Add. Information :



1:325	Position	Code	Observation	Photo	Grade
D 029-002	0.00	AMH	Manhole, REMARK: D 029-002		
	132.05	MMC	Material Change, Steel pipe, REMARK: Steel		
	135.37	MSA	Survey Abandoned, REMARK: Size change	1_3A	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**0000**	**0**	**0**	**0**	**0**	**0**	**0**

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Inspection photos / Inspection: Gas works 7.14.09

City :	Street :	Date :	Pipe Segment Reference :	Section No :
Seattle	**Gasworks**			**1**

Photo: D 022-262 _D 029-002_071409_103532_A.JPG, 00:07:17
135.37FT, Survey Abandoned, REMARK: Size change

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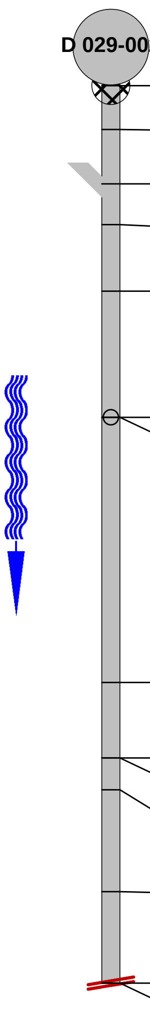
Inspection Report / Inspection: Gas works 7.14.09

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
7/14/2009		**Dry**	**Al**		**2**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
T007-83		**SPU**		**Jetting**	

Street123	**Gasworks**	Use of Sewer	**Stormwater**	Upstream MH	**D 029-002** = SL 4
City	**Seattle**	Drainage Area		Dowstream MH	**Waterway 20 outfall**
Loc. details		Flow Control		Dir. of Survey	**Downstream**
Location Code		Length surveyed	**116.94 ft**	Section Length	**117.04 ft**

Purpose of Survey	**Maintenance Related**	Joint Length	
Year Laid		Dia./Height	**8 inch**
Year Rehabilitated	**SPU**	Material	**Vitrified Clay Pipe**
Tape / Media No.	**7.14.09**	Lining Method	

Add. Information :



1:300	Position	Code	Observation	Photo	Grade
	0.10	AMH	Manhole, REMARK: D 029-002		
	5.84	RFJ	Roots Fine Joint, from 06 to 12 o'clock, within 8 inches of joint: YES, Start		M 2
	12.89	TFD	Tap Factory Made Defective, at 03 o'clock, 6", within 8 inches of joint: NO, REMARK: roots	2_3A	M 2
	18.23	RMJ	Roots Medium Joint, from 07 to 05 o'clock, 30 %, within 8 inches of joint: YES	2_4A	M 4
	26.89	MWLS	Water Level, Sag in pipe, 20 %of cross sectional area		M 2
	43.31	TFD	Tap Factory Made Defective, at 12 o'clock, 6", within 8 inches of joint: NO		M 2
	43.31	CM	Crack Multiple, from 12 to 12 o'clock, within 8 inches of joint: YES		S 3
	77.86	MMC	Material Change, Concrete pipe (non-reinfored), REMARK: CON		
	87.73	MMC	Material Change, Vitrified clay pipe, REMARK: VCP		
	87.73	B	Broken, from 12 to 12 o'clock, within 8 inches of joint: YES	2_10A	S 5
	91.86	B	Broken, from 12 to 12 o'clock, within 8 inches of joint: YES, REMARK: void	2_11A	S 5
	105.15	MWM	Water Mark, 60 %of cross sectional area		M 4
	117.04	RFJ	Roots Fine Joint, from 06 to 12 o'clock, within 8 inches of joint: YES, Finish		M 2
	117.04	MSA	Survey Abandoned, REMARK: camera under water		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
5231	4225	13	18	31	4.33	2.57	3.1

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Inspection photos / Inspection: Gas works 7.14.09

City :	Street :	Date :	Pipe Segment Reference :	Section No :
Seattle	**Gasworks**			**2**

Photo: D 029-002_Waterway 20 outfall_071409_104654_A.JPG, 00:02:05
12.89FT, Tap Factory Made Defective, at 03 o'clock, 6", within 8 inches of joint: NO, REMARK: roots

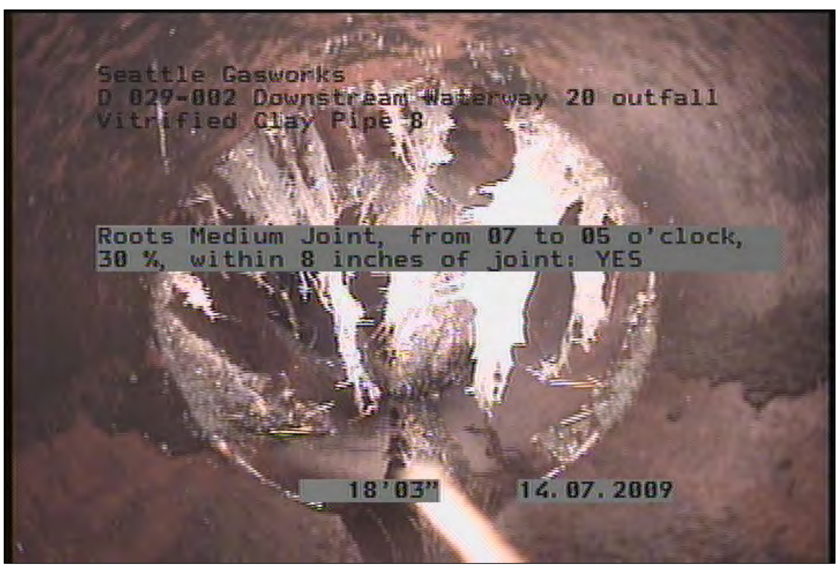

Photo: D 029-002_Waterway 20 outfall_071409_104739_A.JPG, 00:02:46
18.23FT, Roots Medium Joint, from 07 to 05 o'clock, 30 %, within 8 inches of joint: YES

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Inspection photos / Inspection: Gas works 7.14.09

City :	Street :	Date :	Pipe Segment Reference :	Section No :
Seattle	**Gasworks**			**2**

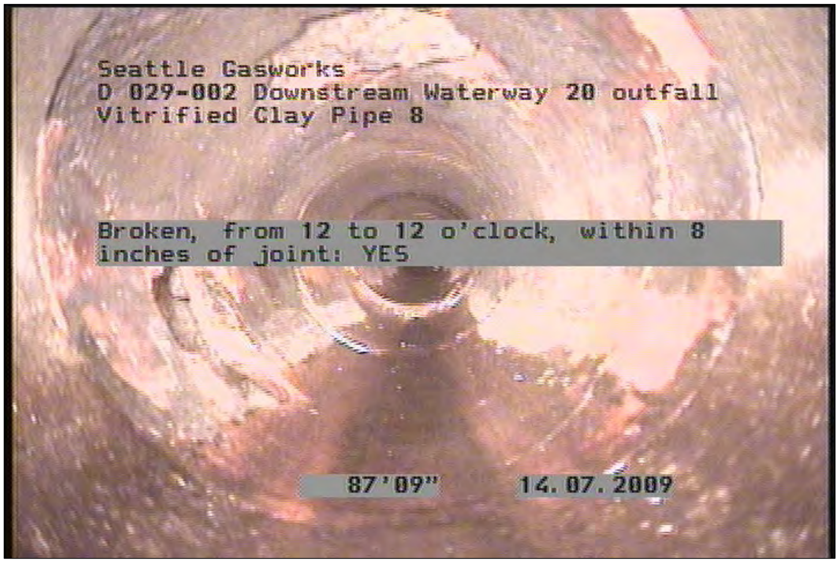

Photo: D 029-002_Waterway 20 outfall_071409_105449_A.JPG, 00:08:17
87.73FT, Broken, from 12 to 12 o'clock, within 8 inches of joint: YES

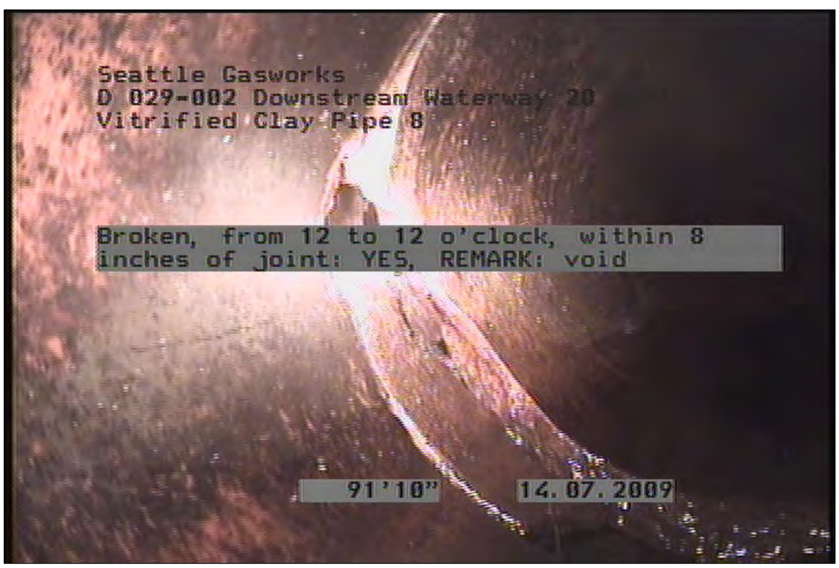

Photo: D 029-002_Waterway 20 outfall_071409_105707_A.JPG, 00:10:10
91.86FT, Broken, from 12 to 12 o'clock, within 8 inches of joint: YES, REMARK: void

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Inspection Report / Inspection: Gas works 7.14.09

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
7/14/2009		**Dry**	**Nirpaul**		**3**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
T007-83		**SPU**		**Jetting**	

Street123	**Gasworks**	Use of Sewer	**Stormwater**	Upstream MH	**D029-003**
City	**Seattle**	Drainage Area		Dowstream MH	**D029-002**
Loc. details		Flow Control		Dir. of Survey	**Upstream**
Location Code		Length surveyed	**0.00 ft**	Section Length	**0.00 ft**

= SL 4

Purpose of Survey	**Maintenance Related**	Joint Length	
Year Laid		Dia./Height	**8 inch**
Year Rehabilitated	**SPU**	Material	**Vitrified Clay Pipe**
Tape / Media No.	**7.14.09**	Lining Method	

Add. Information :

1:25	Position	Code	Observation	Photo	Grade
D029-002	0.00	AMH	Manhole, REMARK: D029-002		
	0.00	DSF	Deposits Settled Fine, 80 %of cross sectional area, from 02 to 10 o'clock, within 8 inches of joint: YES	3_2A	M 5
	0.00	MSA	Survey Abandoned, REMARK: Debris		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**5100**	**0**	**5**	**5**	**0**	**5**	**5**

Bravo Environmental
_6705 NE 175th St_
Kenmore, WA 98028
Tel: 425-424-9000
Fax: 425-424-9002
E-mail:

Inspection photos / Inspection: Gas works 7.14.09

City :	Street :	Date :	Pipe Segment Reference :	Section No :
Seattle	**Gasworks**			**3**

Photo: D029-003_D029-002_071409_112611_A.JPG, 00:00:23
0FT, Deposits Settled Fine, 80 %of cross sectional area, from 02 to 10 o'clock, within 8 inches of joint: YES

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Fax: 425-424-9002
E-mail:

Inspection Report / Inspection: 1

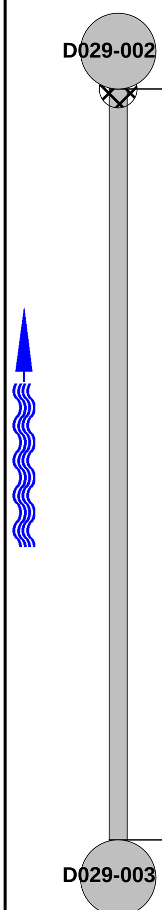
Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
8/24/2009		**Dry**	**Nirpaul**		**1**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
U-1208-7918			**8/24/2009**	**Jetting**	

Street123	**2101 N Northlake Way**	Use of Sewer	**Combined**	Upstream MH	**D029-003**
City	**Seattle**	Drainage Area		Dowstream MH	**D029-002** =SL 4
Loc. details		Flow Control		Dir. of Survey	**Upstream**
Location Code		Length surveyed	**32.57 ft**	Section Length	**32.57 ft**

Purpose of Survey	**Maintenance Related**	Joint Length	
Year Laid		Dia./Height	**8 inch**
Year Rehabilitated	**Steve**	Material	**Concrete Segments (unbolted)**
Tape / Media No.	**GWP 8.24.2009**	Lining Method	

Add. Information :

1:100	Position	Observation	Photo
D029-002	0.00	Manhole, REMARK: D029-002	
D029-003	32.57	Deposits Settled Gravel, 15 %of cross sectional area, from 04 to 08 o'clock, within 8 inches of joint: YES	D029-003_D029-002_082409_124403_A.JPG



QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**3100**	**0**	**3**	**3**	**0**	**3**	**3**

Bravo Environmental
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Fax: 425-424-9002
E-mail:

Inspection photos / Inspection: 1

City :	Street :	Date :	Pipe Segment Reference :	Section No :
Seattle	**2101 N Northlake Way**			**1**

Photo: D029-003_D029-002_082409_124403_A.JPG, VCR #: GWP 8.24.2009
32.57FT, Deposits Settled Gravel, 15 %of cross sectional area, from 04 to 08 o'clock, within 8 inches of joint: YES

Bravo Environmental
6705 NE 175th St
Kenmore, Wa 98028
Tel: 425-424-9000
Fax: 425-424-9002
E-mail:

Inspection Report / Inspection: 1

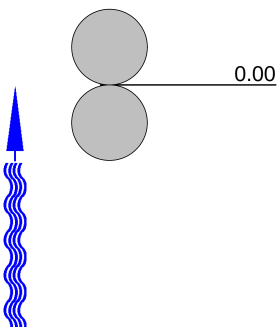
Date **8/24/2009**	P/O. No.	Weather	Surveyor's Name **Nirpaul**	Pipe Segment Reference	Section No. **2**
Certificate No. **U-1208-7918**	Survey Customer	System Owner	Date Cleaned **8/24/2009**	Pre-Cleaning **Jetting**	Sewer Category

Street123	**2101 N Northlake Way**	Use of Sewer	**Combined**	Upstream MH	
City	**Seattle**	Drainage Area		Dowstream MH	
Loc. details		Flow Control		Dir. of Survey	**Upstream**
Location Code		Length surveyed		Section Length	**0.00 ft**

Purpose of Survey	**Maintenance Related**	Joint Length	
Year Laid		Dia./Height	**8 inch**
Year Rehabilitated	**Steve**	Material	**Concrete Segments (unbolted)**
Tape / Media No.	**GWP 8.24.2009**	Lining Method	

Add. Information :

1:25	Position	Observation	Photo



QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI

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Fax: 425-424-9002
E-mail:

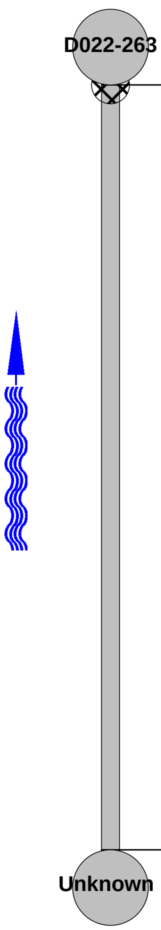
Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
8/24/2009		**Dry**	**Nirpaul**		**3**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
U-1208-7918				**No Pre-Cleaning**	

Street123	**2101 N Northlake Way**	Use of Sewer	**Combined**	Upstream MH	**Unknown** =PE
City	**Seattle**	Drainage Area		Dowstream MH	**D022-263**
Loc. details		Flow Control		Dir. of Survey	**Upstream**
Location Code		Length surveyed	**21.25 ft**	Section Length	**21.25 ft**

Purpose of Survey	**Maintenance Related**	Joint Length	
Year Laid		Dia./Height	**6 inch**
Year Rehabilitated		Material	**Concrete Pipe (non-reinforced)**
Tape / Media No.	**GWP 8.24.2009**	Lining Method	

Add. Information :



1:64	Position	Observation	Photo
	0.00	Manhole, REMARK: D022-263	
	21.25	General Observation, within 8 inches of joint: YES, REMARK: Finish Survey	Unknown_D022-263_082409_135953_A.JPG

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**0000**	**0**	**0**	**0**	**0**	**0**	**0**

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E-mail:

Inspection photos / Inspection: 1

City :	Street :	Date :	Pipe Segment Reference :	Section No :
Seattle	**2101 N Northlake Way**			**3**

Photo: Unknown_D022-263_082409_135953_A.JPG, VCR #: GWP 8.24.2009
21.25FT, General Observation, within 8 inches of joint: YES,
REMARK: Finish Survey

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E-mail:

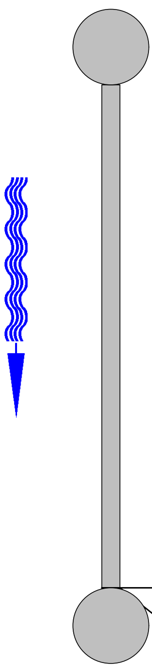
Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
8/24/2009			**Nirpaul**		**4**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
U-1208-7918				**No Pre-Cleaning**	

Street123	**2101 N Northlake Way**	Use of Sewer	**Combined**	Upstream MH	SL2
City	**Seattle**	Drainage Area		Dowstream MH	SL 2 Inlet
Loc. details		Flow Control		Dir. of Survey	
Location Code		Length surveyed	**0.00 ft**	Section Length	**6.99 ft**

Purpose of Survey	**Maintenance Related**	Joint Length	
Year Laid		Dia./Height	**6 inch**
Year Rehabilitated		Material	**Concrete Pipe (non-reinforced)**
Tape / Media No.	**GWP 8.24.2009**	Lining Method	

Add. Information :



1:32	Position	Observation	Photo
	6.99	General Observation, within 8 inches of joint: NO, REMARK:	S_StartNode_S_EndNode_082409_143616_A.JPG
	6.99	General Observation, within 8 inches of joint: YES, REMARK:	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**0000**	**0**	**0**	**0**	**0**	**0**	**0**

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Fax: 425-424-9002
E-mail:

Inspection photos / Inspection: 1

City :	Street :	Date :	Pipe Segment Reference :	Section No :
Seattle	**2101 N Northlake Way**			**4**

Photo: S_StartNode_S_EndNode_082409_143616_A.JPG, VCR #: GWP 8.24.2009
6.99FT, General Observation, within 8 inches of joint: NO,
REMARK:

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Tel: 425-424-9000
Fax: 425-424-9002
E-mail:

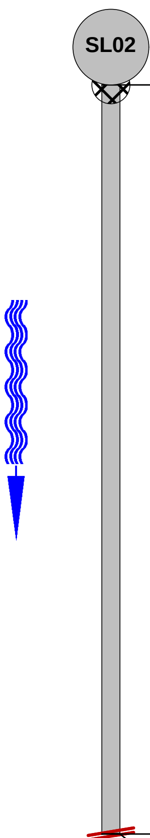
Inspection Report / Inspection: 1

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
8/24/2009			**Nirpaul**		**5**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
U-1208-7918				**No Pre-Cleaning**	

Street123	**2101 N Northlake Way**	Use of Sewer	**Combined**	Upstream MH	**SL02**
City	**Seattle**	Drainage Area		Dowstream MH	**D022-263**
Loc. details		Flow Control		Dir. of Survey	**Downstream**
Location Code		Length surveyed	**10.40 ft**	Section Length	**10.40 ft**

Purpose of Survey	**Maintenance Related**	Joint Length	
Year Laid		Dia./Height	**6 inch**
Year Rehabilitated		Material	**Vitrified Clay Pipe**
Tape / Media No.	**GWP 8.24.2009**	Lining Method	

Add. Information :



1:32	Position	Observation	Photo
	0.00	Manhole, REMARK: SL02	
	10.40	Deposits Settled Fine, 25 %of cross sectional area, from 04 to 08 o'clock, within 8 inches of joint: YES	
	10.40	Survey Abandoned, REMARK: Debris	SL02_D022-263_082409_150340_A.JPG

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**4100**	**0**	**4**	**4**	**0**	**4**	**4**

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Fax: 425-424-9002
E-mail:

Inspection photos / Inspection: 1

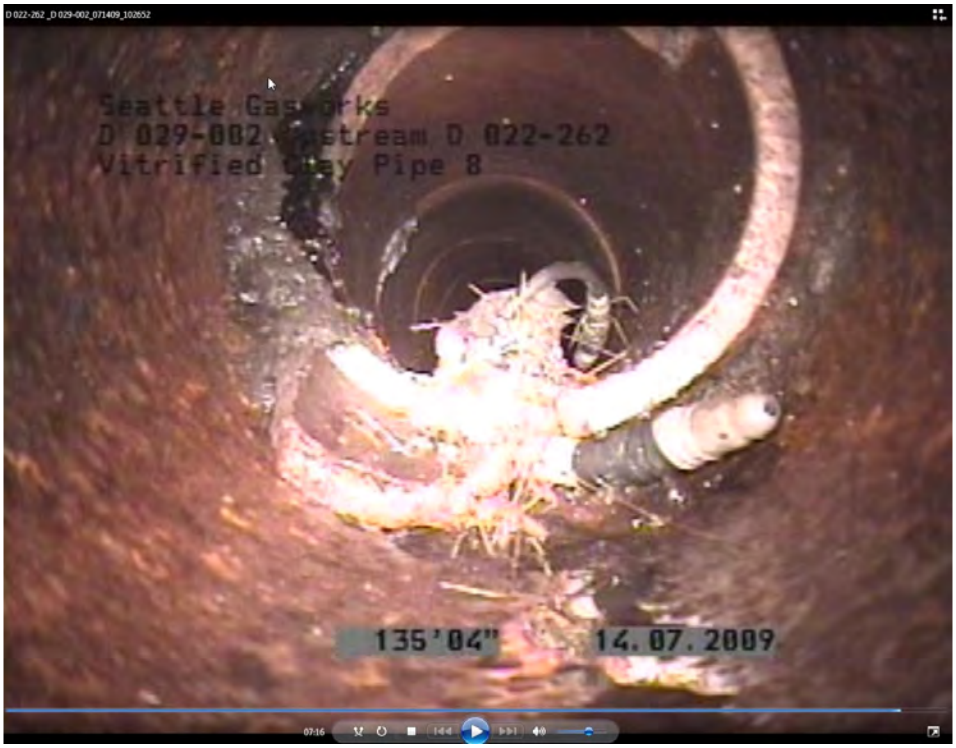
City :	Street :	Date :	Pipe Segment Reference :	Section No :
Seattle	**2101 N Northlake Way**			**5**

Photo: SL02_D022-263_082409_150340_A.JPG, VCR #: GWP
8.24.2009
10.4FT, Survey Abandoned, REMARK: Debris

Attachment D
Key Photographs

Photograph 1. SL 1 to SL 4, pipe change at 65 feet from SL 1.

Photograph 2. SL 1 to SL 4, pipe change at 66 feet from SL 1.

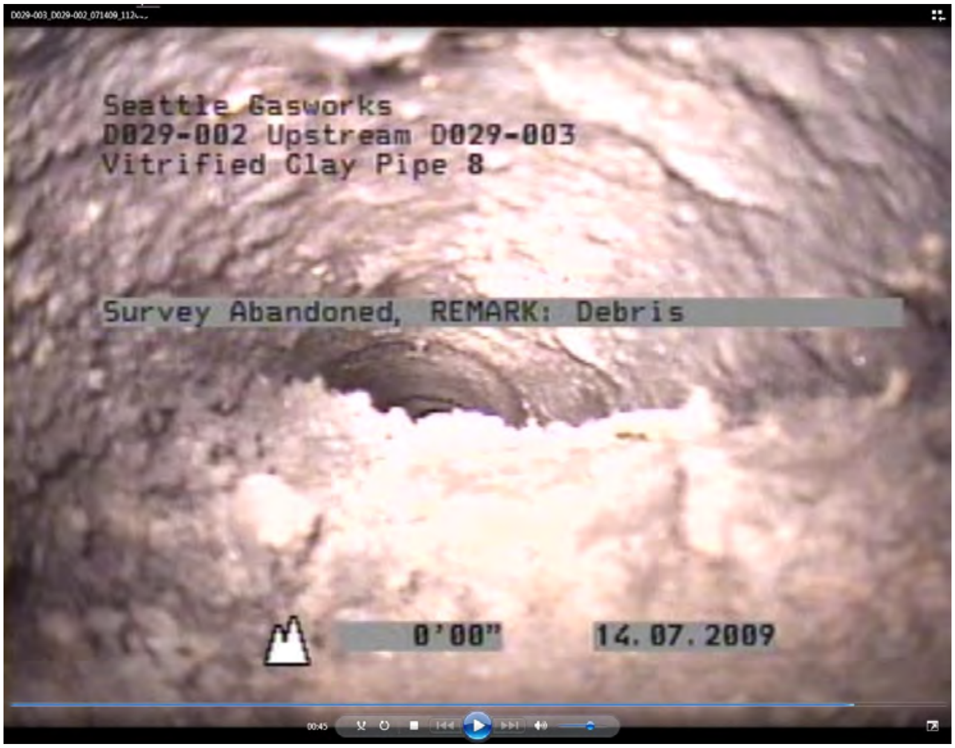


Photograph 3. SL 4 to SL 1, pipe change at 135 feet from SL 4.

Photograph 4. SL 4 to WW20 Outfall, roots and soil intrusion at 41 feet from SL 4.

Photograph 5. SL 4 to WW20 Outfall, hole at 91 feet from SL 4.

Photograph 6. SL 4 to WW20 Outfall, hole at ~94 feet from SL 4.



Photograph 7. SL 4 to D029-003, debris near SL 4 prior to cleaning.

Photograph 8. SL 1 to PE, mid-point structure.

Photograph 9. SL 5 to Catch Basin 1, grate at Catch Basin 1.

Photograph 10. Inlet on North Northlake Way.

Photograph 11. SL 2 to SL 1.

Photograph 12. SL 1 to Eastern CB.

Attachment E
Field Notes/Event Summaries

Summary of key field activities – June 15, 2009

This is a summary of observations and key items completed on June 15, 2009. A detailed description of the day is included in the field logbooks kept by Stephen Bentsen. Photos were also taken throughout the day and will be provided to SPU.

- Samples were collected for disposal analysis from structures SL 4 and SL 3. Samples were collected using equipment provided by Brian Robinson of SPU and were collected by Stephen Bentsen. One 8 oz. jar of sediment was collected from each location and submitted to ARI for analysis for TCLP metals.
    - The sample from SL 4 contained a light iridescent sheen.
    - The sample from SL 3 contained abundant organic material (leaves, etc.)
- Gary Lockwood and John Jurgens attempted to locate several subsurface structures (inlets, catch basins, etc.) with a metal detector and shovel, but were unable to.
- John Jurgens and Harbor Patrol located the area believed to be where the conveyance system discharges into Waterway #20 (WW20). This is consistent with discharges previously witnessed. The pipe itself is not visible, but there is a channel where it appears that water has been discharging. The pipe appears to be located under a shelf of some sort. It was approximately 1 to 2 feet underwater and about 6 feet from the shoreline.
- Gary Lockwood was able to loosen the pea trap that covered what was thought to be the outlet to WW20 in catch basin SL 4.
- SPU's video crew showed up on-site and inspected all three pipes that entered catch basin SL 4.
    - The pipe that was suspected to be the inlet from SL 1 was inspected and it was found that this pipe leads to an inlet at 11 feet which was completely covered with material and was no longer active. This confirmed our suspicions about this pipe's inactivity due to the abundance of debris in it during the last video inspection.
    - The pipe that was suspected to lead to structure D029-003 was inspected and it was found that this pipe lead to an inlet at 16 feet which was completely covered with material and was no longer active.
    - The pipe that was thought to be the outlet directly to WW20 was inspected and at about 20 feet (need to verify this distance), the pipe entered a mainline with flowing water in it. The camera entered this mainline and continued downgradient. Unfortunately the length of the camera cable was only 100 feet and the camera was unable to reach the outlet. No other laterals were identified and the pipe appeared to be in good shape.

- We inspected the upgradient manhole SL 1 and determined that it had approximately the same flow that was witnessed in the mainline. This was due to the irrigation that was occurring in the development at Densmore Ave N. and N. Northlake Way. Gary suspected the mainline might be a sewer line, but it was confirmed that it was not by conducting a dye test in the closest upgradient sewer manhole.

- A depressed area was observed near SL 4 in the roadway. Gary Lockwood used a metal detector to check the depression and based on the hits at areas that may be indicative of a metal ring, it was suspected that this might be a conveyance structure.

- Based on these observations, I've revised my thoughts on the conveyance system in this area as shown on the attached sheet. The basic ideas are below:

    - The structure we have been calling SL 4 is actually SL 5.

    - The structure SL 4 is the depression in the road and has been covered by asphalt.

    - The line to WW#20 likely has a blockage based on observations during prior storms, but could be video inspected all the way to the waterway or to the blockage using a camera with a longer cable.

    - A video tape of these inspections was made and provided to Stephen Bentsen.

- SPU's video crew then inspected an inlet to the north of Harbor Patrol along the south side of N. Northlake Pl. to confirm where it discharged to. The inlet was video-ed for approximately 8 feet before it was completely filled with debris and non-functional.

- SPU's video crew then moved to SL 1 and inspected the down gradient line. They got past the off-set at 66 feet and continued on to 189 feet at which point a significant blockage was encountered with wood and debris blocking the way. The pipe from the off-set to the blockage was in good shape made out of 3-foot sections of clay pipe. Video was unable to be recorded due to computer problems.

- SPU's video crew retrieved the camera and began video work on the two inlet pipes into SL 1 that went to unknown structures. They will tape this and provide the tape to Gary Lockwood for future review by Stephen Bentsen

- Stephen Bentsen then retrieved the filter fabric from catch basins SL 7 and SL 8 and placed them in lab supplied bags for analysis at ARI.

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tel: 206.292.2078
fax: 206.682.7867

- [ ] Calculation
- [ ] Meeting Notes
- [ ] Phone Call Notes
- [ ] Memorandum

Date: 6.16.09

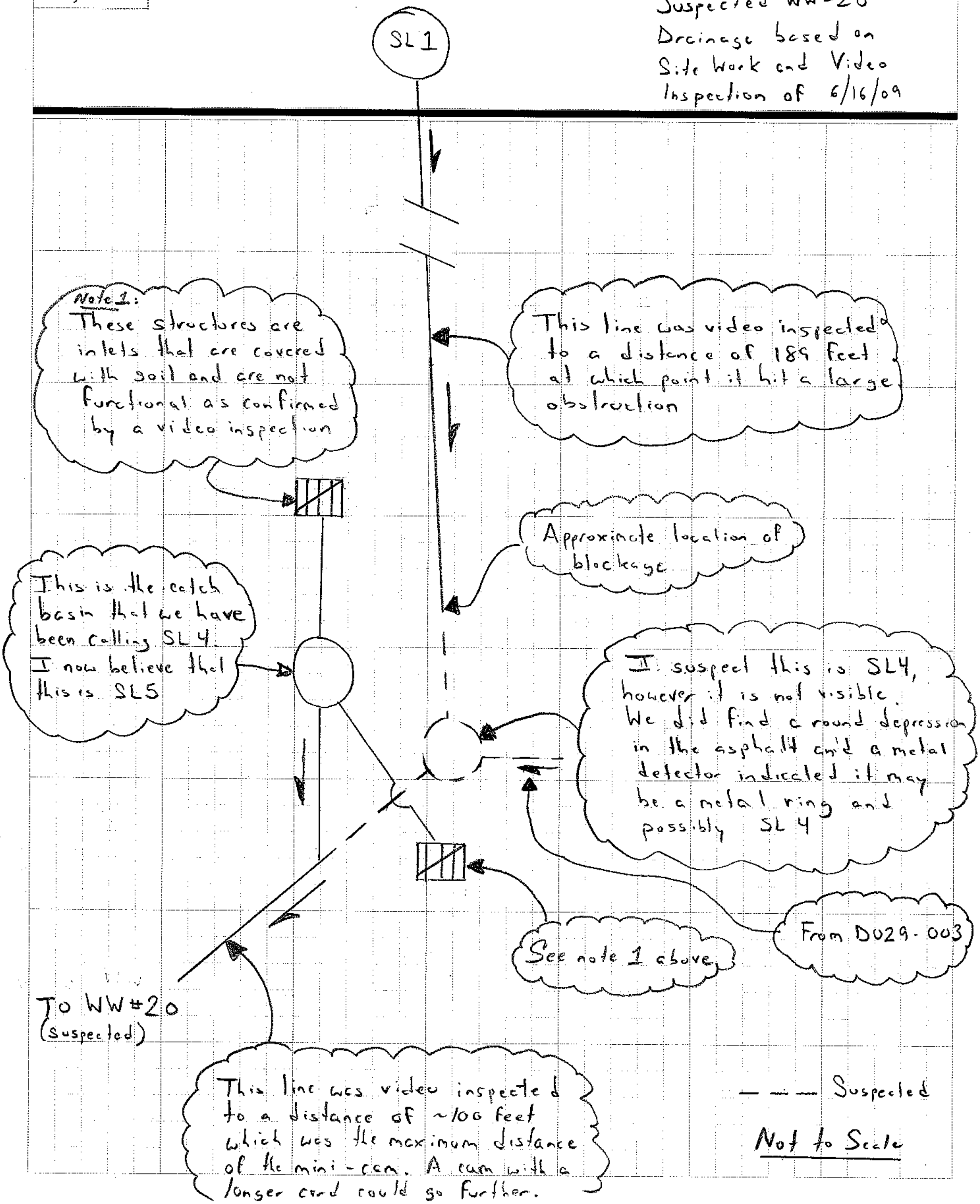
Project No.:

Created by: Stephen Bentsen

Reviewed by:

Subject:

Suspected WW#20 Drainage based on Site Work and Video Inspection of 6/16/09



August 24, 2009 Waterway #20 Field Activity Summary

Here is a summary of the field activities that were conducted in the Waterway #20 drainage basin yesterday.

