90b – Status of Implementation Actions Taken Pursuant to S4F.3.D

On August 19, 2016, Ecology modified the Phase I Permit to include Appendix 13 – Adaptive Management Requirements. Appendix 13 requires adaptive management response plans for discharges from the City of Seattle's (City) municipal separate stormwater system (MS4) to the Lower Duwamish Waterway (LDW). In accordance with S4.F.3 the City must comply with the specific requirements identified in Appendix 13. Per the requirement of S4.F.3.d, Seattle is providing the status of implementation and the results of any monitoring, assessment or evaluation efforts conducted during 2016 related to Appendix 13 Adaptive Management requirements.

This is the second Annual Report that combines the City's required source control activities for the LDW and related information related to these Adaptive Management Response Plans into one report. SPU provided Ecology with a Source Control Implementation Plan (SCIP) in March of 2015, and SPU has implemented the actions contained in the SCIP through August 2016. Beginning August 19, 2016, SPU has been implementing actions that Ecology has approved as an S4.F.3.b Adaptive Management Response Plan.

The following sections describe the actions that the City has taken to implement the adaptive management plan as described in Appendix 13 of the August 19, 2016, Phase I Municipal Stormwater Permit.

Background

An S4.F notification was submitted in 2007 to notify Ecology of potential water quality problems that may be related to discharges from the City's MS4 for the LDW. Ecology determined that a report under S4.F.2.a was not necessary, with that determination conditioned on certain City actions. Ecology required the City, beginning with its Phase I Permit Annual Report for 2008, to include a summary of its stormwater management efforts in basins that discharge to the LDW. The City was to notify Ecology if Seattle's involvement in federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and associated Source Control Strategy processes changed or new information became available regarding phthalate recontamination in the LDW.

An S4F notification was submitted on December 5, 2013, to notify Ecology of potential sediment quality problems that may be related to discharges from the City's MS4 for the LDW. Ecology accepted the notification (June 4, 2014) as a general notification for all MS4 discharges to the LDW for all LDW sediment chemicals of concern (COC). The City's draft SCIP (November 2013) fulfilled the City's requirement for submittal under S4.F.3.a of an expanded adaptive management response. The City revised the SCIP, and a final draft of the SCIP was submitted to Ecology on March 31, 2015.

Though not for the LDW or adaptive management, a S4F notification was submitted on September 5, 2014 to notify Ecology of potential sediment quality problems that may be related to discharges from the City's MS4 for the East Waterway (EW) of the Duwamish Waterway. To satisfy the permit requirements, the City continues to engage in business inspections, source tracing, line cleaning, and other programs regarding the EW, as well as ongoing source control efforts to support the EW CERCLA cleanup.

Appendix 13 - Adaptive Management Requirements Reporting

Source Tracing and Sampling Activities

SPU collects samples of storm drain solids from with the City MS4 to characterize the quality of material discharged to and from the City's drainage system. Samples include 1) grabs from private onsite catch basins and catch basins located in the public right-of-way, 2) grabs from inline maintenance holes in the conveyance system, and 3) inline sediment trap samples. Data generated from these samples are used to identify potential contaminant sources and to prioritize source tracing/control activities. Between July 2016 and December 2017, SPU collected 80 samples of storm drain solids from the City's MS4.

SPU has received funding from Ecology to investigate, experiment and develop new tools to help SPU and others conduct source control. These projects (detection dog and sediment trap pilot tests) are not required by the Phase I permit but are part of the City's SCIP.

Detection dog pilot test

The detection dog pilot test project is funded under Stormwater Financial Assistance Program Grant WQC-2015-SeaPUD-00196. During 2017, SPU conducted continued training events for the detection dog/handler team, including an event in Tacoma in March which was attended by Ecology staff (Heather Khan, Ecology Stormwater Grants & Restoration Specialist; Holly Davies, Toxics Policy Coordinator; Melisa Snoeberger, Grant Project Manager; and Dale Norton, Western Operations Section Manager, EAP). The detention dog/handler team also screened areas where SPU suspected there may be PCB sources and successfully identified PCBs in several areas that would not likely have been found by SPU's standard source tracing techniques without conducting extensive sampling.

The final report describing the pilot test results was submitted to Ecology in October 2017. SPU considers the pilot study a success. Lessons learned during the test included:

- The detection of an invisible target such as PCBs has unique challenges. Dogs are rewarded promptly for a positive result, but chemicals do not provide any visual confirmation. Fortunately, we found that PCBs have a unique and recognizable odor that can be smelled by humans at high levels so that positive responses could be quickly rewarded.

- Having field sites with known and quantifiable PCB hot spots in multi-media (paint, caulking, soil, equipment) helps dial in the detection ability of the dog and handler in the urban environment.
- Detection work during windy conditions should be avoided.
- The detection dog team was highly motivated to find PCBs. Consequently, the handler needs to be confident that not finding PCBs at a site is also a useful conclusion.
- Detection dogs are best suited to screening areas to eliminate those areas without PCBs, or to locate specific PCB hotspots, rather than to define the extent of PCB contamination.
- The development of confidence for both the detection dog and the handler is key to the success of the detection team in identifying PCBs.

SPU is currently evaluating options for continued use of the EAGL grant, including training a new detection dog/handler team (as the dog, Sampson, has retired from detection work) and developing standard protocols/policies for use of a detection dog in SPU's source tracing program. SPU intends to present a plan to Ecology in early 2018.

Sediment trap pilot test

While not a specific requirement of Appendix 13, SPU is currently testing a new sediment trap design to provide more effective collection of storm drain solids to support source tracing efforts that are required by Appendix 13. The second phase of this work, involving field testing of two field prototypes, is funded by EAGL Grant WQC-2015-SeaPUD-00196. The traps, installed at 2 field locations (S Myrtle Street storm drain and Diagonal Ave S combined sewer overflow/storm drain), were retrieved in March after a one-year deployment; samples were analyzed for grain size. SPU submitted a field report to Ecology in October 2017. Although results were encouraging, SPU elected to conduct one additional year of physical testing before initiating chemical testing. The traps were immediately redeployed and will be retrieved in March 2018.

Effectiveness Monitoring Program

SPU is on track to install or collect one sample per calendar year from each outfall and near-end-of-pipe location in Tables 1 and 2 of Appendix 13. In 2017, SPU installed two traps at the last maintenance hole before the outfall in the new 17th Avenue S drainage system that was constructed as part of the Terminal 117 Early Action cleanup. SPU submitted a draft and revised Quality Assurance Project Plan (QAPP) for the LDW source sampling program to Ecology. Source tracing data collected from June 2016 through December 2017 are provided in Attachment A of this report and will be loaded into EIM[1].

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[1] Results for samples collected and validated since the 2016 annual report.

Business Inspection Program

In support of the LDW cleanup efforts, multi-media inspections are conducted, which cover stormwater pollution prevention, hazardous waste management and industrial waste management. In 2017, SPU conducted 279 inspections in the LDW. Each business is inspected for compliance with the City's Stormwater Code and required to be brought into compliance with all relevant best management practices (BMP) for source control. The inspections resulted in 126 Corrective Action Letters, and six of these sites were referred to Ecology for potential NPDES Industrial Stormwater permit coverage. Ten facilities were issued NOV's for non-compliance with the City's Stormwater Code, and one facility entered into a Voluntary Compliance Agreement with the City.

The SCIP described several planned enhancements to streamline the business inspection program in the LDW. The status of these efforts is provided in the following sections.

Shortened business compliance period

Seattle Public Utilities continues to seek ways to most effectively require that businesses come into compliance and remain in compliance. In January 2016, SPU Source Control conducted a Rapid Office Kaizen (Japanese for "improvement') workshop to improve the stormwater code compliance inspection processes and improve our customers' experience. The objective of the event was to streamline our processes by identifying and eliminating wastes. The hope was to accomplish efficiency changes before implementing a mobile inspection data collection system. One of the inefficiencies that was identified in this Kaizen process was that inspected businesses with code violations were taking too long to return to compliance. Because of our workshop, SPU Source Control modified the business inspection process to reduce the return-to-compliance period by eliminating an unnecessary and time-wasting step, the "second and final letter."

Prior to the Kaizen workshop the Source Control inspection return-to-compliance process progressed through a series of inspections followed by compliance letters and ending with a closure letter whenever compliance was achieved in this process:

- Initial inspection
- Corrective action letter + 30 days
- Follow-up inspection
- Second and final letter + 15 days
- Follow-up inspection
- Notice of Violation with deferred penalty + 15 days
- Follow-up inspection (and penalty if still in non-compliance)
- Acknowledgement of Completion letter.

The typical return-to-compliance process was taking on average 55 days. Under the pre-Kaizen process, businesses would get a site inspection, a corrective action letter, a re-inspection and then a "second and final" letter, which provided additional time to come into compliance before a Notice of Violation is issued. Now, a business has 30 days to come into compliance after receiving the corrective action letter, and if the corrections are not made, a Notice of Violation is issued. Extensions may be issued on a case by case basis. This change has resulted in a reduction of process time, allowing SPU to inspect more businesses.

SPU also has implemented a procedure whereby if a business has been inspected multiple times, it can be immediately issued a Notice of Violation for not maintaining best management practices between inspection cycles. Elimination of the "second and final letter" step required less time to re-inspect, write letters, and input data. This change established that consequences for non-compliance, and lack of action are more immediate when code violations were observed. This move is intended to impress upon businesses the importance of maintaining stormwater best management practices, rather than implementing them just for an inspection period. At the closing of an inspection cycle, businesses are alerted that they may be issued a Notice of Violation immediately upon the next inspection if compliance is not sustained. This process is used on a case by case basis, for businesses that SPU has inspected multiple times with no sustained improvement between inspection cycles.

Following the Kaizen event, the new inspection protocol implemented is as follows;

- Initial inspection
- Corrective action letter + 30 days
- Follow-up inspection
- Notice of violation with deferred penalty + 15 days
- Follow-up inspection (and penalty if still in non-compliance)
- Acknowledgement of Completion letter.

As this process was refined and implemented by SPU Source Control inspection staff, the time for a business to return to compliance has decreased on average 22 days.

Revisions to Business Inspection Information Gathering Protocols

For many years, the SPU Source Control Team had used a lengthy inspection checklist that covered not only City Stormwater Code compliance but included multimedia inspection observations for compliance with air, hazardous waste, and industrial waste regulations. The data were recorded on the inspection checklist and entered into the SPU inspection database. Data collection could be time consuming and cause confusion or cloud authority and cloud SPU's message about City source control measures required by City code. Referrals from these observations were made to state, county, and regional agencies with code authority. Indication from other agencies is that they rarely used the data collected in the SPU inspection process. To improve efficiency with the inspection process, SPU decided that the data entry for these Non-City Stormwater Code violations would be discontinued. Inspectors were still encouraged to look for these other environmental concerns to act as a "triage" for other agencies (King County Industrial Waste and Ecology Hazardous Waste and Water Quality); as part of "triage," the inspector may refer issues or problem sites to another agency for follow up and will be part of that agency's enforcement activity for resolving the issue. These changes have helped to shorten SPU's inspection time onsite, without compromising the integrity of the inspection.

Transition to Electronic Information Collection

SPU has used paper inspection forms and two Microsoft Access databases to track business inspections, stormwater facility inspections, water quality complaints and spills since 2003. These databases are near the end of their useful life, and mobile devices such as cellular telephones and tablets have made a paper-based inspection system obsolete.

SPU conducted a Kaizen event to identify ways that the Source Control Team could become more efficient and develop a team culture that supports continuous improvement. The Kaizen event was a 5-day workshop at which source control team members mapped out the current business inspection process, evaluated the process to identify areas where a new process would improve efficiency, and then designed a new process to realize the efficiencies.

A focus of the Kaizen event was to map out the team's process so that business requirements could be developed. The business requirements form the basis of a SPU business case document that authorizes funding and resources to develop a replacement database and mobile solution. The Stage Gate was approved, and the Source Control Team is authorized to design a new database, with mobile data collection, using Microsoft Dynamic CRM. This software will allow for the centralization of data and facilitate communication with our customers, management and Ecology. Inspectors will use mobile telephones or tablets to collect real time inspection data, schedule follow up inspections, and access GIS and other databases while in the field to save time and provide better customer service.

This project is on track, and it is anticipated that SPU will meet the requirement to "transition to electronic information collection methods" by July 31, 2018. SPU will provide a report on the project at that time and in the 2018 Appendix 13 Annual Report.

Effectiveness Evaluation of the Enhanced Business Inspection Program

SPU is developing an effectiveness study, working to meet the Appendix 13 requirement to conduct "An effectiveness evaluation of the enhanced business inspection program" by July 31, 2018. The study will provide feedback to SPU on its program.

Operations & Maintenance

In 2017, SPU cleaned approximately 18,000 linear feet of pipe in the 1st Ave S (west) and S Kenny Street MS4 drainage basins. These basins were identified as priority basins in the City's 2015 SCIP. This work is conducted to remove solids that have accumulated in the MS4, in order to prevent them from discharging into the LDW and to facilitate source tracing efforts. Water generated during line cleaning operations was treated and discharged to the sanitary sewer under a discharge authorization with King County. Solids were dewatered and transported to Waste Management's reload facility in Seattle, for eventual disposal.

Operation and Maintenance for Duwamish Source Control Needs

SPU conducted an evaluation of existing operation and maintenance work for catch basin and flow control/water quality facilities in the MS4 basins that discharge to the LDW to determine if programmatic strategies could be implemented to assist with Source Control. The evaluation was delivered to Ecology in February 2018 (180 days prior to the expiration date of the permit) and is included as Attachment B.

The results of this evaluation are that SPU will continue with the current approach to inspection and maintenance of catch basins. The schedule will be to inspect all catch basin annually, including those on S. Myrtle St, and to perform maintenance as needed within 6-months. The performance target is the target contained in the permit under S5.C.9.d.iii: inspect all catch basins and achieve at least 95% of required inspections.

SPU will continue with the current approach to annual inspection and maintenance of stormwater facilities owned and operated by the permittee. The performance target is the target contained in the permit under S5.C.9.c iii: inspect all sites and achiever at least 95% of required inspections.

SPU will continue with the current approach to line cleaning in the Lower Duwamish SCIP basins as detailed in Section 7 of the 2015-2020 Source Control Implementation plan, which is designed to clean a minimum of 4,000 linear feet of storm drain line each year. SPU will be working to establish consistent preventative maintenance (PM) frequencies as part of the refinements to planning and scheduling associated with the line cleaning program in the Lower Duwamish Waterway. SPU will hold an annual meeting between the Source Control Team and the Drainage and Wastewater Maintenance team to coordinate line cleaning efforts between contracted crews and SPU crews.

SPU will report on progress and accomplishments made towards completion of the South Park Conveyance Project in the 2021 Annual Report.

SPU will continue the development and refinement of preventative maintenance and job plans for City owned stormwater infrastructure and report on status in the 2021 Annual Report.

Identification and Prioritization of Priority Capital Projects to Improve Roadway Surfaces in the LDW MS4 Basins

For the entire City, a key element for identifying locations for roadway surface improvement is pavement condition. SDOT evaluates arterial road conditions once every three years based on ASTMD standards. The most recent pavement condition inventory for arterial roads was completed between 2013 and 2015. In addition, about 85% of non-arterial roadways were evaluated between 2013 and 2015. For non-arterials, the condition of a single sample street within a geographic area is used as an estimate of the pavement condition within that grid. Most of SDOT's pavement repair budget targets arterial streets.

SDOT has several programs aimed at maintenance and improvement of roadway surfaces throughout the City. SDOT has reviewed each program to identify relevant projects. Once a project is funded, it progresses through a series of milestones that lead up to construction. These milestones are planning start, design start, design (10%, 30%, 60%, 90%, 100%), bid advertisement, bid award, and construction start. The farther along the milestone path the project has progressed, the more certain the scope and schedule become.

SDOT has evaluated paving programs and identified funded priority pavement improvement projects within the Lower Duwamish drainage basins. These projects are described below.

Move Seattle

In 2015 Seattle voters passed the Move Seattle nine-year, $930 million property tax levy which is a significant source of funding for the transportation budget. This levy replaces funds previously obtained from the Bridging the Gap levy that helped fund SDOT between 2006 and 2015. The Move Seattle funds support on-going pavement maintenance and corridor improvement projects. The Move Seattle 10-year Strategic Vision for Transportation set forth methods for identifying streets as priority corridors for investment and ranking projects proposed for these corridors. The Move Seattle methodology used several factors including leveraging opportunities, funding availability, community support, SDOT's existing commitments, geographic equity, and avoidance of major maintenance to prioritize capital projects. SDOT has identified the Move Seattle priority projects, listed by project type below, that are located within the Lower Duwamish drainage basins and can reduce pollutants in the roadway runoff and/or improve the effectiveness of operational BMPs.

Corridor Projects

Corridor projects install a suite of improvements within a specific geographic area. These improvements can focus on bike facilities, safety improvements, utility upgrades, providing greenways, traffic revisions, transit lanes, and freight corridors, but they also frequently include pavement improvements.

23rd Avenue Phase II

This project will repave 5,429 feet of roadway on 23rd Avenue between South Jackson Street and Rainier Avenue South. SDOT will mill and overlay asphalt portions of the roadway, install concrete on selected portions of the roadway and repair the roadway base where it has broken. The repaving will reduce the amount of sediment generated since the deteriorated portion of the roadway that produces sediment will be replaced and the renewed surface will reduce areas where sediment can accumulate. Twenty-Third Avenue is a road within the Diagonal Avenue S. combined sewer overflow (CSO)/storm drain (SD) Lower Duwamish drainage basin that SDOT sweeps to improve water quality. The renewed pavement surface will increase the effectiveness of the sweeping BMP. The project is currently completely designed and ready to advertise for construction bids. It is scheduled to be completed by mid-2019.

23rd Avenue Phase I

The 23rd Phase I project repaved 2,770 feet of roadway on 23rd Avenue between Cherry and South Jackson Streets in 2017. This project was the first phase of the 23rd Avenue repaving and is located within the Diagonal Avenue S CSO/SD Lower Duwamish drainage basin. The anticipated sediment reduction results are the same as those described for the 23rd Avenue Phase II Project.

SPU Drainage Partnership -South Park

The project is a partnership with Seattle Public Utilities (SPU) that will rebuild priority roads and stormwater conveyance to direct stormwater to a planned pump station and water quality treatment facility. The project is located within the 7th Avenue S SD and the 2nd Avenue S SD Lower Duwamish drainage basins.

Several roads in the proposed project area are in need of repair, the worst of which are deteriorated to the point that they produce sediment. SDOT will decide whether or not rebuilds will occur based upon several factors and considerations. SDOT is currently working with SPU to finalize which streets to rebuild based on the drainage improvement plan footprint, the technical feasibility, the cost of the roadway improvements and available funding. The streets selected for rebuilding are located near the 1,880 linear foot portion of South Portland Street that SDOT rebuilt in 2015 for $3.4 M. As with the Portland Street rebuild, the South Park Partnership project is expected to significantly reduce the quantity of solids generated from the roadway and entering the roadway runoff.

SDOT has allocated $10M for the rebuild of arterial and non-arterial roadways for the South Park project. The current milestone status for this project is 10% design. The SDOT goal is to complete the South Park road improvements by the end of 2022. This schedule and actual completion of this project are subject to change based on the identification of the needed drainage improvements, changes in scope identified during the design process, SPU/SDOT project delivery decisions, technical feasibility and other competing City priorities. At this time the paving for the SPU/SDOT partnership is expected to cover approximately 3,100 linear feet of roadway.

Arterial Asphalt and Concrete Program (AAC)

This on-going program rehabilitates major arterials. The Move Seattle Levy funds are expected to repave up to 180 lane-miles of arterial streets, maintaining and modernizing 35% of Seattle's busiest streets carrying the most people and goods, over nine years. For 2016-2024, the arterials where SDOT plans AAC projects have been identified based upon pavement condition, traffic volume, use of the roadway, geographic equity, social justice equity, coordination with utility partners (SPU, SCL) and funding leverage (grants). Three of the projects are within the Diagonal Avenue S. CSO/SD. Schedule and actual completion of particular projects is subject to change depending on project scope adjustments and funding.

The projects will mill and overlay asphalt portions of the roadway, install concrete on selected portions of the roadway and repair of the roadway base where it has broken. The repaving will reduce the amount of sediment generated since the deteriorated portion of the roadway that produces sediment will be replaced and the renewed surface will reduce areas where sediment can accumulate. The projects are located on streets that SDOT sweeps to improve water quality. The renewed pavement surface will increase the effectiveness of the sweeping BMP. Details of the projects are listed below.

AAC-Dearborn

The project will repave 912 feet of roadway located on South Dearborn Street from the Dearborn offramp to Rainier Avenue South. The current milestone status for this project is 100% Design. The project is expected to be completed by December 2018.

AAC- South Spokane Street and 15th Avenue South

The project will repave 4,041 feet of roadway located South Spokane Street between S. Columbian Way and 18th Avenue S and on 15th Avenue S. between S. Angeline Street and S Spokane Street. The current milestone status for this project is Planning Start, and the scheduled completion is September 2020.

Rapid Ride Corridor-Rainier /Jackson AAC Portion

The project will repave 2,775 feet of roadway on Rainier Avenue South between South Dearborn and South Massachusetts Streets. The current milestone status of this project is Planning Start, and the projected completion date is mid-2021.

Additional Paving Programs

In addition to the capital project programs discussed above, SDOT operates paving programs that are implemented by SDOT's in-house crews and a micro-surfacing program that is normally scheduled each summer if funds are available. Schedule and actual completion of particular projects depend upon funding, project scopes, and competing work priorities. In 2016 and 2017 SDOT completed approximately 21,300 square feet of crew-led roadway improvements and 1,000 linear feet of micro-surfacing. The projects were located within in the 7th Avenue S SD, SW Idaho SD, I-5 SD at Slip 4, and the Diagonal Avenue S SD/CSO lower Duwamish basins. The programs are described below.

Micro-surfacing

Micro-surfacing, the application of a protective seal coat to extend pavement life, has been an on-going program managed by SDOT's Capital Project Division since 2014. The streets chosen for micro-surfacing are selected based on pavement age, pavement maintenance history and inspection results from Maintenance Operations Division. They are mostly low-volume, non-arterial streets.

Arterial Major Maintenance (AMM)

This is a program implemented by SDOT in-house Maintenance Operation crews. The program typically has funds to repair approximately 8 lane miles per year at about 65 targeted locations. The jobs typically consist of one to three blocks of mill and overlay or replacement of eight to ten concrete panels. No project exceeding $120,000 in value can be constructed by crews, so only projects that do not trigger drainage improvements per Seattle Stormwater Code are undertaken. About 65% of work is planned about a year in advance, the remainder is complaint-driven. For the planned portion of AMM projects there are several areas that are repaired annually because they fail repeatedly but have not been upgraded by an AAC project. AMM priority locations are near schools, hospitals, or bike routes or in an area where the work can be combined with other City departments. As much as 35% of the AMM budget is spent constructing ramps for ADA compliance.

Non-Arterial Street Resurfacing and Restoration (NASS)

This is a program operated in the same manner as the AMM program except that the streets repaired are non-arterials. This is the only SDOT maintenance program that addresses pavement conditions on non-arterials, and its budget covers about 2 lane-miles per year.

Pothole Repair

Maintaining safe roadways is the main priority of the pothole repair program. The locations of the pothole repairs are based on public complaints. According to the Maintenance Operation personnel who implement the program, the Greater Duwamish area may have a higher pothole repair rate because freight trucks tend to break up roads.

Chip Sealing

SDOT no longer has a chip sealing program. The last chip sealing was performed in 2013. Going forward chip sealing will not be used to improve pavement surfaces in the Lower Duwamish storm drainage basins.

Report on weekly sweeping of S. Myrtle St.

S. Myrtle St. was swept by SDOT 48 times in 2017 as part the Street Sweeping for Water Quality Program (SS4WQ).

Report on quarterly inspection of catch basins and maintenance holes on S. Myrtle St.

SPU conducted quarterly inspections of catch basins and mainline maintenance holes from 2011 – 2017. .

The data for catch basin and mainline maintenance hole measurements from 2011 to 2017 are provided in Table 1. Measurement locations on shown on Figure 1. These data were evaluated as part of the evaluation of existing operation and maintenance work for catch basin and flow control/water quality facilities in the MS4 basins that discharge to the LDW, to determine if programmatic strategies could be implemented to assist with Source Control. The evaluation determined that the catch basins on S. Myrtle Street accumulate solids or require maintenance similar to those in the rest of the LDW MS4 basins. The evaluation results support reducing the inspection frequency of the South Myrtle Street catch basins from quarterly to annually to be in alignment with the catch basin inspection and maintenance program in the rest of the LDW MS4 basin. SPU will propose to Ecology that this adaptive management requirement be revised in the 2019 permit.

Table 1: S Myrtle St maintenance hole measurements.

EQNUM	576148	576126	576140	576158	576162	576145	576165	943593	599350	599353	599354
Location	S Myrtle St cul-de-sac, west	S Myrtle St cul-de-sac, north	north side S Myrtle St, west of SIM	south side S Myrtle St, west of SIM	south side S Myrtle St, east of SIM	S Myrtle St and Fox Ave S	south side S Myrtle St at 7th Ave S	north side S Myrtle St, east of SIM	S Myrtle St cul-de-sac	S Myrtle St at SIM	S Myrtle St at 7th Ave S
Type	CBL	CBL	CBL	CBL	CBL	CBL	CBL	CBL	MH	MH	MH
Outlet pipe size	8	8	8	8	8	8	8	8			
Casting Width	1'-4"	1'-4"	NA	1'-4"	1'-4"	1'-4"	1'-4"	1'-8"	NA	NA	NA
Casting Length	2'-7"	2'-7"	NA	2'-7"	2'-7"	2'-7"	2'-7"	2'-0"	NA	NA	NA
Structure Depth (ft)	6.45	7.90	NA	7.22	6.4	6.61	5.76	6.2	7.45	7.35	5.76
Sump Depth (ft)	3	2.4	2.6	2.4	2.9	2.9	2.5	2.3	NA	NA	NA
2011 percent full											
04/21/11	0%	0%	4%	0%	13%	3%	46%	11%	0%	0%	0%
07/14/11	0%	0%	3%	8%	29%	13%	1%	21%	0%	0%	0%
2012 percent full											
01/05/12	0%	1%	10%	11%	50%	13%	19%	27%	0%	0%	0%
06/22/12	1%	19%	11%	16%	57%	11%	41%	20%	0%	0%	0%
10/11/12	1%	9%	16%	27%	62%	14%	45%	27%	0%	0%	0%
2013 percent full											
02/11/13	9%	22%	22%	38%	69%	14%	53%	28%	0%	0%	0%
05/01/13	12%	24%	23%	48%	3%	23%	52%	33%	0%	0%	0%
10/28/13	2%	2%	29%	50%	8%	28%	49%	34%	0%	0%	0%
12/23/13	4%	5%	31%	58%	9%	17%	51%	29%	0%	0%	0%
2014 percent full											
03/14/14	4%	13%	30%	68%	19%	38%	49%	26%	0%	0%	0%
06/23/14	5%	15%	38%	73%	21%	27%	55%	37%	0%	0%	0%
09/29/14	6%	13%	42%	72%	22%	29%	55%	36%	0%	0%	0%
12/29/14	6%	15%	43%	81%	30%	28%	50%	36%	0%	0%	0%
2015 percent full											
03/27/15	7%	16%	43%	80%	33%	32%	53%	44%	0%	0%	0%
06/29/15	8%	17%	40%	2%	36%	32%	55%	41%	0%	0%	0%
09/22/15	10%	28%	50%	2%	37%	31%	0%	45%	0%	0%	0%
12/29/15	9%	15%	43%	12%	40%	39%	8%	37%	0%	0%	0%
2017 percent full											
02/22/17	14%	30%	56%	49%	63%	48%	34%	55%	0%	0%	0%
05/25/17	16%	30%	0%	5%	5%	45%	41%	0%	0%	0%	0%
08/17/17	20%	36%	0%	5%	0%	43%	38%	0%	0%	0%	0%
11/22/17	24%	38%	0%	14%	8%	48%	42%	0%	0%	0%	0%
Times Exceeded Maintenance Threshold (60% full)	0 in 6 years	0 in 6 years	0 in 6 years	1 in 6 years	3 in 6 years	0 in 6 years	0 in 6 years	0 in 6 years	0 in 6 years	0 in 6 years	0 in 6 years

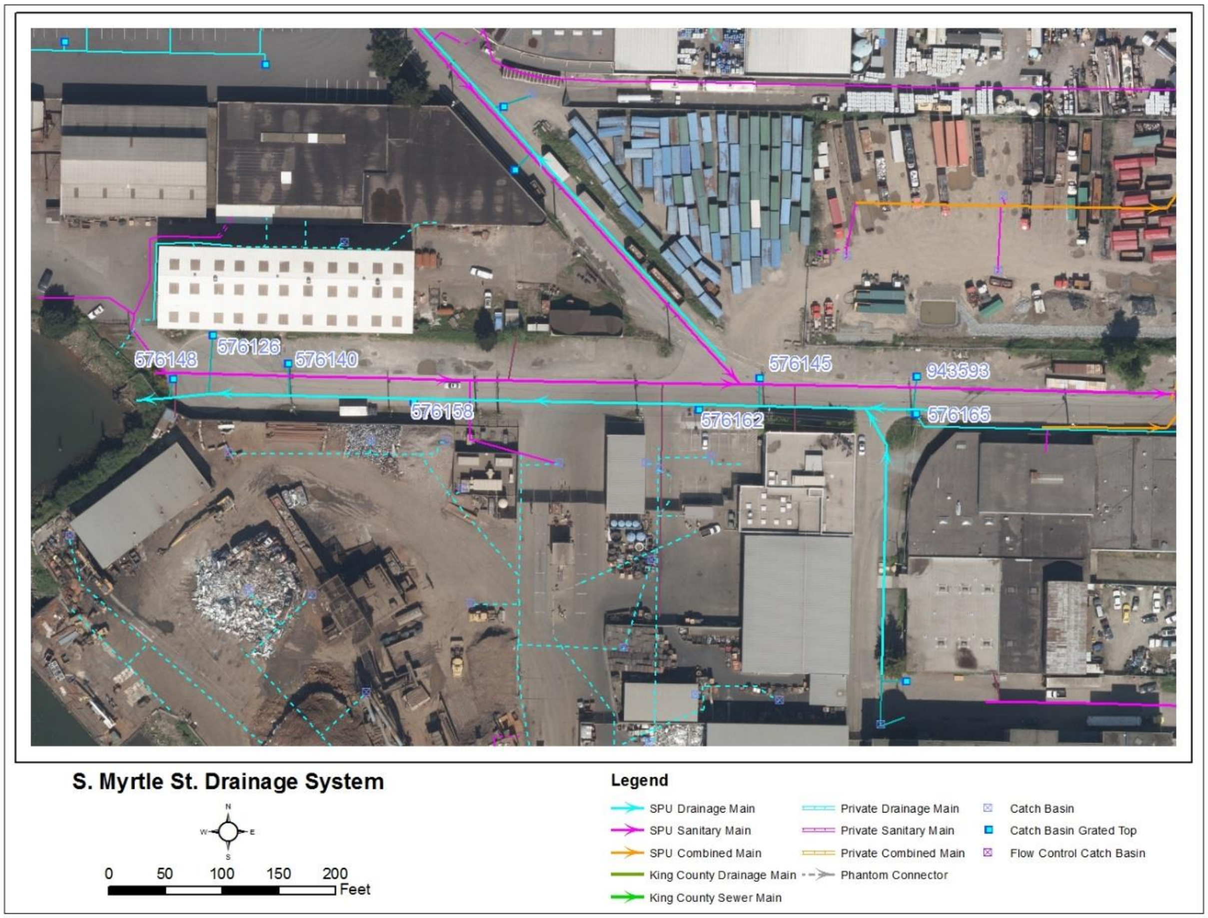

Figure 1: Catch basin and maintenance holes measuring locations on S. Myrtle St.

Structural Controls

South Park Water Quality Stormwater Treatment Facility

The South Park Water Quality Facility will treat stormwater runoff from the 7th Ave S drainage system and is progressing on schedule. SPU completed pilot testing of two treatment technologies (chemically enhanced sand filtration and ballasted flocculation) and submitted the test report to Ecology in 2017. Testing was conducted to 1) evaluate treatment performance, 2) identify appropriate treatment chemicals/dosages, and 3) evaluate operational conditions. The project team will focus on evaluating the pilot test results to identify the preferred treatment technology in 2018.

Street Sweeping Expansion – Arterials

This program has expanded the City's arterial street sweeping program, per commitments in the Plan to Protect Seattle's Waterways (aka Integrated Plan).

The team began implementing the plan in 2016.

During 2018, the team will continue to implement the plan and adapt as needed to meet the regulatory targets. The key tasks planned for this year include:

- Continue sweeping new arterial routes.
- Use SDOT's day shift staff as available to alleviate the current difficulty maintaining a night crew of six.

Terminal 117 Adjacent Streets and Drainage Project

While not an Appendix 13 requirement, in 2017, the City completed modifications to the drainage system that was constructed as part of the Adjacent Streets and Stormwater Infrastructure project for the Terminal 117 Early Action Site. These modifications were needed to direct runoff along the S Donovan St pedestrian pathway to drain to a bioretention cell as designed. SPU also installed two sediment traps in the last maintenance hole before the outfall in the new 17th Ave S storm drain that was constructed as part of this project. This location will be used for the Effectiveness Monitoring Program in Appendix 13.

Annual Prioritization

Validated data from storm drain solids samples collected between approximately August 2014 and December 2017[2] were compiled and reviewed to assess potential changes in the chemical characteristics of storm drain solids. This information was then used to re-evaluate the priorities presented in the SCIP.

Data Review

Comparisons for the major risk drivers in LDW sediment that are monitored in storm drain solids (arsenic, PCBs, and cPAH), are provided in Figures 2-7[3]. These figures present data for the following outfalls that were sampled between August 2014 and December 2017[4]:

- Diagonal Ave S CSO/SD
- S River St SD
- S Myrtle St SD
- I-5 SD at Slip 4
- Norfolk CSO/EOF/SD
- SW Idaho St SD
- SW Kenny St SD
- Highland Park Ave SW SD
- 1st Ave SW SD (west)
- 2nd Ave S SD
- 7th Ave S SD
- 17th Ave S SD.

[2] Data for samples collected and validated since the SCIP was completed in 2015.

[3] Dioxins/furans have been identified as a risk driver in LDW sediment, but these chemicals are not routinely analyzed in storm drain solids samples.

[4] Includes data for samples collected and validated since the SCIP was completed in 2015.

The relatively low number of samples collected from some of the outfalls between August 2014 and December 2017 makes it difficult to draw strong conclusions about trends in storm drain solids chemistry.

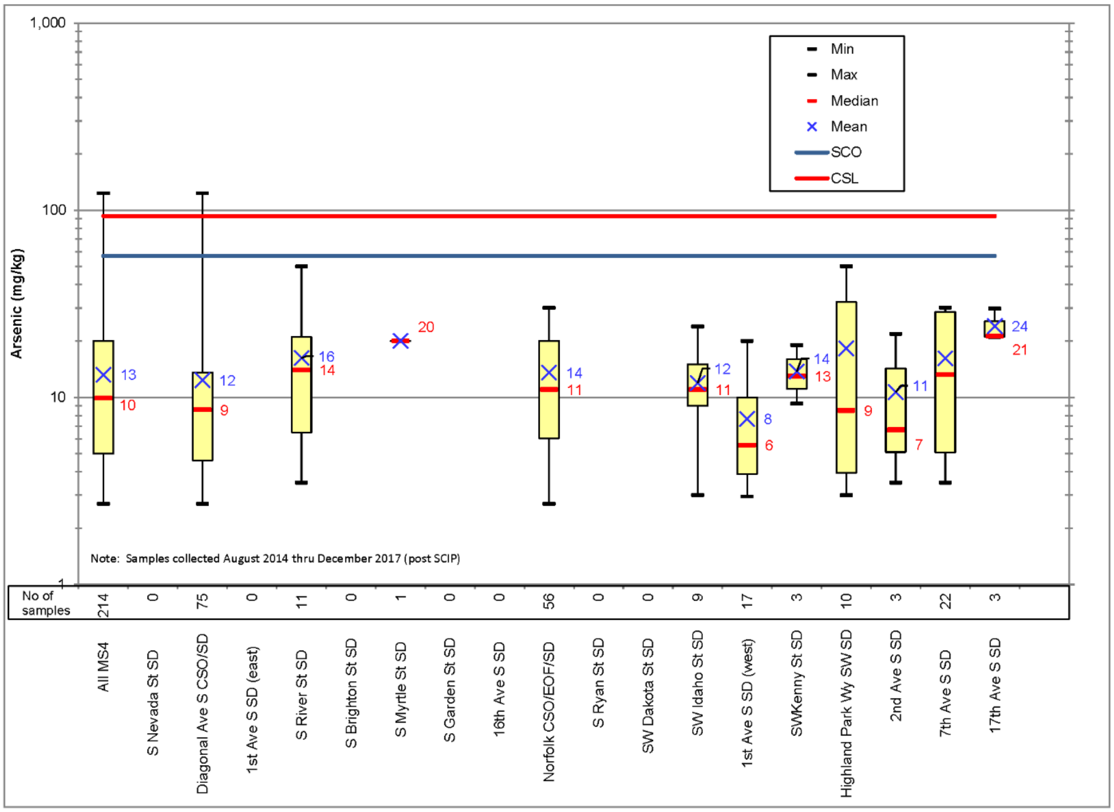

Figure 2: Arsenic s boxplot from the 2015 SCIP (2003 through July 2014 samples).