Jessi Massingale and I met Bravo Environmental at the SL4 (D029-002) location at 8AM. Bravo had two rigs at the site, a vactor truck equipped with a pressure washer and a video inspection truck.

A DVD and a hard copy of the inspection report will be supplied to Pete Rude. Note that the attached figure does not reflect the most recent SPU GIS files supplied to us by SPU last week.

SL 4 (D029-002) to D029-003:

We began work on the pipe from which runs southeast along the N. Northlake Pl. towards the Park. During the last video inspection, SPU's crew was only able to get ~40 feet up the line before encountering too much debris. After plugging the remaining inlets and outlets to the manhole, Bravo pressure washed the system using several different water nozzles to ~120 feet before reaching an impassable obstruction. We then removed the pressure washer to put the video unit to inspect the line. After we removed the pressure washer, water kept on discharging from this line for 5 to 10 minutes before ceasing. The discharged water was light brown in color, but did not have any odor or sheen to it. All water and debris was vacuumed up by Bravo.

We then began a series of video inspections in conjunction with pressure washing. The line contained lots of debris and what appeared to be aggregate pieces, perhaps concrete, and was unable to be completely cleaned. We were able to get to between 90 and 110 feet with the video unit, but were never able to identify the blockage. After numerous attempts and running out of water, we were unable to do any further work in this area. The figure below shows the approximate limits of how far we were able to clean and inspect.

We recommend observing this inlet during a rain event to determine if there is any discharge coming from this pipe.

SL 1 (D022-263) Area

Since we were out of water, we were unable to clean the lines in this area, but we did inspect the easternmost pipe from SL 1 (D022-063) to "?". This pipe does not appear on SPU GIS and it is unclear where this pipe goes. It was called PE (Pipe End) in the October 2008 investigation for identification purposes. The previous inspection was only able to go approximately 27 feet before encountering a pipe material change and coming to a point where it appeared to drop off; the field team was unable to see the bottom of the drop off.

We placed a sond on the push camera and got about 21 feet before reaching the structure. We located the sond and marked the ground. The location appeared right where there is a curb cut that would make sense if there was a catch basin or structure in that area.

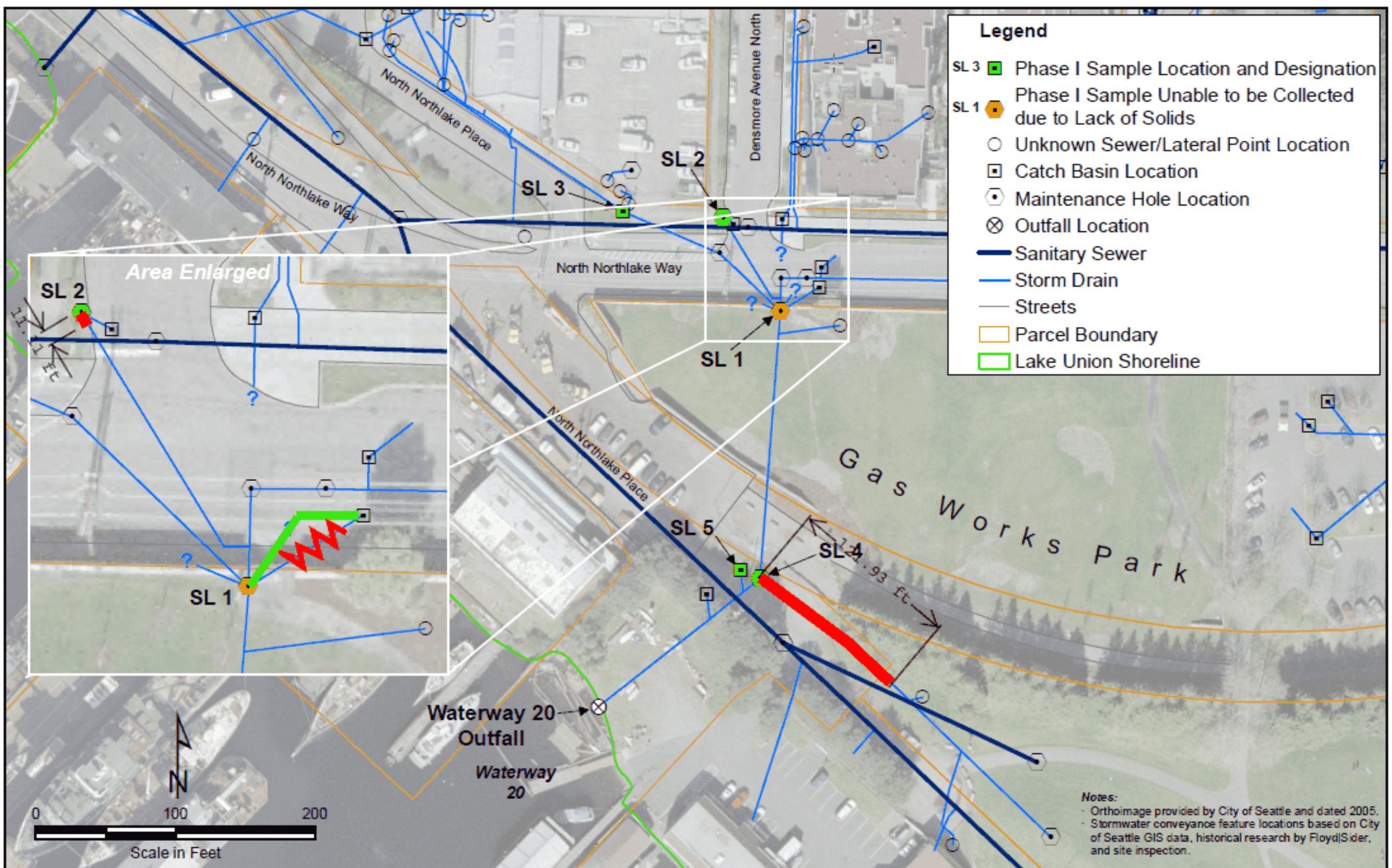
We then placed the push camera, with the sond, on an inlet on the south side of N. Northlake Way and pushed the camera about 20 feet until it also entered a brick structure. We located the sond and it was within 3 feet of the other location. It is likely that these two lines connect and collect runoff from the street. The revised configuration is shown on the two figures below.

I will review the side sewer cards to see if this configuration can be verified and will update our figures.

SL 2 Area

We then attempted to inspect the connection from catch basin SL 2 to its connection to the pipe from SL 1 (D022-063) to D022-262. During the October 2008 video inspection, this line was not recorded. We were only able to get ~10 feet before hitting excessive debris and were unable to go any further.

The figure below shows the approximate limits of how far we were able to clean and inspect.



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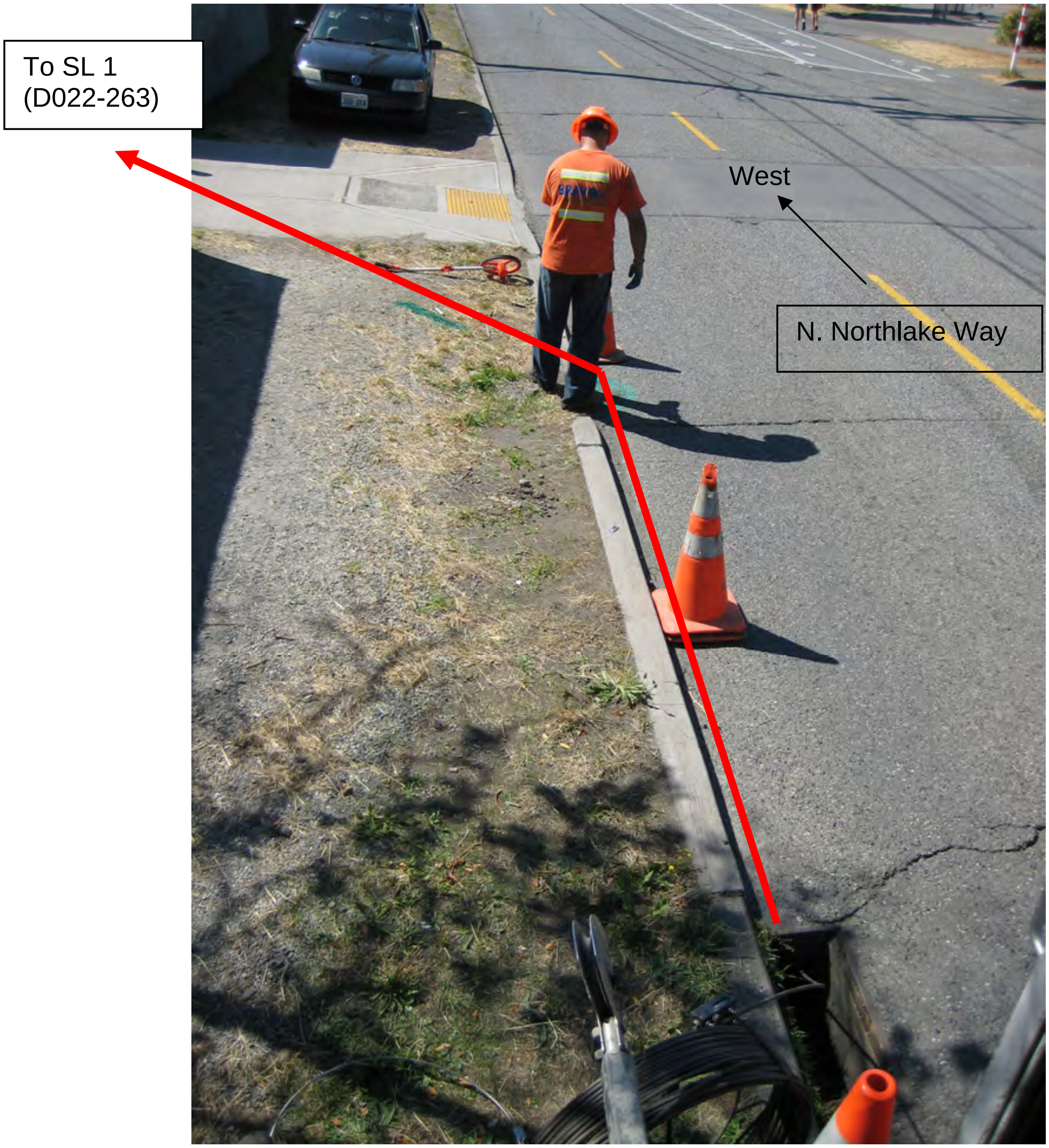
Phase II Stormwater Conveyance System Source Control Evaluation SAP/QAPP Gas Works Park, Seattle, Washington

Figure 1.2
Stormwater Conveyance System and Sample Locations - West Side

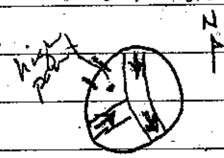

To SL 1
(D022-263)
West
N. Northlake Way

9/19/08

0800 M. King + S. Bentsen arrive onsite @ Gasworks Park. Prepped for sampling.

0815 Met Brian Robinson, SPU. Reviewed HASP, conducted H&S tailgate, and discussed sampling plan.

0825 Set up @ location #6. 24" dia 'DRAIN' manhole cover.



Very little sediment in main effluent channel.

Attempted to collect sample from high point noted above. No measurable volume collected.

Plastic pipe entering ~5' from grating

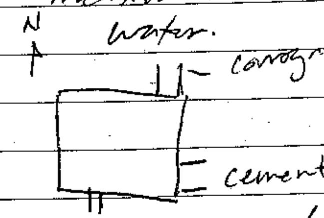
Bottom of channel to grate 9'7"

Invert of plastic pipe to ground 4'7"

9/18/08

0840 Moved to Location #9

Grated rectangular catch basin. water in basin. ~3" of sediment measured in bottom, 3" standing water.



Collected ~~3~~ 4 scoops of sediment, high leaf/organics strong organic odor. Slight sheen on sample. Homogenized in bowl, Sample collected @ 0850.

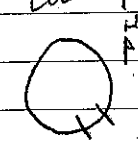
Slight rain began

Sample ID: 09-ONSITE-CB-091908

Material med. brown, very soupy. fines w/few larger particles.

0900 Moved to locations #7 + #8

Loc 7: 24" round grated monument



2'4" from grd to invert of pipe.
2'9" standing water.

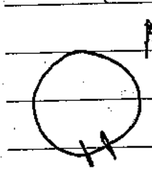
No measurable solids in sump.
Slight sheen on sump water.

9/19/08

attempted to collect, sheen released to surface while sampling.
Sample med. gray, very soupy. very fine grained w/ organics + some trash.

4 scoops collected + composited.
Sample 07-ONSITE-CB-091908 collected @ 0910.

Location 8: 4' standing water.
no measurable solids; attempted to collect sample

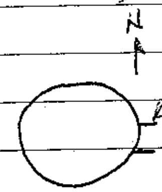


~24" round, grated monument
no visible sheen on water, organic matter + trash.
irregular bottom in sump; few larger rocks

Sample 08-ONSITE-CB-091908 collected @ 0930. 1 + 1/2 jars filled

9/19/08

Moved to location #10.
Had difficulty opening. Monument locked.
26" closed round drain
24" water depth, total sump depth 6'1".
Some measurable sediment.

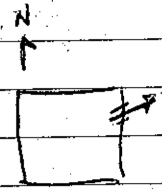


10" cement outlet, 3.5' below grade to invert
organic film on water, no sheen. Sample med. brown + med. gray stratified layers fines w/ some larger sand grains.
Sm. flecks of sheen released in bowl while compositing the sample.
Sample 10-Onsite-MH-091908 collected @ 0945.

1005 Dom + Jason from ENSR arrived onsite

1015 Moved to Location #11.
rectangular catch basin.
outlet pipe @ 1' below grade, water level @ 3' below.
cracks in sump throughout.

9/19/08



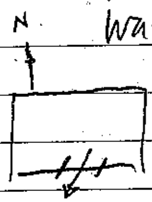
bulge & cracks on S. wall, potentially patch of old inlet?

Strong organic odor, med. to dark gray fine grained. 6" water over 6" sediment. Total depth ~3'

Sample 11-ONSITE-CB-091908 collected @ 1020

Felt around below water level, no other inlets or outlets.

Moved to Location 12. Rectangular grated monument.
Sump depth - 3'   outlet pipe inlet 1'
Water depth - 2'   below grade.



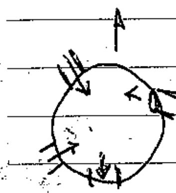
sediment med. brown, highly organic

Sample 12-ONSITE-CB-091908 collected @ 10:35.

9/19/08

10:48 Jason & Dan offsite.

11:00 Moved to location 13 - on Burke Gilman trail. 26" solid manhole cover - labeled 'DRAIN'. Water level @ 3' below grade - water/sediment depth ~3'.



U-bend on outlet

Sediment med. gray/brown silt & sand. White flecks, organics, moderate sheen. Leaf & twig matter.

Collected sample 13-ROW-MH-091908 @ 11:13. Collected duplicate 13-ROW-MH-091908-DUP @ 11:15. 2x 8oz jars for each.

Break for lunch

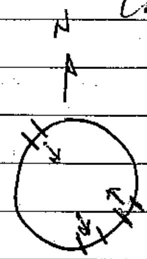
12:20 Moved to location #4 and began digging out manhole

9/19/08

John w/ Harbor Patrol came out to say hello - said that Loc. 4 always fills up - has worked here 21 yrs & never seen catchbasin to the west.

Also said catch basin to the S. is clogged & buried.

Continued digging out Loc. 4



24" solid 'SEWER' manhole cover - brick inside

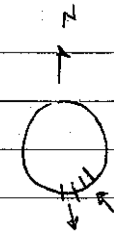
Water @ 4' below cover, 2' depth.

Sediment med. gray to dk. gray, high organic content slight sheen on water.

Globular texture to material

Sample 04-ROW-MH-091908 collected @ 12:35.

9/19/08



Location #2

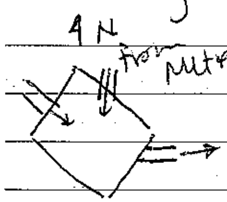
1' sediment, water @ 4' below grade, 1' water column.

24" 'Sewer' manhole cover, vault. Sump - brick.

Sample 02-ROW-~~MH~~ CB -091908 collected @ 1257. MK

Med. brown/gray fine grained sediment, high organic content. Few trace blobs of sheen.

Moved to Location #3. Sump dry.



18"x20" rectangular grated catch basin cover.

Sample 03-ROW-CB-091908 collected @ 1315. Dk. brown organics & sand. Twigs & leaf matter.

Sediment ≈ 4" thick, 2.5-3' below surface.

9/19/08

Moved to location #1

Water flowing through main channel.

Manhole - brick.

Attempted to collect sample no sediment in main channel. limited volume from influent channels

material on flat section, looks like topsoil - roots throughout, with brick + mortar.

Potential break-in from damage in manhole?

Collected sample 01-~~Pow~~-MH-091908 ~~D022-Z63-ONSITE~~
at 1340. Will have lab hold.

material med. brown silty sand w/ roots.

1400 Packed equipment, left site

9/19/08

9/10/08 CUS-GHSR 06020 - Notes by Stephen Benton
Video Inspection of SW lines

0750 Arrive at site, meet Ryan of Bravo Environmental
Prep for work + remove one bollard, one already moved
Weather = high 50's, clear,
recent weather = dry + sunny + warm

0815 Al arrives on-site

0840 ~~Go~~ After prep work we set up at ~~Sample~~ location #6, the manhole in the sidewalk, we will survey the 10" pipe that goes to outfall A.
- using the crawler.
This run will be call SL#6-~~Pipe~~ A PEA
PE = Pipe End A.

0930 Begin video of SL#6 to Outfall A
Unable to field locate lateral connection due to power line interference (?)

0955 Reached end of outfall A, pipe is in very good condition. One slight deposit location. All laterals found as suspected ~~Was~~ a Print out of ~~late~~ laterals made
We will move to SL#10 in order to not change set up

1015 Start Outfall C inspection
- So far first 3 laterals are
capped and have no connections
1037 Crack located 19' in while pulling
camera out.
Inspection showed most perf pipe
but some were capped, need to identify
which ones are actually there.
Outfall C GPS location collected
2 + SL #10 + #11

1054 Begin inspection of outfall D line
SL#11 to PED
- ductile iron pipe
- Fine sediment on bottom
- bend to 20° right at 36' from SL#11
matl change to PVC
- smaller camera does not have
pan + tilt capability.
- Located Outfall D + got GPS
location. It is ~6' above water line
in a lot of blackberry bushes.
End is cracked off

Allison stopped by.

1138 Start SL9 to Outfall B
stretch 6" concrete
Parks Dept was pressure washing
down picnic area so there is
some flow ~~from~~ in pipe
laterals on right side are in pipe,
but do not show up in our
GIS.
Located Outfall B with GPS

1200 Tried to do SL9 ~~to~~ to perf along
sidewalk, but pipe is too crushed
to get camera in. Pipe is
crushed right near SL9.

1215 CB 6.2 to SL6
~~Metal plate that was in~~ Metal
elbow that was in front of the pipe
from CB 6.2 to SL6 ~~[illegible]~~ came
apart upon light impact with pole.
6" concrete
- low flow in pipe at seg points

1215 - 1230 Lunch
1230 Start inspection on CB 6.1 to 6.2
sheet metal cover fell off.
looks good

1330 Setting up to view the perf pipe
leading from SL6
~~pe~~ SL6 ~~→~~ to perf.
Filled 60% water ~ 5' in
large rock ~10' in
Unable to advance further with small
crawler
trying with push camera.

Got past rock with push rods
there is water in line with a little
bit of sediment on bottom
we got to near dry conditions at
~~but~~ ~40', the video turned black
due to mud on lens. We are
bringing the camera back.

1407 Back on track ~5% sediment in
bottom, pipe is dry

~95' some roots are growing into
the pipe, still dry, but 80% full
of sediment
At ~105' unable to go further due to
roots & debris in pipe, abandoning
inspection.

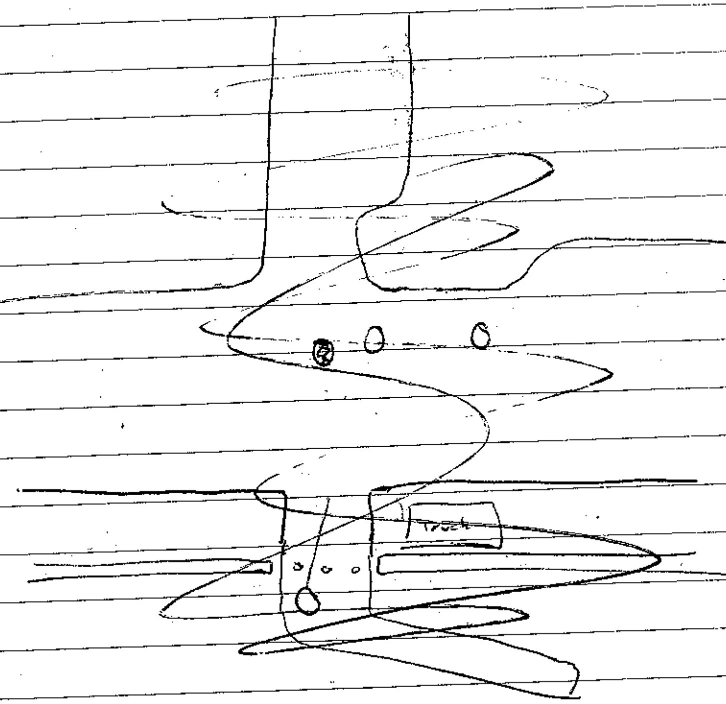
1415 -
1440 . Attempting to do ~~the~~ Outfall E from
the shoreline. Outer 12' of pipe had
built up sand, pebbles, etc. - likely
from the rise of the water level
lots of sand ~~in~~ near outfall
We've been able to get it to move a little
bit up the pipe, but there is too much
soft sediment on the bottom for the
small crawler

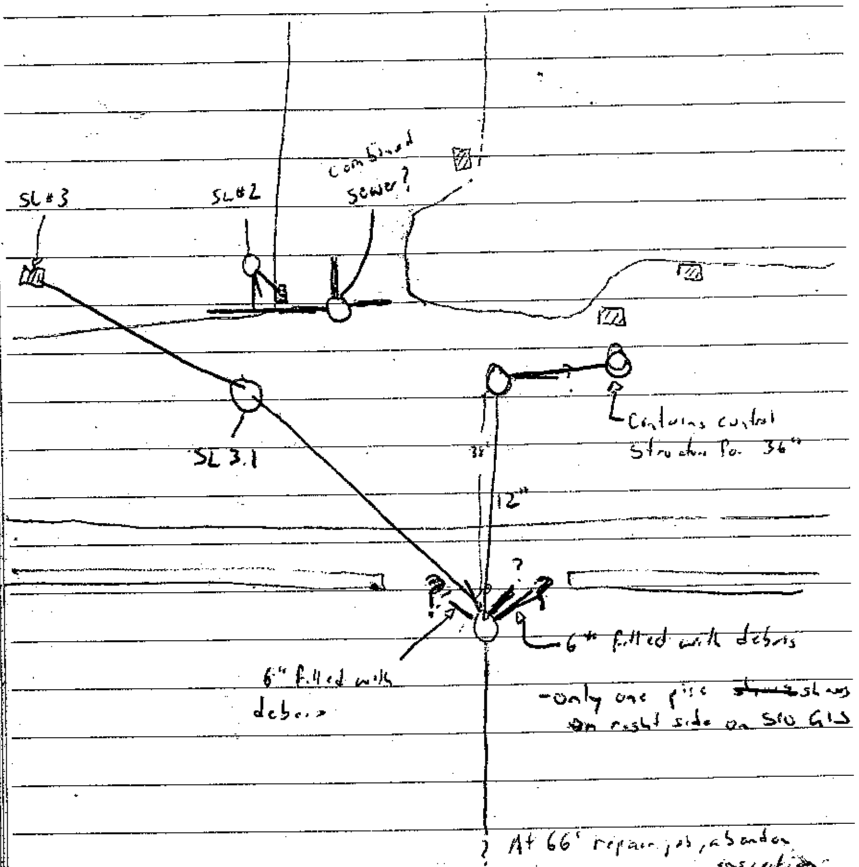
1502 Got past mud & are heading up pipe
At 45' there is a lateral
Saw a bunch of laterals
Got to 155' and hit a chunk
of pipe material

1530 Finish with Outfall 8 due to obstruction
1545 Pack up site & leave

10.2.08 Cloudy, 50's, dry
0740 Arrive on-site
0800 Bravo Env. (Ryan) arrives on-site
set up at ~~[illegible]~~ SL 1 (manhole at base
of Densmore Ave & N. Northlake Wy
This is manhole #D022-263
We'll start by going to ~~&~~ SL #4 (D029-002)
No flow in manhole SL#1
TOC to bottom of channel = 74"
0835 Al arrives (Bravo Forena)
0900 Change of plan - heading north to D022-262
Unknown PVC pipe heading in from left about
3 feet in
went 38' and reached manhole D022-262
Only one ~~[illegible]~~ ~~to~~ pipe coming into the
manhole not two that are shown.
The 12" line went straight to the

Now lightly raining





0917 Starting inspection on 8" line from SL1 to SL4

D022-263 to D027-002

Vitrified Clay Pipe

Attached deposits are evidence of surcharging.

evidence of infiltration in first 15' feet

At 66' entered steel pipe, looks like clay pipe was shoved in there to make connection

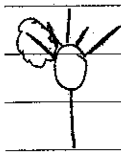
steel heavily corroded

Need to abandon survey due to offset.

0941 Pulling camera back

Unable to field locate position due to power line interference.

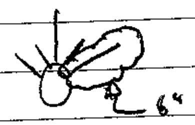
0950 Using small crawler going from SL1 to CB SL3 6" Ø pipe



~20% filled with debris

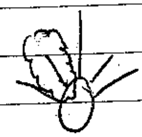
need to abandon inspection. only 3' in since we are unable to go further

1000 Moving into other 6" pipe that leads out of SL#1 leads to catch basin location unknown no SPU #



Over 20% filled with sediment and unable to go further. Need to abandon survey ~12' in

1015 Moving into pipe that leads to SL2

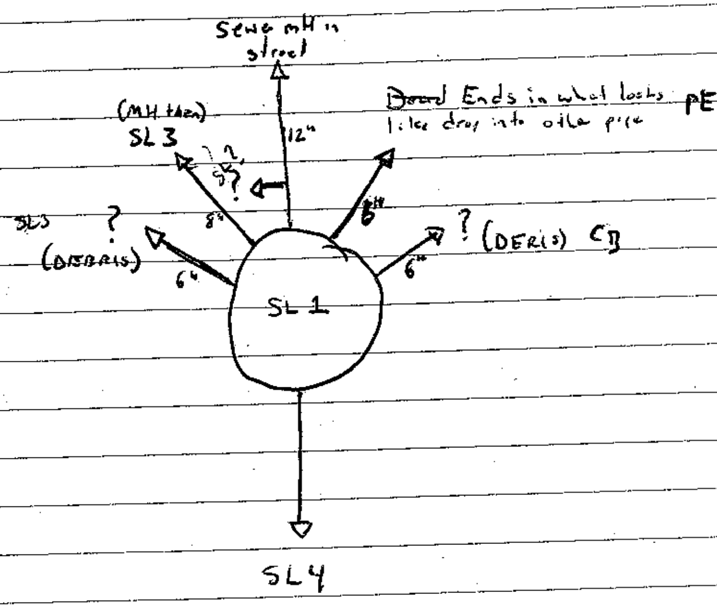


8" Concrete looks clean

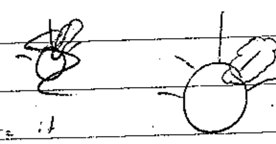
crack along ~~entire~~ length of bottom

Pipe goes to sewer manhole and beyond
We are calling this to ~~SL~~ MH 3.1
~~Ne~~ No other inlets in that manhole
1040 Now going from ~~SL~~ MH 3.1 to SL3
Good shape

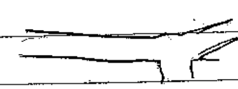
Reached catch basin SL 3
so the SPU GIS is wrong.
We also do not know where SL2 goes
now



1120 Entered pipe 6"



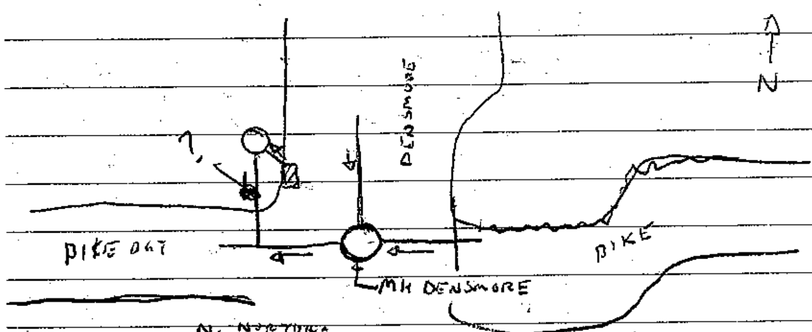
~~goes to~~
went ~27' before it
got to area where it changed to steel
pipe and appeared to ~~enter~~ drop off



pipe on other side
appeared clogged

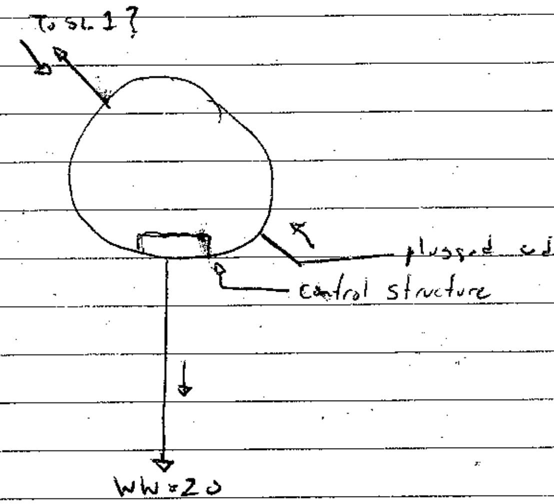
location is unknown and unable to find due
to power interference

1130 Going to check SL2 to see where it
goes, it may not enter WW#20 but rather
CSO (?) line that runs east-west along N.
Northlake Way



Outlet pipe from SL2 drops down steeply
likely into CSO line that heads west along
N. Northlake therefore it does not contribute
to WW#20.

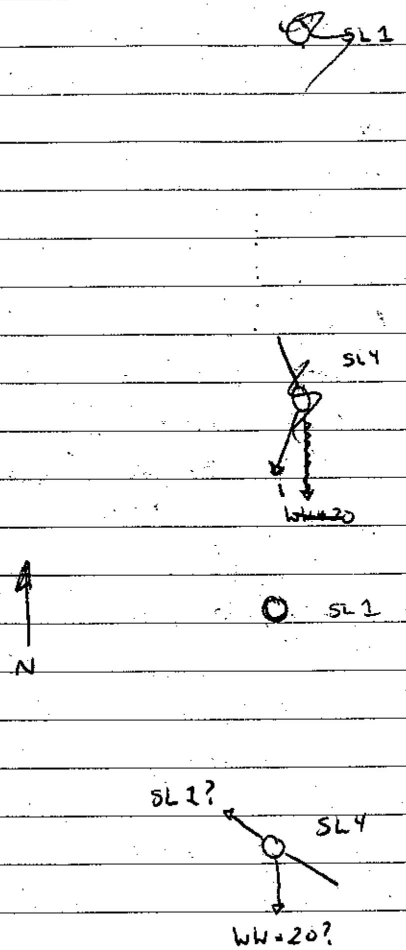
1200-1215 Lunch
1215 Begin video inspection at SL4
The manhole that goes to WW#20



We went up the line to SL1, but
it was very clogged, got about 9' and
found ~~a~~ what appeared to be a new structure
line was too clogged to continue further.
This line appears so clogged it is hard to
believe it is used?!?