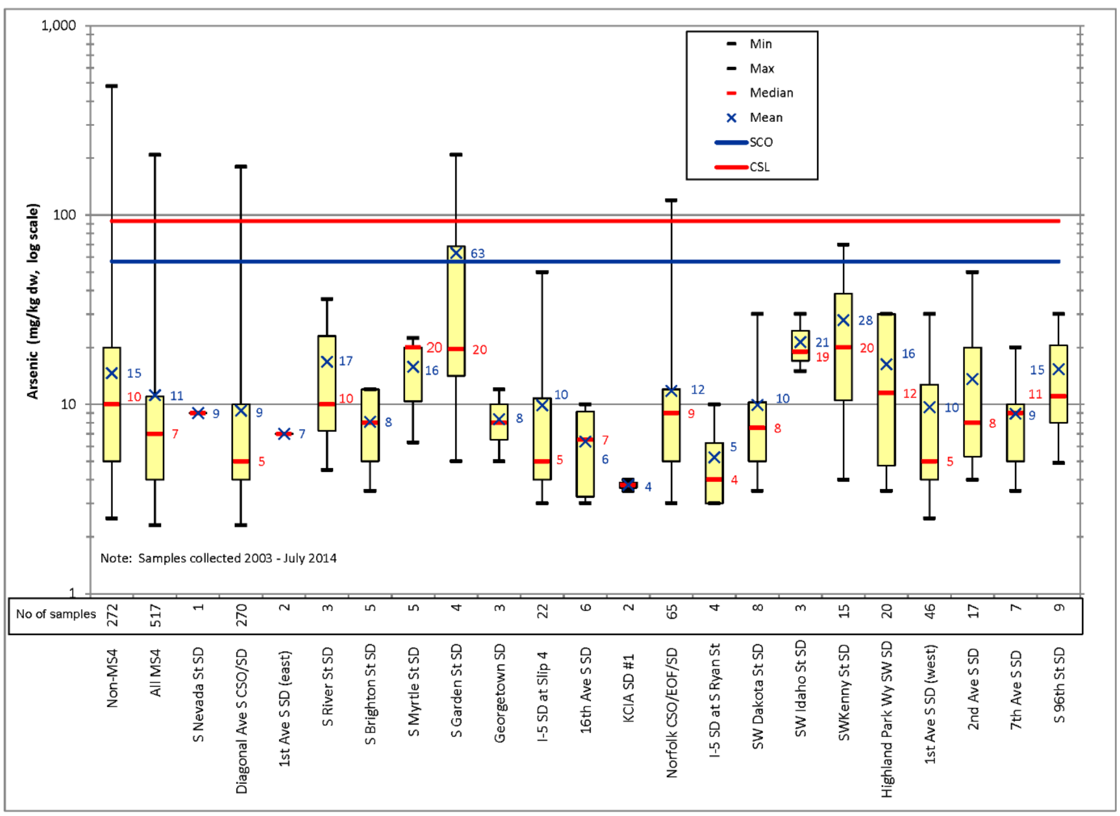

Figure 3: Arsenic boxplot (August 2004 – December 2017 samples).

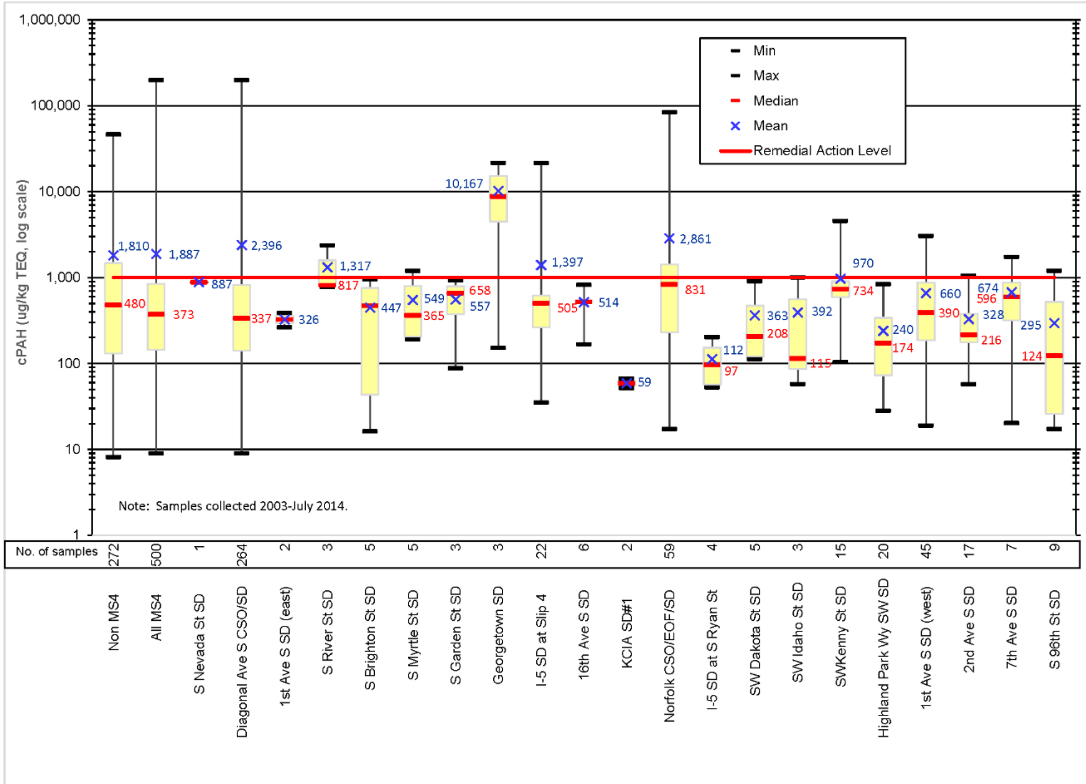

Figure 4: cPAH boxplot from the SCIP (2003 through July 2014 samples).

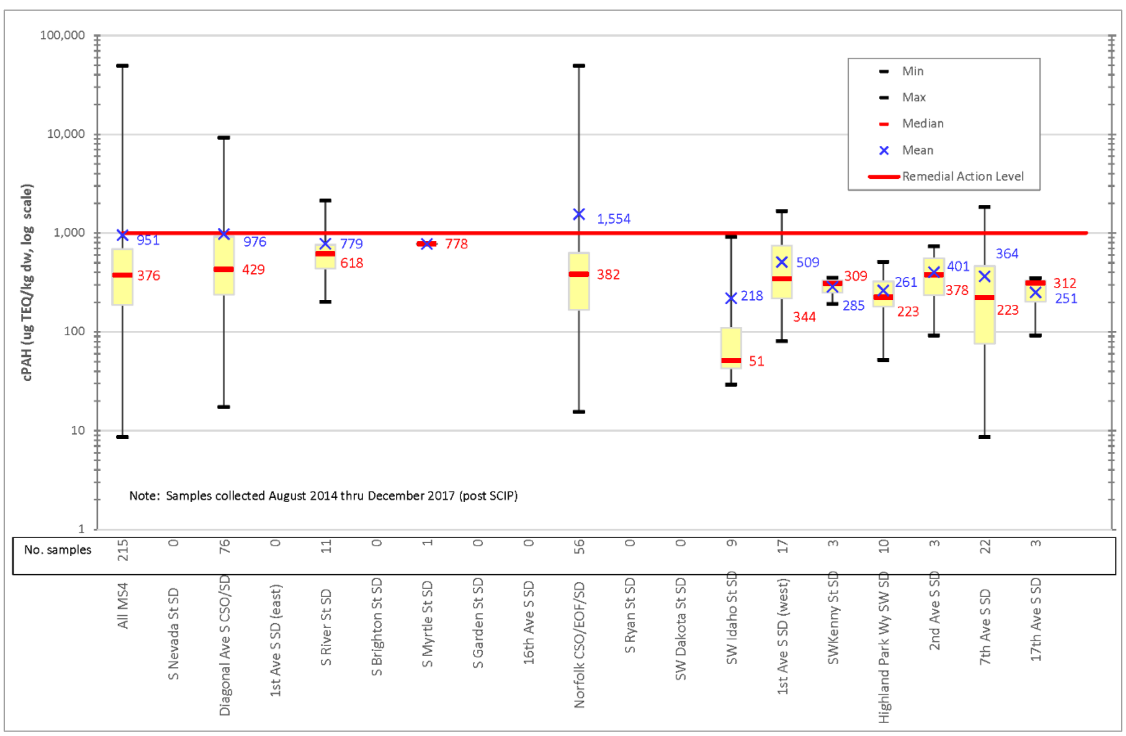

Figure 5: cPAH boxplot (August 2004 through December 2017 samples).

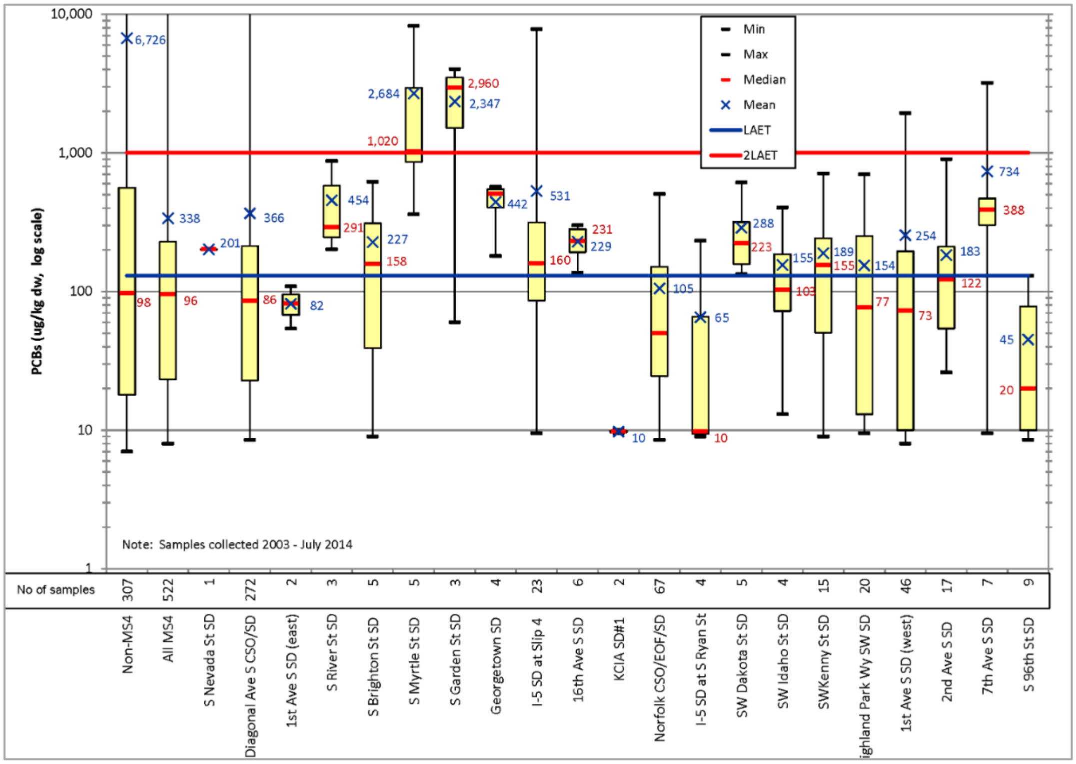

Figure 6: PCB boxplot from SCIP (2003 through July 2014 samples).

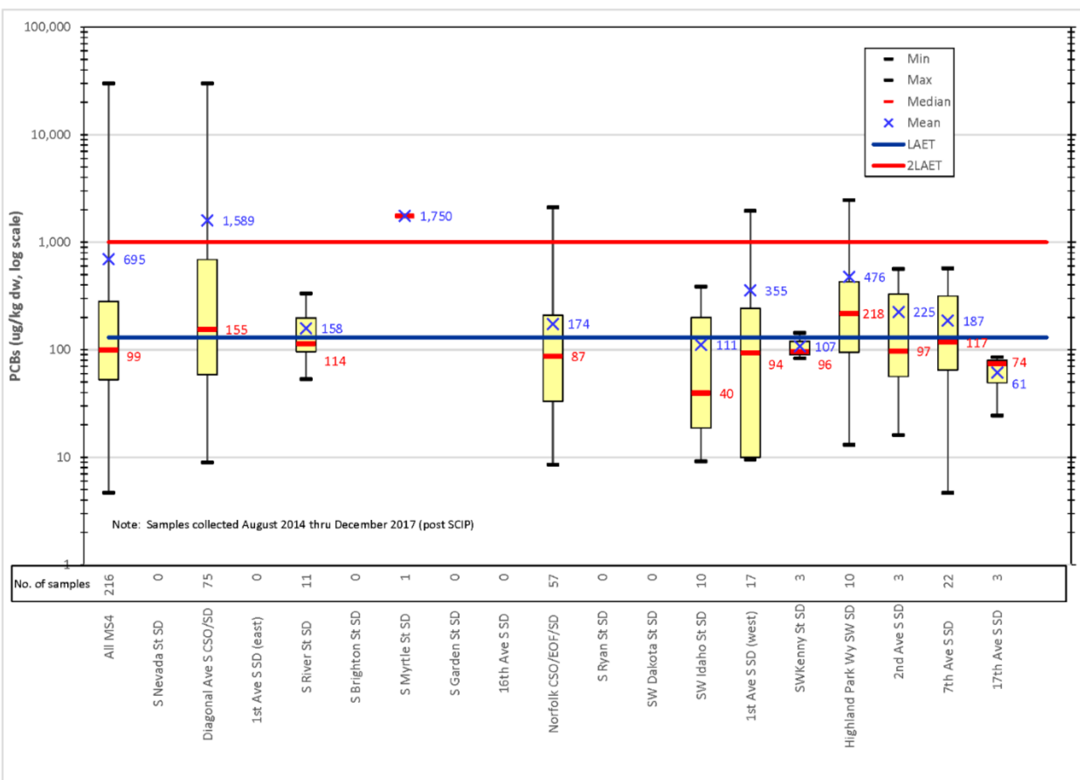

Figure7: PCB boxplot (August 2014 through December 2017 samples).

Outfalls that have not been sampled since the SCIP include:

- S Nevada St SD
- S Brighton St SD
- S Garden St SD
- Georgetown SD
- 1st Ave S SD-east
- 16th Ave E SD
- I-5 SD at S Ryan St
- SW Dakota St SD
- S 96th St SD.

The S Garden, I-5 SD at S Ryan St, and the S 96th St storm drains were not identified as priorities in the SCIP. SPU is awaiting action by City Light to repair/replace the roof on the Georgetown Steam Plant, the suspected source of the high polycyclic aromatic hydrocarbons (PAHs) in this basin, before resampling. The S Nevada (2015) and SW Dakota St (2016) storm drains have recently been cleaned. These systems will be sampled in subsequent years after sediment has accumulated in the lines.

The median concentrations of arsenic measured in each outfall between August 2014 and December 2017, were either slightly lower or similar to the concentrations reported in the SCIP. Exceedances of the sediment cleanup objective (SCO) for arsenic (57 mg/kg) were low in the older samples (2 percent exceeded the SCO). Only one sample collected between July 2014 and December 2017 exceeded the SCO. This sample was collected in October 2017 from MH29, which is located just downstream of an old flush tank on the sanitary sewer which has since been converted to a storm drain[5]. The flush tank is old and no longer used. SPU intends to jet and clean this pipe in 2018.

Median PCB concentrations in the July 2014 – December 2017 samples also remained fairly similar to the concentrations reported in the SCIP. The main exceptions are the 7th Ave S SD, S River St the SW Idaho St SD, where median PCB concentrations were lower in the more recent samples and the S Brighton St SD and S Myrtle St SD where the median concentrations in August 2014- December 2017 samples were higher than the values reported in the SCIP (Table 2).

Table 2: Outfalls where PCBs changed between SCIP and recent samples.

Outfall	Results from SCIP		Results from 2014-2017 samples	
	Median concentration (ug/kg dw PCBs)	n	Median concentration (ug/kg dw PCBs)	n
7th Ave S SD	388	7	117	22
S River St SD	291	3	114	11
SW Idaho St SD	103	4	40	10
S Myrtle St SD	1,020	5	1,750	1
Diagonal Ave S CSO/SD	86	222	155	75

[5] The 12-inch sanitary sewer was converted to a storm drain as part of the Diagonal Avenue S CSO Control Project constructed in the early 1990s.

The 7th Ave S, S River St, and SW Idaho St drainage systems were cleaned in 2013, 2010, and 2012, respectively. Data presented in the SCIP included only the post-cleaning samples, but the new data indicate that PCB concentrations may be declining in these three systems. The S Myrtle St drainage system was also cleaned in 2010, but as reported in the SCIP, there is an ongoing source in the S Myrtle St system. The S Myrtle St was sampled once between August 2014- December 2017. Additional sampling will be conducted after construction activities associated with the Seattle Iron and Metals storage yard on the north side of S Myrtle St are completed.

The median concentration of PCBs in the Diagonal Ave S CSO/SD has increased by nearly a factor of two over the past three years. This change may be due to the emphasis on following up in areas where the detection dog detected PCBs or where SPU inspectors suspected potential PCB sources.

With the exception of a few outfalls, median cPAH concentrations in the August 2014- December 2017 samples were fairly similar to the concentrations reported in the SCIP (Table 3):

Table 3: Outfalls where cPAHs changed between SCIP and recent samples.

Outfall	Results from SCIP		Results from 2014—2017 samples	
	Median cPAH (ug/ TEQ/kg)	n	Median cPAH (ug/ TEQ/kg)	n
7th Ave S SD	596	7	223	22
Norfolk CSO/EOF/SD	831	59	382	56
SW Idaho St SD	115	3	51	9
SW Kenny St SD	734	15	309	3
2nd Ave S SD	216	17	378	3
S Myrtle St SD	365	5	778	1

n = number of samples

Median concentrations of cPAH have declined in the 7th Ave S, Norfolk, SW Idaho, and SW Kenny St storm drains. As mentioned above, the data presented in the SCIP for the 7th Ave S and SW Idaho St storm drains included only post-cleaning samples, so the recent data may indicate that cPAH concentrations in these two systems are continuing to decline. The August 2014- December 2017 dataset for the Norfolk system is fairly robust (56 samples), because SPU conducted a focused investigation in this basin to identify source(s) of PAHs, which involved intensive inspections and sampling. However, no specific sources were found. Over the past 5 years, a number of PAH sources have been identified and controlled in this system. This system needs to be cleaned and resampled to determine whether there are ongoing sources of PAHs.

Although the recent data indicate that cPAH concentrations may be increasing in the 2nd Ave S and S Myrtle St storm drains, there are not enough samples to confirm whether this is the case. SPU intends to continue sampling in these two basins.

Priorities for 2018

Source Tracing/Sampling

Source tracing priorities for 2018 will largely remain the same as described in the SCIP. Changes identified based on recent sampling and business inspections are summarized below:

- Collect additional samples in the S Brighton St SD to determine whether there are active sources of PCBs in this basin.[6]
- Collect additional samples in the S Myrtle St SD basin to update information on PCB levels in this system and evaluate the effectiveness of improvements made at the Seattle Iron and Metal storage yard, which occurred in 2017.
- Collect additional samples in the 2nd Ave S SD to determine whether there are active sources of cPAH in this basin.

Line Cleaning

Line cleaning in 2018 will occur on the west side of the river to take advantage of the availability of the South Park site for solids decanting/dewatering. This site has been used the past few years and will no longer be available when construction of the pump station begins. MTCA grant funding for line cleaning ran out in 2017. In 2016, the end date of this grant was extended from 2017 to 2019, but no additional money was provided. Line cleaning in 2018 will focus on:

- Remaining MS4 portions of the 1st Ave S SD (west)[7]
- A lateral on the S River St SD system that was missed during the 2010 cleaning
- A short section of 12-inch storm drain on S Bennett St near Denver Ave S where elevated levels of arsenic (123 mg/kg) and PCBs (1,413 ug/kg dw) were found (downstream of the flush tank described earlier).

SPU intends to clean at least 4,000 linear feet of storm drain lines in 2018 to comply with Appendix 13 requirements.

Sediment Trap Pilot

SPU will retrieve the traps in March 2018. Unfortunately, the S Myrtle St traps were affected by construction activities at the Seattle Iron and Metals storage yard. Therefore, SPU intends to redeploy the traps in both the S Myrtle St SD and the Diagonal Ave S CSO/SD for an additional year of physical testing before running chemical analyses on the samples.

Citywide Programs that Support Source Control Efforts in the LDW

In addition to the specific adaptive management elements, SPU conducts other citywide programs that support these efforts. The following is a summary of the 2017 accomplishments in these citywide programs:

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[6] S Brighton St SD was not sampled in 2017 as planned. This system will be sampled in 2018.

[7] Portions of this system were cleaned in 2017. The remainder will be cleaned in 2018.

- Stormwater Facility Inspections: While inspecting a business for source control BMPs, the flow control and/or treatment facility is also inspected. Within the LDW, 65 facilities were inspected for Code compliance with regard to flow control and treatment system code requirements during 2017.
- Illicit Discharge Detection and Elimination (IDDE): SPU conducts sediment sampling of onsite catch basins, right of way catch basins and drainage system mainlines to identify sources of contamination and potential illicit discharges and illicit connections. Sampling is conducted in tandem with business inspections to identify and terminate sources of pollution. Samples are analyzed for the LDW contaminants of concern, including total organic carbon, semi-volatile organic compounds, TPH-Dx, metals, polychlorinated biphenyls, grain size, and occasionally site specific parameters, such as pH, additional metals, and volatile organic compounds.
- Water Quality Complaints: Inspectors respond to complaints as they are received through the water quality hotline, webpage or agency referrals. In 2017, 56 water quality complaints were reported in the LDW and EW basins that resulted in 5 business inspections. When a complaint is reported at a business, a full business inspection is completed.
- Spill Response: Spills are dispatched through the SPU Operations Response Center to on-call Spill Coordinators as they are received. In 2017, SPU responded to 66 spills within the LDW and EW basins.
- Education and Outreach: SPU funds the Resource Venture, a conservation service for Seattle businesses. Resource Venture implements the City's Spill Kit Incentive Program, which provides free spill kits, assistance in developing spill plan and site specific technical assistance to Seattle businesses. Approximately 59 businesses in the LDW and EW basins received spill kits, either stemming from a business inspection or through targeted outreach. Surveys conducted of spill kit recipients statistically show that businesses which participate in this program show an improved understanding of stormwater pollution prevention.

Attachment A: Source tracing data collected from June 2016 through December 2017

Location			1ST-ST1	1ST-ST2	1ST-ST3	1ST-ST3	1ST-ST7
Sample Date			25-May-17	25-May-17	25 May 2017	25 May 2017	04 May 2017
Sample Name			1ST-ST1-052517	1ST-ST1-052517	1ST-ST3-052517	1ST-ST3-052517-G	1ST-ST7-050417
Drainage Type			SD	SD	SD	SD	SD
Sample Method			SedTrap	SedTrap	SedTrap	Grab-Manual	SedTrap
Location Type			Inline w/Active SPU Sed Trap	Inline w/Active SPU Sed Trap	Inline w/Active SPU Sed Trap	Inline w/Active SPU Sed Trap	Inline w/Active SPU Sed Trap
Analyte	Unit	CSL/2LAET					
Solids, Total	%		45.74	44.08	63.09	83.71	36.66
Total Organic Carbon	%		11.2	7.18	4.86	1.66	10.1
Arsenic	mg/kg	93	10.4 U	11.1 U	7.79 U	5.9 U	11.3
Copper	mg/kg	390	245	75.5	48.8	31.6	121
Lead	mg/kg	530	106	82.9	10.6	6.14	144
Mercury	mg/kg	0.59	0.2197	0.1078	0.1084	0.2431 U	0.108 J
Zinc	mg/kg	960	1,350	361	282	188	624
Diesel Range (Silica and Acid Cleaned	mg/kg	2,000	1,680	226	88	43	652
Motor Oil (Silica and Acid Cleaned)	mg/kg	2,000	7,480	1,090	589	377	2,800
Acenaphthene	ug/kg	500	54.8 J	97.3 U	95.9 U	100 U	289 U
Acenaphthylene	ug/kg	1,300	51.6 J	97.3 U	95.9 U	100 U	289 U
Anthracene	ug/kg	960	148 J	30.6 J	53.3 J	100 UJ	289 U
Fluorene	ug/kg	540	98.6 U	97.3 U	95.9 U	100 U	289 U
LPAH	ug/kg	5,200	1,600 J	255 J	451 J	82 J	853 J
Naphthalene	ug/kg	2,100	116	34 J	95.9 U	100 U	120 J
Phenanthrene	ug/kg	1,500	1,230	190	398	81.9 J	733
Benzo(A)anthracene	ug/kg	1,600	472	123	259	47.4 J	632
Benzo(A)pyrene	ug/kg	1,600	361	142	266	39 J	708
Benzo(G,H,I)perylene	ug/kg	720	351	189	237	48 J	839
Benzofluoranthenes, Total	ug/kg	3,600	1,190	375	702	120 J	1,690
Chrysene	ug/kg	2,800	1,150	264	461	96.2 J	1,080
Dibenzo(A,H)anthracene	ug/kg	230	99 U	97 U	63 J	100 U	209 J
Fluoranthene	ug/kg	2,500	1,050	328	826	123	1,570
HPAH	ug/kg	17,000	6,161	1,891	3,674 J	620.3 J	8,721 J
Indeno(1,2,3-Cd)pyrene	ug/kg	690	167	119	185	34.7 J	583
Pyrene	ug/kg	3,300	1,420	351	675	112	1,410
cPAH	ug/kg	1,000	575	226	410 J	80 J	1,093 J
Bis(2-ethylhexyl)phthalate	ug/kg	1,900	15,100	3,900	735	251 U	5,190
Butylbenzylphthalate	ug/kg	900	99 U	195	163	100 U	289 U
Diethylphthalate	ug/kg	1,200	98.6 U	97.3 U	95.9 U	100 U	289 U
Dimethylphthalate	ug/kg	160	98.6 U	97.3 U	95.9 U	100 U	289 U
Di-N-Butylphthalate	ug/kg	1,400	170	85.7 J	95.9 U	35.1 J	113 J
Di-N-Octylphthalate	ug/kg	6,200	1070	361	76.5 J	100 U	413
Aroclor 1016	ug/kg		19.5 U	19.1 U	19.1 U	19.8 U	20.1 U
Aroclor 1221	ug/kg		19.5 U	19.1 U	19.1 U	19.8 U	20.1 U
Aroclor 1232	ug/kg		19.5 U	19.1 U	19.1 U	19.8 U	20.1 U
Aroclor 1242	ug/kg		19.5 U	19.1 U	19.1 U	19.8 U	20.1 U
Aroclor 1248	ug/kg		82.2	19.1 U	19.1 U	19.8 U	20.1 U
Aroclor 1254	ug/kg		100	49.6	19.1 U	19.8 U	752
Aroclor 1260	ug/kg		113	43.9	19.1 U	19.8 U	606 J
Polychlorinated Biphenyls	ug/kg	1,000	295.2	93.5	19.1 U	19.8 U	1,358 J
1,2,4-Trichlorobenzene	ug/kg	51	98.6 U	97.3 U	95.9 U	100 U	289 U
1,2-Dichlorobenzene	ug/kg	50	98.6 U	97.3 U	95.9 U	100 U	289 U
1,3-Dichlorobenzene	ug/kg		98.6 U	97.3 U	95.9 U	100 U	289 U
1,4-Dichlorobenzene	ug/kg	110	98.6 U	97.3 U	95.9 U	100 U	289 U
1-Methylnaphthalene	ug/kg		98.6 U	97.3 U	95.9 U	100 U	289 U
2,2'-Oxybis(1-chloropropane)	ug/kg		98.6 U	97.3 U	95.9 U	100 U	289 U
2,4,5-Trichlorophenol	ug/kg		493 U	486 U	480 U	502 U	1,450 U
2,4,6-Trichlorophenol	ug/kg		493 U	486 U	480 U	502 U	1,450 U
2,4-Dichlorophenol	ug/kg		493 U	486 U	480 U	502 U	1,450 U
2,4-Dimethylphenol	ug/kg	29	493 U	486 U	480 U	502 U	1,450 U
2,4-Dinitrophenol	ug/kg		986 U	973 U	959 U	1000 U	2,890 U
2,4-Dinitrotoluene	ug/kg		493 U	486 U	480 U	502 U	1,450 U
2,6-Dinitrotoluene	ug/kg		493 U	486 U	480 U	502 U	1,450 U
2-Chloronaphthalene	ug/kg		98.6 U	97.3 U	95.9 U	100 U	289 U
2-Chlorophenol	ug/kg		98.6 U	97.3 U	95.9 U	100 U	289 U
2-Methylnaphthalene	ug/kg	670	68.6 J	97.3 U	95.9 U	100 U	289 U
2-Methylphenol	ug/kg	63	98.6 U	97.3 U	95.9 U	100 U	289 U
2-Nitroaniline	ug/kg		493 U	486 U	480 U	502 U	1,450 U
2-Nitrophenol	ug/kg		98.6 U	97.3 U	95.9 U	100 U	289 U
3,3`-Dichlorobenzidine	ug/kg		493 U	486 U	480 U	502 U	1,450 UJ
3-Nitroaniline	ug/kg		493 U	486 U	480 U	502 U	1,450 U
4,6-Dinitro-2-Methylphenol	ug/kg		986 U	973 U	959 U	1,000 U	2,890 U
4-Bromophenyl phenyl ether	ug/kg		98.6 U	97.3 U	95.9 U	100 U	289 U
4-Chloro-3-Methylphenol	ug/kg		493 U	486 U	480 U	502 U	1,450 U
4-Chloroaniline	ug/kg		493 U	486 U	480 U	502 U	1,450 U
4-Chlorophenyl Phenylether	ug/kg		98.6 U	97.3 U	95.9 U	100 U	289 U
4-Methylphenol	ug/kg	670	419	330	1,010	100 U	3,600
4-Nitroaniline	ug/kg		493 U	486 U	480 U	502 U	1,450 U
4-Nitrophenol	ug/kg		493 U	486 U	480 U	502 U	1,450 U
Benzoic acid	ug/kg	650	617 J	350 J	1,050	1,000 U	1,190 J
Benzyl alcohol	ug/kg	73	172	97.3 U	910	100 U	289 U
bis(2-Chloroethoxy) methane	ug/kg		98.6 U	97.3 U	95.9 U	100 U	289 U
Bis-(2-chloroethyl) ether	ug/kg		98.6 U	97.3 U	95.9 U	100 U	289 UJ
Carbazole	ug/kg		145	97.3 U	68.7 J	100 U	182 J
Dibenzofuran	ug/kg	540	54.7 J	97.3 U	95.9 U	100 U	289 U
Hexachlorobenzene	ug/kg	70	98.6 U	97.3 U	95.9 U	100 U	289 U
Hexachlorobutadiene	ug/kg	120	98.6 U	97.3 U	95.9 U	100 U	289 U
Hexachlorocyclopentadiene	ug/kg		493 U	486 U	480 U	502 U	1,450 U
Hexachloroethane	ug/kg		98.6 U	97.3 U	95.9 U	100 U	289 U
Isophorone	ug/kg		98.6 U	97.3 U	95.9 U	100 U	289 U
Nitrobenzene	ug/kg		98.6 U	97.3 U	95.9 U	100 U	289 U
N-Nitroso-Di-N-Propylamine	ug/kg		98.6 U	97.3 U	95.9 U	100 U	289 UJ
N-Nitrosodiphenylamine	ug/kg	40	98.6 U	97.3 U	95.9 U	100 U	289 U
Pentachlorophenol	ug/kg	690	493 U	486 U	480 U	502 U	1,450 U
Phenol	ug/kg	1,200	188	51.7 J	201	100 U	308
Coarse Sand	%					9	
Fine Gravel	%					5.5	
Fine Sand	%					3.5	
Medium Sand	%					17.3	
Very Coarse Sand	%					9.1	
Very Fine Sand	%					0.9	

Location			CB192	ODS57
Sample Date			26 May 2017	26 May 2017
Sample Name			EJK-052617-1	EJK-052617-2
Drainage Type			SD	SD
Sample Method			Grab-Manual	Grab-Manual
Location Type			CB	ODS
Analyte	Unit	CSL/2LAET		
Solids, Total	%		58.02	97.73
Total Organic Carbon	%		5.77	4.38
Arsenic	mg/kg	93	7.43 U	12.7 U
Copper	mg/kg	390	227	249
Lead	mg/kg	530	16.1	48.8
Mercury	mg/kg	0.59	0.06448 J	0.149 J
Zinc	mg/kg	960	988	608
Diesel Range (Silica and Acid Cleaned	mg/kg	2,000	207	753
Motor Oil (Silica and Acid Cleaned)	mg/kg	2,000	1,420	1,890
Acenaphthene	ug/kg	500	287 U	273 U
Acenaphthylene	ug/kg	1,300	287 U	273 U
Anthracene	ug/kg	960	287 U	84.2 J
Fluorene	ug/kg	540	287 U	273 U
LPAH	ug/kg	5,200	117 J	451 J
Naphthalene	ug/kg	2,100	287 U	273 U
Phenanthrene	ug/kg	1,500	117 J	367
Benzo(A)anthracene	ug/kg	1,600	92 J	184 J
Benzo(A)pyrene	ug/kg	1,600	183 J	205 J
Benzo(G,H,I)perylene	ug/kg	720	292	469
Benzofluoranthenes, Total	ug/kg	3,600	569 J	1,050
Chrysene	ug/kg	2,800	280 J	522
Dibenzo(A,H)anthracene	ug/kg	230	287 U	273 U
Fluoranthene	ug/kg	2,500	192 J	478
HPAH	ug/kg	17,000	2,053 J	3,727 J
Indeno(1,2,3-Cd)pyrene	ug/kg	690	210 J	291
Pyrene	ug/kg	3,300	235 J	528
cPAH	ug/kg	1,000	330 J	417 J
Bis(2-ethylhexyl)phthalate	ug/kg	1,900	1,130	4,200
Butylbenzylphthalate	ug/kg	900	287 U	1,000
Diethylphthalate	ug/kg	1,200	287 U	273 U
Dimethylphthalate	ug/kg	160	287 U	273 U
Di-N-Butylphthalate	ug/kg	1,400	287 U	273 U
Di-N-Octylphthalate	ug/kg	6,200	287 U	273 U
Aroclor 1016	ug/kg		19.1 U	18.4 U
Aroclor 1221	ug/kg		19.1 U	18.4 U
Aroclor 1232	ug/kg		19.1 U	18.4 U
Aroclor 1242	ug/kg		19.1 U	18.4 U
Aroclor 1248	ug/kg		19.1 U	18.4 U
Aroclor 1254	ug/kg		15 J	47
Aroclor 1260	ug/kg		26	32
Polychlorinated Biphenyls	ug/kg	1,000	41 J	80
1,2,4-Trichlorobenzene	ug/kg	51	287 U	273 U
1,2-Dichlorobenzene	ug/kg	50	287 U	273 U
1,3-Dichlorobenzene	ug/kg		287 U	273 U
1,4-Dichlorobenzene	ug/kg	110	287 U	273 U
1-Methylnaphthalene	ug/kg		287 U	273 U
2,2'-Oxybis(1-chloropropane)	ug/kg		287 U	273 U
2,4,5-Trichlorophenol	ug/kg		1,440 U	1,370 U
2,4,6-Trichlorophenol	ug/kg		1,440 U	1,370 U
2,4-Dichlorophenol	ug/kg		1,440 U	1,370 U
2,4-Dimethylphenol	ug/kg	29	1,440 U	1,370 U
2,4-Dinitrophenol	ug/kg		2,870 U	2,730 U
2,4-Dinitrotoluene	ug/kg		1,440 U	1,370 U
2,6-Dinitrotoluene	ug/kg		1,440 U	1,370 U
2-Chloronaphthalene	ug/kg		287 U	273 U
2-Chlorophenol	ug/kg		287 U	273 U
2-Methylnaphthalene	ug/kg	670	287 U	273 U
2-Methylphenol	ug/kg	63	287 U	273 U
2-Nitroaniline	ug/kg		1,440 U	1,370 U
2-Nitrophenol	ug/kg		287 U	273 U
3,3`-Dichlorobenzidine	ug/kg		1,440 U	1,370 U
3-Nitroaniline	ug/kg		1,440 U	1,370 U
4,6-Dinitro-2-Methylphenol	ug/kg		2,870 U	2,730 U
4-Bromophenyl phenyl ether	ug/kg		287 U	273 U
4-Chloro-3-Methylphenol	ug/kg		1,440 U	1,370 U
4-Chloroaniline	ug/kg		1,440 U	1,370 U
4-Chlorophenyl Phenylether	ug/kg		287 U	273 U
4-Methylphenol	ug/kg	670	5,450	273 U
4-Nitroaniline	ug/kg		1,440 U	1,370 U
4-Nitrophenol	ug/kg		1,440 U	1,370 U
Benzoic acid	ug/kg	650	1,140 J	2,730 UJ
Benzyl alcohol	ug/kg	73	287 U	273 U
bis(2-Chloroethoxy) methane	ug/kg		287 U	273 U
Bis-(2-chloroethyl) ether	ug/kg		287 U	273 U
Carbazole	ug/kg		287 U	125 J
Dibenzofuran	ug/kg	540	287 U	273 U
Hexachlorobenzene	ug/kg	70	287 U	273 U
Hexachlorobutadiene	ug/kg	120	287 U	273 U
Hexachlorocyclopentadiene	ug/kg		1,440 U	1,370 U
Hexachloroethane	ug/kg		287 U	273 U
Isophorone	ug/kg		287 U	273 U
Nitrobenzene	ug/kg		287 U	273 U
N-Nitroso-Di-N-Propylamine	ug/kg		287 U	273 U
N-Nitrosodiphenylamine	ug/kg	40	287 U	273 U
Pentachlorophenol	ug/kg	690	1,440 U	1,370 U
Phenol	ug/kg	1,200	391	273 U
Coarse Sand	%		20.4	21
Fine Gravel	%		0.6	1.8
Fine Sand	%		5.2	6.2
Medium Sand	%		16.4	16.6
Very Coarse Sand	%		21.7	25.8
Very Fine Sand	%		4.4	5.3