10.2.08 cont.

~~According to GIS~~



There are no other pipes that come into this manhole

1300 Went on to Harbor Patrol to locate the WW #20 outlet, but was unable to due to higher water level and turbid conditions. We will not be able to video the condition from WW20 to SL4.

1317 The line that ~~[illegible]~~ we thought went up to SL1 looks like it goes to a covered catch basin, it is about 9 ft off the manhole, and covered with about 5' of dirt. Used the ~~sonde snode~~ sonde to locate it.

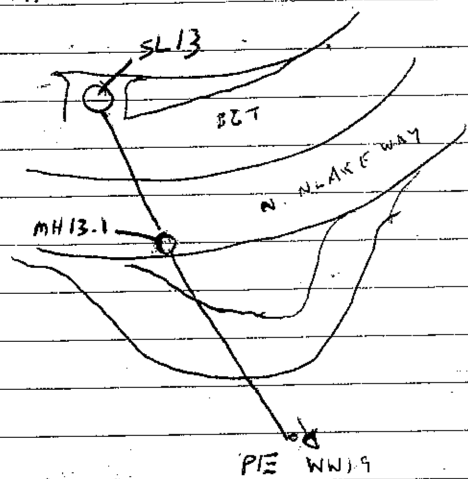
1330 It is unclear how the flow from SL1 gets to here, unless it goes to that covered catch basin and goes over all the debris which may be a reason for the surcharge

1335 Now working on how ~~large~~ the pipe ~~for~~ to plugged D029.003
Hit 50% debris at 22'

Replaced material previously removed around SL4 as requested by Pete Rude.

1345 Done with the WW#20 area, moving on to WW #19.

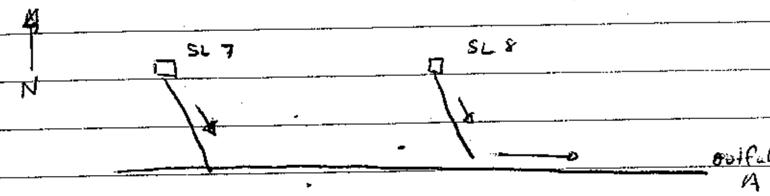
1357 Setting up at WW#19 starting at 6" outfall end.



PE WW19 → MH 13.1
changes to concrete @ 13' offset is high enough that camera is unable to proceed any further.

1415 Need to abandon at 14'.

1420 Moving on to CBs SL 7 + SL 8



CB SL 8 → SYSTEM A (TIE IN)
- 27' looks good.

1428 Setting up at CB SL 7

CB SL 7 → TIE IN looked good, no issues.

1443 Finishing up at CB SL 7 and moving on to SL 13 to see if we can get to other side
Unable to get inverted elbow off in MH for SL 13 unable to inspect line.

1455 Now in park doing SL12, start at outfall end.

10.2.08 cont.

Outfall from CB SL12 has large rocks in it
unable to advance from this side trying to
get to it from other side.

1523 Got through majority of pipe from CB side and
it looks fine.

1530
Video Inspection done.
Wrapping up job. will let Bravo out and
replace bollards.
Bravo making DVD of videos, still photos, +
reports.

1545 Receive DVD of inspection. A PACP video
will be delivered by Monday

1550 Leave site.

~~10.~~ 11.7.08. Site visit after large rain event

Notes documented in 11.7.08 e-mail
L Pete Rude

1/21/09 NE area catch basin cleaning
0830: SL7 cleaning ops began: no solids, H_2O ~3.5 ft
-Jeff Binnendyk & Rudy Kollar w/ Parks & Rec
+ Pete Rude SPU present
0910: finish suction & pressure washing
removing sticks & rocks
needs new trap, otherwise looks good.
0930 SL8 cleaning: no solids, H_2O ~3.5 ft
frame not mudded on to concrete base, which
has cracking occuring & some deterioration
in concrete. can mud today.
1000 done. Jeff & Rudy will mud the frame
onto the concrete base to protect against
soil entering the basin through the seam.
They will take photographs after the
work is done & forward to Pete.
Other Notes: Jeff & Rudy will also install
new traps, which will be aluminum with an
elbow bend, to prevent debris from
entering the outfall.

5/7/09 MK

0930 M. King onsite to meet SPU survey crew + locate outfalls.

Located outfalls A, B, C, D + E.
outfall D broken - dry.

SPU surveyor had located outfall F. loc. in corner of prow, laid on top of concrete pad, black corrugated plastic pipe. Photos taken.

Line @ outfall around E. at kite hill visible indentation + puddling on surface.

1015 Offsite.

M King
5/7/09 10:15

6.15.09 0800

Meet Gary Lockwood + Brian Robison from SPU on-site at SL4 near Harbor Patrol

- Goals -

- find unknown structure between SL4 and SL2
- Remove cover to hwy 20 outlet in SL4
- Find missing CBs in SL4 vicinity
- Collect samples for waste characterization

0815 Collected sample from SL ~~2~~4
8 oz. collected for TCLP metals
Gary is trying to find unknown structure

0830 Collected sample from SL3, 8 oz
collected for TCLP metals
John Jurgens now on-site trying to
get cover in SL4 off. However it is
stuck on there pretty good

Sample notes: SL4 - light irredescent sheen
on sample material, 1' of sediment
SL3 - ~2' sediment; abundant organic
material.

~~0900~~

0853 For unknown structure, Gary was unable to
find structure. He identified several hits
with a metal detector and dug to ~18" and
was unable to find anything. Likely deeper.
Gary did ~~remove~~ get the ~~large~~ hinged cover

in SL 4 off. Awaiting camera crew to look
(P-traps)
down WH20.

Guy + John looking for 2 CBs in SL4 vicinity

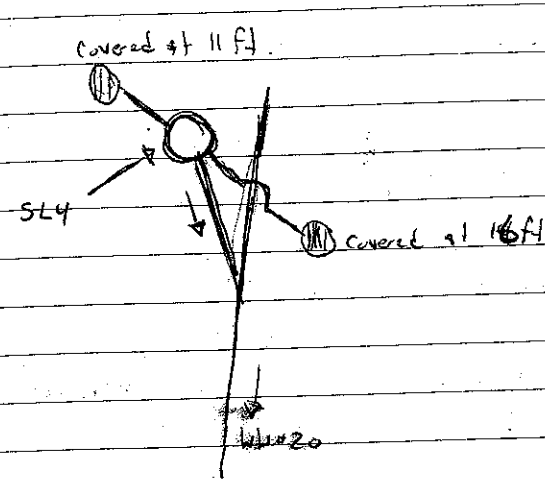
0917 Located one in WH#20 of outfall
~5' out at under 1.2' of water
Jessi took photo
Camera crew now on-site

From SL4 to SL1 we found a blocked
inlet. There is a [illegible] cover
It is completely covered

SPU camera crew - Hermie.

- We will now inspect the line from SL4
to WH#20 - clay pipe
has offset joints
17 feet we hit mainline sewer line

SL4 camera inspection



Inspected CB along N. Northlake Pl. in front
of Harbor Patrol. Filled w/ debris + rocks
at 8 ft.

For SPU catch basins have sumps

1022 - Now inspecting line from SL1 to SL4?
using 6" camera to hopefully get past offset
H

1047 6" was unable to get past offset, expanding
it to 8" to see if it can get past it.

Note:
- ductile iron pipe used for 18' or less

Got past offset clay pipe 3' sections
in good shape
191 feet encountered obstacle

— 7/14/09

0830 Arrive at site to find SL4
- SPU + Brown at site
- Inspected water line and manhole
manhole.
- Using as-builts - Found manhole.

1034
- Found SL4
Conducted video inspection from
SL4 to SL1, looks good until
135' where the offset, pipe repair
was.

1040
- Beginning video inspection from SL4
to WW 20 outfall.
No sand since they do not have one here.

- 12' found lateral to the right
leads to SL5
clay pipe, lots of roots
- 43' found other lateral on top
of pipe filled with debris
- 80' change from clay to concrete
- 87' concrete to clay and holes in
pipe
- Got 117' but then hit water and
did not want to go further

1115 Accessing line to Park, need to get person from manhole.

8/24/09 . 0800 - Arrive at WH20 ~~intercepts~~ with Jessi M. clear, ~~70s~~ 60's

- crew doing Park work is here and are having soil delivered
  - coordinate with them for access
  - conduct cleaning of structure SL4 (D029-001) to D029-003

- 2 guys from Bravo are here. ~~Nirpaul~~ Nirpaul + ?
  - setting up in line for cleaning line

- cleaning out base of manhole, then will plug the downstream pipe to WH20 and the upstream pipe to SL1

- line expected to be ~ 270'.
- ~~800~~ 0900 Pressure washer & reached 120'
  putting larger pressure washer head on to see if he can get through
  1st 100' was smoothly, ~~still~~ needed two passes & but after it went fine.
- 2nd try - blocked at 120', will insert video line to inspect

- "Sand nozzle" used first, "Contractor" used second

- Removed pressure washer line and the pipe continued to discharge a brown water at a steady flow. The flow continued for ~5' minutes and then began to slow down.
- Moving vac truck in order to bring in video truck. Room is tight here due to trucks bringing in soil for construction project.

0930 . Setting up video at SL4
- Flow in pipe has stopped completely

0948 . Survey is being re-started with a 8" setup Initially, a 6" setup was on the rig to allow room to get past joints., can't get past chunks of aggregate at 40'. Bob came

1120 Got a push cam to the site, are able to get to 60' before lens is covered in muck. Push cam gets to ~~123~~ ~~13~~ 93.7' before it gets stuck

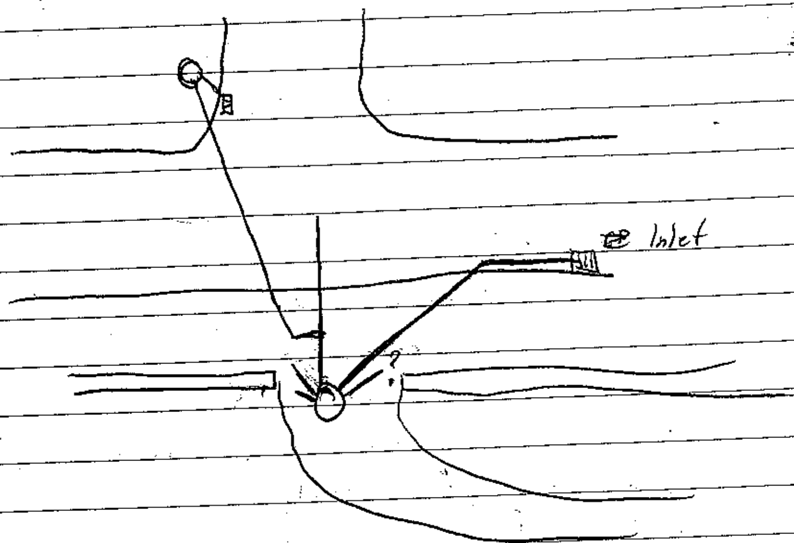
1147 Using jet hose and push cam in tandem. At ~90-100' there is a mixture of aggregate and mud and the camera gets covered with water.

1241 Got to about 90' with the push cam and hit rocks.
Steve is out of water and we are now trying to use a track cam for final viewing.
Got ~40' and hit rocks.

1310 Finished at SL4 area.
Moving on to SL1 area
Steve's vac truck ~~are~~ leave site

1345 Set up at SL1 and will inspect SL1 to PE line.
Pipe appears wet
Went 21' and found structure w/ standing water in it.
- Located and w/ sonde. it is about 1' south of road, close to a cut in the curb. Perhaps an old catch basin.
- sond said ~5.5' down

1429 Redid inspection with push cam, sent in structure (?) and are re-locating with sonde.



1430 Put camera in inlet along N. Northlake Wy
At ~20' it entered brick structure
Likely the same structure that the pipe from SL1 entered. (vitrified clay pipe)
Measured with sond, within ~3' of other sond locate

1453 Moving on to SL2 - 6" vitrified clay.
Got about 10' before hitting excessive debris and we were unable to go any further.
Attempted to get push cam in the pipe, but was unable to get cam in there due to entry pipe.

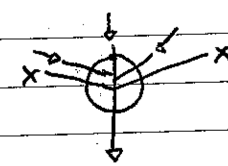
10/14 - Rain has stopped.
14^{50} Arrive on-site, meet Brian Robinson of SPU.

Inspected SL5. Steady flow coming from SL1, and no flow coming from SE pipe that goes towards Gas Works Park.

Inspected SL4. water level is up to invert elevation of outlet pipe and is not over filling.

Manholes in this area have not been raised yet.

Inspected SL1, the three northern inlets had steady flow, and the two southern inlets did not, as expected.



Inspected the Wataug #20 discharge area you could see the area bubbling up at the pipe. The water level is significantly down from summer level.

1530 Went to SL14 catch basin and collected sample. ~1" of sediment in bottom of CB. No sheen or any ~~[illegible]~~ visual or olfactory indications of contamination. Collected 4 8 oz jars of ~~[illegible]~~ solids

1630 Walked site and mapped out areas of surface runoff to Lake.

1645 Left site.

12/14/09 CAS-GWSA [illegible]

0815 M. McCullough onsite @ MW-20. SPN video crew (John) onsite w. Pete Rhode. Setting up to video line from SL-4 to outfall.

Pete checked in w/ Harbor Patrol.

9:00 Camera in SL-4, begin survey of MW-20 outfall. Start point @ 7.2 ft.

- Line in @ 13.3 ft - west side
- Sm. roots in seams
- Larger roots @ 35 ft, 42 ft
- large patch exposed soil @
- large joint crack @ 76 ft
- Hole @ 88 ft. Private tie in?
- Bend @ 92 ft, 133 ft
- lake level water @ 137 ft
- leaf matter @ 153 ft

Reached outfall @ 157 ft No blockages. Confirmed pipe end visually - photos taken.

0935 prep for line Survey @ SL-2.

T.6020 MM

- video from SL-1 up pipe @ 12:00 (12-inch)
  clear to manhole @ 30-ft.

- video from SL-1 down @ 6:00 to SL-4
  mostly south.
  line entering on east side, yellow
  staining. 19 ft
  gaps in joints ~22 ft, 53-ft,
  @ 57 ft change in pipe, cable
  in pipe. stopped camera
  cable from camera?

- Video from SL1 up @ 10:30 toward
  SL3.
  MH @ 61-ft. Stopped video.

- video from SL-1 up @ 9:00 (NW) to
  unknown line. Cannot locate camera,
  no locate data collected.
  sediment blockage @ 73-ft
  136-ft to drain
  147-ft to CB
  blockage near power pole support (east)

12/14/09 T.6020 MM

- video from SL-1 to line @ 3:00. line
  further S. of 2 heading NE.
  - low point from 42-49 ft.
  - increased standing water from 95-
  - Rock/cobble blockage @ 149-ft.
  - Measured out distance along
    S. side of Northlake way. No
    CBs or MHs visible, location/direction
    not confirmed.

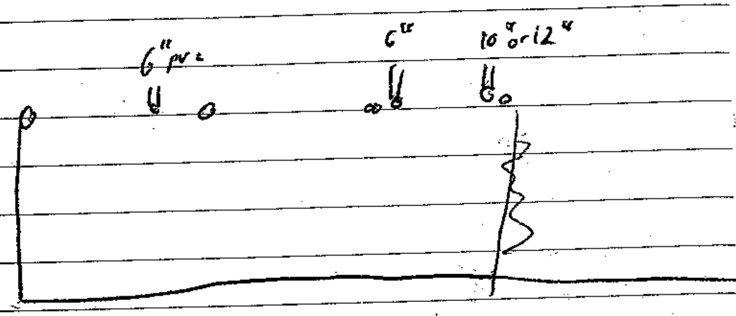
11:50 prepare to move to SL-2 for
final locate.

CB & drain off S. side of Northlake
way west of SL-1 is clogged @
drain. Needs to be cleaned prior to
video.

Blockage w/ dirt @ 10-ft. Blockage
unknown. May not block flow.
Needs cleaning.