Location			CB116	RCB139	RCB203
Sample Date			25 Aug 2017	21 Dec 2016	21 Dec 2016
Sample Name			MKJ-082517-2	MKJ-122116-5	MKJ-122116-6
Drainage Type			SD	SD	SD
Sample Method			Grab-Manual	Grab-Manual	Grab-Manual
Location Type			CB	RCB	RCB
Analyte	Unit	CSL/2LAET			
Solids, Total	%		49.37	64.16	75.13
Total Organic Carbon	%		3.55	6.15	2.11
Arsenic	mg/kg	93	21.8		
Copper	mg/kg	390	375		
Lead	mg/kg	530	348		
Mercury	mg/kg	0.59	2		
Zinc	mg/kg	960	1,630		
Diesel Range (Silica and Acid Cleaned)	mg/kg	2,000	699		
Motor Oil (Silica and Acid Cleaned)	mg/kg	2,000	2,500		
Acenaphthene	ug/kg	500	297 U		
Acenaphthylene	ug/kg	1,300	73.2 J		
Anthracene	ug/kg	960	251 J		
Fluorene	ug/kg	540	297 U		
LPAH	ug/kg	5,200	933 J		
Naphthalene	ug/kg	2,100	126 J		
Phenanthrene	ug/kg	1,500	483		
Benzo(A)anthracene	ug/kg	1,600	200		
Benzo(A)pyrene	ug/kg	1,600	226 J		
Benzo(G,H,I)perylene	ug/kg	720	327		
Benzofluoranthenes, Total	ug/kg	3,600	521 J		
Chrysene	ug/kg	2,800	546		
Dibenzo(A,H)anthracene	ug/kg	230	297 U		
Fluoranthene	ug/kg	2,500	578		
HPAH	ug/kg	17,000	3,020 J		
Indeno(1,2,3-Cd)pyrene	ug/kg	690	297 U		
Pyrene	ug/kg	3,300	622		
cPAH	ug/kg	1,000	378 J		
Bis(2-ethylhexyl)phthalate	ug/kg	1,900	8,390		
Butylbenzylphthalate	ug/kg	900	674		
Diethylphthalate	ug/kg	1,200	297 U		
Dimethylphthalate	ug/kg	160	274 J		
Di-N-Butylphthalate	ug/kg	1,400	641		
Di-N-Octylphthalate	ug/kg	6,200	236 J		
Aroclor 1016	ug/kg		19.7 U	18.2 U	17.1 U
Aroclor 1221	ug/kg		19.7 U	18.2 U	17.1 U
Aroclor 1232	ug/kg		19.7 U	18.2 U	17.1 U
Aroclor 1242	ug/kg		19.7 U	18.2 U	17.1 U
Aroclor 1248	ug/kg		99.8	35.8	58.5
Aroclor 1254	ug/kg		123 J	105	52.3
Aroclor 1260	ug/kg		338 J	160	72.8
Polychlorinated Biphenyls	ug/kg	1,000	561 J	300.8	183.6
1,2,4-Trichlorobenzene	ug/kg	51	297 U		
1,2-Dichlorobenzene	ug/kg	50	297 U		
1,3-Dichlorobenzene	ug/kg		297 U		
1,4-Dichlorobenzene	ug/kg	110	297 U		
1-Methylnaphthalene	ug/kg		297 U		
2,2'-Oxybis(1-chloropropane)	ug/kg		297 U		
2,4,5-Trichlorophenol	ug/kg		1,480 U		
2,4,6-Trichlorophenol	ug/kg		1,480 U		
2,4-Dichlorophenol	ug/kg		1,480 U		
2,4-Dimethylphenol	ug/kg	29	1,480 U		
2,4-Dinitrophenol	ug/kg		2,970 U		
2,4-Dinitrotoluene	ug/kg		1,480 U		
2,6-Dinitrotoluene	ug/kg		1,480 U		
2-Chloronaphthalene	ug/kg		297 U		
2-Chlorophenol	ug/kg		297 U		
2-Methylnaphthalene	ug/kg	670	297 U		
2-Methylphenol	ug/kg	63	297 U		
2-Nitroaniline	ug/kg		1,480 U		
2-Nitrophenol	ug/kg		297 U		
3,3`-Dichlorobenzidine	ug/kg		1,480 UJ		
3-Nitroaniline	ug/kg		1,480 U		
4,6-Dinitro-2-Methylphenol	ug/kg		2,970 U		
4-Bromophenyl phenyl ether	ug/kg		297 U		
4-Chloro-3-Methylphenol	ug/kg		1,480 U		
4-Chloroaniline	ug/kg		1,480 U		
4-Chlorophenyl Phenylether	ug/kg		297 U		
4-Methylphenol	ug/kg	670	1,170		
4-Nitroaniline	ug/kg		1,480 U		
4-Nitrophenol	ug/kg		1,480 U		
Benzoic acid	ug/kg	650	2,970 U		
Benzyl alcohol	ug/kg	73	1,790		
bis(2-Chloroethoxy) methane	ug/kg		297 U		
Bis-(2-chloroethyl) ether	ug/kg		257 J		
Carbazole	ug/kg		138 J		
Dibenzofuran	ug/kg	540	297 U		
Hexachlorobenzene	ug/kg	70	297 U		
Hexachlorobutadiene	ug/kg	120	297 U		
Hexachlorocyclopentadiene	ug/kg		1,480 U		
Hexachloroethane	ug/kg		297 U		
Isophorone	ug/kg		297 U		
Nitrobenzene	ug/kg		297 U		
N-Nitroso-Di-N-Propylamine	ug/kg		297 U		
N-Nitrosodiphenylamine	ug/kg	40	297 U		
Pentachlorophenol	ug/kg	690	1,480 U		
Phenol	ug/kg	1,200	307		
Coarse Sand	%		8.4		
Fine Gravel	%		0.3		
Fine Sand	%		9.2		
Medium Sand	%		22.6		
Very Coarse Sand	%		3.2		
Very Fine Sand	%		19.3		

Sample Date			27 Apr 2017	27 Apr 2017	27 Apr 2017	27 Apr 2017	25 Aug 2017
Sample Name			7TH-ST1-042717	7TH-ST1-042717-	7TH-ST2-042717	7TH-ST3-042717	MKJ-082517-1
Drainage Type			SD	SD	SD	SD	SD
Sample Method			SedTrap	Grab-Manual	SedTrap	SedTrap	Grab-Manual
Location Type			Inline w/Active	Inline w/Active	Inline w/Active	Inline w/Active	CB
Analyte	Unit	CSL/2LAET					
Solids, Total	%		39.1	43.92	77.21	29.38	51.99
Total Organic Carbon	%		8.25	3.03 J	0.55	8.66	3.07
Arsenic	mg/kg	93	22.8	9.03	17.4	27.1	29.2
Copper	mg/kg	390	137	71.3	15.8	132	426
Lead	mg/kg	530	80.8	40.1	12.9	97.2	321
Mercury	mg/kg	0.59	0.1481	0.1079	0.0496	0.2269	4
Zinc	mg/kg	960	593	281	156	732	862
Diesel Range (Silica and Acid Cleaned)	mg/kg	2,000	585	425	15.6	423	1,570
Diesel Range Hydrocarbons	mg/kg	2,000					
Motor Oil (Silica and Acid Cleaned)	mg/kg	2,000	2,240	2,050	68.7	1830	5,270
Motor Oil Range	mg/kg	2,000					
Acenaphthene	ug/kg	500	97.4 U	98.6 U	19.6 U	99.1 U	97.7 U
Acenaphthylene	ug/kg	1,300	97.4 U	98.6 U	19.6 U	99.1 U	104
Anthracene	ug/kg	960	48.2 J	98.6 U	19.6 U	74.1 J	853
Fluorene	ug/kg	540	97.4 U	25.2 J	19.6 U	99.1 U	74.2 J
LPAH	ug/kg	5,200	245 J	175 J	22 J	440 J	1,577 J
Naphthalene	ug/kg	2,100	97.4 U	98.6 U	7.1 J	64 J	195
Phenanthrene	ug/kg	1,500	197	150	15.3 J	302	351
Benzo(A)anthracene	ug/kg	1,600	137	104	16.4 J	192	232
Benzo(A)pyrene	ug/kg	1,600	97.4 U	133	19.6 U	127	283
Benzo(G,H,I)perylene	ug/kg	720	97.4 U	175	19.6 U	99.1 U	338
Benzofluoranthenes, Total	ug/kg	3,600	420	335	28.4 J	607	528
Chrysene	ug/kg	2,800	404	277	51	479	906
Dibenzo(A,H)anthracene	ug/kg	230	97.4 U	98.6 U	19.6 U	99.1 U	97.9
Fluoranthene	ug/kg	2,500	306	268	18.6 J	494	275
HPAH	ug/kg	17,000	1,665	1,696 J	146 J	2,491	3,327
Indeno(1,2,3-Cd)pyrene	ug/kg	690	97.4 U	96.2 J	19.6 U	99.1 U	217
Pyrene	ug/kg	3,300	398	308	31.6	592	450
cPAH	ug/kg	1,000	133	209 J	20 J	236	429
Bis(2-ethylhexyl)phthalate	ug/kg	1,900	5,860	3,960	98	7,670	14,700
Butylbenzylphthalate	ug/kg	900	97.4 U	113	19.6 U	488	193
Diethylphthalate	ug/kg	1,200	97.4 U	98.6 U	19.6 U	99.1 U	97.7 U
Dimethylphthalate	ug/kg	160	51.2 J	98.6 U	19.6 U	99.1 U	109
Di-N-Butylphthalate	ug/kg	1,400	149	67.3 J	19.6 U	132	364
Di-N-Octylphthalate	ug/kg	6,200	97.4 U	106	19.6 U	99.1 U	462
Aroclor 1016	ug/kg		19.6 U	18.9 U	18.5 U	19.8 U	19.5 U
Aroclor 1221	ug/kg		19.6 U	18.9 U	18.5 U	19.8 U	19.5 U
Aroclor 1232	ug/kg		19.6 U	18.9 U	18.5 U	19.8 U	19.5 U
Aroclor 1242	ug/kg		19.6 U	18.9 U	18.5 U	19.8 U	19.5 U
Aroclor 1248	ug/kg		46.6	18.9 U	18.5 U	19.8 U	67.5
Aroclor 1254	ug/kg		69.2	38.6	18.5 U	60.9	112 J
Aroclor 1260	ug/kg		93.5	31.5	18.5 U	43.8	291 J
Polychlorinated Biphenyls	ug/kg	1,000	209.3	70.1	18.5 U	104.7	470.5 J
1,2,4-Trichlorobenzene	ug/kg	51	97.4 U	98.6 U	19.6 U	99.1 U	97.7 U
1,2-Dichlorobenzene	ug/kg	50	97.4 U	98.6 U	19.6 U	99.1 U	97.7 U
1,3-Dichlorobenzene	ug/kg		97.4 U	98.6 U	19.6 U	99.1 U	97.7 U
1,4-Dichlorobenzene	ug/kg	110	97.4 U	98.6 U	19.6 U	99.1 U	97.7 U
1-Methylnaphthalene	ug/kg		97.4 U	98.6 U	19.6 U	99.1 U	55.6 J
2,2'-Oxybis(1-chloropropane)	ug/kg		97.4 U	98.6 U	19.6 U	99.1 U	97.7 U
2,4,5-Trichlorophenol	ug/kg		487 U	493 U	97.8 U	496 U	488 U
2,4,6-Trichlorophenol	ug/kg		487 U	493 U	97.8 U	496 U	488 U
2,4-Dichlorophenol	ug/kg		487 U	493 U	97.8 U	496 U	488 U
2,4-Dimethylphenol	ug/kg	29	487 U	493 UJ	97.8 U	496 U	488 U
2,4-Dinitrophenol	ug/kg		974 U	986 U	196 U	991 U	977 U
2,4-Dinitrotoluene	ug/kg		487 U	493 U	97.8 U	496 U	488 U
2,6-Dinitrotoluene	ug/kg		487 U	493 U	97.8 U	496 U	488 U
2-Chloronaphthalene	ug/kg		97.4 U	98.6 U	19.6 U	99.1 U	97.7 U
2-Chlorophenol	ug/kg		97.4 U	98.6 U	19.6 U	99.1 U	97.7 U
2-Methylnaphthalene	ug/kg	670	31.4 J	98.6 U	5.7 J	99.1 U	126
2-Methylphenol	ug/kg	63	97.4 U	98.6 U	19.6 U	99.1 U	98 U
2-Nitroaniline	ug/kg		487 UJ	493 UJ	97.8 UJ	496 UJ	488 U
2-Nitrophenol	ug/kg		97.4 U	98.6 U	19.6 U	99.1 U	98 U
3,3`-Dichlorobenzidine	ug/kg		487 U	493 UJ	97.8 U	496 U	488 UJ
3-Nitroaniline	ug/kg		487 U	493 U	97.8 U	496 U	488 U
4,6-Dinitro-2-Methylphenol	ug/kg		974 U	986 U	196 U	991 U	977 U
4-Bromophenyl phenyl ether	ug/kg		97.4 U	98.6 U	19.6 U	99.1 U	98 U
4-Chloro-3-Methylphenol	ug/kg		487 U	493 U	97.8 U	496 U	488 U
4-Chloroaniline	ug/kg		487 U	493 U	97.8 U	496 U	488 U
4-Chlorophenyl Phenylether	ug/kg		97.4 U	98.6 U	19.6 U	99.1 U	98 U
4-Methylphenol	ug/kg	670	481	1920	19.6 U	136	270
4-Nitroaniline	ug/kg		487 UJ	493 U	97.8 UJ	496 UJ	488 U
4-Nitrophenol	ug/kg		487 U	493 U	97.8 U	496 U	488 U
Benzoic acid	ug/kg	650	317 J	296 J	142 J	627 J	1,070
Benzyl alcohol	ug/kg	73	529	205	170	311	835
bis(2-Chloroethoxy) methane	ug/kg		97.4 U	98.6 U	19.6 U	99.1 U	98 U
Bis-(2-chloroethyl) ether	ug/kg		97.4 U	98.6 UJ	19.6 U	99.1 U	98 U
Carbazole	ug/kg		97.4 U	98.6 UJ	19.6 U	99.1 U	213
Dibenzofuran	ug/kg	540	97.4 U	98.6 U	19.6 U	99.1 U	98 U
Hexachlorobenzene	ug/kg	70	97.4 U	98.6 U	19.6 U	99.1 U	98 U
Hexachlorobutadiene	ug/kg	120	97.4 U	98.6 U	19.6 U	99.1 U	98 U
Hexachlorocyclopentadiene	ug/kg		487 U	493 U	97.8 U	496 U	488 U
Hexachloroethane	ug/kg		97.4 U	98.6 UJ	19.6 U	99.1 U	98 U
Isophorone	ug/kg		97.4 U	98.6 U	19.6 U	99.1 U	98 U
Nitrobenzene	ug/kg		97.4 U	98.6 U	19.6 U	99.1 U	98 U
N-Nitroso-Di-N-Propylamine	ug/kg		97.4 UJ	98.6 UJ	19.6 UJ	99.1 UJ	98 U
N-Nitrosodiphenylamine	ug/kg	40	97.4 U	98.6 U	19.6 U	99.1 U	98 U
Pentachlorophenol	ug/kg	690	487 U	493 U	97.8 U	496 U	488 U
Phenol	ug/kg	1,200	116	242	19.4 J	270	193
Coarse Sand	%			2.2			16.9
Fine Gravel	%			0.2			0.4
Fine Sand	%			20.5			9.1
Medium Sand	%			17.5			30.3
Very Coarse Sand	%			1.1			3.8
Very Fine Sand	%			22.8			4.8

Sample Date			25 Aug 2017	30 Sep 2016	15 Nov 2016	15 Nov 2016	15 Nov 2016
Sample Name			MKJ-082517-3	CEW-093016-6	ELMGROVE-5	ELMGROVE-1	ELMGROVE-2
Drainage Type			SD	SD	SD	SD	SD
Sample Method			Grab-Manual	Grab-Manual	Grab-Manual	Grab-Manual	Grab-Manual
Location Type			CB	CB	ODS	ODS	ODS
Analyte	Unit	CSL/2LAET					
Solids, Total	%		45.69	87.99	89.18	86.01	89.36
Total Organic Carbon	%		6.95	2.45	0.22	0.81	0.57
Arsenic	mg/kg	93	25.1	5.37			
Copper	mg/kg	390	822	171			
Lead	mg/kg	530	386	96.1			
Mercury	mg/kg	0.59	2	0.02378 U			
Zinc	mg/kg	960	966	415			
Diesel Range (Silica and Acid Cleaned)	mg/kg	2,000	1,330				
Diesel Range Hydrocarbons	mg/kg	2,000		117			
Motor Oil (Silica and Acid Cleaned)	mg/kg	2,000	3,610				
Motor Oil Range	mg/kg	2,000		763			
Acenaphthene	ug/kg	500	82.7 J	17 J			
Acenaphthylene	ug/kg	1,300	96.3 J	19.1 U			
Anthracene	ug/kg	960	434	10 J			
Fluorene	ug/kg	540	296 U	7.1 J			
LPAH	ug/kg	5,200	2,077 J	111 J			
Naphthalene	ug/kg	2,100	264 J	11.1 J			
Phenanthrene	ug/kg	1,500	1200	65.6			
Benzo(A)anthracene	ug/kg	1,600	275	41.6			
Benzo(A)pyrene	ug/kg	1,600	284 J	60.7			
Benzo(G,H,I)perylene	ug/kg	720	337	83.1 J			
Benzofluoranthenes, Total	ug/kg	3,600	543 J	135			
Chrysene	ug/kg	2,800	560	104			
Dibenzo(A,H)anthracene	ug/kg	230	296 U	21.3 J			
Fluoranthene	ug/kg	2,500	802	101			
HPAH	ug/kg	17,000	3,834 J	711 J			
Indeno(1,2,3-Cd)pyrene	ug/kg	690	218 J	47.8 J			
Pyrene	ug/kg	3,300	815	116			
cPAH	ug/kg	1,000	452 J	93 J			
Bis(2-ethylhexyl)phthalate	ug/kg	1,900	12,300	1,150			
Butylbenzylphthalate	ug/kg	900	776	417			
Diethylphthalate	ug/kg	1,200	296 U	25.7 U			
Dimethylphthalate	ug/kg	160	296 U	21.7			
Di-N-Butylphthalate	ug/kg	1,400	296 U	124			
Di-N-Octylphthalate	ug/kg	6,200	603	400			
Aroclor 1016	ug/kg		19.6 U	23.3 U	18.6 U	19.3 U	18.4 U
Aroclor 1221	ug/kg		19.6 U	23.3 U	18.6 U	19.3 U	18.4 U
Aroclor 1232	ug/kg		19.6 U	23.3 U	18.6 U	19.3 U	18.4 U
Aroclor 1242	ug/kg		19.6 U	23.3 U	18.6 U	19.3 U	18.4 U
Aroclor 1248	ug/kg		90	23.3 U	18.6 U	19.3 U	18.4 U
Aroclor 1254	ug/kg		81.9 J	75.6 J	18.6 U	19.3 U	18.4 U
Aroclor 1260	ug/kg		177 J	54.4	18.6 U	22.9	18.4 U
Polychlorinated Biphenyls	ug/kg	1,000	348.9 J	130 J	18.6 U	22.9	18.4 U
1,2,4-Trichlorobenzene	ug/kg	51	296 U	19.1 U			
1,2-Dichlorobenzene	ug/kg	50	296 U	19.1 U			
1,3-Dichlorobenzene	ug/kg		296 U	19.1 U			
1,4-Dichlorobenzene	ug/kg	110	296 U	19.1 U			
1-Methylnaphthalene	ug/kg		134 J	7.7 J			
2,2'-Oxybis(1-chloropropane)	ug/kg		296 U	19.1 U			
2,4,5-Trichlorophenol	ug/kg		1,480 U	95.7 U			
2,4,6-Trichlorophenol	ug/kg		1,480 U	95.7 U			
2,4-Dichlorophenol	ug/kg		1,480 U	95.7 U			
2,4-Dimethylphenol	ug/kg	29	1,480 U	95.7 U			
2,4-Dinitrophenol	ug/kg		2,960 U	191 UJ			
2,4-Dinitrotoluene	ug/kg		1,480 U	95.7 U			
2,6-Dinitrotoluene	ug/kg		1,480 U	95.7 U			
2-Chloronaphthalene	ug/kg		296 U	19.1 U			
2-Chlorophenol	ug/kg		296 U	19.1 U			
2-Methylnaphthalene	ug/kg	670	220 J	12 J			
2-Methylphenol	ug/kg	63	296 U	19.1 U			
2-Nitroaniline	ug/kg		1,480 U	95.7 U			
2-Nitrophenol	ug/kg		296 U	19.1 U			
3,3`-Dichlorobenzidine	ug/kg		1,480 UJ	95.7 U			
3-Nitroaniline	ug/kg		1,480 U	95.7 U			
4,6-Dinitro-2-Methylphenol	ug/kg		2,960 U	191 UJ			
4-Bromophenyl phenyl ether	ug/kg		296 U	19.1 U			
4-Chloro-3-Methylphenol	ug/kg		1,480 U	95.7 U			
4-Chloroaniline	ug/kg		1,480 U	95.7 U			
4-Chlorophenyl Phenylether	ug/kg		296 U	19.1 U			
4-Methylphenol	ug/kg	670	460	19.1 U			
4-Nitroaniline	ug/kg		1,480 U	95.7 U			
4-Nitrophenol	ug/kg		1,480 U	95.7 U			
Benzoic acid	ug/kg	650	2,960 U	202			
Benzyl alcohol	ug/kg	73	417	19.1 U			
bis(2-Chloroethoxy) methane	ug/kg		296 U	19.1 U			
Bis-(2-chloroethyl) ether	ug/kg		296 U	19.1 U			
Carbazole	ug/kg		219 J	10.6 J			
Dibenzofuran	ug/kg	540	89 J	13.2 J			
Hexachlorobenzene	ug/kg	70	296 U	19.1 U			
Hexachlorobutadiene	ug/kg	120	296 U	19.1 U			
Hexachlorocyclopentadiene	ug/kg		1,480 U	95.7 UJ			
Hexachloroethane	ug/kg		296 U	19.1 U			
Isophorone	ug/kg		296 U	9.8 J			
Nitrobenzene	ug/kg		296 U	19.1 U			
N-Nitroso-Di-N-Propylamine	ug/kg		296 U	19.1 U			
N-Nitrosodiphenylamine	ug/kg	40	296 U	32.3			
Pentachlorophenol	ug/kg	690	1,480 U	95.7 UJ			
Phenol	ug/kg	1,200	199 J	41			
Coarse Sand	%		9.9				
Fine Gravel	%		0.3				
Fine Sand	%		12.5				
Medium Sand	%		11.5				
Very Coarse Sand	%		8.4				
Very Fine Sand	%		21.5				

Sample Date			15 Nov 2016	15 Nov 2016	15 Dec 2016	15 Dec 2016	15 Dec 2016
Sample Name			ELMGROVE-3	ELMGROVE-4	MKJ-121516-4	MKJ-121516-5	MKJ-121516-6
Drainage Type			SD	SD	SD	SD	SD
Sample Method			Grab-Manual	Grab-Manual	Grab-Manual	Grab-Manual	Grab-Manual
Location Type			ODS	ODS	ODS	ODS	ODS
Analyte	Unit	CSL/2LAET					
Solids, Total	%		88.67	84.79	87.95	82.27	79.62
Total Organic Carbon	%		0.34	0.54	4.13	1.67	6.21 J
Arsenic	mg/kg	93					
Copper	mg/kg	390					
Lead	mg/kg	530					
Mercury	mg/kg	0.59					
Zinc	mg/kg	960					
Diesel Range (Silica and Acid Cleaned)	mg/kg	2,000					
Diesel Range Hydrocarbons	mg/kg	2,000					
Motor Oil (Silica and Acid Cleaned)	mg/kg	2,000					
Motor Oil Range	mg/kg	2,000					
Acenaphthene	ug/kg	500					
Acenaphthylene	ug/kg	1,300					
Anthracene	ug/kg	960					
Fluorene	ug/kg	540					
LPAH	ug/kg	5,200					
Naphthalene	ug/kg	2,100					
Phenanthrene	ug/kg	1,500					
Benzo(A)anthracene	ug/kg	1,600					
Benzo(A)pyrene	ug/kg	1,600					
Benzo(G,H,I)perylene	ug/kg	720					
Benzofluoranthenes, Total	ug/kg	3,600					
Chrysene	ug/kg	2,800					
Dibenzo(A,H)anthracene	ug/kg	230					
Fluoranthene	ug/kg	2,500					
HPAH	ug/kg	17,000					
Indeno(1,2,3-Cd)pyrene	ug/kg	690					
Pyrene	ug/kg	3,300					
cPAH	ug/kg	1,000					
Bis(2-ethylhexyl)phthalate	ug/kg	1,900					
Butylbenzylphthalate	ug/kg	900					
Diethylphthalate	ug/kg	1,200					
Dimethylphthalate	ug/kg	160					
Di-N-Butylphthalate	ug/kg	1,400					
Di-N-Octylphthalate	ug/kg	6,200					
Aroclor 1016	ug/kg		18.7 U	19.4 U	188 U	17 U	17.2 U
Aroclor 1221	ug/kg		18.7 U	19.4 U	188 U	17 U	17.2 U
Aroclor 1232	ug/kg		18.7 U	19.4 U	188 U	17 U	17.2 U
Aroclor 1242	ug/kg		18.7 U	19.4 U	188 U	17 U	17.2 U
Aroclor 1248	ug/kg		18.7 U	19.4 U	188 U	17 U	17.2 U
Aroclor 1254	ug/kg		18.7 U	43.2	621	46.6	79.2
Aroclor 1260	ug/kg		18.7 U	33.5	2030	49.6	425
Polychlorinated Biphenyls	ug/kg	1,000	18.7 U	76.7	2651	96.2	504.2
1,2,4-Trichlorobenzene	ug/kg	51					
1,2-Dichlorobenzene	ug/kg	50					
1,3-Dichlorobenzene	ug/kg						
1,4-Dichlorobenzene	ug/kg	110					
1-Methylnaphthalene	ug/kg						
2,2'-Oxybis(1-chloropropane)	ug/kg						
2,4,5-Trichlorophenol	ug/kg						
2,4,6-Trichlorophenol	ug/kg						
2,4-Dichlorophenol	ug/kg						
2,4-Dimethylphenol	ug/kg	29					
2,4-Dinitrophenol	ug/kg						
2,4-Dinitrotoluene	ug/kg						
2,6-Dinitrotoluene	ug/kg						
2-Chloronaphthalene	ug/kg						
2-Chlorophenol	ug/kg						
2-Methylnaphthalene	ug/kg	670					
2-Methylphenol	ug/kg	63					
2-Nitroaniline	ug/kg						
2-Nitrophenol	ug/kg						
3,3`-Dichlorobenzidine	ug/kg						
3-Nitroaniline	ug/kg						
4,6-Dinitro-2-Methylphenol	ug/kg						
4-Bromophenyl phenyl ether	ug/kg						
4-Chloro-3-Methylphenol	ug/kg						
4-Chloroaniline	ug/kg						
4-Chlorophenyl Phenylether	ug/kg						
4-Methylphenol	ug/kg	670					
4-Nitroaniline	ug/kg						
4-Nitrophenol	ug/kg						
Benzoic acid	ug/kg	650					
Benzyl alcohol	ug/kg	73					
bis(2-Chloroethoxy) methane	ug/kg						
Bis-(2-chloroethyl) ether	ug/kg						
Carbazole	ug/kg						
Dibenzofuran	ug/kg	540					
Hexachlorobenzene	ug/kg	70					
Hexachlorobutadiene	ug/kg	120					
Hexachlorocyclopentadiene	ug/kg						
Hexachloroethane	ug/kg						
Isophorone	ug/kg						
Nitrobenzene	ug/kg						
N-Nitroso-Di-N-Propylamine	ug/kg						
N-Nitrosodiphenylamine	ug/kg	40					
Pentachlorophenol	ug/kg	690					
Phenol	ug/kg	1,200					
Coarse Sand	%						
Fine Gravel	%						
Fine Sand	%						
Medium Sand	%						
Very Coarse Sand	%						
Very Fine Sand	%						

Sample Date			29 Dec 2016	21 Dec 2016	21 Dec 2016
Sample Name			MKJ-122916-1	MKJ-122116-8	MKJ-122116-9
Drainage Type			SD	SD	SD
Sample Method			Grab-Manual	Grab-Manual	Grab-Manual
Location Type			RCB	RCB	RCB
Analyte	Unit	CSL/2LAET			
Solids, Total	%		86.42	75.45	37.15
Total Organic Carbon	%		1.08 J	2.74	12.1
Arsenic	mg/kg	93			
Copper	mg/kg	390			
Lead	mg/kg	530			
Mercury	mg/kg	0.59			
Zinc	mg/kg	960			
Diesel Range (Silica and Acid Cleaned)	mg/kg	2,000			
Diesel Range Hydrocarbons	mg/kg	2,000			
Motor Oil (Silica and Acid Cleaned)	mg/kg	2,000			
Motor Oil Range	mg/kg	2,000			
Acenaphthene	ug/kg	500			
Acenaphthylene	ug/kg	1,300			
Anthracene	ug/kg	960			
Fluorene	ug/kg	540			
LPAH	ug/kg	5,200			
Naphthalene	ug/kg	2,100			
Phenanthrene	ug/kg	1,500			
Benzo(A)anthracene	ug/kg	1,600			
Benzo(A)pyrene	ug/kg	1,600			
Benzo(G,H,I)perylene	ug/kg	720			
Benzofluoranthenes, Total	ug/kg	3,600			
Chrysene	ug/kg	2,800			
Dibenzo(A,H)anthracene	ug/kg	230			
Fluoranthene	ug/kg	2,500			
HPAH	ug/kg	17,000			
Indeno(1,2,3-Cd)pyrene	ug/kg	690			
Pyrene	ug/kg	3,300			
cPAH	ug/kg	1,000			
Bis(2-ethylhexyl)phthalate	ug/kg	1,900			
Butylbenzylphthalate	ug/kg	900			
Diethylphthalate	ug/kg	1,200			
Dimethylphthalate	ug/kg	160			
Di-N-Butylphthalate	ug/kg	1,400			
Di-N-Octylphthalate	ug/kg	6,200			
Aroclor 1016	ug/kg		19.7 U	18.3 U	19.2 U
Aroclor 1221	ug/kg		19.7 U	18.3 U	19.2 U
Aroclor 1232	ug/kg		19.7 U	18.3 U	19.2 U
Aroclor 1242	ug/kg		19.7 U	18.3 U	19.2 U
Aroclor 1248	ug/kg		19.7 U	24.4	57
Aroclor 1254	ug/kg		19.7 U	47.8	166
Aroclor 1260	ug/kg		19.7 U	76.3	643
Polychlorinated Biphenyls	ug/kg	1,000	19.7 U	148.5	866
1,2,4-Trichlorobenzene	ug/kg	51			
1,2-Dichlorobenzene	ug/kg	50			
1,3-Dichlorobenzene	ug/kg				
1,4-Dichlorobenzene	ug/kg	110			
1-Methylnaphthalene	ug/kg				
2,2'-Oxybis(1-chloropropane)	ug/kg				
2,4,5-Trichlorophenol	ug/kg				
2,4,6-Trichlorophenol	ug/kg				
2,4-Dichlorophenol	ug/kg				
2,4-Dimethylphenol	ug/kg	29			
2,4-Dinitrophenol	ug/kg				
2,4-Dinitrotoluene	ug/kg				
2,6-Dinitrotoluene	ug/kg				
2-Chloronaphthalene	ug/kg				
2-Chlorophenol	ug/kg				
2-Methylnaphthalene	ug/kg	670			
2-Methylphenol	ug/kg	63			
2-Nitroaniline	ug/kg				
2-Nitrophenol	ug/kg				
3,3`-Dichlorobenzidine	ug/kg				
3-Nitroaniline	ug/kg				
4,6-Dinitro-2-Methylphenol	ug/kg				
4-Bromophenyl phenyl ether	ug/kg				
4-Chloro-3-Methylphenol	ug/kg				
4-Chloroaniline	ug/kg				
4-Chlorophenyl Phenylether	ug/kg				
4-Methylphenol	ug/kg	670			
4-Nitroaniline	ug/kg				
4-Nitrophenol	ug/kg				
Benzoic acid	ug/kg	650			
Benzyl alcohol	ug/kg	73			
bis(2-Chloroethoxy) methane	ug/kg				
Bis-(2-chloroethyl) ether	ug/kg				
Carbazole	ug/kg				
Dibenzofuran	ug/kg	540			
Hexachlorobenzene	ug/kg	70			
Hexachlorobutadiene	ug/kg	120			
Hexachlorocyclopentadiene	ug/kg				
Hexachloroethane	ug/kg				
Isophorone	ug/kg				
Nitrobenzene	ug/kg				
N-Nitroso-Di-N-Propylamine	ug/kg				
N-Nitrosodiphenylamine	ug/kg	40			
Pentachlorophenol	ug/kg	690			
Phenol	ug/kg	1,200			
Coarse Sand	%				
Fine Gravel	%				
Fine Sand	%				
Medium Sand	%				
Very Coarse Sand	%				
Very Fine Sand	%				

Location			ODS51	RCB75	RCB76
Sample Date			09 Jan 2017	08 Jan 2017	09 Jan 2017
Sample Name			MBS-010917-2	MBS-010817-1	MBS-010917-1
Drainage Type			SD	SD	SD
Sample Method			Grab-Manual	Grab-Manual	Grab-Manual
Location Type			ODS	RCB	RCB
Analyte	Unit	CSL/2LAET			
Solids, Total	%		61.74	35.15	57.04
Total Organic Carbon	%		5.91 J	8.63 J	6.13 J
Arsenic	mg/kg	93	21.2	21	29.8
Copper	mg/kg	390	62.3	87.6	114
Lead	mg/kg	530	21	29.4	46.7
Mercury	mg/kg	0.59	0.06059	0.09382	0.06326
Zinc	mg/kg	960	176	455	1,090
Diesel Range Hydrocarbons, silica gel	mg/kg	2,000	75.7	379	201
Motor Oil Range, silica gel cleanup	mg/kg	2,000	628	2,030	1,620
Acenaphthene	ug/kg	500	48.8 U	49.3 U	243 U
Acenaphthylene	ug/kg	1,300	48.8 U	49.3 U	243 U
Anthracene	ug/kg	960	48.8 U	46 J	243 U
Fluorene	ug/kg	540	48.8 U	23.8 J	243 U
LPAH	ug/kg	5,200	106.6 J	383.4 J	236 J
Naphthalene	ug/kg	2,100	24.9 J	46.6 J	243 U
Phenanthrene	ug/kg	1,500	81.7	267	236 J
Benzo(A)anthracene	ug/kg	1,600	38.5 J	200	151 J
Benzo(A)pyrene	ug/kg	1,600	54.9	224	172 J
Benzo(G,H,I)perylene	ug/kg	720	42.8 J	137	153 J
Benzofluoranthenes, Total	ug/kg	3,600	183	670	709
Chrysene	ug/kg	2,800	164	447	478
Dibenzo(A,H)anthracene	ug/kg	230	48.8 U	60.7	90.1 J
Fluoranthene	ug/kg	2,500	135	586	482
HPAH	ug/kg	17,000	775 J	3,048	2,781 J
Indeno(1,2,3-Cd)pyrene	ug/kg	690	34.5 J	95.8	133 J
Pyrene	ug/kg	3,300	122	627	413
cPAH	ug/kg	1,000	92 J	349	312 J
Bis(2-ethylhexyl)phthalate	ug/kg	1,900	4,450	14,500	9,610
Butylbenzylphthalate	ug/kg	900	113	533	298
Dimethylphthalate	ug/kg	160	91	49 U	243 U
Di-N-Butylphthalate	ug/kg	1,400	30.5 J	61.1	243 U
Di-N-Octylphthalate	ug/kg	6,200	48.8 U	308	243 U
Aroclor 1016	ug/kg		3.9 U	4 U	3.9 U
Aroclor 1221	ug/kg		3.9 U	4 U	3.9 U
Aroclor 1232	ug/kg		3.9 U	4 U	3.9 U
Aroclor 1242	ug/kg		3.9 U	4 U	3.9 U
Aroclor 1248	ug/kg		7.2	9.6	13.8
Aroclor 1254	ug/kg		11.3	32.6	26.1
Aroclor 1260	ug/kg		5.9	32.1	45.2
Polychlorinated Biphenyls	ug/kg	1,000	24.4	74.3	85.1
1,2,4-Trichlorobenzene	ug/kg	51	48.8 U	49.3 U	243 U
1,2-Dichlorobenzene	ug/kg	50	48.8 U	49.3 U	243 U
1,3-Dichlorobenzene	ug/kg		48.8 U	49.3 U	243 U
1,4-Dichlorobenzene	ug/kg	110	48.8 U	49.3 U	243 U
1-Methylnaphthalene	ug/kg		48.8 U	49.3 U	243 U
2,2'-Oxybis(1-chloropropane)	ug/kg		48.8 U	49.3 U	243 U
2,4,5-Trichlorophenol	ug/kg		244 U	247 U	1,210 U
2,4,6-Trichlorophenol	ug/kg		244 U	247 U	1,210 U
2,4-Dichlorophenol	ug/kg		244 U	247 U	1,210 U
2,4-Dimethylphenol	ug/kg	29	244 U	247 U	1,210 U
2,4-Dinitrophenol	ug/kg		488 U	493 U	2,430 U
2,4-Dinitrotoluene	ug/kg		244 U	247 U	1,210 U
2,6-Dinitrotoluene	ug/kg		244 U	247 U	1,210 U
2-Chloronaphthalene	ug/kg		48.8 U	49.3 U	243 U
2-Chlorophenol	ug/kg		48.8 U	49.3 U	243 U
2-Methylnaphthalene	ug/kg	670	48.8 U	24.6 J	243 U
2-Methylphenol	ug/kg	63	48.8 U	49.3 U	243 U
2-Nitroaniline	ug/kg		244 U	247 U	1,210 U
2-Nitrophenol	ug/kg		48.8 U	49.3 U	243 U
3-Nitroaniline	ug/kg		244 U	247 U	1,210 U
4,6-Dinitro-2-Methylphenol	ug/kg		488 U	493 U	2,430 U
4-Bromophenyl phenyl ether	ug/kg		48.8 U	49.3 U	243 U
4-Chloro-3-Methylphenol	ug/kg		244 U	247 U	1,210 U
4-Chloroaniline	ug/kg		244 U	247 U	1,210 U
4-Methylphenol	ug/kg	670	48.8 U	49.3 U	243 U
4-Nitroaniline	ug/kg		244 U	247 U	1,210 U
4-Nitrophenol	ug/kg		244 U	247 U	1,210 U
Benzoic acid	ug/kg	650	338 J	1,950	739 J
Benzyl alcohol	ug/kg	73	212 J	1,580 J	5,760 J
Carbazole	ug/kg		28.3 J	118 J	243 U
Dibenzofuran	ug/kg	540	48.8 U	49.3 U	243 U
Hexachlorobenzene	ug/kg	70	48.8 U	432	243 U
Hexachlorobutadiene	ug/kg	120	48.8 U	49.3 U	243 U
Hexachlorocyclopentadiene	ug/kg		244 U	247 U	1,210 U
Hexachloroethane	ug/kg		48.8 U	49.3 U	243 U
Isophorone	ug/kg		48.8 U	49.3 U	243 U
Nitrobenzene	ug/kg		48.8 U	49.3 U	243 U
N-Nitroso-Di-N-Propylamine	ug/kg		48.8 U	49.3 U	243 U
N-Nitrosodiphenylamine	ug/kg	40	48.8 U	49.3 U	243 U
Pentachlorophenol	ug/kg	690	244 U	138 J	1,210 U
Phenol	ug/kg	1,200	48.8 U	387	243 U
Coarse Sand	%			5.9	23.8
Coarse Silt	%			4.8	2.6
Fine Sand	%			9	11.7
Medium Sand	%			7.1	11.5
Very Coarse Sand	%			2.4	29.8
Very Fine Sand	%			4	1.7

Location			CB121	CB190	CB191	CB221	CB222
Sample Date			23 Sep 2016	06 Apr 2017	06 Apr 2017	26 Sep 2017	26 Sep 2017
Sample Name			MKJ-092316	MKJ-040617-3	MKJ-040617-4	CEW-092617-02	CEW-092617-01
Drainage Type			SD	SD	SD	SD	SD
Sample Method			Grab-Manual	Grab-Manual	Grab-Manual	Grab-Manual	Grab-Manual
Location Type			CB	CB	CB	CB	CB
Analyte	Unit	CSL/2LAET	Result	Result	Result	Result	Result
Solids, Total	%		38.45	39.03	36.92	39.27	28.37
Total Organic Carbon	%		10.9	14.8	13.5	24.4	19.5
Arsenic	mg/kg	93	10.1	22.2	15.8	3.66	8.58
Copper	mg/kg	390	301	182	93.9	42	274
Lead	mg/kg	530	63	103	25.5	15.4	242
Mercury	mg/kg	0.59	1.411 J	0.5061	0.05738	0.0558 U	0.0713 U
Zinc	mg/kg	960	1,620	1,990	1,970	209	989
Diesel Range (Silica and Acid Cleaned)	mg/kg	2,000	284	1,060	1,320	396	580
Diesel Range Hydrocarbons	mg/kg	2,000	1,050				
Motor Oil (Silica and Acid Cleaned)	mg/kg	2,000	1,750	4,550	5,680	3,260	4,740
Motor Oil Range	mg/kg	2,000	3790				
Acenaphthene	ug/kg	500	96.4 U	290 U	298 U	292 U	137 J
Acenaphthylene	ug/kg	1,300	96.4 U	290 U	298 U	292 U	290 U
Anthracene	ug/kg	960	50.7 J	290 U	298 U	292 U	452
Fluorene	ug/kg	540	34.9 J	290 U	298 U	292 U	179 J
Naphthalene	ug/kg	2,100	92.6 J	290 U	298 U	292 U	101 J
Phenanthrene	ug/kg	1,500	316	358	335	514	3,650
LPAH	ug/kg	5,200	494 J	358	335	514	4,519 J
Benzo(A)anthracene	ug/kg	1,600	79.3 J	113 J	103 J	336	2720
Benzo(A)pyrene	ug/kg	1,600	91.2 J	114 J	298 U	394	3,100
Benzo(G,H,I)perylene	ug/kg	720	175	176 J	211 J	414	2,120
Benzofluoranthenes, Total	ug/kg	3,600	241	303 J	272 J	889	6,300
Chrysene	ug/kg	2,800	711	281 J	310	719	4,710
Dibenzo(A,H)anthracene	ug/kg	230	48.6 J	290 U	298 U	105 J	790
Fluoranthene	ug/kg	2,500	243	349	348	809	6,910
Indeno(1,2,3-Cd)pyrene	ug/kg	690	92.8 J	290 U	298 U	335	1,920
Pyrene	ug/kg	3,300	272	405	363	807	5,830
HPAH	ug/kg	17,000	1,954 J	1,741 J	1,607 J	4808	34,400
cPAH	ug/kg	1,000	159 J	231 J	264 J	599 J	4,557
Bis(2-ethylhexyl)phthalate	ug/kg	1,900	13,600	9,890	65,700	12,300	86,200
Butylbenzylphthalate	ug/kg	900	4,770	438	462	292 UJ	372 J
Diethylphthalate	ug/kg	1,200	96.4 U	290 U	298 U	292 U	290 U
Dimethylphthalate	ug/kg	160	96.4 U	290 U	3,460	292 U	290 U
Di-N-Butylphthalate	ug/kg	1,400	3,910	290 U	156 J	292 U	179 J
Di-N-Octylphthalate	ug/kg	6,200	96.4 U	400	712	292 U	290 U
Aroclor 1016	ug/kg		19.2 U	21.2 U	20.4 U	19.5 U	19.1 U
Aroclor 1221	ug/kg		19.2 U	21.2 U	20.4 U	19.5 U	19.1 U
Aroclor 1232	ug/kg		19.2 U	21.2 U	20.4 U	19.5 U	19.1 U
Aroclor 1242	ug/kg		19.2 U	21.2 U	20.4 U	19.5 U	19.1 U
Aroclor 1248	ug/kg		193 U	93.8	146	19.5 U	19.1 U
Aroclor 1254	ug/kg		5,820	156	416	19.5 U	19.1 U
Aroclor 1260	ug/kg		1,810	102 J	187 J	19.5 U	34.5 J
Polychlorinated Biphenyls	ug/kg	1,000	7,630	351.8 J	749 J	19.5 U	34.5 J
1,2,4-Trichlorobenzene	ug/kg	51	96.4 U	290 U	298 U	292 U	290 U
1,2-Dichlorobenzene	ug/kg	50	96.4 U	290 U	298 U	292 U	290 U
1,3-Dichlorobenzene	ug/kg		96.4 U	290 U	298 U	292 U	290 U
1,4-Dichlorobenzene	ug/kg	110	96.4 U	290 U	298 U	292 U	290 U
1-Methylnaphthalene	ug/kg		96.4 U	290 U	298 U	292 U	290 U
2,2'-Oxybis(1-chloropropane)	ug/kg		96.4 U	290 U	298 U	292 U	290 U
2,4,5-Trichlorophenol	ug/kg		482 U	1,450 U	1,490 U	1,460 U	1,450 U
2,4,6-Trichlorophenol	ug/kg		482 U	1,450 U	1,490 U	1,460 U	1,450 U
2,4-Dichlorophenol	ug/kg		482 U	1,450 U	1,490 U	1,460 U	1,450 U
2,4-Dimethylphenol	ug/kg	29	482 U	1450 U	1490 U	1460 U	1450 U
2,4-Dinitrophenol	ug/kg		964 U	2,900 U	2,980 U	2,920 U	2,900 U
2,4-Dinitrotoluene	ug/kg		482 U	1,450 U	1,490 U	1,460 U	1,450 U
2,6-Dinitrotoluene	ug/kg		482 U	1,450 U	1,490 U	1,460 U	1,450 U
2-Chloronaphthalene	ug/kg		96.4 U	290 U	298 U	292 U	290 U
2-Chlorophenol	ug/kg		96.4 U	290 U	298 U	292 U	290 U
2-Methylnaphthalene	ug/kg	670	39.6 J	290 U	298 U	292 U	290 U
2-Methylphenol	ug/kg	63	96.4 U	290 U	298 U	292 U	290 U
2-Nitroaniline	ug/kg		482 U	1,450 U	1,490 U	1,460 U	1,450 U
2-Nitrophenol	ug/kg		96.4 U	290 U	298 U	292 U	290 U
3,3`-Dichlorobenzidine	ug/kg		482 UJ	1,450 U	1,490 U	1,460 U	1,450 U
3-Nitroaniline	ug/kg		482 UJ	1,450 U	1,490 U	1,460 U	1,450 U
4,6-Dinitro-2-Methylphenol	ug/kg		964 U	2,900 U	2,980 U	2,920 U	2,900 U
4-Bromophenyl phenyl ether	ug/kg		96.4 U	290 U	298 U	292 U	290 U
4-Chloro-3-Methylphenol	ug/kg		482 U	1,450 U	1,490 U	1,460 U	1,450 U
4-Chloroaniline	ug/kg		482 UJ	1,450 U	1,490 U	1,460 U	1,450 U
4-Chlorophenyl Phenylether	ug/kg		96.4 U	290 U	298 U	292 U	290 U
4-Methylphenol	ug/kg	670	971	10,700	4,170	1,420	840
4-Nitroaniline	ug/kg		482 UJ	1,450 U	1,490 U	1,460 U	1,450 U
4-Nitrophenol	ug/kg		482 U	1,450 U	1,490 U	1,460 U	1,450 U
Benzoic acid	ug/kg	650	25,600 J	17,100	1,130 J	2,920 U	2,900 U
Benzyl alcohol	ug/kg	73	698	2,030	12,100	292 U	290 U
bis(2-Chloroethoxy) methane	ug/kg		96 U	290 U	298 U	292 UJ	290 UJ
Bis-(2-chloroethyl) ether	ug/kg		96 UJ	290 U	298 U	292 UJ	290 UJ
Carbazole	ug/kg		96 UJ	290 U	298 U	292 U	596
Dibenzofuran	ug/kg	540	96 U	290 U	298 U	292 U	290 U
Hexachlorobenzene	ug/kg	70	96 U	290 U	298 U	292 U	290 U
Hexachlorobutadiene	ug/kg	120	96 U	290 U	298 U	292 U	290 U
Hexachlorocyclopentadiene	ug/kg		482 U	1,450 U	1,490 U	1,460 U	1,450 U
Hexachloroethane	ug/kg		96 U	290 U	298 U	292 U	290 U
Isophorone	ug/kg		96 U	290 U	298 U	292 UJ	290 UJ
Nitrobenzene	ug/kg		431	290 U	298 U	292 UJ	290 UJ
N-Nitroso-Di-N-Propylamine	ug/kg		96 U	290 U	298 U	292 UJ	290 UJ
N-Nitrosodiphenylamine	ug/kg	40	96 U	290 U	298 U	292 U	290 U
Pentachlorophenol	ug/kg	690	482 U	1,450 U	1,490 U	1,460 U	1,450 U
Phenol	ug/kg	1,200	629	1,620	298 U	292 U	290 U
Coarse Sand	%		11.8	5	11.7		
Coarse Silt	%						
Fine Gravel	%		0.4	0.7	0.2		
Fine Sand	%		3.2	2.4	7.5		
Gravel	%						
Medium Sand	%		19.2	4.2	11.2		
Very Coarse Sand	%		13.1	3.4	10.5		
Very Fine Sand	%		11	4.9	7.5		

Location			CB225	CB226	CB227	CB237	CB238
Sample Date			25 Aug 2017	25 Aug 2017	25 Aug 2017	21 Dec 2016	19 Jun 2017
Sample Name			EJK082517-1	EJK082517-2	EJK082517-3	MKJ-122116-3	JRZ-061917-1
Drainage Type			SD	SD	SD	SD	SD
Sample Method				Grab-Manual	Grab-Manual	Grab-Manual	Grab-Manual
Location Type			CB	CB	Inline	CB	CB
Analyte	Unit	CSL/2LAET	Result	Result	Result	Result	Result
Solids, Total	%		56.24	72.6	41.46	40.44	56.26
Total Organic Carbon	%		3.45 J	4.47	4.47	13.9	5.35
Arsenic	mg/kg	93	6.28	7.99	5.71 U		8.35 U
Copper	mg/kg	390	169	122	69.3		133
Lead	mg/kg	530	81.6	96.9	15.3		31
Mercury	mg/kg	0.59	0.04358	0.09259	0.02488		0.1325
Zinc	mg/kg	960	513	1,260	206		450
Diesel Range (Silica and Acid Cleaned)	mg/kg	2,000	335	723	162		265
Diesel Range Hydrocarbons	mg/kg	2,000					
Motor Oil (Silica and Acid Cleaned)	mg/kg	2,000	1,660	3,000	897		1350 B
Motor Oil Range	mg/kg	2,000					
Acenaphthene	ug/kg	500	296 U	294 U	60.5 J		95.6 U
Acenaphthylene	ug/kg	1,300	296 U	294 U	98.6 U		28.8 J
Anthracene	ug/kg	960	296 U	96.2 J	89.1 J		83.3 J
Fluorene	ug/kg	540	296 U	85.3 J	82.2 J		56.6 J
Naphthalene	ug/kg	2,100	296 U	103 J	98.6 U		95.6 U
Phenanthrene	ug/kg	1,500	195 J	660	465		422
LPAH	ug/kg	5,200	195 J	945 J	697 J		590.7 J
Benzo(A)anthracene	ug/kg	1,600	296 U	275	122		212
Benzo(A)pyrene	ug/kg	1,600	125 J	351	119		156
Benzo(G,H,I)perylene	ug/kg	720	343	549	172		126
Benzofluoranthenes, Total	ug/kg	3,600	261 J	790	245		423
Chrysene	ug/kg	2,800	279 J	803	286		481
Dibenzo(A,H)anthracene	ug/kg	230	296 U	167 J	62 J		57.4 J
Fluoranthene	ug/kg	2,500	259 J	967	342		494
Indeno(1,2,3-Cd)pyrene	ug/kg	690	135 J	293 J	89 J		74.9 J
Pyrene	ug/kg	3,300	277 J	900	330		435
HPAH	ug/kg	17,000	1,679 J	5,095 J	1,767 J		2,459 J
cPAH	ug/kg	1,000	241 J	562 J	192 J		255 J
Bis(2-ethylhexyl)phthalate	ug/kg	1,900	1,740	9,890	1,310		6,320
Butylbenzylphthalate	ug/kg	900	296 U	48,000 J	48 J		288
Diethylphthalate	ug/kg	1,200	296 U	294 U	99 U		95.6 U
Dimethylphthalate	ug/kg	160	296 U	294 U	293		95.6 U
Di-N-Butylphthalate	ug/kg	1,400	296 U	2,290	35.1 J		269
Di-N-Octylphthalate	ug/kg	6,200	130 J	4620	54.6 J		94.5 J
Aroclor 1016	ug/kg		19.3 U	19.5 U	19.1 U	19.3 U	19.1 U
Aroclor 1221	ug/kg		19.3 U	19.5 U	19.1 U	19.3 U	19.1 U
Aroclor 1232	ug/kg		19.3 U	19.5 U	19.1 U	19.3 U	19.1 U
Aroclor 1242	ug/kg		19.3 U	19.5 U	19.1 U	19.3 U	19.1 U
Aroclor 1248	ug/kg		19.3 U	34.4	19.1 U	145 U	19.1 U
Aroclor 1254	ug/kg		19.5	53 J	19.1 U	574	22.4
Aroclor 1260	ug/kg		39.7 J	67.5 J	19.1 U	217	18.8 J
Polychlorinated Biphenyls	ug/kg	1,000	59.2 J	154.9 J	19.1 U	791	41.2 J
1,2,4-Trichlorobenzene	ug/kg	51	296 U	294 U	98.6 U		95.6 U
1,2-Dichlorobenzene	ug/kg	50	296 U	294 U	98.6 U		95.6 U
1,3-Dichlorobenzene	ug/kg		296 U	294 U	98.6 U		95.6 U
1,4-Dichlorobenzene	ug/kg	110	296 U	294 U	98.6 U		95.6 U
1-Methylnaphthalene	ug/kg		296 U	294 U	98.6 U		95.6 U
2,2'-Oxybis(1-chloropropane)	ug/kg		296 U	294 U	98.6 U		95.6 U
2,4,5-Trichlorophenol	ug/kg		1,480 U	1,470 U	493 U		478 U
2,4,6-Trichlorophenol	ug/kg		1,480 U	1,470 U	493 U		478 U
2,4-Dichlorophenol	ug/kg		1,480 U	1,470 U	493 U		478 U
2,4-Dimethylphenol	ug/kg	29	1480 U	1470 U	493 U		478 U
2,4-Dinitrophenol	ug/kg		2,960 U	2,940 U	986 U		956 U
2,4-Dinitrotoluene	ug/kg		1,480 U	1,470 U	493 U		478 U
2,6-Dinitrotoluene	ug/kg		1,480 U	1,470 U	493 U		478 U
2-Chloronaphthalene	ug/kg		296 U	294 U	98.6 U		95.6 U
2-Chlorophenol	ug/kg		296 U	294 U	98.6 U		95.6 U
2-Methylnaphthalene	ug/kg	670	296 U	294 U	98.6 U		95.6 U
2-Methylphenol	ug/kg	63	296 U	294 U	98.6 U		95.6 U
2-Nitroaniline	ug/kg		1,480 U	1,470 U	493 U		478 U
2-Nitrophenol	ug/kg		296 U	294 U	98.6 U		95.6 U
3,3`-Dichlorobenzidine	ug/kg		1,480 UJ	1,470 UJ	493 UJ		478 UJ
3-Nitroaniline	ug/kg		1,480 U	1,470 U	493 U		478 U
4,6-Dinitro-2-Methylphenol	ug/kg		2,960 U	2,940 U	986 U		956 U
4-Bromophenyl phenyl ether	ug/kg		296 U	294 U	98.6 U		95.6 U
4-Chloro-3-Methylphenol	ug/kg		1,480 U	1,470 U	493 U		478 U
4-Chloroaniline	ug/kg		1,480 U	1,470 U	493 U		478 U
4-Chlorophenyl Phenylether	ug/kg		296 U	294 U	98.6 U		95.6 U
4-Methylphenol	ug/kg	670	296 U	294 U	98.6 U		329
4-Nitroaniline	ug/kg		1,480 U	1,470 U	493 U		478 U
4-Nitrophenol	ug/kg		1,480 U	1,470 U	493 U		478 U
Benzoic acid	ug/kg	650	2,960 U	2,940 U	986 U		956 U
Benzyl alcohol	ug/kg	73	296 U	294 U	98.6 U		95.6 U
bis(2-Chloroethoxy) methane	ug/kg		296 U	294 U	98.6 U		95.6 U
Bis-(2-chloroethyl) ether	ug/kg		296 U	294 U	98.6 U		95.6 U
Carbazole	ug/kg		296 U	294 U	98.6 U		61.6 J
Dibenzofuran	ug/kg	540	296 U	294 U	36.3 J		95.6 U
Hexachlorobenzene	ug/kg	70	296 U	294 U	98.6 U		95.6 U
Hexachlorobutadiene	ug/kg	120	296 U	294 U	98.6 U		95.6 U
Hexachlorocyclopentadiene	ug/kg		1,480 U	1,470 U	493 U		478 U
Hexachloroethane	ug/kg		296 U	294 U	98.6 U		95.6 U
Isophorone	ug/kg		296 U	294 U	98.6 U		95.6 U
Nitrobenzene	ug/kg		296 U	294 U	98.6 U		95.6 U
N-Nitroso-Di-N-Propylamine	ug/kg		296 U	294 U	98.6 U		95.6 U
N-Nitrosodiphenylamine	ug/kg	40	296 U	294 U	98.6 U		95.6 U
Pentachlorophenol	ug/kg	690	1,480 U	1,470 U	493 U		478 U
Phenol	ug/kg	1,200	296 U	172 J	98.6 U		95.6 U
Coarse Sand	%		22.4	10.2	24.6		
Coarse Silt	%						
Fine Gravel	%		0.4	0.7	0.2		
Fine Sand	%		5.6	12.3	5.2		
Gravel	%						
Medium Sand	%		16.6	9.9	13.4		
Very Coarse Sand	%		28.5	9.4	45.2		
Very Fine Sand	%		3.9	13.2	2.5		

Location			CB239	CB240	CB241	CB248	CB260
Sample Date			19 Jun 2017	21 Jul 2016	21 Jul 2016	21 Jul 2016	29 Jun 2016
Sample Name			JRZ-061917-2	CB240-072116	CB241-072116	CB248-072116	CB260-062916
Drainage Type			SD	SD	SD	SD	SD
Sample Method			Grab-Manual	Grab-Manual	Grab-Manual	Grab-Manual	Grab-Manual
Location Type			CB	CB	CB	CB	ODS
Analyte	Unit	CSL/2LAET	Result	Result	Result	Result	Result
Solids, Total	%		55.12	66	36.84	33.79	24.96
Total Organic Carbon	%		6.8	8.04	10.1	12.7	3.36
Arsenic	mg/kg	93	8.6 U	7 U	10 U	10.7	30
Copper	mg/kg	390	145	59.6	336	178	120
Lead	mg/kg	530	60.4	31	121	105	30
Mercury	mg/kg	0.59	0.05487	0.03	0.09	0.41	0.09 U
Zinc	mg/kg	960	559	476	3,520	1,960	677
Diesel Range (Silica and Acid Cleaned)	mg/kg	2,000	180	260	330	580	
Diesel Range Hydrocarbons	mg/kg	2,000		480	510	690	400
Motor Oil (Silica and Acid Cleaned)	mg/kg	2,000	956 B	1,600	1,600	2,500	
Motor Oil Range	mg/kg	2,000		2,600	2,600	3,100	1,600
Acenaphthene	ug/kg	500	96 U	280 U	290 U	300 U	20 U
Acenaphthylene	ug/kg	1,300	96 U	280 U	290 U	300 U	20 U
Anthracene	ug/kg	960	96 U	280 U	290 U	88 J	17 J
Fluorene	ug/kg	540	26.5 J	280 U	130 J	120 J	20 U
Naphthalene	ug/kg	2,100	96 U	280 U	160 J	130 J	13 J
Phenanthrene	ug/kg	1,500	154	270 J	860	880	93
LPAH	ug/kg	5,200	180.5 J	270 J	1,150 J	1,218 J	123 J
Benzo(A)anthracene	ug/kg	1,600	62.4 J	280 U	130 J	240 J	33
Benzo(A)pyrene	ug/kg	1,600	96 U	280 U	170 J	260 J	45
Benzo(G,H,I)perylene	ug/kg	720	90.7 J	260 J	350	380	60
Benzofluoranthenes, Total	ug/kg	3,600	229	180 J	450 J	630	110
Chrysene	ug/kg	2,800	434	210 J	450	530	110
Dibenzo(A,H)anthracene	ug/kg	230	96 U	280 U	290 U	300 U	20 U
Fluoranthene	ug/kg	2,500	220	340	870	960	80
Indeno(1,2,3-Cd)pyrene	ug/kg	690	50 J	280 U	140 J	220 J	30
Pyrene	ug/kg	3,300	260	410	620	740	140
HPAH	ug/kg	17,000	1,346 J	1,400 J	3,180 J	3,960 J	608
cPAH	ug/kg	1,000	106 J	244 J	305 J	434 J	67
Bis(2-ethylhexyl)phthalate	ug/kg	1,900	3,840	11,000	7,700	2,600	6,800
Butylbenzylphthalate	ug/kg	900	355	140 J	640	180 J	59
Diethylphthalate	ug/kg	1,200	96 U	280 U	290 U	300 U	31 U
Dimethylphthalate	ug/kg	160	96 U	280 U	290 U	300 U	20 U
Di-N-Butylphthalate	ug/kg	1,400	80.6 J	85 J	200 J	300 U	110
Di-N-Octylphthalate	ug/kg	6,200	129	280 U	170 J	300 U	660
Aroclor 1016	ug/kg		18.5 U	18 U	18 U	1200 U	19 U
Aroclor 1221	ug/kg		18.5 U	18 U	18 U	1200 U	19 U
Aroclor 1232	ug/kg		18.5 U	18 U	18 U	1200 U	19 U
Aroclor 1242	ug/kg		18.5 U	18 U	18 U	1200 U	19 U
Aroclor 1248	ug/kg		18.5 U	18 U	37 U	1200 U	19 U
Aroclor 1254	ug/kg		16.6 J	44 U	100 J	2500 U	580
Aroclor 1260	ug/kg		13.9 J	270	150	30000	280
Polychlorinated Biphenyls	ug/kg	1,000	30.5 J	270	250 J	30000	860
1,2,4-Trichlorobenzene	ug/kg	51	96 U	280 U	290 U	300 U	20 U
1,2-Dichlorobenzene	ug/kg	50	96 U	280 U	290 U	300 U	20 U
1,3-Dichlorobenzene	ug/kg		96 U	280 U	290 U	300 U	20 U
1,4-Dichlorobenzene	ug/kg	110	96 U	280 U	290 U	300 U	20 U
1-Methylnaphthalene	ug/kg		96 U	280 U	290 U	300 U	20 U
2,2'-Oxybis(1-chloropropane)	ug/kg		96 U	280 U	290 U	300 U	20 U
2,4,5-Trichlorophenol	ug/kg		480 U	1400 U	1400 U	1500 U	98 UJ
2,4,6-Trichlorophenol	ug/kg		480 U	1400 U	1400 U	1500 U	98 UJ
2,4-Dichlorophenol	ug/kg		480 U	1400 U	1400 U	1500 U	98 UJ
2,4-Dimethylphenol	ug/kg	29	480 U	1400 U	1400 U	1500 U	98 UJ
2,4-Dinitrophenol	ug/kg		960 U	2800 U	2900 U	3000 U	200 UJ
2,4-Dinitrotoluene	ug/kg		480 U	1400 U	1400 U	1500 U	98 U
2,6-Dinitrotoluene	ug/kg		480 U	1400 U	1400 U	1500 U	98 U
2-Chloronaphthalene	ug/kg		96 U	280 U	290 U	300 U	20 U
2-Chlorophenol	ug/kg		96 U	280 U	290 U	300 U	20 UJ
2-Methylnaphthalene	ug/kg	670	96 U	280 U	290 U	300 U	20 U
2-Methylphenol	ug/kg	63	96 U	280 U	290 U	300 U	20 UJ
2-Nitroaniline	ug/kg		480 U	1400 U	1400 U	1500 U	98 U
2-Nitrophenol	ug/kg		96 U	280 U	290 U	300 U	20 UJ
3,3`-Dichlorobenzidine	ug/kg		480 UJ	1400 UJ	1400 UJ	1500 UJ	98 UJ
3-Nitroaniline	ug/kg		480 U	1400 U	1400 U	1500 U	98 U
4,6-Dinitro-2-Methylphenol	ug/kg		960 U	2800 U	2900 U	3000 U	200 UJ
4-Bromophenyl phenyl ether	ug/kg		96 U	280 U	290 U	300 U	20 U
4-Chloro-3-Methylphenol	ug/kg		480 U	1400 U	1400 U	1500 U	98 UJ
4-Chloroaniline	ug/kg		480 U	1400 U	1400 U	1500 U	98 U
4-Chlorophenyl Phenylether	ug/kg		96 U	280 U	290 U	300 U	20 U
4-Methylphenol	ug/kg	670	102	280 U	860	370	600 J
4-Nitroaniline	ug/kg		480 U	1400 U	1400 U	1500 U	98 U
4-Nitrophenol	ug/kg		480 U	1400 U	1400 U	1500 U	98 UJ
Benzoic acid	ug/kg	650	960 U	2800 U	1,600 J	1,800 J	200 UJ
Benzyl alcohol	ug/kg	73	96 U	280 U	290 U	300 U	20 UJ
bis(2-Chloroethoxy) methane	ug/kg		96 U	280 U	290 U	300 U	20 U
Bis-(2-chloroethyl) ether	ug/kg		96 U	280 U	290 U	300 U	20 U
Carbazole	ug/kg		37.8 J	280 UJ	290 UJ	300 UJ	24
Dibenzofuran	ug/kg	540	96 U	280 U	140 J	130 J	20 U
Hexachlorobenzene	ug/kg	70	96 U	280 U	290 U	300 U	20 U
Hexachlorobutadiene	ug/kg	120	96 U	280 U	290 U	300 U	20 U
Hexachlorocyclopentadiene	ug/kg		480 U	1,400 U	1,400 U	1,500 U	98 U
Hexachloroethane	ug/kg		96 U	280 U	290 U	300 U	20 U
Isophorone	ug/kg		96 U	280 U	290 U	300 U	20 U
Nitrobenzene	ug/kg		96 U	280 U	290 U	300 U	20 U
N-Nitroso-Di-N-Propylamine	ug/kg		96 U	280 U	290 U	300 U	20 U
N-Nitrosodiphenylamine	ug/kg	40	96 U	280 U	290 U	300 U	20 U
Pentachlorophenol	ug/kg	690	480 U	1,400 U	1,400 U	1,500 U	98 UJ
Phenol	ug/kg	1,200	96 U	180 J	740	440	360 J
Coarse Sand	%			14.6	23.8	23.8	0.6
Coarse Silt	%						
Fine Gravel	%			0.6	1.1	1.8	0.6
Fine Sand	%			2.7	4.4	8.7	2
Gravel	%			10	3.1	2.9	0.1
Medium Sand	%			17	9.9	21.8	1.7
Very Coarse Sand	%			11.4	10.4	8.7	0.4
Very Fine Sand	%			5.3	4.2	8	3