Return to document & video

1/20/10
- observe steel pipe near impound dam
bldg during storm



5/19/2010
Arrived 9:00 am
SL7 - pulling back 1/2 - 1" of soil
and grass from cover to
fully expose and open CB.
Some soil may have entered
filter.
no sediment at bottom of
SL7 or SL8
- removed 1 stick from SL7
2 sticks, some debris from
SL8

08/25/10 - Stephen Bentson cool, overcast
- 0700 Call Katie Davis at HP to see if
space is available, spots taken by
team that may be out at San Ste Bill
keep an eye on it
- 0730 Arrive at site
0745 Bravo arrives at site - Nirpaul + Jake
Cone off spots, all are available except
PA-CB-02
0820 Begin work at PA-CB-03 to mainline
called mainline discharge point
8" concrete pipe good condition
113' and done, 2 to 3 sags between 46' and
50'
0835 Inlet PA-CB-03 to PA-CB-03
Using push cam
New push cam is not connected to truck
- but is self-contained
Roots at 22', 18½'
~25-50% debris in it
0845 Inlet PA-CB-01 to PA-CB-01
6" non-reinforced pipe
filled w/ debris + roots at 8'
unable to continue

Inlet PA-CB-04 → CB-04
Debris at 3', Roots at 5'
and at 15'

Inlet PA-CB-07 → PA-CB-07
3.63' all good.

- WW-19
Ditch ~68' from inlet to outlet
Place samples at 23', 46'

0936 Beginning survey of storm drain mainline
using lateral launcher.
10" pipe w/ concrete 4' sections
storm drain mainline manhole → PACB-04
At 41' we hit a junction that had a
1½" offset that obstructed the
launcher from going any further. Pulling
back and we will go to other access
point.
Doing lateral to PA-CB-07 8" CMP
Minor longitudinal cracks.

1012 ~~Do~~ Mainline MH → SL6
roots in first 2 feet, now clean.
all good to 110'.
Moving onto other manhole to get
remainder of mainline.
1038 Mainline MH II is located at the
junction where PACB-05 discharges into
the mainline, not shown on SPU
GIS, nice new manhole channelized
Mainline MH II → Mainline MH I.
10" concrete pipe
Roots at 38' where PA-CB-06 enters
mainline, looks good for the rest of
the way.
Unable to use lateral up PA-CB-06 line
due to steepness of entry point ~ 10:00
and roots and debris, will access it
from CB
1105 Inspected PA-CB-06, but were unable
to gain access to outlet pipe due
to position of manhole cover being
on the opposite side of the manhole.
Unable to inspect this line
Continuing west bound on the mainline to
PA-CB-01.

hit root mass @ 38', unable to continue further
- Doing mainline to PA-CB-04
3.5' hit outlet cover, looks good
~1130 Did manhole II → PA-CB-05,
but were unable to get past 40' or so
due to push wire coiling in pipe
Are now trying ~~PA-CB-0~~ manhole II to
PA-CB-01 with push cam to see if
we can get past rootball
No access is available at PA-CB-01
due to cover outlet flap was
unable to be removed
Jake will enter manhole to try and
push the push cam beyond rootball
Unable to get past rootball, will try
with lateral launcher
1215 Tim Shaw from City showed up to do
survey
Got push cam from mainline to PA-CB-05
all good.
1251 Unable to get past lip in pipe from
Manhole II to PACB-01 ∴ we were
unable to get to root ball and go
further. Abandon survey.

1300-1330 Lunch

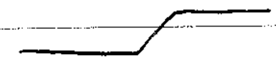
1330 Inspect Outfall F. Bravo not comfortable doing it due to access + high water. I agree.

1342 Get gear to set up on Kite Hill Outfall

1405 Unable to video Kite Hill Outfall due to material in pipe w/in 2' of pipe start.
Camera was able to get in to pipe but could not be pushed further and was caked with mud when it came out.
Water level in catch basin was also higher than ~~inlet~~ invert elevation so there is clogging going on.

~~12~~1415 At Harbor Patrol doing HP-CB-02 → HP-CB-03
We are unable to video HP-CB-02 → CB-01 due to water in pipe. this is due to the outlet elevation being higher than the inlet elevation in HP-CB-01.
Doing ~~CB~~- HP-CB-02 to HP-CB-03
approx. 30% full of water.
8" PVC
- Unknown inlet at 14'

25' to 32' camera underwater
@ ~42' 45° bend in line, another opposite 45° about 5'



- unable to go any further,
- cannot access upgradient side due to car parked on it
- cannot use push cam due to level of water and we would not be able to see anything

1446 Doing HP OWS to ~~CB~~- HP-CB-01
6' of 8" PVC looked great

1454 Doing HP-CB-01 to HP-CB-02, bend right at beginning, this is just to confirm that it goes where we think it does
- Went through no problem, debris at bottom of pipe, showed up in HP-CB-02.

1501 HP-CB-02 to ~~@~~ HP Overflow Outfall
- Debris in pipe including bag, small board, got 32 feet and it seemed that the end was reached but it was in water so we could not verify

6/25/10 cont.

1511 Moving on to OWS → OWS outfall
Pipe goes to the west but outlet
is to the south so there is likely
a bend. Bend confirmed
~~At 14' it went~~
At 14' it ~~went cam~~ cam went
underwater. & Camera daylighted
at 35'.

6/30/10
arrived on site 8:00am met
Brian Robinson 9:30 am
- decontaminated trowel and used
for rinsate blank, completed 9:00am

9:40 am
started w/ WW19-01. Brian
pulled back blackberries
that were covering location no odor
roots, leaves, dark brown, worm
9:54 am gravel, sand, silty,
WW19-03 fine, damp
Duplicate
rocks, worm fine sand, gravel some
silt, brown, no odor, no sheen
dry

1010am WW19-05
light brown, fine sand, some
silt, roots, no odor, no sheen,
some rocks, dry

10:25am WW19-06
wood chips, leaves on surface
dark brown, fine sand,
some silt, worms, some
roots, slightly damp
Brian pulled back blackberries
to expose soil

8/23/10
Arrived on site 9:00am
met Brian Robinson, SPU

9:15 collected WW19-04
collected Duplicate and
MS/MSD, - 5 jars total
fine sand, some silt and rocks
9:30 collected WW19-02
collected 3 jars
10:00 Left site

1/3

1.5.10 Gas Works Park Video Inspection of Outfall F + Kite Hill Outfall

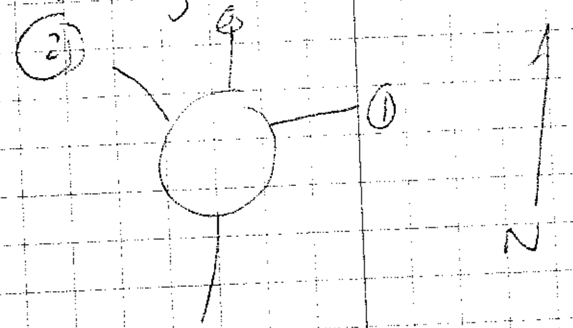
0945 Arrive on-site
Overcast, 37°F, rained last night but dry now.

1045 Kite Hill Outfall
got to 15.77 ft before hitting obstruction.
Lots of dirt on lens, so unable to really see what it looked like
6' sag in line
23' constriction in line

The pipe is not straight but twists and turns frequently

166' pipe 100% full and unable to go further

1055
Now doing hlde into manhole



1 Easterly are 1st
6" PVC

2 Going west 6" PVC

Pipe cut line

1200
3 Filled with debris
6" ABS
5' abandoned

1215 Open F 6" ABS
Got 18 and it was full fill of
soil and rocks. Above sump

10

1/5/16

1215 Kick Hill Con Out
crushed cdd tested a 120

1300 Leave site

Attachment F
Conveyance System Records
(provided on DVD)

This page is a directory to the figures and drawings that were used throughout this process, which are on the DVD. The files on the attached DVD are as follows:

- Side Sewer Cards and Associated Plats:
  - No. 3865
  - No. 3866
  - No. 5140-2
  - No. 5141-5
- Figure 16-31: Northlake Avenue et al, Grading etc., As-built, 1917.
- Figures 201-12-65 and 201-12-66A: Utilities along North Northlake Way, June 1990.
- Figure 16848: Lake Union Park Site Utilities, March 20, 1974.
- Seattle Public Utilities GIS Utilities and Aerial Photo, March 13, 2006.
- Figures 777-91-A12 and 777-91-A13: Westlake Avenue North, Et Al, Sanitary Sewer System, Sheets 12 and 13 of 27, July 1963.
- Gas Works Park Existing Conditions, Drainage As-built, May 2009.
- Figure 777-550-A2: N. Northlake Way Et Al, Storm Drainage Details, July 23, 2003.

ATTACHMENT 6B-7
Gas Works Park Stormwater Conveyance System Status Update

FLOYD | SNIDER
strategy ▪ science ▪ engineering

Two Union Square
601 Union Street, Suite 600
Seattle, WA 98101
tel: 206.292.2078 fax: 206.682.7867

Memorandum

To: Mr. Pete Rude, Seattle Public Utilities

From: Stephen Bentsen, P.E.
Allison Geiselbrecht, Ph.D.

Date: July 16, 2012

Project No: COS-GWSA.07050

Re: **Gas Works Park Stormwater Conveyance System Status Update**

This memorandum is intended to provide a status update on the stormwater conveyance systems in the vicinity of Gas Works Park, including the systems that discharge into Lake Union from Waterway #19 to Waterway #20. A vicinity map is shown on Figure 1 and the conveyance systems evaluated in this memorandum are shown on Figures 2 through 4. This memorandum describes the studies completed since 2007, reports submitted, data gaps, known issues, and provides general recommendations for each of the systems.

BACKGROUND AND HISTORY

The following bullets summarize the reports that have been prepared related to the stormwater conveyance systems within the vicinity of Gas Works Park:

- In 2007, a Joint Source Control Evaluation (JSCE) was conducted on the facilities and conveyance systems in the vicinity of Gas Works Park. The JSCE evaluated the nature of the facilities' operations and areas that were part of the conveyance system drainage basins; identified the potential for recontamination of the post-remedial sediments; and provided recommendations for additional data collection and actions related to source control. This information was presented to the Washington State Department of Ecology (Ecology) in the *Gas Works Sediment Area Joint Source Control Evaluation* (Floyd|Snider 2007).
- Based on recommendations resulting from the JSCE, a source control screening investigation was conducted in October 2008 on several conveyance systems including Waterway #19, Waterway #20, and the conveyance systems within Gas Works Park. The analytical results and a summary of the inspection results were provided to Ecology in the *Gas Works Sediment Area Initial Source Control Screening Investigation of Storm Drains* (Phase 1 Investigation Report) in April 2009 (Floyd|Snider 2009).
- From March through September 2009, in response to the elevated total polycyclic aromatic hydrocarbons (TPAHs) in the solids from Catch Basin SL 7, the City of Seattle (City) conducted a further investigation of the catch basins and surface soils in the Northeast Corner (NE Corner) of Gas Works Park. Results from this investigation were reported in the Gas Works Park Northeast Corner Source Control

Data Report *(*Phase 2 Investigation Report) submitted to Ecology in March 2010 (Floyd|Snider 2010a).

- In September 2009 through August 2010, a Phase 3 Source Control Investigation was conducted within Gas Works Park, at the City of Seattle Police Harbor Patrol Facility, and on the upland portion of Waterway #19 and the adjacent right-of-way as part of an overall Storm Drain Source Control Evaluation. This investigation was conducted to fill data gaps that remained from the Phase 1 and Phase 2 Investigations, including collecting additional field data to characterize the quality of solids in the storm drain catch basins not investigated during the previous phases. The analytical results and a summary of inspection results were provided to Ecology in the Storm Drain Source Control Evaluation Phase 3 Data Report (Phase 3 Report) in December 2010 (Floyd|Snider 2010b).
- As part of the Phase 3 Source Control Investigation (Phase 3 Investigation) storm drain video inspections were conducted on the Kite Hill Outfall and the Outfall F stormwater conveyance systems in January 2011. A memorandum describing the results of this additional investigation (the Phase 3 Data Report Addendum) was submitted to Seattle Public Utilities (SPU) in October 2011 (Floyd|Snider 2011).
- In March 2012, a memorandum summarizing the storm drain video inspections and actions conducted on the Waterway #20 Outfall stormwater conveyance systems was submitted to SPU as Phase 3 Data Report Addendum 2 (Floyd|Snider 2012). The memorandum summarizes numerous investigations conducted from 2007 to 2009 on this conveyance system and provides a chronology of the events related to the Waterway #20 system, a description of the findings, and a summary of the key issues related to this system.

CONVEYANCE SYSTEM STATUS

A full description of the conveyance systems, their contributing drainage basins, and the methodology used to conduct the inspections and investigations can be found in the above-referenced documents. This memorandum solely provides an update on the current status of the conveyance systems. For a full understanding of the investigations conducted, refer to the referenced documents. The status of each outfall's conveyance system between Waterway #19 and Waterway #20 is described below in an east-to-west direction as shown on Figure 2.

This memo focuses exclusively on the conveyance system and structures themselves, and does not provide recommendations concerning source control actions that may be required based on the conveyance system solid chemical concentrations that were collected from within the conveyance systems and the soil samples that were collected in the drainage basins.

Waterway #19

The Waterway #19 Outfall is a 6-inch polyvinyl chloride (PVC) pipe that discharges approximately 80 feet inland from the shoreline and two-thirds of the way up the slope from the shoreline towards North Northlake Way. The discharge from this pipe flows down a small partially armored channel into a depression near the shoreline, where it enters another 6-inch PVC culvert that discharges on the other side of a foot path near the shore and flows into

Waterway #19. The basin associated with this outfall is estimated to be 1.2 acres and is composed of a portion of Meridian Avenue North and North Northlake Way, the Burke Gilman Trail, a patio, a landscaped area, and a portion of roof drainage from a building complex, which includes condominiums and commercial facilities. The exact area of the roof that drains into this basin is unknown, but is not expected to significantly affect the quality of the runoff.

In 2009, only a limited section of this system was able to be video inspected due to elbows in a manhole and bends in the pipe that the camera was unable to make. During this inspection, 14 feet of this system was able to be inspected and was found to be in good shape. The conveyance system was only inspected downgradient from Manhole SL 13. The conveyance system upgradient of this manhole connects to residential and commercial operations that were beyond the scope of this work. This conveyance system has been observed discharging during storm events.

In 2010, soil samples from the slope side that contributes to the Waterway #19 outfall were collected and analyzed. This conveyance system is discussed in the JSCE, the Phase 1 Investigation Report, and the Phase 3 Data Report.

Based on the condition of the pipe that was able to be inspected, the discharge during storm events, and the limited size and nature of the conveyance system, there are no data gaps and there are no known issues with this conveyance system.

Recommendations

There are no known issues with this conveyance system and no significant data gaps; therefore, no additional work is recommended.

Gas Works Park

The following sections discuss the outfalls that discharge within Gas Works Park. They are discussed in an east-to-west direction and are shown on Figures 2 through 4.

Outfall A

Outfall A is a 10-inch storm drain that discharges drainage from an approximately 5-acre area that includes the Gas Works Park parking lot, a lawn area to the west of the restrooms, and the lawn and vegetated area located north of the play barn. The drainage basin is the largest within the park and contains approximately 14 catch basins as shown on Figure 2. The basin also includes approximately 200 feet of perforated piping. The perforated pipe is located in the soil below the cap placed in 2001 as part of the uplands remediation project and in an area of the park that was not capped during the uplands remediation project.

The majority of the conveyance system within this basin was inspected during several events from 2008 to 2011 and is in good shape except for the items discussed below:

- The perforated pipe section that runs upgradient in a westward direction from Manhole SL 6 to the center of the park contains a dip in the pipe approximately 5 feet from the manhole where water has accumulated indicating that the pipe does not have a consistent grade. Additionally, this pipe contains roots coming from the top of the pipe and debris in the bottom of the pipe. Due to the root and debris presence, the survey was only able to extend approximately 105 feet from SL 6 in the pipe before it had to be abandoned.

  - Note that this line also shows a catch basin at the end of this run in the City's Geographic Information System (GIS) files. This feature is either not there or buried.