Location			CB271	CB273	CB275	CB279	CB283
Sample Date			29 Jun 2016	13 Jul 2016	29 Jun 2016	25 Aug 2017	18 Aug 2017
Sample Name			CB271-062916	CB273-071316	CB275-062916	EJK082517-5	MKJ-081817-2
Drainage Type			SD	SD	SD	SD	SD
Sample Method						Grab-Manual	Grab-Manual
Location Type			CB	CB	CB	CB	CB
Analyte	Unit	CSL/2LAET	Result	Result	Result	Result	Result
Solids, Total	%		43.74	55.81	63.04	79.19	37.9
Total Organic Carbon	%		8.64	10.3	3.67	2.72	10.6
Arsenic	mg/kg	93	30	7 U	7 U	6.87	8.24
Copper	mg/kg	390	784 J	174	77.4	187	190
Lead	mg/kg	530	176 J	76	34	155	71.4
Mercury	mg/kg	0.59	0.12	0.03	0.03 U	0.07272	0.1621
Zinc	mg/kg	960	1,450	617	420	592	2,180
Diesel Range (Silica and Acid Cleaned)	mg/kg	2,000				1,220	3,580
Diesel Range Hydrocarbons	mg/kg	2,000	79	6,000	340		
Motor Oil (Silica and Acid Cleaned)	mg/kg	2,000				3,400	11,400
Motor Oil Range	mg/kg	2,000	690	22,000	1,800		
Acenaphthene	ug/kg	500	78 J	450 U	98 U	296 U	293 U
Acenaphthylene	ug/kg	1,300	97 U	450 U	98 U	296 U	293 U
Anthracene	ug/kg	960	97	140 J	34 J	296 U	108 J
Fluorene	ug/kg	540	97 U	270 J	59 J	296 U	293 U
Naphthalene	ug/kg	2,100	120	1,600	59 J	296 U	103 J
Phenanthrene	ug/kg	1,500	800	1,100	270	394	568
LPAH	ug/kg	5,200	1,095 J	3,110 J	422 J	394	779 J
Benzo(A)anthracene	ug/kg	1,600	370	520	110	141	207
Benzo(A)pyrene	ug/kg	1,600	420	380 J	170	180 J	226 J
Benzo(G,H,I)perylene	ug/kg	720	630	900 J	170	372	416
Benzofluoranthenes, Total	ug/kg	3,600	1,100	1,100	310	475 J	706
Chrysene	ug/kg	2,800	770	930	310	477	708
Dibenzo(A,H)anthracene	ug/kg	230	83 J	450 U	98 U	296 U	293 U
Fluoranthene	ug/kg	2,500	1,300	790	360	479	891
Indeno(1,2,3-Cd)pyrene	ug/kg	690	370	340 J	98	173 J	180 J
Pyrene	ug/kg	3,300	1,100	1,200	340	632	1,050
HPAH	ug/kg	17,000	6,143 J	6,160 J	1,868	2,929 J	4,384 J
cPAH	ug/kg	1,000	645 J	675 J	245	323 J	401 J
Bis(2-ethylhexyl)phthalate	ug/kg	1,900	3,700	47,000	8,600	14,300	57,100
Butylbenzylphthalate	ug/kg	900	210	1,500	33,000	1,210	1,160
Diethylphthalate	ug/kg	1,200	97 U	450 U	98 U	296 U	293 U
Dimethylphthalate	ug/kg	160	97 U	450 U	49 J	296 U	293 U
Di-N-Butylphthalate	ug/kg	1,400	150	630	810	217 J	293 U
Di-N-Octylphthalate	ug/kg	6,200	97 U	1,200	3,400	4,130	2,040
Aroclor 1016	ug/kg		18 U	19 U	20 U	19 U	19.5 U
Aroclor 1221	ug/kg		18 U	19 U	20 U	19 U	19.5 U
Aroclor 1232	ug/kg		18 U	19 U	20 U	19 U	19.5 U
Aroclor 1242	ug/kg		18 U	19 U	20 U	19 U	19.5 U
Aroclor 1248	ug/kg		230 U	19 U	29 U	19 U	29.2 U
Aroclor 1254	ug/kg		420	47	64	23.9	49
Aroclor 1260	ug/kg		210	20	55 J	40 J	43.6 J
Polychlorinated Biphenyls	ug/kg	1,000	630	20	119 J	63.9 J	92.6 J
1,2,4-Trichlorobenzene	ug/kg	51	97 U	450 U	98 U	296 U	293 U
1,2-Dichlorobenzene	ug/kg	50	97 U	450 U	98 U	296 U	293 U
1,3-Dichlorobenzene	ug/kg		97 U	450 U	98 U	296 U	293 U
1,4-Dichlorobenzene	ug/kg	110	97 U	450 U	98 U	296 U	293 U
1-Methylnaphthalene	ug/kg		97 U	1,800	98 U	296 U	293 U
2,2'-Oxybis(1-chloropropane)	ug/kg		97 U	450 U	98 U	296 U	293 U
2,4,5-Trichlorophenol	ug/kg		490 U	2,300 U	490 U	1,480 U	1,470 U
2,4,6-Trichlorophenol	ug/kg		490 U	2,300 U	490 U	1,480 U	1,470 U
2,4-Dichlorophenol	ug/kg		490 U	2,300 U	490 U	1,480 U	1,470 UJ
2,4-Dimethylphenol	ug/kg	29	490 U	2,300 U	490 U	1,480 U	1,470 U
2,4-Dinitrophenol	ug/kg		970 U	4,500 U	980 U	2,960 U	2,930 U
2,4-Dinitrotoluene	ug/kg		490 U	2,300 U	490 U	1,480 U	1,470 U
2,6-Dinitrotoluene	ug/kg		490 U	2,300 U	490 U	1,480 U	1,470 U
2-Chloronaphthalene	ug/kg		97 U	450 U	98 U	296 U	293 U
2-Chlorophenol	ug/kg		97 U	450 U	98 U	296 U	293 U
2-Methylnaphthalene	ug/kg	670	53 J	3,700	64 J	296 U	293 U
2-Methylphenol	ug/kg	63	120	450 U	98 U	296 U	293 U
2-Nitroaniline	ug/kg		490 U	2,300 U	490 U	1,480 U	1,470 U
2-Nitrophenol	ug/kg		97 U	450 U	98 U	296 U	293 U
3,3`-Dichlorobenzidine	ug/kg		490 UJ	2,300 U	490 UJ	1,480 UJ	1,470 U
3-Nitroaniline	ug/kg		490 U	2,300 U	490 U	1,480 U	1,470 U
4,6-Dinitro-2-Methylphenol	ug/kg		970 U	4,500 U	980 U	2,960 U	2,930 U
4-Bromophenyl phenyl ether	ug/kg		97 U	450 U	98 U	296 U	293 U
4-Chloro-3-Methylphenol	ug/kg		490 U	2,300 U	490 U	1,480 U	1,470 U
4-Chloroaniline	ug/kg		490 U	2,300 U	490 U	1,480 U	1,470 U
4-Chlorophenyl Phenylether	ug/kg		97 U	450 U	98 U	296 U	293 U
4-Methylphenol	ug/kg	670	320	1,400	150	296 U	18,900
4-Nitroaniline	ug/kg		490 U	2,300 U	490 U	1,480 U	1,470 U
4-Nitrophenol	ug/kg		490 U	2,300 U	490 U	1,480 U	1,470 U
Benzoic acid	ug/kg	650	1,200	4,500 UJ	980 U	1,130 J	1,260 J
Benzyl alcohol	ug/kg	73	97 U	2,000	5,600	296 U	5,290
bis(2-Chloroethoxy) methane	ug/kg		97 U	450 U	98 U	296 U	293 U
Bis-(2-chloroethyl) ether	ug/kg		97 U	450 U	98 U	296 U	1,110
Carbazole	ug/kg		150	450 U	98 U	296 U	293 U
Dibenzofuran	ug/kg	540	78 J	450 U	98 U	296 U	293 U
Hexachlorobenzene	ug/kg	70	97 U	450 U	98 U	296 U	293 U
Hexachlorobutadiene	ug/kg	120	97 U	450 U	98 U	296 U	293 U
Hexachlorocyclopentadiene	ug/kg		490 U	2,300 U	490 U	1,480 U	1,470 U
Hexachloroethane	ug/kg		97 U	450 U	98 U	296 U	293 U
Isophorone	ug/kg		97 U	450 U	98 U	296 U	293 U
Nitrobenzene	ug/kg		97 U	450 U	98 U	296 U	293 U
N-Nitroso-Di-N-Propylamine	ug/kg		97 U	450 U	98 U	296 U	293 U
N-Nitrosodiphenylamine	ug/kg	40	97 U	540	98 U	296 U	293 U
Pentachlorophenol	ug/kg	690	490 U	2,300 U	490 U	1,480 U	1,470 U
Phenol	ug/kg	1,200	430	630	98 U	296 U	312
Coarse Sand	%		12.5	1.2	6.3	24	7.7
Coarse Silt	%						
Fine Gravel	%		1.4	1.5	0.1	0.4	1.1
Fine Sand	%		9.5	2.9	5.3	15	4.5
Gravel	%		2	0.6	1.8		
Medium Sand	%		18.4	2.5	5.7	28.2	9
Very Coarse Sand	%		4.8	1	5.3	7.9	7.4
Very Fine Sand	%		8	3.9	5.1	7.5	11.7

Location			CB284	CB285	CB286	CB293	CB297
Sample Date			18 Aug 2017	25 Jul 2017	07 Jul 2017	07 Jul 2017	07 Jul 2017
Sample Name			MKJ-081817-1	CEW-072517-1	MKJ-070717-1	MKJ-070717-3	MKJ-070717-4
Drainage Type			SD	SD	SD	SD	SD
Sample Method			Grab-Manual	Grab-Manual	Grab-Manual	Grab-Manual	Grab-Manual
Location Type			CB	CB	CB	CB	CB
Analyte	Unit	CSL/2LAET	Result	Result	Result	Result	Result
Solids, Total	%		46.73	55.34	46.45	66.77	51.82
Total Organic Carbon	%		5.89	5.65	7.66 J	6.89	6.16
Arsenic	mg/kg	93	8.02	8.81 U	10.7	17.4 U	23.2 U
Copper	mg/kg	390	426	200	236	209	309
Lead	mg/kg	530	122	84.4	193	239	350
Mercury	mg/kg	0.59	0.1253	0.1348	0.2896	0.3136	0.2653
Zinc	mg/kg	960	705	868	1,520	1,340	3,080
Diesel Range (Silica and Acid Cleaned)	mg/kg	2,000	2,720		1,060	626	210
Diesel Range Hydrocarbons	mg/kg	2,000		916			
Motor Oil (Silica and Acid Cleaned)	mg/kg	2,000	12,100		6,540	3,260	1,370
Motor Oil Range	mg/kg	2,000		3,490			
Acenaphthene	ug/kg	500	300 U	401 U	290 U	283 U	794
Acenaphthylene	ug/kg	1,300	300 U	401 U	108 J	283 U	292 U
Anthracene	ug/kg	960	300 U	211 J	272 J	105 J	1,500
Fluorene	ug/kg	540	300 U	401 U	107 J	283 U	704
Naphthalene	ug/kg	2,100	300 U	169 J	230 J	149 J	418
Phenanthrene	ug/kg	1,500	474	1,230	729	690	7,710
LPAH	ug/kg	5,200	474	1,610 J	1,446 J	944 J	11,126
Benzo(A)anthracene	ug/kg	1,600	487	283 J	695	338	3,010
Benzo(A)pyrene	ug/kg	1,600	668	315 J	724	388	2,660
Benzo(G,H,I)perylene	ug/kg	720	761	371 J	932	505	2,080
Benzofluoranthenes, Total	ug/kg	3,600	1,380	833	2,130	850	5,440
Chrysene	ug/kg	2,800	1,010	954	1,760	680	4,410
Dibenzo(A,H)anthracene	ug/kg	230	300 U	401 U	239 J	121 J	574
Fluoranthene	ug/kg	2,500	891	1,640	1,810	961	7,920
Indeno(1,2,3-Cd)pyrene	ug/kg	690	507	186 J	623	313	1,740
Pyrene	ug/kg	3,300	1,110	2,320	2,020	855	7,010
HPAH	ug/kg	17,000	6,814	6,902 J	10,933 J	5,011 J	34,844
cPAH	ug/kg	1,000	976	535 J	1,182 J	593 J	3,953
Bis(2-ethylhexyl)phthalate	ug/kg	1,900	24,900	39,100	19,300	4,920	15,300
Butylbenzylphthalate	ug/kg	900	866	1,160	571	293	1,780
Diethylphthalate	ug/kg	1,200	300 U	401 U	290 U	283 U	292 U
Dimethylphthalate	ug/kg	160	300 U	139 J	290 U	283 U	292 U
Di-N-Butylphthalate	ug/kg	1,400	200 J	369 J	215 J	273 J	387
Di-N-Octylphthalate	ug/kg	6,200	1,550	1,240	1,570	213 J	790
Aroclor 1016	ug/kg		19.1 U	19 U	19.4 U	18.8 U	19.3 U
Aroclor 1221	ug/kg		19.1 U	19 U	19.4 U	18.8 U	19.3 U
Aroclor 1232	ug/kg		19.1 U	19 U	19.4 U	18.8 U	19.3 U
Aroclor 1242	ug/kg		19.1 U	19 U	19.4 U	18.8 U	19.3 U
Aroclor 1248	ug/kg		19.1 U	41.8	229	227	174
Aroclor 1254	ug/kg		34.6	76.3	716	425	512
Aroclor 1260	ug/kg		43.9 J	97.2 J	647	540	533
Polychlorinated Biphenyls	ug/kg	1,000	78.5 J	215.3 J	1,592	1,192	1,219
1,2,4-Trichlorobenzene	ug/kg	51	300 U	401 U	290 U	283 U	292 U
1,2-Dichlorobenzene	ug/kg	50	300 U	401 U	290 U	283 U	292 U
1,3-Dichlorobenzene	ug/kg		300 U	401 U	290 U	283 U	292 U
1,4-Dichlorobenzene	ug/kg	110	300 U	401 U	290 U	283 U	292 U
1-Methylnaphthalene	ug/kg		300 U	401 U	109 J	283 U	108 J
2,2'-Oxybis(1-chloropropane)	ug/kg		300 U	401 U	290 U	283 U	292 U
2,4,5-Trichlorophenol	ug/kg		1,500 U	2,000 U	1,450 U	1,420 U	1,460 U
2,4,6-Trichlorophenol	ug/kg		1,500 U	2,000 U	1,450 U	1,420 U	1,460 U
2,4-Dichlorophenol	ug/kg		1,500 UJ	2,000 U	1,450 U	1,420 U	1,460 U
2,4-Dimethylphenol	ug/kg	29	1,500 U	2,000 U	1,450 U	1,420 U	1,460 U
2,4-Dinitrophenol	ug/kg		3,000 U	4,010 U	2,900 U	2,830 U	2,920 U
2,4-Dinitrotoluene	ug/kg		1,500 U	2,000 U	1,450 U	1,420 U	1,460 U
2,6-Dinitrotoluene	ug/kg		1,500 U	2,000 U	1,450 U	1,420 U	1,460 U
2-Chloronaphthalene	ug/kg		300 U	401 U	290 U	283 U	292 U
2-Chlorophenol	ug/kg		300 U	401 U	290 U	283 U	292 U
2-Methylnaphthalene	ug/kg	670	300 U	132 J	290 U	283 U	167 J
2-Methylphenol	ug/kg	63	300 U	401 U	290 U	283 U	292 U
2-Nitroaniline	ug/kg		1,500 U	2,000 U	1,450 U	1,420 U	1,460 U
2-Nitrophenol	ug/kg		300 U	401 U	290 U	283 U	292 U
3,3`-Dichlorobenzidine	ug/kg		1,500 U	2,000 UJ	1,450 U	1,420 U	1,460 U
3-Nitroaniline	ug/kg		1,500 U	2,000 U	1,450 U	1,420 U	1,460 U
4,6-Dinitro-2-Methylphenol	ug/kg		3,000 U	4,010 U	2,900 U	2,830 U	2,920 U
4-Bromophenyl phenyl ether	ug/kg		300 U	401 U	290 U	283 U	292 U
4-Chloro-3-Methylphenol	ug/kg		1,500 U	2,000 U	1,450 U	1,420 U	1,460 U
4-Chloroaniline	ug/kg		1,500 U	2,000 UJ	1,450 U	1,420 U	1,460 U
4-Chlorophenyl Phenylether	ug/kg		300 U	401 U	290 U	283 U	292 U
4-Methylphenol	ug/kg	670	1,130	329 J	1,040	1,010	292 U
4-Nitroaniline	ug/kg		1,500 U	2,000 UJ	1,450 U	1,420 U	1,460 U
4-Nitrophenol	ug/kg		1,500 U	2,000 U	1,450 U	1,420 U	1,460 U
Benzoic acid	ug/kg	650	3,000 U	4,010 U	1,720 J	2,830 U	2,920 U
Benzyl alcohol	ug/kg	73	1,580	401 U	290 U	283 U	292 U
bis(2-Chloroethoxy) methane	ug/kg		300 U	401 U	290 U	283 U	292 U
Bis-(2-chloroethyl) ether	ug/kg		300 U	401 U	290 U	283 U	292 U
Carbazole	ug/kg		300 U	401 U	116 J	110 J	841
Dibenzofuran	ug/kg	540	300 U	401 U	85 J	283 U	370
Hexachlorobenzene	ug/kg	70	300 U	401 U	290 U	283 U	292 U
Hexachlorobutadiene	ug/kg	120	300 U	401 U	290 U	283 U	292 U
Hexachlorocyclopentadiene	ug/kg		1,500 U	2,000 U	1,450 UJ	1,420 UJ	1,460 UJ
Hexachloroethane	ug/kg		300 U	401 U	290 U	283 U	292 U
Isophorone	ug/kg		300 U	401 U	290 U	283 U	292 U
Nitrobenzene	ug/kg		300 U	401 U	290 U	283 U	292 U
N-Nitroso-Di-N-Propylamine	ug/kg		300 U	401 U	290 U	283 U	292 U
N-Nitrosodiphenylamine	ug/kg	40	300 U	401 U	290 U	283 U	292 U
Pentachlorophenol	ug/kg	690	1,500 U	2,000 U	1,450 U	1,420 U	1,460 U
Phenol	ug/kg	1,200	521	401 UJ	313	286	292 U
Coarse Sand	%		12.1	11.2	9.9	5.8	12.9
Coarse Silt	%						
Fine Gravel	%		0.7	0.3	0.6	0.4	0.8
Fine Sand	%		7	19.9	18.4	6.3	35.3
Gravel	%						
Medium Sand	%		14.5	14.1	11.5	7.8	13.5
Very Coarse Sand	%		9.3	6.8	6.4	5.6	8.2
Very Fine Sand	%		9.6	21.1	13.6	20.6	7.1

Location			CB298	CB299	CB300	CB301	CB302
Sample Date			08 Jul 2017	12 Oct 2017	12 Oct 2017	12 Oct 2017	12 Oct 2017
Sample Name			MKJ-070717-5	MKJ-101217-1	MKJ-101217-2	MKJ-101217-4	MKJ-101217-6
Drainage Type			SD	SD	SD	SD	SD
Sample Method			Grab-Manual	Grab-Manual	Grab-Manual	Grab-Manual	Grab-Manual
Location Type			CB	CB	CB	CB	CB
Analyte	Unit	CSL/2LAET	Result	Result	Result	Result	Result
Solids, Total	%		86.27	43.27	48.73	44.63	53.85
Total Organic Carbon	%		3.54	5.46	8.23	5.31 J	3.37 J
Arsenic	mg/kg	93	14.2 U	11.3 U	24.2 U	6.73	8.68 U
Copper	mg/kg	390	379	276	380	169	110
Lead	mg/kg	530	201	122	214	151 J	74.7 J
Mercury	mg/kg	0.59	0.2042	0.251	0.784	0.106	0.0844
Zinc	mg/kg	960	947	767	689	737	484
Diesel Range (Silica and Acid Cleaned)	mg/kg	2,000	193	833	1490	1690	1940
Diesel Range Hydrocarbons	mg/kg	2,000					
Motor Oil (Silica and Acid Cleaned)	mg/kg	2,000	1,310	3,730	4,530	8,420	8,440
Motor Oil Range	mg/kg	2,000					
Acenaphthene	ug/kg	500	97.1 U	446 U	96.4 U	104 J	115 J
Acenaphthylene	ug/kg	1,300	97.1 U	446 U	96.4 U	293 U	149 U
Anthracene	ug/kg	960	42.1 J	446 U	96.4 U	166 J	263
Fluorene	ug/kg	540	97.1 U	446 U	96.4 U	169 J	218
Naphthalene	ug/kg	2,100	49.2 J	121 J	63.6 J	122 J	137 J
Phenanthrene	ug/kg	1,500	215	276 J	129	1,720	1,720
LPAH	ug/kg	5,200	306 J	397 J	192.6 J	2,281 J	2,453 J
Benzo(A)anthracene	ug/kg	1,600	116	159	71.6	609	687
Benzo(A)pyrene	ug/kg	1,600	150	164 J	104	806	831
Benzo(G,H,I)perylene	ug/kg	720	268	316 J	272	1,070	918
Benzofluoranthenes, Total	ug/kg	3,600	388	369 J	186 J	1,610	1,510
Chrysene	ug/kg	2,800	265	321 J	154	1,390	1,560
Dibenzo(A,H)anthracene	ug/kg	230	31.9 J	446 U	57.4 J	275 J	209
Fluoranthene	ug/kg	2,500	313	335 J	135	2,090	2,280
Indeno(1,2,3-Cd)pyrene	ug/kg	690	140	446 U	136	782	667
Pyrene	ug/kg	3,300	310	472	213	2,550	2,680
HPAH	ug/kg	17,000	1,982 J	2,136 J	1329 J	11,182 J	11,342
cPAH	ug/kg	1,000	230 J	332 J	168 J	1,230 J	1,217
Bis(2-ethylhexyl)phthalate	ug/kg	1,900	2,200	9,550	1740	15,500	17,500
Butylbenzylphthalate	ug/kg	900	463	446 U	175	333	674
Diethylphthalate	ug/kg	1,200	97.1 U	446 U	96.4 U	293 U	149 U
Dimethylphthalate	ug/kg	160	74.3 J	234 J	375	293 U	149 U
Di-N-Butylphthalate	ug/kg	1,400	277	157 J	435	371	80.1 J
Di-N-Octylphthalate	ug/kg	6,200	97.1 U	446 U	96.4 U	1410	149 U
Aroclor 1016	ug/kg		19.2 U	19.8 U	18.5 U	18.8 UJ	19.1 U
Aroclor 1221	ug/kg		19.2 U	19.8 U	18.5 U	18.8 UJ	19.1 U
Aroclor 1232	ug/kg		19.2 U	19.8 U	18.5 U	18.8 UJ	19.1 U
Aroclor 1242	ug/kg		19.2 U	19.8 U	18.5 U	18.8 UJ	19.1 U
Aroclor 1248	ug/kg		217	23.1	18.5 U	35.3 J	19.1 U
Aroclor 1254	ug/kg		516	47.4	55.8	67.8 J	243 J
Aroclor 1260	ug/kg		517	65.6	109	80.5 J	3,910 J
Polychlorinated Biphenyls	ug/kg	1,000	1,250	136.1	164.8	183.6 J	4,153 J
1,2,4-Trichlorobenzene	ug/kg	51	97.1 U	446 U	96.4 U	293 U	149 U
1,2-Dichlorobenzene	ug/kg	50	97.1 U	446 U	96.4 U	293 U	149 U
1,3-Dichlorobenzene	ug/kg		97.1 U	446 U	96.4 U	293 U	149 U
1,4-Dichlorobenzene	ug/kg	110	97.1 U	446 U	96.4 U	293 U	149 U
1-Methylnaphthalene	ug/kg		97.1 U	446 U	35.9 J	293 U	132 J
2,2'-Oxybis(1-chloropropane)	ug/kg		97.1 U	446 U	96.4 U	293 U	149 U
2,4,5-Trichlorophenol	ug/kg		485 U	2,230 U	482 U	1470 U	744 U
2,4,6-Trichlorophenol	ug/kg		485 U	2,230 U	482 U	1470 U	744 U
2,4-Dichlorophenol	ug/kg		485 U	2,230 U	482 U	1470 U	744 U
2,4-Dimethylphenol	ug/kg	29	485 U	2,230 U	482 U	1,470 U	744 U
2,4-Dinitrophenol	ug/kg		971 U	4,460 U	964 U	2,930 U	1,490 U
2,4-Dinitrotoluene	ug/kg		485 U	2,230 U	482 U	1,470 U	744 U
2,6-Dinitrotoluene	ug/kg		485 U	2,230 U	482 U	1,470 U	744 U
2-Chloronaphthalene	ug/kg		97.1 U	446 U	96.4 U	293 U	149 U
2-Chlorophenol	ug/kg		97.1 U	446 U	96.4 U	293 U	149 U
2-Methylnaphthalene	ug/kg	670	97.1 U	446 U	81.7 J	293 U	256
2-Methylphenol	ug/kg	63	97.1 U	446 U	96.4 U	293 U	149 U
2-Nitroaniline	ug/kg		485 U	2230 U	482 U	1,470 U	744 U
2-Nitrophenol	ug/kg		97.1 U	446 U	96 U	293 U	149 U
3,3`-Dichlorobenzidine	ug/kg		485 U	2230 U	482 U	1,470 U	744 U
3-Nitroaniline	ug/kg		485 U	2230 U	482 U	1,470 U	744 U
4,6-Dinitro-2-Methylphenol	ug/kg		971 U	4460 U	964 U	2,930 U	1,490 U
4-Bromophenyl phenyl ether	ug/kg		97.1 U	446 U	96 U	293 U	149 U
4-Chloro-3-Methylphenol	ug/kg		485 U	2230 U	482 U	1,470 U	744 U
4-Chloroaniline	ug/kg		485 U	2230 U	482 U	1,470 U	744 U
4-Chlorophenyl Phenylether	ug/kg		97.1 U	446 U	96 U	293 U	149 U
4-Methylphenol	ug/kg	670	97.1 U	377 J	96 U	560	257
4-Nitroaniline	ug/kg		485 U	2230 U	482 U	1,470 U	744 U
4-Nitrophenol	ug/kg		485 U	2230 U	482 U	1,470 U	744 U
Benzoic acid	ug/kg	650	564 J	4,460 U	646 J	1,170 J	818 J
Benzyl alcohol	ug/kg	73	97.1 U	446 U	96 U	293 U	149 U
bis(2-Chloroethoxy) methane	ug/kg		97.1 U	446 U	96 U	293 U	149 U
Bis-(2-chloroethyl) ether	ug/kg		97.1 U	446 U	96 U	293 U	149 U
Carbazole	ug/kg		97.1 U	446 U	96 U	309	295
Dibenzofuran	ug/kg	540	97.1 U	446 U	23 J	293 U	149 U
Hexachlorobenzene	ug/kg	70	97.1 U	446 U	96 U	293 U	149 U
Hexachlorobutadiene	ug/kg	120	97.1 U	446 U	96 U	293 U	149 U
Hexachlorocyclopentadiene	ug/kg		485 UJ	2230 U	482 U	1,470 U	744 U
Hexachloroethane	ug/kg		97.1 U	446 U	96 U	293 U	149 U
Isophorone	ug/kg		97.1 U	446 U	96 U	293 U	149 U
Nitrobenzene	ug/kg		97.1 U	446 U	96 U	293 U	149 U
N-Nitroso-Di-N-Propylamine	ug/kg		97.1 U	446 U	96 U	293 U	149 U
N-Nitrosodiphenylamine	ug/kg	40	97.1 U	446 U	96 U	293 U	149 U
Pentachlorophenol	ug/kg	690	485 U	2230 U	482 U	1,470 U	744 U
Phenol	ug/kg	1,200	58 J	446 U	87.8 J	154 J	135 J
Coarse Sand	%		15.8	8.6	21.5	9	16.7
Coarse Silt	%						
Fine Gravel	%		2	0.5	1	0.4	2
Fine Sand	%		11	14.1	10.6	8.8	6.9
Gravel	%						
Medium Sand	%		19.3	13.2	25	14.4	17.8
Very Coarse Sand	%		16.5	5.4	11.8	7	14
Very Fine Sand	%		10.3	16.7	6.3	14.7	7.6

Location			CB303	CB306	CB311	CB312	CB313
Sample Date			12 Oct 2017	11 Oct 2017	29 Jun 2016	18 Aug 2016	18 Aug 2016
Sample Name			MKJ-101217-7	CEW-101117-01	CB274-062916	MKJ-081816-1	MKJ-081816-2 TJ
Drainage Type			SD	SD	SD	SD	SD
Sample Method			Grab-Manual	Grab-Manual		Grab-Manual	Grab-Manual
Location Type			CB	CB	CB	CB	CB
Analyte	Unit	CSL/2LAET	Result	Result	Result	Result	Result
Solids, Total	%		33.8	30.43	50.88	36.48	45.5
Total Organic Carbon	%		10.5 J	18.4	6.7	18.2	10.4
Arsenic	mg/kg	93	8.63	17.8	10 U	15.8	11.2 J
Copper	mg/kg	390	168	301	116	203	204
Lead	mg/kg	530	181 J	296	59	120	129
Mercury	mg/kg	0.59	0.161	0.202	0.04 U	0.4505	0.1844
Zinc	mg/kg	960	1100	1990	845	2,890	2,060
Diesel Range (Silica and Acid Cleaned)	mg/kg	2,000	4160	1220		726	458
Diesel Range Hydrocarbons	mg/kg	2,000			1,000	1,780 J	1,390
Motor Oil (Silica and Acid Cleaned)	mg/kg	2,000	11,800	6,520		3,530	3,090
Motor Oil Range	mg/kg	2,000			4,500	5,740 J	5,820
Acenaphthene	ug/kg	500	149 U	934	97 U	193 U	69.3 J
Acenaphthylene	ug/kg	1,300	112 J	744 U	97 U	193 U	56.9 J
Anthracene	ug/kg	960	301	1,880	97 U	193 U	59.4 J
Fluorene	ug/kg	540	333	775	97 U	193 UJ	82.5 J
Naphthalene	ug/kg	2,100	312	371 J	68 J	345	280
Phenanthrene	ug/kg	1,500	2,060	6,670	300	375	397
LPAH	ug/kg	5,200	3,118 J	10,630 J	368 J	720 J	1,082 J
Benzo(A)anthracene	ug/kg	1,600	993	4,610	140	134 J	157 J
Benzo(A)pyrene	ug/kg	1,600	1,050	5,490	160	152 J	179 J
Benzo(G,H,I)perylene	ug/kg	720	1,040	3,700	330	343	394
Benzofluoranthenes, Total	ug/kg	3,600	2,070	10,200	430	350 J	463
Chrysene	ug/kg	2,800	2,020	7,830	420	438	495
Dibenzo(A,H)anthracene	ug/kg	230	264	1,220	97 U	193 U	195 U
Fluoranthene	ug/kg	2,500	2,730	10,100	380	435	496
Indeno(1,2,3-Cd)pyrene	ug/kg	690	561	3,460	83 J	125 J	158 J
Pyrene	ug/kg	3,300	3,330	9,310	560	531	582
HPAH	ug/kg	17,000	14,058	55,920	2,503 J	2,508 J	3966 J
cPAH	ug/kg	1,000	1,538	7,883	249 J	256 J	301 J
Bis(2-ethylhexyl)phthalate	ug/kg	1,900	52,700	7,930	9,500 J	112,000	
Butylbenzylphthalate	ug/kg	900	927	744 U	230	470	325
Diethylphthalate	ug/kg	1,200	149 U	744 U	97 U	193 U	195 U
Dimethylphthalate	ug/kg	160	149 U	744 U	97 U	1,100	195 U
Di-N-Butylphthalate	ug/kg	1,400	657	744 U	73 J	203	106 J
Di-N-Octylphthalate	ug/kg	6,200	5500	744 U	97 U	1,280	1510
Aroclor 1016	ug/kg		19.9 U	98.8 U	18 U	19.4 U	19.6 U
Aroclor 1221	ug/kg		19.9 U	98.8 U	18 U	19.4 U	19.6 U
Aroclor 1232	ug/kg		19.9 U	98.8 U	18 U	19.4 U	19.6 U
Aroclor 1242	ug/kg		19.9 U	98.8 U	18 U	19.4 U	29.4 U
Aroclor 1248	ug/kg		93.6	98.8 U	27 U	97 U	19.6 U
Aroclor 1254	ug/kg		114	1560	100	3,000	83.6
Aroclor 1260	ug/kg		72.4	734	120 J	341	39.3 U
Polychlorinated Biphenyls	ug/kg	1,000	280	2294	220 J	3,341	83.6
1,2,4-Trichlorobenzene	ug/kg	51	149 U	744 U	97 U	193 U	195 U
1,2-Dichlorobenzene	ug/kg	50	149 U	744 U	97 U	193 U	195 U
1,3-Dichlorobenzene	ug/kg		149 U	744 U	97 U	193 U	195 U
1,4-Dichlorobenzene	ug/kg	110	149 U	744 U	97 U	193 U	195 U
1-Methylnaphthalene	ug/kg		206	744 U	97 U	193 U	195 U
2,2'-Oxybis(1-chloropropane)	ug/kg		149 U	744 U	97 U	193 U	195 U
2,4,5-Trichlorophenol	ug/kg		746 U	3,720 U	490 U	966 U	975 U
2,4,6-Trichlorophenol	ug/kg		746 U	3,720 U	490 U	966 U	975 U
2,4-Dichlorophenol	ug/kg		746 U	3,720 U	490 U	966 U	975 U
2,4-Dimethylphenol	ug/kg	29	746 U	3,720 U	490 U	966 U	975 U
2,4-Dinitrophenol	ug/kg		1,490 U	7,440 U	970 U	1,930 U	1950 U
2,4-Dinitrotoluene	ug/kg		746 U	3,720 U	490 U	966 U	975 U
2,6-Dinitrotoluene	ug/kg		746 U	3,720 U	490 U	966 U	975 U
2-Chloronaphthalene	ug/kg		149 U	744 U	97 U	193 U	195 U
2-Chlorophenol	ug/kg		149 U	744 U	97 U	193 U	195 U
2-Methylnaphthalene	ug/kg	670	325	744 U	97 U	193 U	69.9 J
2-Methylphenol	ug/kg	63	149 U	744 U	97 U	193 U	195 U
2-Nitroaniline	ug/kg		746 U	3,720 U	490 U	966 U	975 U
2-Nitrophenol	ug/kg		149 U	744 U	97 U	193 U	195 U
3,3`-Dichlorobenzidine	ug/kg		746 U	3,720 U	490 UJ	966 U	975 U
3-Nitroaniline	ug/kg		746 U	3,720 U	490 U	966 U	975 U
4,6-Dinitro-2-Methylphenol	ug/kg		1,490 U	7,440 U	970 U	1,930 U	1,950 U
4-Bromophenyl phenyl ether	ug/kg		149 U	744 U	97 U	193 U	195 U
4-Chloro-3-Methylphenol	ug/kg		746 U	3,720 U	490 U	966 U	975 U
4-Chloroaniline	ug/kg		746 U	3,720 U	490 U	966 U	975 U
4-Chlorophenyl Phenylether	ug/kg		149 U	744 U	97 U	193 UJ	195 UJ
4-Methylphenol	ug/kg	670	1,420	744 U	1,500	1,570	217
4-Nitroaniline	ug/kg		746 U	3,720 U	490 U	966 U	975 U
4-Nitrophenol	ug/kg		746 U	3,720 U	490 U	966 U	975 U
Benzoic acid	ug/kg	650	1,680	7,440 U	480 J	4,890	1710 J
Benzyl alcohol	ug/kg	73	1,810	744 U	97 U	4,940	15,100
bis(2-Chloroethoxy) methane	ug/kg		149 U	744 U	97 U	193 U	195 U
Bis-(2-chloroethyl) ether	ug/kg		149 U	744 U	97 U	193 U	195 U
Carbazole	ug/kg		313	771	97 U	82 J	195 U
Dibenzofuran	ug/kg	540	149 U	356 J	44 J	193 U	82.7 J
Hexachlorobenzene	ug/kg	70	149 U	744 U	97 U	193 UJ	195 UJ
Hexachlorobutadiene	ug/kg	120	149 U	744 U	97 U	193 U	195 U
Hexachlorocyclopentadiene	ug/kg		746 U	3,720 U	490 U	966 UJ	975 UJ
Hexachloroethane	ug/kg		149 U	744 U	97 U	193 U	195 U
Isophorone	ug/kg		149 U	744 U	97 U	193 U	195 U
Nitrobenzene	ug/kg		149 U	744 U	97 U	193 U	195 U
N-Nitroso-Di-N-Propylamine	ug/kg		149 U	744 U	97 U	193 U	195 U
N-Nitrosodiphenylamine	ug/kg	40	149 U	744 U	97 U	193 U	195 U
Pentachlorophenol	ug/kg	690	746 U	3,720 U	490 U	966 U	975 U
Phenol	ug/kg	1,200	283	744 U	140	425	389
Coarse Sand	%		9.2	9.7	4.7	10.9	5.6
Coarse Silt	%					1.7	9
Fine Gravel	%		0.2	2.2	1.6	2.4	2.3
Fine Sand	%		15.5	5.7	7.5	19.1	7.7
Gravel	%				2		
Medium Sand	%		12.9	8.9	6.5	12	10
Very Coarse Sand	%		6.5	13.7	4.1	3.7	1.7
Very Fine Sand	%		14.4	11.5	4.6	2.8	4.9