- All of the pipe segments within the parking lot were inspected, if accessible, and did not have obstructions or bends that prohibited inspection. Sags and small cracks are located in several pipes, but were deemed insignificant in this analysis. Overall, the majority of the pipes appeared in good shape; however, the following segments of pipe need work to remove debris to allow further inspection.
  - **Mainline Segment.** PA-CB-01 to 10 feet west of where the pipe from PA-CB-04 junctions with the mainline. This segment of pipe was unable to be inspected because of a large, dense root ball that filled about 50 percent of the pipe at approximately 10 feet west of where the pipe from PA-CB-04 junctions with the mainline. This obstruction blocked the inspection from manhole Mainline MH-2.
  - **Inlet-PA-CB-01 to Mainline.** Roots and debris occupied over 20 percent of the pipe at 8 feet from the inlet and the video camera was unable to go any further.

In addition to the video inspections of this conveyance system, numerous samples were collected and analyzed of both solids from the stormwater conveyance system structures and of soils within the NE Corner that are part of the drainage basin. Samples of material from catch basin filter fabric inserts in the NE Corner were also collected and analyzed.

This conveyance system is discussed in the JSCE, the Phase 1 Investigation Report, the Phase 2 Investigation Report, and the Phase 3 Data Report.

Data Gaps

The pipe segment from Catch Basin SL 14 to the Outfall A Mainline was not inspected; however, this pipe segment is assumed to be of the same condition as the rest of the conveyance system in this area, which is very good. Therefore, this is not a critical data gap.

Recommendations

Although the perforated pipe section that leads to SL 6 is crushed and the catch basin has not been located, it appears that the drainage in this area is not significantly affected. The perforated pipe may, however, be located in soil with potential contamination and may be a pathway for transport of this material. If the area is being redeveloped as part of another project, it would be prudent to address these issues and consider removing or replacing the perforated pipe segment. Otherwise no additional work is recommended on this length of pipe.

For the parking lot pipes, it is recommended that the obstructions in this system described above be removed. Removing this material will assist with drainage in that area and prolong the functionality of the conveyance system.

Outfall B

Outfall B is a 6-inch pipe that discharges drainage from a portion of the paved area west of the restrooms, the picnic area north of the play barn, and may also drain a portion of the main paved path that links the parking lot and the play barn/paved picnic area. This conveyance system also contains a segment of approximately 160 feet of perforated piping that runs upgradient from Catch Basin SL 9 towards the parking lot.

The majority of the conveyance system within this basin was inspected in 2008 and is in good shape except for as noted below:

- The perforated pipe section that runs upgradient from Catch Basin SL 9 towards the parking lot (Section SL 9 to Parking Lot) was crushed approximately 2 feet in from the catch basin and was unable to be inspected.

In addition to the video inspections of this conveyance system, numerous samples were collected and analyzed of solids from the stormwater conveyance system structures.

This conveyance system is discussed in the JSCE and the Phase 1 Investigation Report.

Data Gaps

This conveyance system contains unmapped pipe segments. The pipe segment from Catch Basin SL 9 to Outfall B had multiple laterals to the south and north that were not shown on existing maps. These are likely floor drains from the picnic area north of the play barn, and were unable to be inspected.

Recommendations

Although the perforated pipe section that leads to SL 9 is crushed, it appears that the drainage in this area is not significantly affected. If the area is being redeveloped as part of another project, it would be prudent to address this perforated pipe stretch and either remove or replace the section. Additionally, given the potential subsurface contamination in the vicinity of the play barn, mapping or further investigation into the potential stormwater quality conveyed by the unknown laterals may be prudent.

Outfall E

Outfall E is a 6-inch pipe that discharges drainage from a series of catch basins and a floor drain that collects runoff from the roofs and impervious areas of the play barn and picnic shelter; however, its full extent is unknown.

In 2008, a video inspection of this line was conducted from the downgradient end, Outfall E, since there was not an upgradient location available for inserting the camera. This section (identified as PE E to play barn on the video inspection report) contained significant fine deposits near the outfall, possibly due the intrusion of Lake Union water at high level variations and/or via storms. After passing through the deposits area, the inspection was able to continue to 155 feet where a piece of broken pipe obstructed any further inspection. In the area that was inspected, however, numerous unknown laterals were discovered. It is unknown where these laterals come from and what drainage areas contribute to this outfall.

This conveyance system is discussed in the JSCE and the Phase 1 Investigation Report.

Data Gaps

The nature and extent of this drainage basin and the piping network related to Outfall E is relatively unknown. There are numerous laterals that come off the inspected line and their associated inputs are not known, and the video inspection was only able to go a limited distance before encountering an obstruction.

Recommendations

The configuration and condition of this conveyance system is relatively unknown. Since the play barn is in an area that has not been remediated, the condition of the subsurface soils surrounding the conveyance system is suspect. It is recommended that further investigation be completed to better identify the configuration and condition of this system, its drainage basin, and the conditions of the soils within the basin.

Outfall C

Outfall C is a 10-inch pipe that discharges drainage from one catch basin that drains a portion of the paved pathway located west of the sand play area and adjacent unpaved areas. Outfall C also discharges stormwater that is collected through a network of perforated pipes located under the sand play area.

In 2008 this pipe was video inspected and is in good shape except for a small fracture at the upgradient end of the pipe.

In addition to the video inspections of this conveyance system, a sample was collected from the solids in Catch Basin SL 10 and submitted for laboratory analysis.

This conveyance system is discussed in the JSCE and the Phase 1 Investigation Report.

Data Gaps

The perforated pipes that go underneath the sandy play area were unable to be inspected since they were laterals off the mainline and are inaccessible by the cameras with no upgradient points of access.

Recommendations

The condition of the perforated pipes in the sandy play area is not known. If the area is being redeveloped as part of another project, it would be prudent to better understand the condition of these pipes and confirm that subsurface materials are more recent and not in contact with impacted soils. Otherwise, no additional work is recommended on this conveyance system.

Outfall D

Outfall D is a pipe that discharges drainage from a portion of the paved pathway that is located west of the sand play area, adjacent unpaved areas, and a portion of the lawn to the south of the sand play area.

The pipe segment within this basin appears to be in good shape; however, Catch Basin SL 11 shows evidence of deterioration with large cracks and evidence of water draining to levels below the effluent pipe level. On the south side of the catch basin there is a patched section; it is unclear whether this is a repair patch or a cover where another pipe previously entered the catch basin.

In addition to the video inspections of this conveyance system, a sample was collected from the solids in Catch Basin SL 11and submitted for laboratory analysis.

This conveyance system is discussed in the JSCE and the Phase 1 Investigation Report.

Data Gaps

There are no data gaps associated with this conveyance system.

Recommendations

It is recommended that the Catch Basin SL 11 be routinely inspected to ensure that the structure does not deteriorate further and continues to function properly.

Outfall F

Outfall F is a 6-inch pipe that discharges into Lake Union on the south side of the park and is located at the west end of the prow along the southern portion of the park (Figure 3). The Outfall F conveyance system collects subsurface drainage only and consists of a solid pipe that conveys subsurface water collected in an upgradient perforated pipe and an upstream perforated pipe that is below the ground surface. The perforated pipe is located in a low elevation area just north of a paved path and is approximately 40 feet long. Stormwater runoff from a northern area of the park that is between the main east-west path and the parking lot is conveyed to this area through an inlet and short pipe that conveys the runoff to the south underneath the paved path. This runoff then travels overland to the low area where the perforated pipe is located. Additional runoff from the eastern side of Kite Hill and the grassy area west of the cracking towers may also infiltrate and be collected by the perforated pipe.

Because of the high level of water in Lake Union in June 2010, this pipe was unable to be accessed safely and was, therefore, not inspected at that time; it was re-inspected in January 2011. The camera went approximately 18 feet before the pipe was 100 percent filled with dirt and the inspection was abandoned. It was noted by Pete Rude of SPU that he has never observed flow from Outfall F during several storms and, based on the blockage observed during the video inspection, it is unlikely that this pipe is operational.

In addition to the video inspections of this conveyance system, a sample was collected from the solids in Catch Basin SL 12 (which may potentially contribute to this outfall) and submitted for laboratory analysis.

This conveyance system is discussed in the JSCE, the Phase 1 Investigation Report, the Phase 3 Investigation Report, and is summarized in the Phase 3 Data Report Addendum.

Data Gaps

The nature and condition of this pipe is unknown because it was unable to be inspected.

Recommendations

Outfall F is essentially non-functional. If this outfall is necessary to promote proper drainage within this drainage basin, then the conveyance system should be repaired. If it is not necessary for this area based on a lack of ponding or drainage concerns, it should be capped and abandoned to prevent any potential migration of subsurface and surface soils from the drainage basin into Lake Union.

Kite Hill Outfall

The Kite Hill Outfall is a 6-inch pipe that conveys runoff collected from three inlets located around the perimeter of the sculpture on top of Kite Hill to Lake Union. The runoff from the three inlets is conveyed to a manhole located on the south side of the sculpture, at which point the runoff enters the 6-inch pipe. Only two inlets are functional.

This system was inspected initially in 2010 and again in 2011 after some cleaning by City of Seattle Parks and Recreation staff.

The majority of the conveyance system within this basin was inspected during several events and was found to have significant issues, as discussed below:

- **Kite Hill Manhole to the Kite Hill Outfall.** The 6-inch corrugated acrylonitrile butadiene styrene (ABS) pipe contains many twists and turns as it descends to Lake Union. It may not be bedded in sand and is not straight, but still appears functional where it was able to be inspected. At 5 feet from the manhole a low point was encountered where water had accumulated in the pipe. At approximately 160 feet from the manhole, significant debris, dirt, and rock were encountered and the inspection was unable to go any further. Up to that point, the pipe appeared in reasonable shape with no tears or cracks.

  In order to fully inspect this pipe, the inspection was continued from the outfall end of the pipe. At approximately 20 feet from the outfall, the pipe was severely twisted and crushed and the camera was unable to go any further. The twisting was so significant that there was no visibility beyond the deformation. It is likely that the pipe is crushed beyond this point as well.

  It was noted by Pete Rude of SPU that he has never observed any water coming out of this pipe, even during heavy storms.

- **Kite Hill Manhole to Northern Inlet.** At 5 feet from the manhole, the 6-inch corrugated ABS pipe that enters the manhole from a northerly direction was completely filled with debris, rocks, and soil and the inspection was abandoned. This pipe is assumed to continue to the northern portion of Kite Hill and the sundial sculpture, but is likely not active.

In addition to the video inspections of this conveyance system, a sample was collected from the solids in the Kite Hill Manhole that contributes to this outfall and submitted for laboratory analysis.

This conveyance system is discussed in the JSCE, the Phase 1 Investigation Report, the Phase 3 Investigation Report, and is summarized in the Phase 3 Data Report Addendum.

Data Gaps

The full condition of the pipe from the Kite Hill Manhole to the Kite Hill Outfall is unknown. This pipe is known to be in serious disrepair and has not been observed to be functional.

Recommendations

The pipe from the Kite Hill Manhole to the Kite Hill Outfall F is in serious disrepair. This pipe does collect runoff from the top of Kite Hill, but has not been observed discharging and it is known that the pipe is severely twisted. Since the condition of the soil surrounding this pipe is suspect and it is known that stormwater runoff does enter the pipe, it is recommended that replacement or repair of this pipe be considered.

Harbor Patrol Outfall and Overflow Outfall

The Harbor Patrol Outfall and Overflow Outfall conveyance systems are located within the Harbor Patrol facility located just west of Gas Works Park and collects and discharges runoff from the Harbor Patrol (Figure 4). The Overflow Outfall is a high-flow outfall from the oil/water separator that diverts stormwater runoff during periods of heavy rainfall when the flow rate is beyond the design capacity of the oil/water separator.

The majority of the conveyance system within this basin was inspected during several events in 2009 and 2010 and is in good shape. Several pipes within this conveyance system were unable to be inspected due to inaccessibility, water, or pipe configurations and are described below:

- **HP-CB-01 to HP-CB-02.** This pipe was filled with water so it could not be inspected for integrity. The water in the pipe is due to the outlet elevation of Catch Basin HP-CB-01 being higher than the outlet elevation of Catch Basin HP-CB-02; therefore, this pipe will always contain water. The video camera, however, was pushed from HP-CB-01 to HP-CB-02 and it was confirmed that these two structures are connected. The pipe was approximately 6 feet long and was in good condition.
- **Forty-five feet from HP-CB-02 to HP-CB-03.** The inspection began at Catch Basin HP-CB-02 and went approximately 45 feet before encountering two 45 degree bends that the camera was unable to get past. A truck was parked on Catch Basin HP-CB-03 all day so access was not possible from that catch basin.

- **HP-CB-02 to 45 feet from HP-CB-02 towards HP-CB-03.** The inspection of the 8-inch PVC pipe from Catch Basin HP-CB-02 towards Catch Basin HP-CB-03 showed sags and standing water at approximately 3 feet, 22 feet, and 38 feet from HP-CB-02. An unidentified 4-inch pipe entered this segment at approximately 15 feet from HP-CB-02; this pipe may come from the Harbor Patrol building. At 42 feet, there were two 45 degree bends in the pipe and the inspection was unable to continue. Up to this point, the pipe appeared to be in good condition.

In addition to the video inspections of this conveyance system, samples were collected from the solids in several catch basins and the oil/water separator that contribute to this outfall and submitted for laboratory analysis.

This conveyance system is discussed in the JSCE and the Phase 3 Investigation Report.

Data Gaps

There is an unidentified pipe that enters the pipe from HP-CB-02 to HP-CB-03; its contribution and condition is unknown. There is also a pipe that appears on the City of Seattle GIS data, but was unable to be verified in the field.

Recommendations

Although the system appears to be in good shape, there are still several items that should be addressed. The source of the unidentified pipe should be identified and its contribution should be better understood. There is also a pipe that appears on the City of Seattle GIS data, but was unable to be verified in the field. The existence of this pipe should be determined.

Additionally, the elevations of the catch basins are configured so that the pipe will always be full of water. This is not an optimal design; however, if the system remains operational this is not an immediate issue and can be addressed during any future redevelopment.

Waterway #20

Waterway #20 is an 8-inch outfall that discharges at the shoreline in between Harbor Patrol and the South Yard of King County Metro, at the foot of Densmore Avenue North (refer to Figure 4). The Waterway #20 storm drain was built prior to 1919. The drainage basin for this outfall contributes stormwater from approximately 7.0 acres, with inputs primarily from street right-of-ways, Gas Works Park, a condominium complex, and the majority of the former Metro Lake Union North Yard currently planned for development. Waterway #20 contains the largest drainage basin of any basin investigated within or adjacent to the park.

The majority of the conveyance system within this basin was video inspected during numerous events from 2008 to 2009, which are described in detail in the Phase 3 Data Report Addendum 2. Several cleaning events occurred within this conveyance system and are also described in detail in the Phase 3 Data Report Addendum 2.

Many of the inspected pipe segments for Waterway #20 appeared to be in good condition, but there are significant issues in several areas. The structural integrity of this system is the poorest in the vicinity of Gas Works Park. Disregarding small hairline cracks and minimal gaps, a summary of the key issues of the Waterway #20 conveyance system is presented below:

- **SL 1 to SL 4 Pipe.** Approximately 135 feet from SL 4 and 65 feet from SL 1, the material and diameter of the pipe changes. This may be a historical patch repair that is not in good shape. At this location, surrounding soil is visible and there are cracks in the vicinity. This pipe is in a historically industrial area and potential infiltration of contaminated soil and groundwater is a source control concern for the Gas Works Sediment Area (GWSA). There is also an obstruction near the SL 4 structure consisting of wood and debris; however, water is able to travel past this obstruction.
- **SL 4 to Waterway #20 Outfall.** There are roots growing at the joints between the pipe segments at numerous locations throughout the pipe. There is also exposure to the soil at the location where the covered catch basin pipe connects to this pipe (approximately 44 feet from SL 4); the joint at that location is completely exposed to the soil. At approximately 90 to 95 feet from SL 4 there are several holes in the pipe and soil is visible at this location. At 135 feet there is a large gap at the pipe joints. These gaps may allow potentially contaminated soil and groundwater to enter the conveyance system. Additionally, the outfall for this pipe is located several feet offshore and is cracked. The outfall for this pipe was initially further out into Lake Union, but has broken off near the shoreline.
- **SL 4 to D029-003.** This pipe has severe blockage and is not believed to be functional since no water has been observed discharging out of this pipe during storm events. Numerous cleaning events were performed on this pipe, but were unable to get further than approximately 100 feet before hitting obstructions that the pressure washer could not pass.
- **SL 1 to PE.** The joint in between SL 1 and inlet PE does not appear to be a standard connection point. Although it has been confirmed that these two points are connected, it is unclear as to what this structure is and the integrity of it has not been evaluated.
- **Inlet on North Northlake Place.** The outlet for this inlet was only able to be inspected for 8 feet until it was completely filled with material. In essence, this inlet is no longer active. This inlet may lead to the pipe that connects SL 4 and D029-003, but it is unknown.
- **SL 2 to SL 1.** The pipe that leads from SL 2 to SL 1 was unable to be completely inspected due to the debris in the pipe; however, this does not appear to be affecting drainage in this area.
- **Covered and inoperable conveyance structures.** There are numerous covered catch basins or inlets that are no longer functioning due to coverage with soil or pavement; however, the inoperability of these structures does not appear to be affecting drainage in this area.

In addition to the video inspections of this conveyance system, numerous samples were collected of solids from the stormwater conveyance system structures and submitted for laboratory analysis.

This conveyance system is discussed in the JSCE, the Phase 1 Investigation Report, the Phase 2 Investigation Report, the Phase 3 Data Report, and is summarized in the Phase 3 Data Report Addendum 2.

Data Gaps

As shown on Figure 4, there are several sections of the conveyance system that were unable to be inspected.

Recommendations

As noted above and described fully in the Phase 3 Data Report Addendum 2, there are significant issues in this conveyance system. The recommendations for this system include the following:

- The pipe from SL 1 to SL 4 is in a historically industrial area and infiltration of contaminated soil and groundwater is a source control concern for the GWSA. Unless additional investigation or evaluation shows that this pipe section is not a concern, it is recommended that this pipe section be repaired or replaced.
- Remove the obstruction near SL 4 in the pipe from SL 1 to SL 4. This pipe is in a historically industrial area and infiltration of contaminated soil and groundwater is a source control concern for the GWSA.
- Unless additional investigation or evaluation shows that the pipe from SL 4 to the Waterway #20 Outfall is not a concern, it is recommended that this pipe section be repaired or replaced. There are numerous gaps and cracks in this pipe that may allow potentially contaminated soil and groundwater to enter the conveyance system. Additionally, the outfall for this pipe is located several feet offshore and is cracked. The outfall for this pipe was initially further out into Lake Union, but has broken off near the shoreline.
- Cap the pipe from SL 4 to D029-003. This pipe is filled with material and has not been observed to be functional; therefore, capping is unlikely to affect drainage in the area.
- If there are drainage issues on North Northlake Way, it is recommended to clean the inlet on North Northlake Way or install additional drainage to address these issues. If the drainage is functioning properly, then no additional work is recommended in this area.
- Clean the pipe from SL 2 to SL 1. Although this does not appear to be affecting drainage, it is part of the conveyance system for this area and should be maintained.

CONCLUSION

The previous sections summarize the nature of the conveyance systems in the vicinity of Gas Works Park and present the data gaps and recommendations for each system. A more detailed description of each conveyance system is provided in the referenced documents.

As noted before, this evaluation does not identify stormwater capacity issues or ponding issues that may occur within the conveyance systems. The key findings above only identify structural integrity issues or operational issues within the conveyance systems. This evaluation also does not consider the associated laboratory analytical results, such as catch basin sample results.

REFERENCES

Floyd|Snider. 2007. *Gas Works Sediment Area Joint Source Control Evaluation Ecology Review Draft*. Prepared for City of Seattle and Seattle Public Utilities. 27 February.

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———. 2011. Memorandum to Pete Rude, Seattle Public Utilities, re: Storm Drain Source Control Evaluation Phase 3 Data Report Addendum. 7 October.

———. 2012. Memorandum to Pete Rude, Seattle Public Utilities, re: Storm Drain Source Control Evaluation Phase 3 Data Report Addendum 2 –Waterway #20. 5 March.

ENCLOSURES

Figure 1	Vicinity Map
Figure 2	East Portion Video Inspection and Sampling Locations
Figure 3	Central Portion of Site Video Inspection and Sampling Locations
Figure 4	Northwest Portion Video Inspection and Sampling Locations

Figures

Notes:

- Orthoimage provided by City of Seattle and dated 2005.
- Reference data provided by ArcGIS Streetmap North America.

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Stormwater Conveyance System Summary
Gas Works Sediment Area
City of Seattle

Figure 1
Vicinity Map

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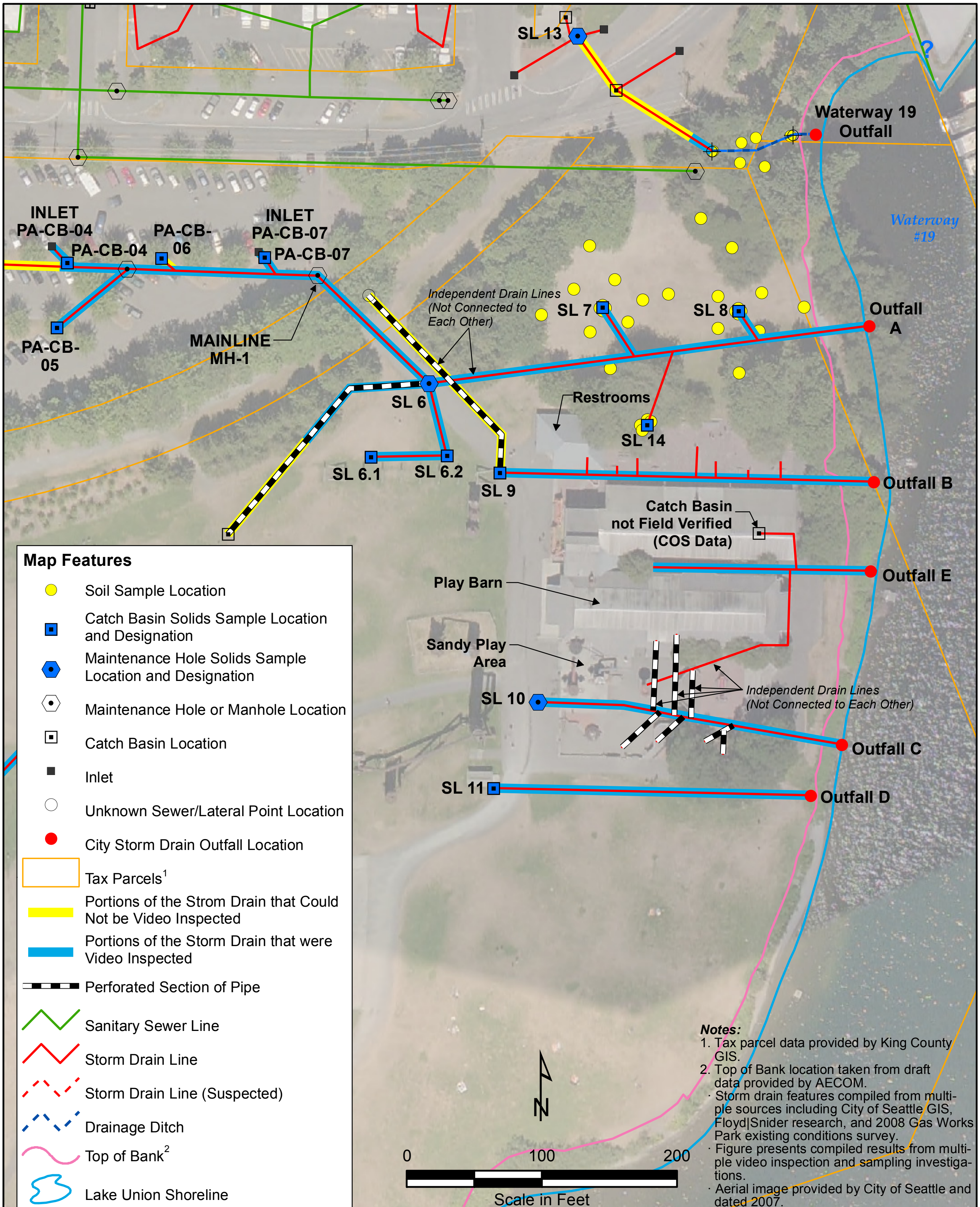
6/7/2012



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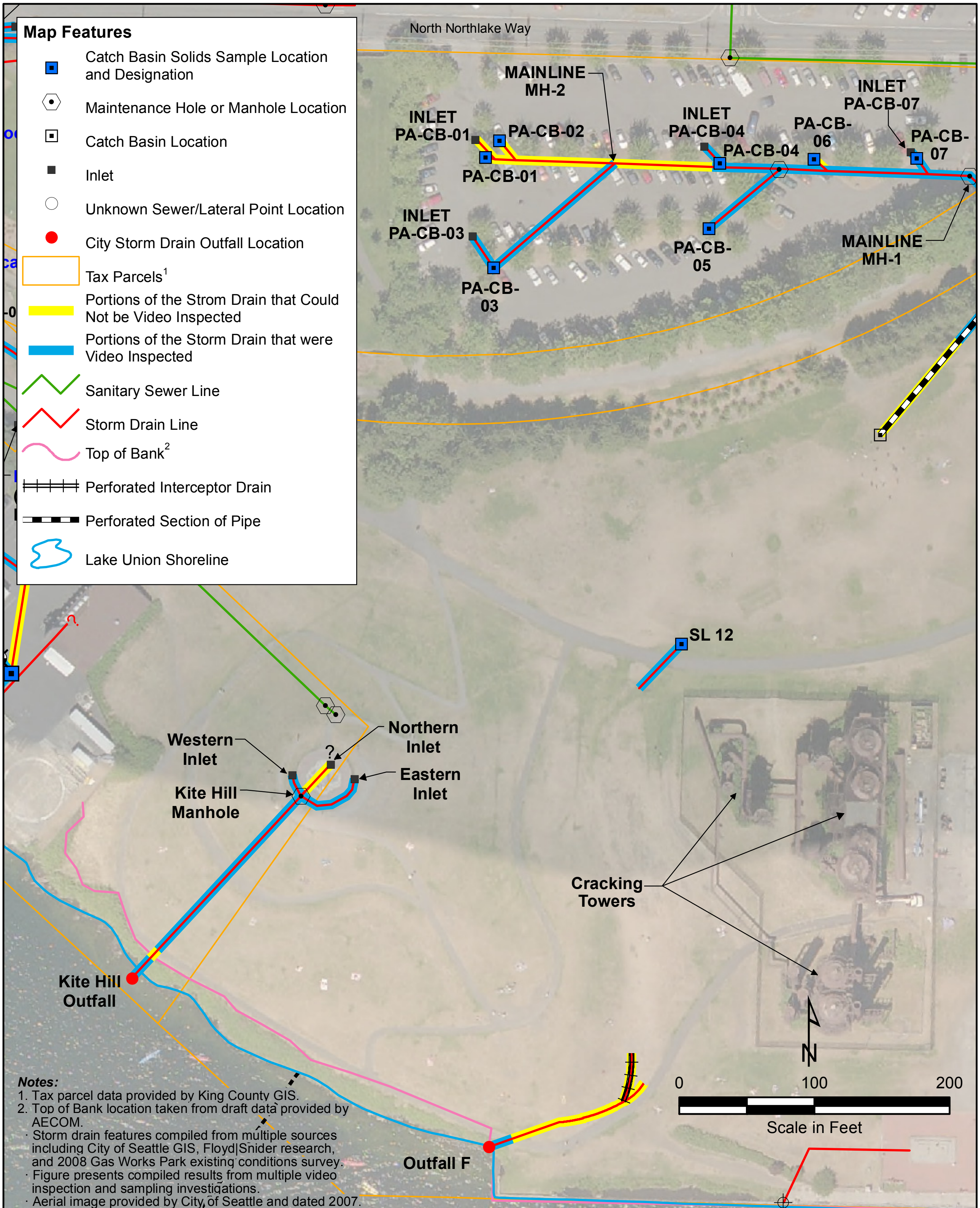
Stormwater Conveyance System Summary
Gas Works Sediment Area
City of Seattle

Figure 2
East Portion Video Inspection and Sampling Locations

F:\projects\COS-GWSA\GIS\Task 07050\Conveyance System Summary Figures May 2012\Figure 2 (East Portion of Site Video Inspection and Sampling Locations).mxd
6/7/2012



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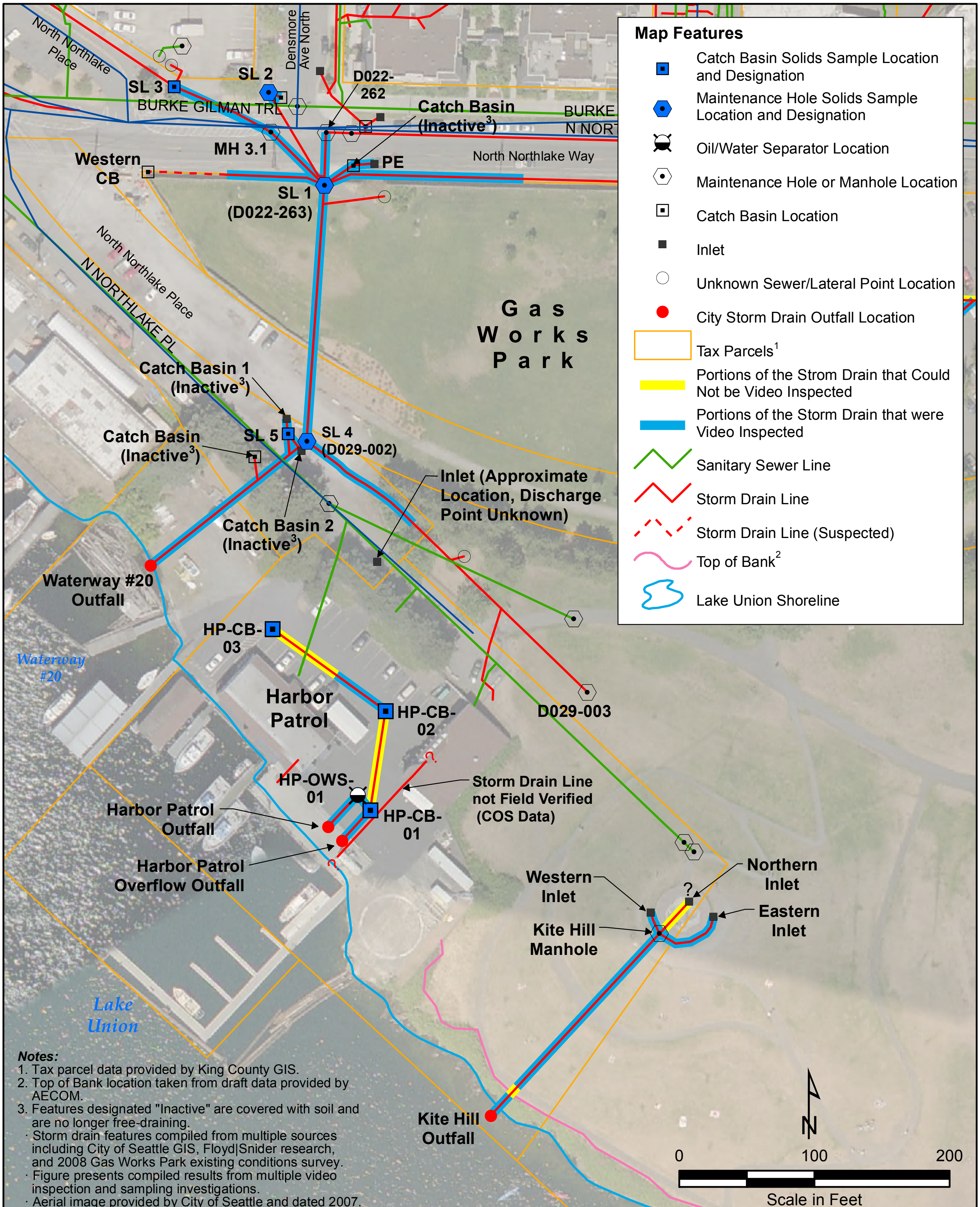
Stormwater Conveyance System Summary
Gas Works Sediment Area
City of Seattle

Figure 3
Central Portion of Site Video Inspection and Sampling Locations

F:\projects\COS-GWSA\GIS\Task 07050\Conveyance System Summary Figures May 2012\Figure 3 (Central Portion of Site Video Inspection and Sampling Locations).mxd
6/7/2012



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Stormwater Conveyance System Summary
Gas Works Sediment Area
City of Seattle

Figure 4
Northwest Portion Video Inspection and Sampling Locations

F:\projects\COS-GWSA\GIS\Task 07050\Conveyance System Summary Figures May 2012\Figure 4 (NW Portion of Site Video Inspection and Sampling Locations).mxd
6/7/2012

ATTACHMENT 6B-8
Outfall C Video Inspection

(Video files on DVD)