Location			CB314	CB315	CB317	CB319	CB320
Sample Date			01 Sep 2016	01 Sep 2016	30 Sep 2016	07 Nov 2016	07 Nov 2016
Sample Name			M-NCH-090116-1	TJM-NCH-090116-2	CEW-093016-4	CEW-110716-2	CEW-110716-1
Drainage Type			SD	SD	SD	SD	SD
Sample Method			Grab-Manual	Grab-Manual	Grab-Manual	Grab-Manual	Grab-Manual
Location Type			CB	CB	CB	CB	CB
Analyte	Unit	CSL/2LAET	Result	Result	Result	Result	Result
Solids, Total	%		69.11	25.43	79.85	54.45	55.21
Total Organic Carbon	%		3.83	18.2	2.25	4.33	7.02
Arsenic	mg/kg	93	14	13	9.82	8.5 U	8.59 U
Copper	mg/kg	390	129	626	65.1	129	196
Lead	mg/kg	530	83	286	21.2	66.9	217
Mercury	mg/kg	0.59	0.05062	0.18	0.0222 U	0.1579	0.2033
Zinc	mg/kg	960	8,620	1,480	263	3,440	2,670
Diesel Range (Silica and Acid Cleaned)	mg/kg	2,000					
Diesel Range Hydrocarbons	mg/kg	2,000	865		82.2	1,570	1,320
Motor Oil (Silica and Acid Cleaned)	mg/kg	2,000					
Motor Oil Range	mg/kg	2,000	2,160		629	5,660	5,660
Acenaphthene	ug/kg	500	44.5 J	864	91.3 U	177 U	170 U
Acenaphthylene	ug/kg	1,300	17.5 J	470 U	91.3 U	177 U	62.3 J
Anthracene	ug/kg	960	53.1 J	233 J	91.3 U	177 U	170 U
Fluorene	ug/kg	540	68.5	2,880	91.3 U	177 U	50 J
Naphthalene	ug/kg	2,100	109	18,500	91.3 U	65.1 J	174
Phenanthrene	ug/kg	1,500	252	1,510	67.4 J	209	418
LPAH	ug/kg	5,200	545 J	23,987 J	67 J	274 J	704 J
Benzo(A)anthracene	ug/kg	1,600	112	537	29.5 J	88.9 J	162 J
Benzo(A)pyrene	ug/kg	1,600	117	490	38.6 J	130 J	193
Benzo(G,H,I)perylene	ug/kg	720	169	1,130	45.6 J	274	404
Benzofluoranthenes, Total	ug/kg	3,600	242	1290	104 J	351 J	562
Chrysene	ug/kg	2,800	290	1420	86.2 J	319	596
Dibenzo(A,H)anthracene	ug/kg	230	42.3 J	470 U	91.3 U	177 U	170 U
Fluoranthene	ug/kg	2,500	228	958	75.6 J	239	452
Indeno(1,2,3-Cd)pyrene	ug/kg	690	85.4	343 J	31.9 J	101 J	173
Pyrene	ug/kg	3,300	374	1670	72.3 J	425	538
HPAH	ug/kg	17,000	1,660 J	7,838 J	484 J	1,928 J	3,080 J
cPAH	ug/kg	1,000	181 J	815 J	74 J	223 J	323 J
Bis(2-ethylhexyl)phthalate	ug/kg	1,900	3,150	170,000	1,130	8,080	8,000
Butylbenzylphthalate	ug/kg	900	709	1,710	165	177 U	369
Diethylphthalate	ug/kg	1,200	57.6 U	470 U	91.3 U	177 U	170 U
Dimethylphthalate	ug/kg	160	54.2 J	470 U	31 J	177 U	170 U
Di-N-Butylphthalate	ug/kg	1,400	76.3	302 J	91.3 U	111 J	90.9 J
Di-N-Octylphthalate	ug/kg	6,200	3220	6,650	73.1 J	236	557
Aroclor 1016	ug/kg		19.2 U	18.8 U	24 U	97.5 U	93.8 U
Aroclor 1221	ug/kg		19.2 U	18.8 U	24 U	97.5 U	93.8 U
Aroclor 1232	ug/kg		19.2 U	18.8 U	24 U	97.5 U	93.8 U
Aroclor 1242	ug/kg		19.2 U	18.8 U	24 U	97.5 U	93.8 U
Aroclor 1248	ug/kg		28.8 U	56.5 U	24 U	146 U	328 U
Aroclor 1254	ug/kg		30.2	56.5 U	24 U	557	2,000
Aroclor 1260	ug/kg		31	94.2 U	24 U	816	1,570
Polychlorinated Biphenyls	ug/kg	1,000	61.2	94.2 U	24 U	1,373	3,570
1,2,4-Trichlorobenzene	ug/kg	51	57.6 U	470 U	91.3 U	177 U	170 U
1,2-Dichlorobenzene	ug/kg	50	57.6 U	470 U	91.3 U	177 U	170 U
1,3-Dichlorobenzene	ug/kg		57.6 U	470 U	91.3 U	177 U	170 U
1,4-Dichlorobenzene	ug/kg	110	57.6 U	470 U	91.3 U	177 U	170 U
1-Methylnaphthalene	ug/kg		33 J	19,400	91.3 U	177 U	53.3 J
2,2'-Oxybis(1-chloropropane)	ug/kg		57.6 U	470 U	91.3 U	177 U	170 U
2,4,5-Trichlorophenol	ug/kg		288 U	2,350 U	457 U	883 U	850 U
2,4,6-Trichlorophenol	ug/kg		288 U	2,350 U	457 U	883 U	850 U
2,4-Dichlorophenol	ug/kg		288 U	2,350 U	457 U	883 U	850 U
2,4-Dimethylphenol	ug/kg	29	288 U	2,350 U	457 U	883 U	850 U
2,4-Dinitrophenol	ug/kg		576 UJ	4,700 UJ	913 UJ	1,770 U	1,700 U
2,4-Dinitrotoluene	ug/kg		288 U	2,350 U	457 U	883 U	850 U
2,6-Dinitrotoluene	ug/kg		288 U	2,350 U	457 U	883 U	850 U
2-Chloronaphthalene	ug/kg		57.6 U	470 U	91.3 U	177 U	170 U
2-Chlorophenol	ug/kg		57.6 U	470 U	91.3 U	177 U	170 U
2-Methylnaphthalene	ug/kg	670	61		91.3 U	177 U	109 J
2-Methylphenol	ug/kg	63	57.6 U	470 U	91.3 U	177 U	170 U
2-Nitroaniline	ug/kg		288 U	2,350 U	457 U	883 U	850 U
2-Nitrophenol	ug/kg		57.6 U	470 U	91.3 U	177 U	170 U
3,3`-Dichlorobenzidine	ug/kg				457 U	883 U	850 U
3-Nitroaniline	ug/kg		288 U	2,350 U	457 U	883 U	850 U
4,6-Dinitro-2-Methylphenol	ug/kg		576 UJ	4,700 UJ	913 UJ	1,770 U	1,700 U
4-Bromophenyl phenyl ether	ug/kg		57.6 U	470 U	91 U	177 U	170 U
4-Chloro-3-Methylphenol	ug/kg		288 U	2,350 U	457 U	883 U	850 U
4-Chloroaniline	ug/kg		288 U	2,350 U	457 U	883 U	850 U
4-Chlorophenyl Phenylether	ug/kg		57.6 U	470 U	91 U	177 U	170 U
4-Methylphenol	ug/kg	670	90.6	470 U	78.6 J	177 U	621
4-Nitroaniline	ug/kg		288 U	2,350 U	457 U	883 U	850 U
4-Nitrophenol	ug/kg		288 U	2,350 U	457 U	883 U	850 U
Benzoic acid	ug/kg	650	1,290	4,700 U	913 UJ	869 J	1,140 J
Benzyl alcohol	ug/kg	73	503	470 U	91 U	177 U	170 U
bis(2-Chloroethoxy) methane	ug/kg		58 UJ	470 UJ	91 U	177 U	170 U
Bis-(2-chloroethyl) ether	ug/kg		57.6 U	470 U	91.3 U	177 U	170 U
Carbazole	ug/kg		25.6 J	470 U	91.3 U	177 U	66.6 J
Dibenzofuran	ug/kg	540	38.6 J	470 U	91.3 U	177 U	59.5 J
Hexachlorobenzene	ug/kg	70	57.6 U	470 U	91.3 U	177 U	170 U
Hexachlorobutadiene	ug/kg	120	57.6 U	470 U	91.3 U	177 U	170 U
Hexachlorocyclopentadiene	ug/kg		288 UJ	2,350 UJ	457 UJ	883 U	850 U
Hexachloroethane	ug/kg		57.6 U	470 U	91.3 UJ	177 U	170 U
Isophorone	ug/kg		57.6 U	470 U	91.3 U	177 U	170 U
Nitrobenzene	ug/kg		57.6 U	470 U	91.3 U	177 U	170 U
N-Nitroso-Di-N-Propylamine	ug/kg		57.6 U	470 U	91.3 U	177 U	170 U
N-Nitrosodiphenylamine	ug/kg	40	81.6	1,780	91.3 U	627	170 U
Pentachlorophenol	ug/kg	690	118 J	2,350 U	457 U	883 U	850 U
Phenol	ug/kg	1,200	267	283 J	91.3 UJ	233	220
Coarse Sand	%		12.7	1.2			
Coarse Silt	%						
Fine Gravel	%		1.1	0.2			
Fine Sand	%		9.1	2.3			
Gravel	%		3.3	0.2			
Medium Sand	%		15.8	1.6			
Very Coarse Sand	%		8.9	0.5			
Very Fine Sand	%		12.2	6			

Location			CB321	MH29	MH33	MH34	ODS11
Sample Date			16 Nov 2016	11 Oct 2017	07 Nov 2017	07 Nov 2017	30 Sep 2016
Sample Name			MKJ-111616-1	CEW-101117-02	CEW-110717-01	CEW-110717-02	CEW-093016-5
Drainage Type			SD	SD	SD	SD	SD
Sample Method			Grab-Manual	Grab-Manual	Grab-Manual	Grab-Manual	Grab-Manual
Location Type			CB	Inline	Inline	Inline	ODS
Analyte	Unit	CSL/2LAET	Result	Result	Result	Result	Result
Solids, Total	%		37.96	47.82	75.74	79.12	85.11
Total Organic Carbon	%		6.91	3.59	2.67	1.05	2.66
Arsenic	mg/kg	93		123	16.3	6.02 U	9.01
Copper	mg/kg	390		179	125	56.2	71
Lead	mg/kg	530		310	181	30.5	58.5
Mercury	mg/kg	0.59		0.199	0.203	0.0434	0.07627
Zinc	mg/kg	960		392	369	234	278
Diesel Range (Silica and Acid Cleaned)	mg/kg	2,000		619	207	108	
Diesel Range Hydrocarbons	mg/kg	2,000					206
Motor Oil (Silica and Acid Cleaned)	mg/kg	2,000		1,490	759	743	
Motor Oil Range	mg/kg	2,000					1,270
Acenaphthene	ug/kg	500		271	98.1 U	37.2 J	22.8
Acenaphthylene	ug/kg	1,300		35.1 J	33.1 J	98.7 U	25
Anthracene	ug/kg	960		341	113	83.2 J	56.6
Fluorene	ug/kg	540		169	25.2 J	42.6 J	30.3
Naphthalene	ug/kg	2,100		110	56.2 J	39.6 J	27
Phenanthrene	ug/kg	1,500		1,620	331	422	351
LPAH	ug/kg	5,200		2,546 J	559 J	625 J	513
Benzo(A)anthracene	ug/kg	1,600		1,340	299	401	189
Benzo(A)pyrene	ug/kg	1,600		1,730	340	446	272
Benzo(G,H,I)perylene	ug/kg	720		986	459	406	285 J
Benzofluoranthenes, Total	ug/kg	3,600		2,940	847	1,000	659
Chrysene	ug/kg	2,800		2,100	683	606	414
Dibenzo(A,H)anthracene	ug/kg	230		444	124	141	102 J
Fluoranthene	ug/kg	2,500		2,650	611	947	296
Indeno(1,2,3-Cd)pyrene	ug/kg	690		1,010	302	334	226 J
Pyrene	ug/kg	3,300		2,750	595	823	348
HPAH	ug/kg	17,000		15,950	4,260	5,104	2,791 J
cPAH	ug/kg	1,000		2,458	541	682	424 J
Bis(2-ethylhexyl)phthalate	ug/kg	1,900		618	950	882	838
Butylbenzylphthalate	ug/kg	900		58.5 U	455	69.7 J	90.6
Diethylphthalate	ug/kg	1,200		58.5 U	98.1 U	98.7 U	27.8 U
Dimethylphthalate	ug/kg	160		58.5 U	208	98.7 U	29.4
Di-N-Butylphthalate	ug/kg	1,400		38.2 J	128	104	46.9
Di-N-Octylphthalate	ug/kg	6,200		58.5 U	98.1 U	98.7 U	18.1 J
Aroclor 1016	ug/kg		19.8 U	97.9 U	98.7 U	19.6 U	25.5 U
Aroclor 1221	ug/kg		19.8 U	97.9 U	98.7 U	19.6 U	25.5 U
Aroclor 1232	ug/kg		19.8 U	97.9 U	98.7 U	19.6 U	25.5 U
Aroclor 1242	ug/kg		19.8 U	97.9 U	98.7 U	19.6 U	25.5 U
Aroclor 1248	ug/kg		29.7 U	97.9 U	98.7 U	19.6 U	25.5 U
Aroclor 1254	ug/kg		113	945	7,830	69.8	43.3
Aroclor 1260	ug/kg		609 J	468	1,900	23.8	55.6
Polychlorinated Biphenyls	ug/kg	1,000	722 J	1,413	9,730	93.6	98.9
1,2,4-Trichlorobenzene	ug/kg	51		58.5 U	98.1 U	98.7 U	19.4 U
1,2-Dichlorobenzene	ug/kg	50		58.5 U	98.1 U	98.7 U	19.4 U
1,3-Dichlorobenzene	ug/kg			58.5 U	98.1 U	98.7 U	19.4 U
1,4-Dichlorobenzene	ug/kg	110		58.5 U	98.1 U	98.7 U	19.4 U
1-Methylnaphthalene	ug/kg			36.5 J	98.1 U	98.7 U	20.1
2,2'-Oxybis(1-chloropropane)	ug/kg			58.5 U	98.1 U	98.7 U	19.4 U
2,4,5-Trichlorophenol	ug/kg			293 U	491 U	493 U	96.8 U
2,4,6-Trichlorophenol	ug/kg			293 U	491 U	493 U	96.8 U
2,4-Dichlorophenol	ug/kg			293 U	491 U	493 U	96.8 U
2,4-Dimethylphenol	ug/kg	29		293 U	491 U	493 U	96.8 U
2,4-Dinitrophenol	ug/kg			585 U	981 U	987 U	194 UJ
2,4-Dinitrotoluene	ug/kg			293 U	491 U	493 U	96.8 U
2,6-Dinitrotoluene	ug/kg			293 U	491 U	493 U	96.8 U
2-Chloronaphthalene	ug/kg			58.5 U	98.1 U	98.7 U	19.4 U
2-Chlorophenol	ug/kg			58.5 U	98.1 U	98.7 U	19.4 U
2-Methylnaphthalene	ug/kg	670		66.4	98.1 U	98.7 U	23.1
2-Methylphenol	ug/kg	63		58.5 U	98.1 U	98.7 U	19.4 U
2-Nitroaniline	ug/kg			293 U	491 U	493 U	96.8 U
2-Nitrophenol	ug/kg			58.5 U	98.1 U	98.7 U	19.4 U
3,3`-Dichlorobenzidine	ug/kg			293 U	491 U	493 U	96.8 U
3-Nitroaniline	ug/kg			293 U	491 U	493 U	96.8 U
4,6-Dinitro-2-Methylphenol	ug/kg			585 U	981 U	987 U	194 UJ
4-Bromophenyl phenyl ether	ug/kg			58.5 U	98.1 U	98.7 U	19.4 U
4-Chloro-3-Methylphenol	ug/kg			293 U	491 U	493 U	96.8 U
4-Chloroaniline	ug/kg			293 U	491 U	493 U	96.8 U
4-Chlorophenyl Phenylether	ug/kg			58.5 U	98.1 U	98.7 U	19.4 U
4-Methylphenol	ug/kg	670		58.5 U	98.1 U	98.7 U	14.4 J
4-Nitroaniline	ug/kg			293 U	491 U	493 U	96.8 U
4-Nitrophenol	ug/kg			293 U	491 U	493 U	96.8 U
Benzoic acid	ug/kg	650		187 J	506 J	987 U	202
Benzyl alcohol	ug/kg	73		58.5 U	98.4 UJ	99 UJ	19.4 U
bis(2-Chloroethoxy) methane	ug/kg			58.5 U	98.1 U	98.7 U	19.4 U
Bis-(2-chloroethyl) ether	ug/kg			58.5 U	98.1 U	98.7 U	19.4 U
Carbazole	ug/kg			224	68.1 J	74.1 J	29
Dibenzofuran	ug/kg	540		94.6	26.8 J	98.7 U	13.3 J
Hexachlorobenzene	ug/kg	70		58.5 U	98.1 U	98.7 U	19.4 U
Hexachlorobutadiene	ug/kg	120		58.5 U	98.1 U	98.7 U	19.4 U
Hexachlorocyclopentadiene	ug/kg			293 U	491 U	493 U	96.8 UJ
Hexachloroethane	ug/kg			58.5 U	98.1 U	98.7 U	19.4 U
Isophorone	ug/kg			58.5 U	98.1 U	98.7 U	19.4 U
Nitrobenzene	ug/kg			58.5 U	98.1 U	98.7 U	19.4 U
N-Nitroso-Di-N-Propylamine	ug/kg			58.5 U	98.1 U	98.7 U	19.4 U
N-Nitrosodiphenylamine	ug/kg	40		58.5 U	98.1 U	98.7 U	19.4 U
Pentachlorophenol	ug/kg	690		293 U	304 J	493 U	51.9 J
Phenol	ug/kg	1,200		35.3 J	148	98.7 U	41.7
Coarse Sand	%			9.8			
Coarse Silt	%						
Fine Gravel	%			1.4			
Fine Sand	%			14.8			
Gravel	%						
Medium Sand	%			14.6			
Very Coarse Sand	%			7.6			
Very Fine Sand	%			13.1			

Location			ODS15	ODS16	ODS17	ODS18	ODS27
Sample Date			16 Nov 2016	16 Nov 2016	16 Nov 2016	16 Nov 2016	10 Nov 2016
Sample Name			MKJ-111616-2	MKJ-111616-3	MKJ-111616-4	MKJ-111616-5	MKJ-111016-1
Drainage Type			SD	SD	SD	SD	SD
Sample Method			Grab-Manual	Grab-Manual	Grab-Manual	Grab-Manual	Grab-Manual
Location Type			ODS	ODS	ODS	ODS	ODS
Analyte	Unit	CSL/2LAET	Result	Result	Result	Result	Result
Solids, Total	%			43.39	77.97	57.53	49.92
Total Organic Carbon	%			10.8	4.43	6.63	9.81
Arsenic	mg/kg	93					
Copper	mg/kg	390					
Lead	mg/kg	530					
Mercury	mg/kg	0.59					
Zinc	mg/kg	960					
Diesel Range (Silica and Acid Cleaned)	mg/kg	2,000					
Diesel Range Hydrocarbons	mg/kg	2,000					
Motor Oil (Silica and Acid Cleaned)	mg/kg	2,000					
Motor Oil Range	mg/kg	2,000					
Acenaphthene	ug/kg	500					
Acenaphthylene	ug/kg	1,300					
Anthracene	ug/kg	960					
Fluorene	ug/kg	540					
Naphthalene	ug/kg	2,100					
Phenanthrene	ug/kg	1,500					
LPAH	ug/kg	5,200					
Benzo(A)anthracene	ug/kg	1,600					
Benzo(A)pyrene	ug/kg	1,600					
Benzo(G,H,I)perylene	ug/kg	720					
Benzofluoranthenes, Total	ug/kg	3,600					
Chrysene	ug/kg	2,800					
Dibenzo(A,H)anthracene	ug/kg	230					
Fluoranthene	ug/kg	2,500					
Indeno(1,2,3-Cd)pyrene	ug/kg	690					
Pyrene	ug/kg	3,300					
HPAH	ug/kg	17,000					
cPAH	ug/kg	1,000					
Bis(2-ethylhexyl)phthalate	ug/kg	1,900					
Butylbenzylphthalate	ug/kg	900					
Diethylphthalate	ug/kg	1,200					
Dimethylphthalate	ug/kg	160					
Di-N-Butylphthalate	ug/kg	1,400					
Di-N-Octylphthalate	ug/kg	6,200					
Aroclor 1016	ug/kg		3,850 U	43.7 U	17.5 U	19.6 U	387 U
Aroclor 1221	ug/kg		3,850 U	43.7 U	17.5 U	19.6 U	387 U
Aroclor 1232	ug/kg		3,850 U	43.7 U	17.5 U	19.6 U	387 U
Aroclor 1242	ug/kg		3,850 U	43.7 U	17.5 U	19.6 U	387 U
Aroclor 1248	ug/kg		3,850 U	131 U	17.5 U	19.6 U	387 U
Aroclor 1254	ug/kg		28,800 U	1,920	143	71.6	5,950
Aroclor 1260	ug/kg		130,000	31,500	825	934 J	1,360 U
Polychlorinated Biphenyls	ug/kg	1,000	130,000	1,920	968	1,006 J	5,950
1,2,4-Trichlorobenzene	ug/kg	51					
1,2-Dichlorobenzene	ug/kg	50					
1,3-Dichlorobenzene	ug/kg						
1,4-Dichlorobenzene	ug/kg	110					
1-Methylnaphthalene	ug/kg						
2,2'-Oxybis(1-chloropropane)	ug/kg						
2,4,5-Trichlorophenol	ug/kg						
2,4,6-Trichlorophenol	ug/kg						
2,4-Dichlorophenol	ug/kg						
2,4-Dimethylphenol	ug/kg	29					
2,4-Dinitrophenol	ug/kg						
2,4-Dinitrotoluene	ug/kg						
2,6-Dinitrotoluene	ug/kg						
2-Chloronaphthalene	ug/kg						
2-Chlorophenol	ug/kg						
2-Methylnaphthalene	ug/kg	670					
2-Methylphenol	ug/kg	63					
2-Nitroaniline	ug/kg						
2-Nitrophenol	ug/kg						
3,3`-Dichlorobenzidine	ug/kg						
3-Nitroaniline	ug/kg						
4,6-Dinitro-2-Methylphenol	ug/kg						
4-Bromophenyl phenyl ether	ug/kg						
4-Chloro-3-Methylphenol	ug/kg						
4-Chloroaniline	ug/kg						
4-Chlorophenyl Phenylether	ug/kg						
4-Methylphenol	ug/kg	670					
4-Nitroaniline	ug/kg						
4-Nitrophenol	ug/kg						
Benzoic acid	ug/kg	650					
Benzyl alcohol	ug/kg	73					
bis(2-Chloroethoxy) methane	ug/kg						
Bis-(2-chloroethyl) ether	ug/kg						
Carbazole	ug/kg						
Dibenzofuran	ug/kg	540					
Hexachlorobenzene	ug/kg	70					
Hexachlorobutadiene	ug/kg	120					
Hexachlorocyclopentadiene	ug/kg						
Hexachloroethane	ug/kg						
Isophorone	ug/kg						
Nitrobenzene	ug/kg						
N-Nitroso-Di-N-Propylamine	ug/kg						
N-Nitrosodiphenylamine	ug/kg	40					
Pentachlorophenol	ug/kg	690					
Phenol	ug/kg	1,200					
Coarse Sand	%						
Coarse Silt	%						
Fine Gravel	%						
Fine Sand	%						
Gravel	%						
Medium Sand	%						
Very Coarse Sand	%						
Very Fine Sand	%						

Location			ODS28	ODS29	ODS30	ODS37	ODS53
Sample Date			10 Nov 2016	10 Nov 2016	10 Nov 2016	14 Dec 2016	06 Mar 2017
Sample Name			MKJ-111016-2	MKJ-111016-3	MKJ-111016-4	MKJ-121416-1	CEW-030617-1
Drainage Type			SD	SD	SD	SD	SD
Sample Method			Grab-Manual	Grab-Manual	Grab-Manual	Grab-Manual	Grab-Manual
Location Type			ODS	ODS	ODS	ODS	ODS
Analyte	Unit	CSL/2LAET	Result	Result	Result	Result	Result
Solids, Total	%		36.83	35.84	57.09		54.56
Total Organic Carbon	%		9.32	9.11	14.5		7.14 J
Arsenic	mg/kg	93					
Copper	mg/kg	390					
Lead	mg/kg	530					
Mercury	mg/kg	0.59					
Zinc	mg/kg	960					
Diesel Range (Silica and Acid Cleaned)	mg/kg	2,000					
Diesel Range Hydrocarbons	mg/kg	2,000					2,920
Motor Oil (Silica and Acid Cleaned)	mg/kg	2,000					
Motor Oil Range	mg/kg	2,000					7,400
Acenaphthene	ug/kg	500					195 U
Acenaphthylene	ug/kg	1,300					195 U
Anthracene	ug/kg	960					92.5 J
Fluorene	ug/kg	540					195 U
Naphthalene	ug/kg	2,100					291
Phenanthrene	ug/kg	1,500					429
LPAH	ug/kg	5,200					813 J
Benzo(A)anthracene	ug/kg	1,600					321
Benzo(A)pyrene	ug/kg	1,600					234
Benzo(G,H,I)perylene	ug/kg	720					477
Benzofluoranthenes, Total	ug/kg	3,600					802
Chrysene	ug/kg	2,800					796
Dibenzo(A,H)anthracene	ug/kg	230					147 J
Fluoranthene	ug/kg	2,500					722
Indeno(1,2,3-Cd)pyrene	ug/kg	690					240
Pyrene	ug/kg	3,300					853
HPAH	ug/kg	17,000					4,592 J
cPAH	ug/kg	1,000					437 J
Bis(2-ethylhexyl)phthalate	ug/kg	1,900					10,100
Butylbenzylphthalate	ug/kg	900					728
Diethylphthalate	ug/kg	1,200					97.7 U
Dimethylphthalate	ug/kg	160					80.5 J
Di-N-Butylphthalate	ug/kg	1,400					629
Di-N-Octylphthalate	ug/kg	6,200					246
Aroclor 1016	ug/kg		19.2 U	372 U	95.7 U	19.1 U	
Aroclor 1221	ug/kg		19.2 U	372 U	95.7 U	19.1 U	
Aroclor 1232	ug/kg		19.2 U	372 U	95.7 U	19.1 U	
Aroclor 1242	ug/kg		19.2 U	372 U	95.7 U	19.1 U	
Aroclor 1248	ug/kg		47.9 U	372 U	95.7 U	41.7	
Aroclor 1254	ug/kg		412	372 U	312	199	
Aroclor 1260	ug/kg		133	1,670 U	95.7 U	238 J	
Polychlorinated Biphenyls	ug/kg	1,000	545	372 U	312	478.7 J	
1,2,4-Trichlorobenzene	ug/kg	51					195 U
1,2-Dichlorobenzene	ug/kg	50					195 U
1,3-Dichlorobenzene	ug/kg						195 U
1,4-Dichlorobenzene	ug/kg	110					195 U
1-Methylnaphthalene	ug/kg						87.7 J
2,2'-Oxybis(1-chloropropane)	ug/kg						69.8 J
2,4,5-Trichlorophenol	ug/kg						977 U
2,4,6-Trichlorophenol	ug/kg						977 U
2,4-Dichlorophenol	ug/kg						977 U
2,4-Dimethylphenol	ug/kg	29					977 U
2,4-Dinitrophenol	ug/kg						1,950 U
2,4-Dinitrotoluene	ug/kg						977 U
2,6-Dinitrotoluene	ug/kg						977 U
2-Chloronaphthalene	ug/kg						195 U
2-Chlorophenol	ug/kg						195 U
2-Methylnaphthalene	ug/kg	670					241
2-Methylphenol	ug/kg	63					195 U
2-Nitroaniline	ug/kg						977 U
2-Nitrophenol	ug/kg						195 U
3,3`-Dichlorobenzidine	ug/kg						488 U
3-Nitroaniline	ug/kg						977 U
4,6-Dinitro-2-Methylphenol	ug/kg						1,950 U
4-Bromophenyl phenyl ether	ug/kg						195 U
4-Chloro-3-Methylphenol	ug/kg						977 U
4-Chloroaniline	ug/kg						977 U
4-Chlorophenyl Phenylether	ug/kg						97.7 U
4-Methylphenol	ug/kg	670					195 U
4-Nitroaniline	ug/kg						977 U
4-Nitrophenol	ug/kg						977 U
Benzoic acid	ug/kg	650					1,150 J
Benzyl alcohol	ug/kg	73					994
bis(2-Chloroethoxy) methane	ug/kg						97.7 U
Bis-(2-chloroethyl) ether	ug/kg						97.7 U
Carbazole	ug/kg						159 J
Dibenzofuran	ug/kg	540					195 U
Hexachlorobenzene	ug/kg	70					195 U
Hexachlorobutadiene	ug/kg	120					195 U
Hexachlorocyclopentadiene	ug/kg						977 U
Hexachloroethane	ug/kg						195 U
Isophorone	ug/kg						195 U
Nitrobenzene	ug/kg						195 U
N-Nitroso-Di-N-Propylamine	ug/kg						195 U
N-Nitrosodiphenylamine	ug/kg	40					195 U
Pentachlorophenol	ug/kg	690					460 J
Phenol	ug/kg	1,200					278
Coarse Sand	%						10.5 J
Coarse Silt	%						
Fine Gravel	%						1.9 J
Fine Sand	%						4.6 J
Gravel	%						
Medium Sand	%						
Very Coarse Sand	%						
Very Fine Sand	%						

Location			ODS55	ODS56	RCB1	RCB193	RCB194
Sample Date			06 Apr 2017	06 Apr 2017	26 Sep 2017	06 Mar 2017	06 Mar 2017
Sample Name			MKJ-040617-6	MKJ-040617-7	CEW-092617-04	CEW-030617-3	CEW-030617-2
Drainage Type			SD	SD	SD	SD	SD
Sample Method			Grab-Manual	Grab-Manual	Grab-Manual	Grab-Manual	Grab-Manual
Location Type			ODS	ODS	RCB	RCB	RCB
Analyte	Unit	CSL/2LAET	Result	Result	Result	Result	Result
Solids, Total	%		68.1	52.83	11.61	30.63	37.71
Total Organic Carbon	%		5.61	8.26	22.5	3.48	3.17
Arsenic	mg/kg	93			5.56	18.5	29.4
Copper	mg/kg	390			249	131	141
Lead	mg/kg	530			68.2	76.5	88
Mercury	mg/kg	0.59			0.209 U	1.032	0.1406
Zinc	mg/kg	960			991	964	434
Diesel Range (Silica and Acid Cleaned)	mg/kg	2,000			718		
Diesel Range Hydrocarbons	mg/kg	2,000				4,300	1,250
Motor Oil (Silica and Acid Cleaned)	mg/kg	2,000			4,740		
Motor Oil Range	mg/kg	2,000				12,700	3,710
Acenaphthene	ug/kg	500			346 U	319 U	98.7 U
Acenaphthylene	ug/kg	1,300			346 U	319 U	98.7 U
Anthracene	ug/kg	960			123 J	131 J	98.7 U
Fluorene	ug/kg	540			89.5 J	147 J	63.6 J
Naphthalene	ug/kg	2,100			346 U	1530	53.3 J
Phenanthrene	ug/kg	1,500			954	925	247
LPAH	ug/kg	5,200			1,167 J	2,733 J	364 J
Benzo(A)anthracene	ug/kg	1,600			823	541	104
Benzo(A)pyrene	ug/kg	1,600			1,040	616	111
Benzo(G,H,I)perylene	ug/kg	720			1,000	633 J	148 J
Benzofluoranthenes, Total	ug/kg	3,600			2150	1120	290
Chrysene	ug/kg	2,800			1560	1210	310
Dibenzo(A,H)anthracene	ug/kg	230			209 J	195 J	98.7 U
Fluoranthene	ug/kg	2,500			1940	1020	272
Indeno(1,2,3-Cd)pyrene	ug/kg	690			725	274 J	97.9 J
Pyrene	ug/kg	3,300			1910	1530	382
HPAH	ug/kg	17,000			11,357 J	7,139 J	1,715 J
cPAH	ug/kg	1,000			1,509 J	900 J	183 J
Bis(2-ethylhexyl)phthalate	ug/kg	1,900			6,750	28,800	6,570
Butylbenzylphthalate	ug/kg	900			346 UJ	958	228
Diethylphthalate	ug/kg	1,200			346 U	*319*	98.7
Dimethylphthalate	ug/kg	160			346 U	319 U	98.7 U
Di-N-Butylphthalate	ug/kg	1,400			864	2,100	742
Di-N-Octylphthalate	ug/kg	6,200			271 J	3660	193
Aroclor 1016	ug/kg		28.3 U	37.1 U	57.6 U	159 U	19.7 U
Aroclor 1221	ug/kg		28.3 U	37.1 U	57.6 U	159 U	19.7 U
Aroclor 1232	ug/kg		28.3 U	37.1 U	57.6 U	159 U	19.7 U
Aroclor 1242	ug/kg		28.3 U	37.1 U	57.6 U	159 U	19.7 U
Aroclor 1248	ug/kg		283 U	37.1 U	57.6 U	159 U	77.2
Aroclor 1254	ug/kg		1150	3,970	57.6 U	159 U	77.5
Aroclor 1260	ug/kg		268	440	58.2 J	159 U	76.5 J
Polychlorinated Biphenyls	ug/kg	1,000	1,418	4,410	58.2 J	159 U	231.2 J
1,2,4-Trichlorobenzene	ug/kg	51			346 U	319 U	98.7 U
1,2-Dichlorobenzene	ug/kg	50			346 U	319 U	98.7 U
1,3-Dichlorobenzene	ug/kg				346 U	319 U	98.7 U
1,4-Dichlorobenzene	ug/kg	110			346 U	319 U	98.7 U
1-Methylnaphthalene	ug/kg				346 U	1,940	36.7 J
2,2'-Oxybis(1-chloropropane)	ug/kg				346 U	319 U	98.7 U
2,4,5-Trichlorophenol	ug/kg				1,730 U	1,600 U	494 U
2,4,6-Trichlorophenol	ug/kg				1,730 U	1,600 U	494 U
2,4-Dichlorophenol	ug/kg				1,730 U	1,600 U	494 U
2,4-Dimethylphenol	ug/kg	29			1,730 U	1,600 U	494 U
2,4-Dinitrophenol	ug/kg				3,460 U	3,190 U	987 U
2,4-Dinitrotoluene	ug/kg				1,730 U	1,600 U	494 U
2,6-Dinitrotoluene	ug/kg				1,730 U	1,600 U	494 U
2-Chloronaphthalene	ug/kg				346 U	319 U	98.7 U
2-Chlorophenol	ug/kg				346 U	319 U	98.7 U
2-Methylnaphthalene	ug/kg	670			346 U	4,040	69.3 J
2-Methylphenol	ug/kg	63			346 U	319 U	98.7 U
2-Nitroaniline	ug/kg				1,730 U	1,600 U	494 U
2-Nitrophenol	ug/kg				346 U	319 U	98.7 U
3,3`-Dichlorobenzidine	ug/kg				1,730 U	1,600 U	494 U
3-Nitroaniline	ug/kg				1,730 U	1,600 U	494 U
4,6-Dinitro-2-Methylphenol	ug/kg				3,460 U	3,190 U	987 U
4-Bromophenyl phenyl ether	ug/kg				346 U	319 U	98.7 U
4-Chloro-3-Methylphenol	ug/kg				1,730 U	1,600 U	494 U
4-Chloroaniline	ug/kg				1,730 U	1,600 U	494 U
4-Chlorophenyl Phenylether	ug/kg				346 U	319 U	98.7 U
4-Methylphenol	ug/kg	670			346 U	11,700	98.7 U
4-Nitroaniline	ug/kg				1,730 U	1,600 U	494 U
4-Nitrophenol	ug/kg				1,730 U	1,600 U	494 U
Benzoic acid	ug/kg	650			1,110 J	3,990	869 J
Benzyl alcohol	ug/kg	73			346 U	319 U	98.7 U
bis(2-Chloroethoxy) methane	ug/kg				346 UJ	319 U	98.7 U
Bis-(2-chloroethyl) ether	ug/kg				346 UJ	319 U	98.7 U
Carbazole	ug/kg				190 J	124 J	98.7 U
Dibenzofuran	ug/kg	540			346 U	319 U	98.7 U
Hexachlorobenzene	ug/kg	70			346 U	319 U	98.7 U
Hexachlorobutadiene	ug/kg	120			346 U	319 U	98.7 U
Hexachlorocyclopentadiene	ug/kg				1,730 U	1,600 U	494 U
Hexachloroethane	ug/kg				346 U	319 U	98.7 U
Isophorone	ug/kg				346 UJ	319 U	98.7 U
Nitrobenzene	ug/kg				346 UJ	319 U	98.7 U
N-Nitroso-Di-N-Propylamine	ug/kg				346 UJ	319 U	98.7 U
N-Nitrosodiphenylamine	ug/kg	40			346 U	319 U	98.7 U
Pentachlorophenol	ug/kg	690			1,730 U	1,600 U	491 J
Phenol	ug/kg	1,200			178 J	319 U	926
Coarse Sand	%						3.1
Coarse Silt	%						
Fine Gravel	%						0.3
Fine Sand	%						3.5
Gravel	%						
Medium Sand	%						3.1
Very Coarse Sand	%						2.8
Very Fine Sand	%						4.3

Location			RCB215	RCB217	RCB251	RCB306	RCB309
Sample Date			21 Jul 2016	11 Aug 2016	21 Dec 2016	11 Aug 2016	30 Sep 2016
Sample Name			RCB294-072116	RCB217-081116	MKJ-122116-2	RCB306-081116	CEW-093016-2
Drainage Type			SD	SD	CS	SD	SD
Sample Method			Grab-Manual	Grab-Manual	Grab-Manual	Grab-Manual	Grab-Manual
Location Type			RCB	RCB	RCB	RCB	RCB
Analyte	Unit	CSL/2LAET	Result	Result	Result	Result	Result
Solids, Total	%		78.64	33.74	29.08	15.55	80.86
Total Organic Carbon	%		3.86	2.42	22.2	15.2	3.16
Arsenic	mg/kg	93	6 U	8.71 U		3.78	10.3
Copper	mg/kg	390	51.1	31.6		55.2	99.7
Lead	mg/kg	530	30	52.6		30.4	54.7
Mercury	mg/kg	0.59	0.03	0.04636 U		0.1043 U	0.04564
Zinc	mg/kg	960	528	299		609	285
Diesel Range (Silica and Acid Cleaned)	mg/kg	2,000	220				
Diesel Range Hydrocarbons	mg/kg	2,000	550	2,020		2,010	464
Motor Oil (Silica and Acid Cleaned)	mg/kg	2,000	960				
Motor Oil Range	mg/kg	2,000	1,900	2,820		7,060	2,620
Acenaphthene	ug/kg	500	60 U	108		149 U	94.8 U
Acenaphthylene	ug/kg	1,300	60 U	97 U		46.2 J	94.8 U
Anthracene	ug/kg	960	27 J	75.8 J		62.9 J	94.8 U
Fluorene	ug/kg	540	15 J	97 U		65.9 J	94.8 U
Naphthalene	ug/kg	2,100	42 J	178		135 J	25.5 J
Phenanthrene	ug/kg	1,500	160	422		558	68.5 J
LPAH	ug/kg	5,200	244 J	784 J		868 J	94 J
Benzo(A)anthracene	ug/kg	1,600	63	76.5 J		226	95 U
Benzo(A)pyrene	ug/kg	1,600	69	71.9 J		250	88.9 J
Benzo(G,H,I)perylene	ug/kg	720	110	168		451	204 J
Benzofluoranthenes, Total	ug/kg	3,600	140	181 J		569	202
Chrysene	ug/kg	2,800	200	160		530	182
Dibenzo(A,H)anthracene	ug/kg	230	60 U	97 U		149 U	94.8 U
Fluoranthene	ug/kg	2,500	190	215		751	106
Indeno(1,2,3-Cd)pyrene	ug/kg	690	36 J	97 U		149 U	74.8 J
Pyrene	ug/kg	3,300	270	453		1600	136
HPAH	ug/kg	17,000	1,078 J	1325.4 J		4377	994 J
cPAH	ug/kg	1,000	107 J	124 J		372	147 J
Bis(2-ethylhexyl)phthalate	ug/kg	1,900	2,100	21,300		41,000	2010
Butylbenzylphthalate	ug/kg	900	57 J	490		10,900	830
Diethylphthalate	ug/kg	1,200	60 U	97 U		149 U	94.8 U
Dimethylphthalate	ug/kg	160	60 U	79 J		149 U	94.8 U
Di-N-Butylphthalate	ug/kg	1,400	33 J	960		149 U	52.9 J
Di-N-Octylphthalate	ug/kg	6,200	60 U	111		504	94.8 U
Aroclor 1016	ug/kg		20 U	18.2 U	19.7 U	19.8 U	24.8 U
Aroclor 1221	ug/kg		20 U	18.2 U	19.7 U	19.8 U	24.8 U
Aroclor 1232	ug/kg		20 U	18.2 U	19.7 U	19.8 U	24.8 U
Aroclor 1242	ug/kg		20 U	18.2 U	19.7 U	19.8 U	24.8 U
Aroclor 1248	ug/kg		20 U	27.4 U	19.7 U	19.8 U	24.8 U
Aroclor 1254	ug/kg		20 U	27.4 U	49.1 U	76	36.8
Aroclor 1260	ug/kg		27	18.2 J	35.4	55.3	35.8
Polychlorinated Biphenyls	ug/kg	1,000	27	18.2 J	35.4	131.3	72.6
1,2,4-Trichlorobenzene	ug/kg	51	60 U	97 U		149 U	94.8 U
1,2-Dichlorobenzene	ug/kg	50	60 U	97 U		149 U	94.8 U
1,3-Dichlorobenzene	ug/kg		60 U	97 U		149 U	94.8 U
1,4-Dichlorobenzene	ug/kg	110	60 U	97 U		149 U	94.8 U
1-Methylnaphthalene	ug/kg		27 J	294		149 U	94.8 U
2,2'-Oxybis(1-chloropropane)	ug/kg		60 U	97 U		149 U	94.8 U
2,4,5-Trichlorophenol	ug/kg		300 U	485 U		743 U	474 U
2,4,6-Trichlorophenol	ug/kg		300 U	485 U		743 U	474 U
2,4-Dichlorophenol	ug/kg		300 U	485 U		743 U	474 U
2,4-Dimethylphenol	ug/kg	29	300 U	485 U		743 U	474 U
2,4-Dinitrophenol	ug/kg		600 U	970 U		1490 U	948 UJ
2,4-Dinitrotoluene	ug/kg		300 U	485 U		743 U	474 U
2,6-Dinitrotoluene	ug/kg		300 U	485 U		743 U	474 U
2-Chloronaphthalene	ug/kg		60 U	97 U		149 U	94.8 U
2-Chlorophenol	ug/kg		60 U	97 U		149 U	94.8 U
2-Methylnaphthalene	ug/kg	670	51 J	598		50.7 J	94.8 U
2-Methylphenol	ug/kg	63	60 U	97 U		221	94.8 U
2-Nitroaniline	ug/kg		300 U	485 U		743 U	474 U
2-Nitrophenol	ug/kg		60 U	97 U		149 U	94.8 U
3,3`-Dichlorobenzidine	ug/kg		300 UJ	485 U		743 U	474 U
3-Nitroaniline	ug/kg		300 U	485 U		743 U	474 U
4,6-Dinitro-2-Methylphenol	ug/kg		600 U	970 U		1,490 U	948 UJ
4-Bromophenyl phenyl ether	ug/kg		60 U	97 U		149 U	94.8 U
4-Chloro-3-Methylphenol	ug/kg		300 U	485 U		743 U	474 U
4-Chloroaniline	ug/kg		300 U	485 U		743 U	474 U
4-Chlorophenyl Phenylether	ug/kg		60 U	97 U		149 U	94.8 U
4-Methylphenol	ug/kg	670	5,900	2,380		1,360	94.8 U
4-Nitroaniline	ug/kg		300 U	485 U		743 U	474 U
4-Nitrophenol	ug/kg		300 U	485 U		743 U	474 U
Benzoic acid	ug/kg	650	800	970 U		1,030 J	948 UJ
Benzyl alcohol	ug/kg	73	60 U	97 U		134 J	184
bis(2-Chloroethoxy) methane	ug/kg		60 U	97 U		149 U	94.8 U
Bis-(2-chloroethyl) ether	ug/kg		60 U	97 U		274	94.8 U
Carbazole	ug/kg		60 UJ	97 U		149 U	94.8 U
Dibenzofuran	ug/kg	540	60 U	41 J		149 U	94.8 U
Hexachlorobenzene	ug/kg	70	60 U	97 U		149 U	94.8 U
Hexachlorobutadiene	ug/kg	120	60 U	97 U		149 U	94.8 U
Hexachlorocyclopentadiene	ug/kg		300 U	485 UJ		743 UJ	474 UJ
Hexachloroethane	ug/kg		60 U	97 U		149 U	94.8 UJ
Isophorone	ug/kg		60 U	97 U		149 U	94.8 U
Nitrobenzene	ug/kg		60 U	97 U		149 U	94.8 U
N-Nitroso-Di-N-Propylamine	ug/kg		60 U	97 U		149 U	94.8 U
N-Nitrosodiphenylamine	ug/kg	40	60 U	257		116 J	94.8 U
Pentachlorophenol	ug/kg	690	300 U	485 U		743 U	474 U
Phenol	ug/kg	1,200	350	159		176	56.9 J
Coarse Sand	%		3.8	10.8		6.4	
Coarse Silt	%			6		3.6	
Fine Gravel	%		45.9	19.1		9.7	
Fine Sand	%		4.1	23.2		6.7	
Gravel	%		14.7				
Medium Sand	%		7.2	15.9		6.7	
Very Coarse Sand	%		4.9	7.3		3.6	
Very Fine Sand	%		2.3	12.1		4.3	

Location			RCB72	ST1	ST1	ST7	TUL-CB3
Sample Date			21 Dec 2016	27 Apr 2017	27 Apr 2017	11 Apr 2017	21 Sep 2017
Sample Name			MKJ-122116-4	ST1-042717	ST1-042717-G	ST7-041117	MBS-092117-1
Drainage Type			SD	SD	SD	SD	SD
Sample Method			Grab-Manual	SedTrap	Grab-Manual	SedTrap	Grab-Manual
Location Type			RCB	Active SPU Sed Trap	Active SPU Sed Trap	Active SPU Sed Trap	CB
Analyte	Unit	CSL/2LAET	Result	Result	Result	Result	Result
Solids, Total	%		24.13	50.88	89.66	52.86	34.26
Total Organic Carbon	%		19.7	8.71	0.52	6.01	13.4
Arsenic	mg/kg	93		12.7	5.4 U	8.94 U	41 U
Copper	mg/kg	390		141	31.7	135	192
Lead	mg/kg	530		96.9	15.1	84.7	120
Mercury	mg/kg	0.59		0.1438	0.0264	0.0716	0.144
Zinc	mg/kg	960		568	122	547	1,030
Diesel Range (Silica and Acid Cleaned)	mg/kg	2,000		415	65.9	447	2,860
Diesel Range Hydrocarbons	mg/kg	2,000					
Motor Oil (Silica and Acid Cleaned)	mg/kg	2,000		1,760	350	2,270	15,600
Motor Oil Range	mg/kg	2,000					
Acenaphthene	ug/kg	500		96.3 U	19.6 U	39.1 J	180 J
Acenaphthylene	ug/kg	1,300		96.3 U	19.6 U	32 J	148 J
Anthracene	ug/kg	960		129	19.6 U	96.6 J	728
Fluorene	ug/kg	540		96.3 U	19.6 U	57.2 J	333
Naphthalene	ug/kg	2,100		73.7 J	19.6 U	79.5 J	352
Phenanthrene	ug/kg	1,500		367	19.6 U	539	3,770
LPAH	ug/kg	5,200		570 J	20 U	843 J	5,511 J
Benzo(A)anthracene	ug/kg	1,600		220	20 U	393	2,660
Benzo(A)pyrene	ug/kg	1,600		291	19.6 U	393	2,050
Benzo(G,H,I)perylene	ug/kg	720		96.3 U	11.5 J	374	1,930
Benzofluoranthenes, Total	ug/kg	3,600		595	15.4 J	824	5,490
Chrysene	ug/kg	2,800		579	12.5 J	677	4,640
Dibenzo(A,H)anthracene	ug/kg	230		96.3 U	19.6 U	107	467
Fluoranthene	ug/kg	2,500		553	8.9 J	959	7,750
Indeno(1,2,3-Cd)pyrene	ug/kg	690		96.3 U	19.6 U	215	1,440
Pyrene	ug/kg	3,300		550	15.7 J	1050	6,370
HPAH	ug/kg	17,000		2,788	64 J	4,992	32,797
cPAH	ug/kg	1,000		402	17 J	586	3,242
Bis(2-ethylhexyl)phthalate	ug/kg	1,900		5,750	236	7,040	48,200
Butylbenzylphthalate	ug/kg	900		96.3 U	36.9	97.6 U	827 J
Diethylphthalate	ug/kg	1,200		96.3 U	19.6 U	97.6 U	298 U
Dimethylphthalate	ug/kg	160		75.3 J	19.6 U	56.9 J	298 U
Di-N-Butylphthalate	ug/kg	1,400		127	19.6 U	86.5 J	248 J
Di-N-Octylphthalate	ug/kg	6,200		592	14 J	1450	298 U
Aroclor 1016	ug/kg		19.3 U	19.3 U	17.9 U	18.7 U	966 U
Aroclor 1221	ug/kg		19.3 U	19.3 U	17.9 U	18.7 U	966 U
Aroclor 1232	ug/kg		19.3 U	19.3 U	17.9 U	18.7 U	966 U
Aroclor 1242	ug/kg		19.3 U	19.3 U	17.9 U	18.7 U	966 U
Aroclor 1248	ug/kg		35	168	17.9 U	67.2	966 U
Aroclor 1254	ug/kg		66	173	17.9 U	121	11,800
Aroclor 1260	ug/kg		48.3	67.1 J	17.9 U	96.5 J	14,500 J
Polychlorinated Biphenyls	ug/kg	1,000	149.3	408.1 J	17.9 U	284.7 J	26,300 J
1,2,4-Trichlorobenzene	ug/kg	51		96.3 U	19.6 U	97.6 U	298 U
1,2-Dichlorobenzene	ug/kg	50		96.3 U	19.6 U	97.6 U	298 U
1,3-Dichlorobenzene	ug/kg			96.3 U	19.6 U	97.6 U	298 U
1,4-Dichlorobenzene	ug/kg	110		96.3 U	19.6 U	97.6 U	298 U
1-Methylnaphthalene	ug/kg			96.3 U	19.6 U	97.6 U	298 U
2,2'-Oxybis(1-chloropropane)	ug/kg			96.3 U	19.6 U	97.6 U	298 U
2,4,5-Trichlorophenol	ug/kg			481 U	98.2 U	488 U	1,490 U
2,4,6-Trichlorophenol	ug/kg			481 U	98.2 U	488 U	1,490 U
2,4-Dichlorophenol	ug/kg			481 U	98.2 U	488 U	1,490 U
2,4-Dimethylphenol	ug/kg	29		481 U	98.2 UJ	488 UJ	1,490 U
2,4-Dinitrophenol	ug/kg			963 U	196 U	976 U	2,980 U
2,4-Dinitrotoluene	ug/kg			481 U	98.2 U	488 U	1,490 U
2,6-Dinitrotoluene	ug/kg			481 U	98.2 U	488 U	1,490 U
2-Chloronaphthalene	ug/kg			96.3 U	19.6 U	97.6 U	298 U
2-Chlorophenol	ug/kg			96.3 U	19.6 U	97.6 U	298 U
2-Methylnaphthalene	ug/kg	670		96.3 U	19.6 U	56.7 J	123 J
2-Methylphenol	ug/kg	63		96.3 U	19.6 U	97.6 U	298 U
2-Nitroaniline	ug/kg			481 UJ	98.2 UJ	488 U	1,490 U
2-Nitrophenol	ug/kg			96.3 U	19.6 U	97.6 U	298 U
3,3`-Dichlorobenzidine	ug/kg			481 U	98.2 UJ	488 U	1,490 U
3-Nitroaniline	ug/kg			481 U	98.2 U	488 U	1,490 U
4,6-Dinitro-2-Methylphenol	ug/kg			963 U	196 U	976 U	2,980 U
4-Bromophenyl phenyl ether	ug/kg			96.3 U	19.6 U	97.6 U	298 U
4-Chloro-3-Methylphenol	ug/kg			481 U	98.2 U	488 U	1,490 U
4-Chloroaniline	ug/kg			481 U	98.2 U	488 U	1,490 U
4-Chlorophenyl Phenylether	ug/kg			96.3 U	19.6 U	97.6 U	298 U
4-Methylphenol	ug/kg	670		1,400	25.9	4,700	856
4-Nitroaniline	ug/kg			481 UJ	98.2 U	488 U	1,490 U
4-Nitrophenol	ug/kg			481 U	98.2 U	488 U	1,490 U
Benzoic acid	ug/kg	650		963 U	196 U	434 J	4,480
Benzyl alcohol	ug/kg	73		96.3 U	19.6 U	97.6 U	298 U
bis(2-Chloroethoxy) methane	ug/kg			96.3 U	19.6 U	97.6 U	298 UJ
Bis-(2-chloroethyl) ether	ug/kg			96.3 U	19.6 UJ	97.6 U	298 UJ
Carbazole	ug/kg			58.4 J	19.6 UJ	64.8 J	453
Dibenzofuran	ug/kg	540		96.3 U	19.6 U	97.6 U	144 J
Hexachlorobenzene	ug/kg	70		96.3 U	19.6 U	97.6 U	298 U
Hexachlorobutadiene	ug/kg	120		96.3 U	19.6 U	97.6 U	298 U
Hexachlorocyclopentadiene	ug/kg			481 U	98.2 U	488 U	1490 U
Hexachloroethane	ug/kg			96.3 U	19.6 UJ	97.6 U	298 U
Isophorone	ug/kg			96.3 U	19.6 U	97.6 U	298 UJ
Nitrobenzene	ug/kg			96.3 U	19.6 U	97.6 U	298 UJ
N-Nitroso-Di-N-Propylamine	ug/kg			96.3 UJ	19.6 UJ	97.6 UJ	298 UJ
N-Nitrosodiphenylamine	ug/kg	40		96.3 U	19.6 U	97.6 U	298 U
Pentachlorophenol	ug/kg	690		481 U	98.2 U	488 U	1,490 U
Phenol	ug/kg	1,200		259	19.6 U	546	397
Coarse Sand	%				15.5		8.2
Coarse Silt	%						
Fine Gravel	%				8.2		0.6
Fine Sand	%				0.1		15.5
Gravel	%						
Medium Sand	%				4.6		9.4
Very Coarse Sand	%				18.6		6.3
Very Fine Sand	%				0.1		18.6

Location			CB304	CB305	HP-ST4	HP-ST6	HP-ST6
Sample Date			02 Oct 2017	02 Oct 2017	11 Apr 2017	27 Apr 2017	27 Apr 2017
Sample Name			EJK-100217-1	EJK-100217-2	HPST4-041117	HP-ST6-042717	HP-ST6-042717-G
Drainage Type			SD	SD	SD	SD	SD
Sample Method			Grab-Manual	Grab-Manual	SedTrap	SedTrap	Grab-Manual
Location Type			CB	CB	Inline w/Active SPU Sed Trap	Inline w/Active SPU Sed Trap	Inline w/Active SPU Sed Trap
Analyte	Unit	CSL/2LAET	Result	Result	Result	Result	Result
Solids, Total	%		64.81	46.46	65.78	36.04	34.54
Total Organic Carbon	%		3.4 J	7.58	3.23	8.8	5.92
Arsenic	mg/kg	93	7.34 U	4.81	8.01	37.4	33.1
Copper	mg/kg	390	143	302	47.4	116	110
Lead	mg/kg	530	48.2	71.3	60.8	156	134
Mercury	mg/kg	0.59	0.0397	0.0777	0.05742	0.1678	0.2696
Zinc	mg/kg	960	370	1,150	280	660	963
Diesel Range (Silica and Acid Cleaned)	mg/kg	2,000	994	468	208	410	819
Motor Oil (Silica and Acid Cleaned)	mg/kg	2,000	4,120	2,180	1,020	2,020	3,460
Acenaphthene	ug/kg	500	483 U	297 U	94 U	137	104
Acenaphthylene	ug/kg	1,300	483 U	297 U	94 U	98.8 U	96.3
Anthracene	ug/kg	960	288 J	297 U	46.6 J	79.8 J	50.5
Fluorene	ug/kg	540	483 U	297 U	94 U	85.3 J	79.6
LPAH	ug/kg	5,200	579 J	180 J	221 J	607 J	357
Naphthalene	ug/kg	2,100	483 U	297 U	29.3 J	58.4 J	96.3
Phenanthrene	ug/kg	1,500	291 J	180 J	145	246	123
Benzo(A)anthracene	ug/kg	1,600	200	108	355	257	82
Benzo(A)pyrene	ug/kg	1,600	299 J	109 J	156	104	104
Benzo(G,H,I)perylene	ug/kg	720	540	257 J	134	98.8 U	174
Benzofluoranthenes, Total	ug/kg	3,600	305 J	262 J	419	542	267
Chrysene	ug/kg	2,800	593	280 J	493	412	235
Dibenzo(A,H)anthracene	ug/kg	230	483 U	297 U	94 U	98.8 U	96.3
Fluoranthene	ug/kg	2,500	372 J	243 J	934	514	250
HPAH	ug/kg	17,000	3,230 J	1,564 J	3,406 J	2,374	1,490
Indeno(1,2,3-Cd)pyrene	ug/kg	690	250 J	297 U	67.3 J	98.8 U	83
Pyrene	ug/kg	3,300	671	305	848	545	295
cPAH	ug/kg	1,000	477 J	223 J	264 J	213	169
Bis(2-ethylhexyl)phthalate	ug/kg	1,900	9,920	6,100	3,500	5,160	4,120
Butylbenzylphthalate	ug/kg	900	240 J	297 U	94 U	374	195
Diethylphthalate	ug/kg	1,200	483 U	297 U	94 U	98.8 U	89.2
Dimethylphthalate	ug/kg	160	483 U	297 U	94 U	135	72.5
Di-N-Butylphthalate	ug/kg	1,400	18,400	173 J	57.3 J	136	96.3
Di-N-Octylphthalate	ug/kg	6,200	978	323	94 U	530	96.3
Aroclor 1016	ug/kg		18.1 U	18.6 U	18.7 U	19.6 U	19.3
Aroclor 1221	ug/kg		18.1 U	18.6 U	18.7 U	19.6 U	19.3
Aroclor 1232	ug/kg		18.1 U	18.6 U	18.7 U	19.6 U	19.3
Aroclor 1242	ug/kg		18.1 U	18.6 U	18.7 U	19.6 U	19.3
Aroclor 1248	ug/kg		18.1 U	18.6 U	18.7 U	81.8	133
Aroclor 1254	ug/kg		417	469	93.6 U	75	85.2
Aroclor 1260	ug/kg		1,980	342	227 J	51.8	85.1
Polychlorinated Biphenyls	ug/kg	1,000	2,451	811	227 J	208.6	303.3
1,2,4-Trichlorobenzene	ug/kg	51	483 U	297 U	94 U	98.8 U	96.3
1,2-Dichlorobenzene	ug/kg	50	483 U	297 U	94 U	98.8 U	96.3
1,3-Dichlorobenzene	ug/kg		483 U	297 U	94 U	98.8 U	96.3
1,4-Dichlorobenzene	ug/kg	110	483 U	297 U	94 U	98.8 U	96.3
1-Methylnaphthalene	ug/kg		483 U	297 U	94 U	98.8 U	96.3
2,2'-Oxybis(1-chloropropane)	ug/kg		483 U	297 U	94 U	98.8 U	96.3
2,4,5-Trichlorophenol	ug/kg		2,420 U	1,490 U	470 U	494 U	482
2,4,6-Trichlorophenol	ug/kg		2,420 U	1,490 U	470 U	494 U	482
2,4-Dichlorophenol	ug/kg		2,420 U	1,490 U	470 U	494 U	482
2,4-Dimethylphenol	ug/kg	29	2,420 U	1,490 U	470 UJ	494 U	482
2,4-Dinitrophenol	ug/kg		4,830 U	2,970 U	940 U	988 U	963
2,4-Dinitrotoluene	ug/kg		2,420 U	1,490 U	470 U	494 U	482
2,6-Dinitrotoluene	ug/kg		2,420 U	1,490 U	470 U	494 U	482
2-Chloronaphthalene	ug/kg		483 U	297 U	94 U	98.8 U	96.3
2-Chlorophenol	ug/kg		483 U	297 U	94 U	98.8 U	96.3
2-Methylnaphthalene	ug/kg	670	483 U	297 U	94 U	36.5 J	96.3
2-Methylphenol	ug/kg	63	483 U	297 U	94 U	98.8 U	96.3
2-Nitroaniline	ug/kg		2,420 U	1,490 U	470 U	494 UJ	482
2-Nitrophenol	ug/kg		483 U	297 U	94 U	98.8 U	96.3
3,3`-Dichlorobenzidine	ug/kg		2,420 U	1,490 U	470 U	494 U	482
3-Nitroaniline	ug/kg		2,420 U	1,490 U	470 U	494 U	482
4,6-Dinitro-2-Methylphenol	ug/kg		4,830 U	2,970 U	940 U	988 U	963
4-Bromophenyl phenyl ether	ug/kg		483 U	297 U	94 U	98.8 U	96.3
4-Chloro-3-Methylphenol	ug/kg		2,420 U	1,490 U	470 U	494 U	482
4-Chloroaniline	ug/kg		2,420 U	1,490 U	470 U	494 U	482
4-Chlorophenyl Phenylether	ug/kg		483 U	297 U	94 U	98.8 U	96.3
4-Methylphenol	ug/kg	670	640	349	704	80.7 J	96.3
4-Nitroaniline	ug/kg		2,420 U	1,490 U	470 U	494 UJ	482
4-Nitrophenol	ug/kg		2,420 U	1,490 U	470 U	494 U	482
Benzoic acid	ug/kg	650	4,830 U	1,160 J	391 J	988 U	963
Benzyl alcohol	ug/kg	73	4,010	456	94 U	160	335
bis(2-Chloroethoxy) methane	ug/kg		483 U	297 U	94 U	98.8 U	96.3
Bis-(2-chloroethyl) ether	ug/kg		483 U	297 U	94 U	98.8 U	96.3
Carbazole	ug/kg		483 U	297 U	41 J	98.8 U	96.3
Dibenzofuran	ug/kg	540	483 U	297 U	94 U	47.3 J	31.3
Hexachlorobenzene	ug/kg	70	483 U	297 U	94 U	98.8 U	96.3
Hexachlorobutadiene	ug/kg	120	483 U	297 U	94 U	98.8 U	96.3
Hexachlorocyclopentadiene	ug/kg		2,420 U	1,490 U	470 U	494 U	482
Hexachloroethane	ug/kg		483 U	297 U	94 U	98.8 U	96.3
Isophorone	ug/kg		483 U	297 U	94 U	98.8 U	96.3
Nitrobenzene	ug/kg		483 U	297 U	94 U	98.8 U	96.3
N-Nitroso-Di-N-Propylamine	ug/kg		483 U	297 U	94 UJ	98.8 UJ	96.3
N-Nitrosodiphenylamine	ug/kg	40	483 U	297 U	94 U	98.8 U	96.3
Pentachlorophenol	ug/kg	690	2,420 U	1,490 U	470 U	494 U	482
Phenol	ug/kg	1,200	566	362	94 U	130	75
Coarse Sand	%		17.2	13.9			14
Fine Gravel	%		2.2	0.6			0.8
Fine Sand	%		6.2	7.8			4.4
Medium Sand	%		10	13.8			17.9
Very Coarse Sand	%		20.2	12.3			7.2
Very Fine Sand	%		3.7	5			5

Location			
Sample Date			
Sample Name			
Drainage Type			
Sample Method			
Location Type			
Analyte	Unit	CSL/2LAET	
Solids, Total	%		
Total Organic Carbon	%		
Arsenic	mg/kg	93	
Copper	mg/kg	390	
Lead	mg/kg	530	
Mercury	mg/kg	0.59	
Zinc	mg/kg	960	
Diesel Range (Silica and Acid Cleaned)	mg/kg	2,000	
Motor Oil (Silica and Acid Cleaned)	mg/kg	2,000	
Acenaphthene	ug/kg	500	
Acenaphthylene	ug/kg	1,300	U
Anthracene	ug/kg	960	J
Fluorene	ug/kg	540	J
LPAH	ug/kg	5,200	J
Naphthalene	ug/kg	2,100	U
Phenanthrene	ug/kg	1,500	
Benzo(A)anthracene	ug/kg	1,600	J
Benzo(A)pyrene	ug/kg	1,600	
Benzo(G,H,I)perylene	ug/kg	720	
Benzofluoranthenes, Total	ug/kg	3,600	
Chrysene	ug/kg	2,800	
Dibenzo(A,H)anthracene	ug/kg	230	U
Fluoranthene	ug/kg	2,500	
HPAH	ug/kg	17,000	J
Indeno(1,2,3-Cd)pyrene	ug/kg	690	J
Pyrene	ug/kg	3,300	
cPAH	ug/kg	1,000	J
Bis(2-ethylhexyl)phthalate	ug/kg	1,900	
Butylbenzylphthalate	ug/kg	900	
Diethylphthalate	ug/kg	1,200	J
Dimethylphthalate	ug/kg	160	J
Di-N-Butylphthalate	ug/kg	1,400	U
Di-N-Octylphthalate	ug/kg	6,200	U
Aroclor 1016	ug/kg		U
Aroclor 1221	ug/kg		U
Aroclor 1232	ug/kg		U
Aroclor 1242	ug/kg		U
Aroclor 1248	ug/kg		J
Aroclor 1254	ug/kg		
Aroclor 1260	ug/kg		J
Polychlorinated Biphenyls	ug/kg	1,000	J
1,2,4-Trichlorobenzene	ug/kg	51	U
1,2-Dichlorobenzene	ug/kg	50	U
1,3-Dichlorobenzene	ug/kg		U
1,4-Dichlorobenzene	ug/kg	110	U
1-Methylnaphthalene	ug/kg		U
2,2'-Oxybis(1-chloropropane)	ug/kg		U
2,4,5-Trichlorophenol	ug/kg		U
2,4,6-Trichlorophenol	ug/kg		U
2,4-Dichlorophenol	ug/kg		U
2,4-Dimethylphenol	ug/kg	29	UJ
2,4-Dinitrophenol	ug/kg		U
2,4-Dinitrotoluene	ug/kg		U
2,6-Dinitrotoluene	ug/kg		U
2-Chloronaphthalene	ug/kg		U
2-Chlorophenol	ug/kg		U
2-Methylnaphthalene	ug/kg	670	U
2-Methylphenol	ug/kg	63	U
2-Nitroaniline	ug/kg		UJ
2-Nitrophenol	ug/kg		U
3,3`-Dichlorobenzidine	ug/kg		UJ
3-Nitroaniline	ug/kg		U
4,6-Dinitro-2-Methylphenol	ug/kg		U
4-Bromophenyl phenyl ether	ug/kg		U
4-Chloro-3-Methylphenol	ug/kg		U
4-Chloroaniline	ug/kg		U
4-Chlorophenyl Phenylether	ug/kg		U
4-Methylphenol	ug/kg	670	U
4-Nitroaniline	ug/kg		U
4-Nitrophenol	ug/kg		U
Benzoic acid	ug/kg	650	U
Benzyl alcohol	ug/kg	73	
bis(2-Chloroethoxy) methane	ug/kg		U
Bis-(2-chloroethyl) ether	ug/kg		UJ
Carbazole	ug/kg		UJ
Dibenzofuran	ug/kg	540	J
Hexachlorobenzene	ug/kg	70	U
Hexachlorobutadiene	ug/kg	120	U
Hexachlorocyclopentadiene	ug/kg		U
Hexachloroethane	ug/kg		UJ
Isophorone	ug/kg		U
Nitrobenzene	ug/kg		U
N-Nitroso-Di-N-Propylamine	ug/kg		UJ
N-Nitrosodiphenylamine	ug/kg	40	U
Pentachlorophenol	ug/kg	690	U
Phenol	ug/kg	1,200	J
Coarse Sand	%		
Fine Gravel	%		
Fine Sand	%		
Medium Sand	%		
Very Coarse Sand	%		
Very Fine Sand	%		

Location			SL4-T6	
Sample Date			27 Apr 2017	
Sample Name			SL4-042717	
Drainage Type			SD	
Sample Method			SedTrap	
Location Type			Inline w/Active SPU Sed Trap	
Analyte	Unit	CSL/2LAET		
Solids, Total	%		69.26	
Total Organic Carbon	%		1.71	J
Arsenic	mg/kg	93	6.86	U
Copper	mg/kg	390	87.7	
Lead	mg/kg	530	65.4	
Mercury	mg/kg	1	0.05037	
Zinc	mg/kg	960	354	
Diesel Range (Silica and Acid Cleaned)	mg/kg	2,000	147	
Motor Oil (Silica and Acid Cleaned)	mg/kg	2,000	844	
Acenaphthene	ug/kg	500	44.5	J
Acenaphthylene	ug/kg	1,300	35.4	J
Anthracene	ug/kg	960	157	
Fluorene	ug/kg	540	55.5	J
LPAH	ug/kg	5,200	1,102	J
Naphthalene	ug/kg	2,100	37.9	J
Phenanthrene	ug/kg	1,500	772	
Benzo(A)anthracene	ug/kg	1,600	459	
Benzo(A)pyrene	ug/kg	1,600	383	
Benzo(G,H,I)perylene	ug/kg	720	330	
Benzofluoranthenes, Total	ug/kg	3,600	752	
Chrysene	ug/kg	2,800	664	
Dibenzo(A,H)anthracene	ug/kg	230	94.2	
Fluoranthene	ug/kg	2,500	1,030	
HPAH	ug/kg	17,000	5,004	
Indeno(1,2,3-Cd)pyrene	ug/kg	690	222	
Pyrene	ug/kg	3,300	1,070	
cPAH	ug/kg	1,000	571	
Bis(2-ethylhexyl)phthalate	ug/kg	1,900	4,420	
Butylbenzylphthalate	ug/kg	900	392	
Diethylphthalate	ug/kg	1,200	56.6	U
Dimethylphthalate	ug/kg	160	56.6	U
Di-N-Butylphthalate	ug/kg	1,400	95.4	
Di-N-Octylphthalate	ug/kg	6,200	1770	
Aroclor 1016	ug/kg		17.9	U
Aroclor 1221	ug/kg		17.9	U
Aroclor 1232	ug/kg		17.9	U
Aroclor 1242	ug/kg		17.9	U
Aroclor 1248	ug/kg		21.4	
Aroclor 1254	ug/kg		51.4	
Aroclor 1260	ug/kg		26.9	
Polychlorinated Biphenyls	ug/kg	1,000	99.7	
1,2,4-Trichlorobenzene	ug/kg	51	56.6	U
1,2-Dichlorobenzene	ug/kg	50	56.6	U
1,3-Dichlorobenzene	ug/kg		56.6	U
1,4-Dichlorobenzene	ug/kg	110	56.6	U
1-Methylnaphthalene	ug/kg		56.6	U
2,2'-Oxybis(1-chloropropane)	ug/kg		56.6	U
2,4,5-Trichlorophenol	ug/kg		283	U
2,4,6-Trichlorophenol	ug/kg		283	U
2,4-Dichlorophenol	ug/kg		283	U
2,4-Dimethylphenol	ug/kg	29	283	U
2,4-Dinitrophenol	ug/kg		566	U
2,4-Dinitrotoluene	ug/kg		283	U
2,6-Dinitrotoluene	ug/kg		283	U
2-Chloronaphthalene	ug/kg		56.6	U
2-Chlorophenol	ug/kg		56.6	U
2-Methylnaphthalene	ug/kg	670	37.7	J
2-Methylphenol	ug/kg	63	56.6	U
2-Nitroaniline	ug/kg		283	UJ
2-Nitrophenol	ug/kg		56.6	U
3,3`-Dichlorobenzidine	ug/kg		283	U
3-Nitroaniline	ug/kg		283	U
4,6-Dinitro-2-Methylphenol	ug/kg		566	U
4-Bromophenyl phenyl ether	ug/kg		56.6	U
4-Chloro-3-Methylphenol	ug/kg		283	U
4-Chloroaniline	ug/kg		283	U
4-Chlorophenyl Phenylether	ug/kg		56.6	U
4-Methylphenol	ug/kg	670	145	
4-Nitroaniline	ug/kg		283	UJ
4-Nitrophenol	ug/kg		283	U
Benzoic acid	ug/kg	650	237	J
Benzyl alcohol	ug/kg	73	97.7	
bis(2-Chloroethoxy) methane	ug/kg		56.6	U
Bis-(2-chloroethyl) ether	ug/kg		56.6	U
Carbazole	ug/kg		74.1	
Dibenzofuran	ug/kg	540	56.6	U
Hexachlorobenzene	ug/kg	70	56.6	U
Hexachlorobutadiene	ug/kg	120	56.6	U
Hexachlorocyclopentadiene	ug/kg		283	U
Hexachloroethane	ug/kg		56.6	U
Isophorone	ug/kg		56.6	U
Nitrobenzene	ug/kg		56.6	U
N-Nitroso-Di-N-Propylamine	ug/kg		56.6	UJ
N-Nitrosodiphenylamine	ug/kg	40	56.6	U
Pentachlorophenol	ug/kg	690	283	U
Phenol	ug/kg	1200	56.6	U

Location			CB214	NST1	NST1	NST2
Sample Date			12 Oct 2017	04 May 2017	04 May 2017	25 Apr 2017
Sample Name			MKJ-101217-5	NST1-050417	NST1-050417-G	NST2-042517
Drainage Type			SD	SD	SD	SD
Sample Method			Grab-Manual	SedTrap		SedTrap
Location Type			CB	Inline w/Active SPU Sed Trap	Inline w/Active SPU Sed Trap	Inline w/Active SPU Sed Trap
Analyte	Unit	CSL/2LAET	Result	Result	Result	Result
Solids, Total	%		48.93	42.45	47.26	18.81
Total Organic Carbon	%		14 J	4.56	5.07	14.1
Arsenic	mg/kg	93	9.88 U	10.1	11	29.4
Copper	mg/kg	390	82	124	111	195
Lead	mg/kg	530	54.9 J	74.3	86.8	172
Mercury	mg/kg	0.59	0.0661	0.07731 J	0.09562 J	0.2543
Zinc	mg/kg	960	930	571	769	1,440
Diesel Range (Silica and Acid Cleaned)	mg/kg	2,000	3,080	606	1,010	1,210
Motor Oil (Silica and Acid Cleaned)	mg/kg	2,000		2,250	3,210	4,970
Motor Oil Range	mg/kg	2,000	14,600			
Acenaphthene	ug/kg	500	438 U	292 U	58.5 J	1,580 U
Acenaphthylene	ug/kg	1,300	438 U	292 U	96 U	1,580 U
Anthracene	ug/kg	960	135 J	292 U	160	1,580 U
Fluorene	ug/kg	540	160 J	292 U	77.8 J	1,580 U
LPAH	ug/kg	5,200	1,724 J	343	1,179 J	1,580 U
Naphthalene	ug/kg	2,100	309 J	292 U	63.6 J	1,580 U
Phenanthrene	ug/kg	1,500	1,120	343	819	1,580 U
Benzo(A)anthracene	ug/kg	1,600	369	263 J	469	1,580 U
Benzo(A)pyrene	ug/kg	1,600	394 J	253 J	1400	1,580 U
Benzo(G,H,I)perylene	ug/kg	720	1,080	393	96 U	1,580 U
Benzofluoranthenes, Total	ug/kg	3,600	788 J	613	1,580	841 J
Chrysene	ug/kg	2,800	906	444	1,420	899 J
Dibenzo(A,H)anthracene	ug/kg	230	438 U	292 U	96 U	1,580 U
Fluoranthene	ug/kg	2,500	1,080	558	1,350	663 J
HPAH	ug/kg	17,000	6,948 J	3,374 J	7,679	3,301 J
Indeno(1,2,3-Cd)pyrene	ug/kg	690	401 J	239 J	96 U	1,580 U
Pyrene	ug/kg	3,300	1,930	611	1,460	898 J
cPAH	ug/kg	1,000	646 J	427 J	1,643	1,357 J
Bis(2-ethylhexyl)phthalate	ug/kg	1,900	12,900	5700	10600	8,340
Butylbenzylphthalate	ug/kg	900	759	255 J	96 U	1,580 U
Diethylphthalate	ug/kg	1,200	438 U	292 U	96 U	1,580 U
Dimethylphthalate	ug/kg	160	438 U	292 U	96 U	1,580 U
Di-N-Butylphthalate	ug/kg	1,400	6,710	116 J	154	1,580 U
Di-N-Octylphthalate	ug/kg	6,200	871	3460	812	1,580 U
Aroclor 1016	ug/kg		18.5 U	18.6 U	18.9 U	104 U
Aroclor 1221	ug/kg		18.5 U	18.6 U	18.9 U	104 U
Aroclor 1232	ug/kg		18.5 U	18.6 U	18.9 U	104 U
Aroclor 1242	ug/kg		18.5 U	18.6 U	18.9 U	104 U
Aroclor 1248	ug/kg		25.4	18.6 U	76.7	104 U
Aroclor 1254	ug/kg		37	128	126	104 U
Aroclor 1260	ug/kg		47.6	69 J	59.7	104 U
Polychlorinated Biphenyls	ug/kg	1,000	110	197 J	262.4	104 U
1,2,4-Trichlorobenzene	ug/kg	51	438 U	292 U	96 U	1,580 U
1,2-Dichlorobenzene	ug/kg	50	438 U	292 U	96 U	1,580 U
1,3-Dichlorobenzene	ug/kg		438 U	292 U	96 U	1,580 U
1,4-Dichlorobenzene	ug/kg	110	438 U	292 U	96 U	1,580 U
1-Methylnaphthalene	ug/kg		438 U	292 U	96 U	1,580 U
2,2'-Oxybis(1-chloropropane)	ug/kg		438 U	292 U	96 U	1,580 U
2,4,5-Trichlorophenol	ug/kg		2,190 U	1,460 U	480 U	7,900 U
2,4,6-Trichlorophenol	ug/kg		2,190 U	1,460 U	480 U	7,900 U
2,4-Dichlorophenol	ug/kg		2,190 U	1,460 U	480 U	7,900 U
2,4-Dimethylphenol	ug/kg	29	2,190 U	1,460 U	480 U	7,900 U
2,4-Dinitrophenol	ug/kg		4,380 U	2,920 U	960 U	15,800 U
2,4-Dinitrotoluene	ug/kg		2,190 U	1,460 U	480 U	7,900 U
2,6-Dinitrotoluene	ug/kg		2,190 U	1,460 U	480 U	7,900 U
2-Chloronaphthalene	ug/kg		438 U	292 U	96 U	1,580 U
2-Chlorophenol	ug/kg		438 U	292 U	96 U	1,580 U
2-Methylnaphthalene	ug/kg	670	186 J	292 U	60 J	1,580 U
2-Methylphenol	ug/kg	63	438 U	292 U	96 U	1,580 U
2-Nitroaniline	ug/kg		2,190 U	1,460 U	480 UJ	7,900 UJ
2-Nitrophenol	ug/kg		438 U	292 U	96 U	1,580 U
3,3`-Dichlorobenzidine	ug/kg		2,190 U	1,460 UJ	480 U	7,900 UJ
3-Nitroaniline	ug/kg		2,190 U	1,460 U	480 U	7,900 UJ
4,6-Dinitro-2-Methylphenol	ug/kg		4,380 U	2,920 U	960 U	15,800 U
4-Bromophenyl phenyl ether	ug/kg		438 U	292 U	96 U	1,580 U
4-Chloro-3-Methylphenol	ug/kg		2,190 U	1,460 U	480 U	7,900 U
4-Chloroaniline	ug/kg		2,190 U	1,460 U	480 U	7,900 U
4-Chlorophenyl Phenylether	ug/kg		438 U	292 U	96 U	1,580 U
4-Methylphenol	ug/kg	670	1,250	640	96 U	1,580 U
4-Nitroaniline	ug/kg		2,190 U	1,460 U	480 UJ	7,900 UJ
4-Nitrophenol	ug/kg		2,190 U	1,460 U	480 U	7,900 U
Benzoic acid	ug/kg	650	4,380 U	2,920 U	960 U	15,800 U
Benzyl alcohol	ug/kg	73	438 U	452	86.9 J	1,580 U
bis(2-Chloroethoxy) methane	ug/kg		438 U	292 U	96 U	1,580 U
Bis-(2-chloroethyl) ether	ug/kg		438 U	292 UJ	96 U	1,580 U
Carbazole	ug/kg		438 U	292 UJ	120	1,580 UJ
Dibenzofuran	ug/kg	540	438 U	292 U	96 U	1,580 U
Hexachlorobenzene	ug/kg	70	438 U	292 U	96 UJ	1,580 U
Hexachlorobutadiene	ug/kg	120	438 U	292 U	96 U	1,580 U
Hexachlorocyclopentadiene	ug/kg		2190 U	1460 U	480 U	7,900 U
Hexachloroethane	ug/kg		438 U	292 U	96 U	1,580 U
Isophorone	ug/kg		438 U	292 U	96 U	1,580 U
Nitrobenzene	ug/kg		438 U	292 U	96 U	1,580 UJ
N-Nitroso-Di-N-Propylamine	ug/kg		438 U	292 UJ	96 UJ	1,580 U
N-Nitrosodiphenylamine	ug/kg	40	438 U	292 U	96 U	1,580 U
Pentachlorophenol	ug/kg	690	2190 U	1460 U	480 U	7,900 U
Phenol	ug/kg	1200	438 U	219 J	96 U	1,580 U
Coarse Sand	%		7.6		2.2	
Fine Gravel	%		0.9		0.2	
Fine Sand	%		19.3		10.6	
Medium Sand	%		11.3		3.9	
Very Coarse Sand	%		6.9		2.4	
Very Fine Sand	%		16.3		15.2	

Location			NST3	NST4	NST4	NST5
Sample Date			04 May 2017	25 Apr 2017	25 Apr 2017	25 Apr 2017
Sample Name			NST3-050417	NST4-042517	NST4-042517-G	NST5-042517
Drainage Type			SD	SD	SD	SD
Sample Method			SedTrap	SedTrap	Grab-Manual	SedTrap
Location Type			Inline w/Active SPU Sed Trap	Inline w/Active SPU Sed Trap	Inline w/Active SPU Sed Trap	Inline w/Active SPU Sed Trap
Analyte	Unit	CSL/2LAET	Result	Result	Result	Result
Solids, Total	%		41.93	29.98	70.47	28.02
Total Organic Carbon	%		12.3	4.75	0.89	11.6
Arsenic	mg/kg	93	6.73	16.7	11.6	43.6 U
Copper	mg/kg	390	106	69.5	19.8	90
Lead	mg/kg	530	55.9	219	69.9	163
Mercury	mg/kg	0.59	0.05582 J	0.1553	0.03071	0.2131
Zinc	mg/kg	960	605	208	95.7	970
Diesel Range (Silica and Acid Cleaned)	mg/kg	2,000	316	458	21.2	
Motor Oil (Silica and Acid Cleaned)	mg/kg	2,000	1760	775	86.9	
Motor Oil Range	mg/kg	2,000				
Acenaphthene	ug/kg	500	294 U	695	97.8 U	311 U
Acenaphthylene	ug/kg	1,300	294 U	2,990	97.8 U	311 U
Anthracene	ug/kg	960	294 U	66300	97.8 U	158 J
Fluorene	ug/kg	540	294 U	1,230	97.8 U	311 U
LPAH	ug/kg	5,200	390	12,827	66 J	477 J
Naphthalene	ug/kg	2,100	294 U	702	97.8 U	311 U
Phenanthrene	ug/kg	1,500	390	7,210	66.1 J	319
Benzo(A)anthracene	ug/kg	1,600	338	22,000	81.7 J	284 J
Benzo(A)pyrene	ug/kg	1,600	381	35400	86.3 J	365
Benzo(G,H,I)perylene	ug/kg	720	563	8,400	131	464
Benzofluoranthenes, Total	ug/kg	3,600	910	48,600	242	843
Chrysene	ug/kg	2,800	542	122000	172	698
Dibenzo(A,H)anthracene	ug/kg	230	108 J	9,960	97.8 U	311 U
Fluoranthene	ug/kg	2,500	763	42800	159	663
HPAH	ug/kg	17,000	4,634 J	105,560	1,150 J	4,292 J
Indeno(1,2,3-Cd)pyrene	ug/kg	690	350	16,600	98.1	344
Pyrene	ug/kg	3,300	679	54400	180	631
cPAH	ug/kg	1,000	589 J	49,324	150 J	581 J
Bis(2-ethylhexyl)phthalate	ug/kg	1,900	2350	734 U	210 J	3,810
Butylbenzylphthalate	ug/kg	900	294 U	294 U	97.8 U	311 U
Diethylphthalate	ug/kg	1,200	294 U	294 U	97.8 U	311 U
Dimethylphthalate	ug/kg	160	294 U	294 U	97.8 U	224 J
Di-N-Butylphthalate	ug/kg	1,400	294 U	294 U	47.3 J	311 U
Di-N-Octylphthalate	ug/kg	6,200	294 U	294 U	97.8 U	1260
Aroclor 1016	ug/kg		19.7 U	19.5 U	18.2 U	
Aroclor 1221	ug/kg		19.7 U	19.5 U	18.2 U	
Aroclor 1232	ug/kg		19.7 U	19.5 U	18.2 U	
Aroclor 1242	ug/kg		19.7 U	19.5 U	18.2 U	
Aroclor 1248	ug/kg		19.7 U	19.5 U	18.2 U	
Aroclor 1254	ug/kg		43.1	46.4	18.2 U	
Aroclor 1260	ug/kg		25.4	47.9	18.2 U	
Polychlorinated Biphenyls	ug/kg	1,000	68.5	94.3	18.2 U	
1,2,4-Trichlorobenzene	ug/kg	51	294 U	294 U	97.8 U	311 U
1,2-Dichlorobenzene	ug/kg	50	294 U	294 U	97.8 U	311 U
1,3-Dichlorobenzene	ug/kg		294 U	294 U	97.8 U	311 U
1,4-Dichlorobenzene	ug/kg	110	294 U	294 U	97.8 U	311 U
1-Methylnaphthalene	ug/kg		294 U	294 U	97.8 U	311 U
2,2'-Oxybis(1-chloropropane)	ug/kg		294 U	294 U	97.8 U	311 U
2,4,5-Trichlorophenol	ug/kg		1,470 U	1,470 U	489 U	1,560 U
2,4,6-Trichlorophenol	ug/kg		1,470 U	1,470 U	489 U	1,560 U
2,4-Dichlorophenol	ug/kg		1,470 U	1,470 U	489 U	1,560 U
2,4-Dimethylphenol	ug/kg	29	1,470 U	1,470 U	489 UJ	1,560 U
2,4-Dinitrophenol	ug/kg		2,940 U	2,940 U	978 U	3,110 U
2,4-Dinitrotoluene	ug/kg		1,470 U	1,470 U	489 U	1,560 U
2,6-Dinitrotoluene	ug/kg		1,470 U	1,470 U	489 U	1,560 U
2-Chloronaphthalene	ug/kg		294 U	294 U	97.8 U	311 U
2-Chlorophenol	ug/kg		294 U	294 U	97.8 U	311 U
2-Methylnaphthalene	ug/kg	670	294 U	300	97.8 U	311 U
2-Methylphenol	ug/kg	63	294 U	294 U	97.8 U	311 U
2-Nitroaniline	ug/kg		1,470 U	1,470 UJ	489 UJ	1,560 UJ
2-Nitrophenol	ug/kg		294 U	294 U	97.8 U	311 U
3,3`-Dichlorobenzidine	ug/kg		1,470 UJ	1,470 UJ	489 UJ	1,560 UJ
3-Nitroaniline	ug/kg		1,470 U	1,470 UJ	489 U	1,560 UJ
4,6-Dinitro-2-Methylphenol	ug/kg		2,940 U	2,940 U	978 U	3,110 U
4-Bromophenyl phenyl ether	ug/kg		294 U	294 U	97.8 U	311 U
4-Chloro-3-Methylphenol	ug/kg		1,470 U	1,470 U	489 U	1,560 U
4-Chloroaniline	ug/kg		1,470 U	1,470 U	489 U	1,560 U
4-Chlorophenyl Phenylether	ug/kg		294 U	294 U	97.8 U	311 U
4-Methylphenol	ug/kg	670	2,360	294 U	97.8 U	311 U
4-Nitroaniline	ug/kg		1,470 U	1,470 UJ	489 U	1,560 UJ
4-Nitrophenol	ug/kg		1,470 U	1,470 U	489 U	1,560 U
Benzoic acid	ug/kg	650	2,940 U	2,940 U	978 U	3,110 U
Benzyl alcohol	ug/kg	73	294 U	294 U	97.8 U	311 U
bis(2-Chloroethoxy) methane	ug/kg		294 U	294 U	97.8 U	311 U
Bis-(2-chloroethyl) ether	ug/kg		294 UJ	294 U	97.8 UJ	311 U
Carbazole	ug/kg		294 UJ	4,000 J	97.8 UJ	311 UJ
Dibenzofuran	ug/kg	540	294 U	335	97.8 U	311 U
Hexachlorobenzene	ug/kg	70	294 U	294 U	97.8 U	311 U
Hexachlorobutadiene	ug/kg	120	294 U	294 U	97.8 U	311 U
Hexachlorocyclopentadiene	ug/kg		1,470 U	1,470 U	489 U	1,560 U
Hexachloroethane	ug/kg		294 U	294 U	97.8 UJ	311 U
Isophorone	ug/kg		294 U	294 U	97.8 U	311 U
Nitrobenzene	ug/kg		294 U	294 UJ	97.8 U	311 UJ
N-Nitroso-Di-N-Propylamine	ug/kg		294 UJ	294 U	97.8 UJ	311 U
N-Nitrosodiphenylamine	ug/kg	40	294 U	294 U	97.8 U	311 U
Pentachlorophenol	ug/kg	690	1,470 U	1,470 U	489 U	1,560 U
Phenol	ug/kg	1200	334	294 U	97.8 U	311 U
Coarse Sand	%		13.5		22	
Fine Gravel	%		1.2		0.1	
Fine Sand	%		8.4		8.8	
Medium Sand	%		24.5		48.1	
Very Coarse Sand	%		10.7		6.5	
Very Fine Sand	%		8.1		2.6	

Location			ODS38		RCB178	
Sample Date			22 Dec 2016		22 Dec 2016	
Sample Name			MKJ-122216-1		MKJ-122216-2	
Drainage Type			SD		SD	
Sample Method			Grab-Manual		Grab-Manual	
Location Type			ODS		RCB	
Analyte	Unit	CSL/2LAET	Result		Result	
Solids, Total	%		75		56.09	
Total Organic Carbon	%		3.56		7.02	
Aroclor 1016	ug/kg		18.8	U	18.4	U
Aroclor 1221	ug/kg		18.8	U	18.4	U
Aroclor 1232	ug/kg		18.8	U	18.4	U
Aroclor 1242	ug/kg		18.8	U	18.4	U
Aroclor 1248	ug/kg		81.1		261	
Aroclor 1254	ug/kg		130		195	
Aroclor 1260	ug/kg		149	J	106	J
Polychlorinated Biphenyls	ug/kg	1000	360.1	J	562	J

Location			ID-ST1	ID-ST2	ID-ST3	RCB82
Sample Date			11 Apr 2017	11 Apr 2017	25 May 2017	03 Feb 2017
Sample Name			ID-ST1-041117	IDST2-041117	ID-ST3-052517	CEW-020317-01
Drainage Type			SD	SD	SD	SD
Sample Method			SedTrap	SedTrap	SedTrap	Grab-Manual
Location Type			Inline w/Active SPU Sed Trap	Inline w/Active SPU Sed Trap	Inline w/Active SPU Sed Trap	RCB
Analyte	Unit	CSL/2LAET	Result	Result	Result	Result
Solids, Total	%		31.34	69.97	55.81	61.83
Total Organic Carbon	%		7.76	1.35 J	3.69	2.13
Arsenic	mg/kg	93	11	6.99 U	11.9	23.9
Copper	mg/kg	390	110	24.6	25.6	61.9
Lead	mg/kg	530	81.4	12.7	76.3	45.7
Mercury	mg/kg	0.59	0.1479	0.03162 U	0.06399	0.05287
Zinc	mg/kg	960	1,060	83.4	215	227
Diesel Range (Silica and Acid Cleaned)	mg/kg	2,000	469	18.9	27.4	
Diesel Range Hydrocarbons	mg/kg	2,000				148
Motor Oil (Silica and Acid Cleaned)	mg/kg	2,000	3,480	87.8	139	
Motor Oil Range	mg/kg	2,000				730
Acenaphthene	ug/kg	500	98.7 U	8 J	94.3 U	20.7 J
Acenaphthylene	ug/kg	1,300	98.7 U	18.9 U	94.3 U	38.6 U
Anthracene	ug/kg	960	110	8.7 J	94.3 UJ	34 J
Fluorene	ug/kg	540	98.7 U	7.9 J	94.3 U	23.3 J
LPAH	ug/kg	5,200	710 J	123 J	94 U	284 J
Naphthalene	ug/kg	2,100	57.6 J	18.9 U	94.3 U	38.6 U
Phenanthrene	ug/kg	1,500	542	98.3	94.3 U	206
Benzo(A)anthracene	ug/kg	1,600	422	24.8	94.3 U	70.4
Benzo(A)pyrene	ug/kg	1,600	558	34	94.3 U	67.9
Benzo(G,H,I)perylene	ug/kg	720	631	27	94.3 U	97.6
Benzofluoranthenes, Total	ug/kg	3,600	1,840	78.3	189 U	167
Chrysene	ug/kg	2,800	1,120	52.3	94.3 U	125
Dibenzo(A,H)anthracene	ug/kg	230	157	18.9 U	94.3 U	27.7 J
Fluoranthene	ug/kg	2,500	1,010	84.3	94.3 U	240
HPAH	ug/kg	17,000	7,289	409	94 U	1,076 J
Indeno(1,2,3-Cd)pyrene	ug/kg	690	511	25.1	94.3 U	60.1 J
Pyrene	ug/kg	3,300	1,040	82.9	94.3 U	220
cPAH	ug/kg	1,000	909	51	85 U	110 J
Bis(2-ethylhexyl)phthalate	ug/kg	1,900	7,260	122	155 J	2,680
Butylbenzylphthalate	ug/kg	900	98.7 U	18.9 U	94.3 U	427
Diethylphthalate	ug/kg	1,200	98.7 U	18.9 U	94.3 U	38.6 U
Dimethylphthalate	ug/kg	160	98.7 U	18.9 U	94.3 U	46.3
Di-N-Butylphthalate	ug/kg	1,400	98.7 U	18.9 U	50.9 J	34.6 J
Di-N-Octylphthalate	ug/kg	6,200	631	18.9 U	94.3 U	67.5
Aroclor 1016	ug/kg		19.9 U	19.5 U	19.2 U	18.3 U
Aroclor 1221	ug/kg		19.9 U	19.5 U	19.2 U	18.3 U
Aroclor 1232	ug/kg		19.9 U	19.5 U	19.2 U	18.3 U
Aroclor 1242	ug/kg		19.9 U	19.5 U	19.2 U	18.3 U
Aroclor 1248	ug/kg		48.2	40.4	19.2 U	18.3 U
Aroclor 1254	ug/kg		116	29.8	12.3 J	18.3 U
Aroclor 1260	ug/kg		77.9 J	19.5 U	11.9 J	18.3 U
Polychlorinated Biphenyls	ug/kg	1,000	242.1 J	70.2	24.2 J	18.3 U
1,2,4-Trichlorobenzene	ug/kg	51	98.7 U	18.9 U	94.3 U	38.6 U
1,2-Dichlorobenzene	ug/kg	50	98.7 U	18.9 U	94.3 U	38.6 U
1,3-Dichlorobenzene	ug/kg		98.7 U	18.9 U	94.3 U	38.6 U
1,4-Dichlorobenzene	ug/kg	110	98.7 U	18.9 U	94.3 U	38.6 U
1-Methylnaphthalene	ug/kg		98.7 U	18.9 U	94.3 U	38.6 U
2,2'-Oxybis(1-chloropropane)	ug/kg		98.7 U	18.9 U	94.3 U	38.6 U
2,4,5-Trichlorophenol	ug/kg		493 U	94.7 U	471 U	193 U
2,4,6-Trichlorophenol	ug/kg		493 U	94.7 U	471 U	193 U
2,4-Dichlorophenol	ug/kg		493 U	94.7 U	471 U	193 U
2,4-Dimethylphenol	ug/kg	29	493 UJ	94.7 UJ	471 U	193 U
2,4-Dinitrophenol	ug/kg		987 U	189 U	943 U	386 U
2,4-Dinitrotoluene	ug/kg		493 U	94.7 U	471 U	193 U
2,6-Dinitrotoluene	ug/kg		493 U	94.7 U	471 U	193 U
2-Chloronaphthalene	ug/kg		98.7 U	18.9 U	94.3 U	38.6 U
2-Chlorophenol	ug/kg		98.7 U	18.9 U	94.3 U	38.6 U
2-Methylnaphthalene	ug/kg	670	98.7 U	18.9 U	94.3 U	12.7 J
2-Methylphenol	ug/kg	63	98.7 U	18.9 U	94.3 U	38.6 U
2-Nitroaniline	ug/kg		493 U	94.7 U	471 U	193 U
2-Nitrophenol	ug/kg		98.7 U	18.9 U	94.3 U	38.6 U
3,3`-Dichlorobenzidine	ug/kg		493 U	94.7 U	471 U	193 U
3-Nitroaniline	ug/kg		493 U	94.7 U	471 U	193 U
4,6-Dinitro-2-Methylphenol	ug/kg		987 U	189 U	943 U	386 U
4-Bromophenyl phenyl ether	ug/kg		98.7 U	18.9 U	94.3 U	38.6 U
4-Chloro-3-Methylphenol	ug/kg		493 U	94.7 U	471 U	193 U
4-Chloroaniline	ug/kg		493 U	94.7 U	471 U	193 U
4-Chlorophenyl Phenylether	ug/kg		98.7 U	18.9 U	94.3 U	38.6 U
4-Methylphenol	ug/kg	670	1,780	18.9 U	185	87.3
4-Nitroaniline	ug/kg		493 U	94.7 U	471 U	193 U
4-Nitrophenol	ug/kg		493 U	94.7 U	471 U	193 U
Benzoic acid	ug/kg	650	3,490 J	77.7 J	943 U	172 J
Benzyl alcohol	ug/kg	73	679	18.9 U	140	38.6 U
bis(2-Chloroethoxy) methane	ug/kg		98.7 U	18.9 U	94.3 U	38.6 U
Bis-(2-chloroethyl) ether	ug/kg		98.7 U	18.9 U	94.3 U	38.6 U
Carbazole	ug/kg		90.4 J	13.1 J	94.3 U	56 J
Dibenzofuran	ug/kg	540	98.7 U	18.9 U	94.3 U	15.1 J
Hexachlorobenzene	ug/kg	70	98.7 U	18.9 U	94.3 U	38.6 U
Hexachlorobutadiene	ug/kg	120	98.7 U	18.9 U	94.3 U	38.6 U
Hexachlorocyclopentadiene	ug/kg		493 U	94.7 U	471 U	193 U
Hexachloroethane	ug/kg		98.7 U	18.9 U	94.3 U	38.6 U
Isophorone	ug/kg		98.7 U	18.9 U	94.3 U	38.6 U
Nitrobenzene	ug/kg		98.7 U	18.9 U	94.3 U	38.6 U
N-Nitroso-Di-N-Propylamine	ug/kg		98.7 UJ	18.9 UJ	94.3 U	38.6 U
N-Nitrosodiphenylamine	ug/kg	40	98.7 U	18.9 U	94.3 U	38.6 U
Pentachlorophenol	ug/kg	690	493 U	94.7 U	471 U	193 U
Phenol	ug/kg	1200	779	217	94.3 U	38.6 U
Coarse Sand	%					15.7
Fine Gravel	%					1.7
Fine Sand	%					5.8
Medium Sand	%					15.8
Very Coarse Sand	%					14.2
Very Fine Sand	%					2

Location			KN-ST1
Sample Date			24 Jul 2017
Sample Name			KN-ST1-072417
Drainage Type			SD
Sample Method			
Location Type			Inline w/Active SPU Sed Trap
Analyte	Unit	CSL/2LAET	
Solids, Total	%		55.5
Total Organic Carbon	%		4.63
Arsenic	mg/kg	93	9.24
Copper	mg/kg	390	61.7
Lead	mg/kg	530	43.5
Zinc	mg/kg	960	318
Diesel Range Hydrocarbons	mg/kg	2,000	103
Motor Oil Range	mg/kg	2,000	478
Acenaphthene	ug/kg	500	160 U
Acenaphthylene	ug/kg	1,300	160 U
Anthracene	ug/kg	960	60.3 J
Fluorene	ug/kg	540	160 U
LPAH	ug/kg	5,200	455 J
Naphthalene	ug/kg	2,100	87.5 J
Phenanthrene	ug/kg	1,500	307
Benzo(A)anthracene	ug/kg	1,600	164 J
Benzo(A)pyrene	ug/kg	1,600	186
Benzo(G,H,I)perylene	ug/kg	720	237
Benzofluoranthenes, Total	ug/kg	3,600	533
Chrysene	ug/kg	2,800	371
Dibenzo(A,H)anthracene	ug/kg	230	160 U
Fluoranthene	ug/kg	2,500	370
HPAH	ug/kg	17,000	2,454 J
Indeno(1,2,3-Cd)pyrene	ug/kg	690	173
Pyrene	ug/kg	3,300	420
cPAH	ug/kg	1,000	309 J
Bis(2-ethylhexyl)phthalate	ug/kg	1,900	2,770
Butylbenzylphthalate	ug/kg	900	160 U
Diethylphthalate	ug/kg	1,200	160 U
Dimethylphthalate	ug/kg	160	160 U
Di-N-Butylphthalate	ug/kg	1,400	59.3 J
Di-N-Octylphthalate	ug/kg	6,200	171
Aroclor 1016	ug/kg		19.2 U
Aroclor 1221	ug/kg		19.2 U
Aroclor 1232	ug/kg		19.2 U
Aroclor 1242	ug/kg		19.2 U
Aroclor 1248	ug/kg		25.6
Aroclor 1254	ug/kg		46.2
Aroclor 1260	ug/kg		24.4
Polychlorinated Biphenyls	ug/kg	1,000	96.2
1,2,4-Trichlorobenzene	ug/kg	51	160 U
1,2-Dichlorobenzene	ug/kg	50	160 U
1,3-Dichlorobenzene	ug/kg		160 U
1,4-Dichlorobenzene	ug/kg	110	160 U
1-Methylnaphthalene	ug/kg		160 U
2,2'-Oxybis(1-chloropropane)	ug/kg		160 U
2,4,5-Trichlorophenol	ug/kg		802 U
2,4,6-Trichlorophenol	ug/kg		802 U
2,4-Dichlorophenol	ug/kg		802 U
2,4-Dimethylphenol	ug/kg	29	802 U
2,4-Dinitrophenol	ug/kg		1600 U
2,4-Dinitrotoluene	ug/kg		802 U
2,6-Dinitrotoluene	ug/kg		802 U
2-Chloronaphthalene	ug/kg		160 U
2-Chlorophenol	ug/kg		160 U
2-Methylnaphthalene	ug/kg	670	56.7 J
2-Methylphenol	ug/kg	63	160 U
2-Nitroaniline	ug/kg		802 U
2-Nitrophenol	ug/kg		160 U
3,3`-Dichlorobenzidine	ug/kg		802 U
3-Nitroaniline	ug/kg		802 U
4,6-Dinitro-2-Methylphenol	ug/kg		1600 U
4-Bromophenyl phenyl ether	ug/kg		160 U
4-Chloro-3-Methylphenol	ug/kg		802 U
4-Chloroaniline	ug/kg		802 U
4-Chlorophenyl Phenylether	ug/kg		160 U
4-Methylphenol	ug/kg	670	326 J
4-Nitroaniline	ug/kg		802 UJ
4-Nitrophenol	ug/kg		802 U
Benzoic acid	ug/kg	650	1,040 J
Benzyl alcohol	ug/kg	73	763
bis(2-Chloroethoxy) methane	ug/kg		160 U
Bis-(2-chloroethyl) ether	ug/kg		160 UJ
Carbazole	ug/kg		160 U
Dibenzofuran	ug/kg	540	160 U
Hexachlorobenzene	ug/kg	70	160 U
Hexachlorobutadiene	ug/kg	120	160 U
Hexachlorocyclopentadiene	ug/kg		802 U
Hexachloroethane	ug/kg		160 U
Isophorone	ug/kg		160 U
Nitrobenzene	ug/kg		160 U
N-Nitroso-Di-N-Propylamine	ug/kg		160 U
N-Nitrosodiphenylamine	ug/kg	40	160 U
Pentachlorophenol	ug/kg	690	802 U
Phenol	ug/kg	1200	122 J
Coarse Sand	%		0.8
Fine Gravel	%		0.2
Fine Sand	%		2.9
Medium Sand	%		1.6
Very Coarse Sand	%		0.6
Very Fine Sand	%		19

Location			RCB276	RCB278	RCB279
Sample Date			26 Oct 2017	22 Dec 2016	29 Dec 2016
Sample Name			MKJ-102617-3	MKJ-122216-4	MKJ-122916-4
Drainage Type			CS	CS	CS
Sample Method			Grab-Manual	Grab-Manual	Grab-Manual
Location Type			RCB	RCB	RCB
Analyte	Unit	CSL/2LAET	Result	Result	Result
Solids, Total	%		45.5	33.65	59.67
Total Organic Carbon	%		9.21	12.5	1.84
Arsenic	mg/kg	93	7.74		
Copper	mg/kg	390	546		
Lead	mg/kg	530	317		
Mercury	mg/kg	0.59	0.8		0.2 J
Zinc	mg/kg	960	1,290		
Diesel Range (Silica and Acid Cleaned)	mg/kg	2,000	3,740 J		
Motor Oil (Silica and Acid Cleaned)	mg/kg	2,000	12,400 J		
Acenaphthene	ug/kg	500	199 UJ		
Acenaphthylene	ug/kg	1,300	82.7 J		
Anthracene	ug/kg	960	207 J		
Fluorene	ug/kg	540	134 J		
LPAH	ug/kg	5,200	1,677 J		
Naphthalene	ug/kg	2,100	173 J		
Phenanthrene	ug/kg	1,500	1,080 J		
Benzo(A)anthracene	ug/kg	1,600	550		
Benzo(A)pyrene	ug/kg	1,600	567 J		
Benzo(G,H,I)perylene	ug/kg	720	727 J		
Benzofluoranthenes, Total	ug/kg	3,600	1,340 J		
Chrysene	ug/kg	2,800	1,580 J		
Dibenzo(A,H)anthracene	ug/kg	230	210 J		
Fluoranthene	ug/kg	2,500	1,680 J		
HPAH	ug/kg	17,000	9,041 J		
Indeno(1,2,3-Cd)pyrene	ug/kg	690	387 J		
Pyrene	ug/kg	3,300	2,000 J		
cPAH	ug/kg	1,000	895 J		
Bis(2-ethylhexyl)phthalate	ug/kg	1,900	26,700 J		
Butylbenzylphthalate	ug/kg	900	60,800 J		
Diethylphthalate	ug/kg	1,200	199 UJ		
Dimethylphthalate	ug/kg	160	660 J		
Di-N-Butylphthalate	ug/kg	1,400	1,840 J		
Di-N-Octylphthalate	ug/kg	6,200	19,600 J		
Aroclor 1016	ug/kg		98.2 U	19.7 U	18 U
Aroclor 1221	ug/kg		98.2 U	19.7 U	18 U
Aroclor 1232	ug/kg		98.2 U	19.7 U	18 U
Aroclor 1242	ug/kg		98.2 U	19.7 U	18 U
Aroclor 1248	ug/kg		618	92.3	63.3
Aroclor 1254	ug/kg		289	131	183
Aroclor 1260	ug/kg		398	78.9	273
Polychlorinated Biphenyls	ug/kg	1,000	1,305	302.2	519.3
1,2,4-Trichlorobenzene	ug/kg	51	199 UJ		
1,2-Dichlorobenzene	ug/kg	50	199 UJ		
1,3-Dichlorobenzene	ug/kg		199 UJ		
1,4-Dichlorobenzene	ug/kg	110	199 UJ		
1-Methylnaphthalene	ug/kg		81.8 J		
2,2'-Oxybis(1-chloropropane)	ug/kg		199 UJ		
2,4,5-Trichlorophenol	ug/kg		994 UJ		
2,4,6-Trichlorophenol	ug/kg		994 UJ		
2,4-Dichlorophenol	ug/kg		994 UJ		
2,4-Dimethylphenol	ug/kg	29	994 UJ		
2,4-Dinitrophenol	ug/kg		1,990 UJ		
2,4-Dinitrotoluene	ug/kg		994 UJ		
2,6-Dinitrotoluene	ug/kg		994 UJ		
2-Chloronaphthalene	ug/kg		199 UJ		
2-Chlorophenol	ug/kg		199 UJ		
2-Methylnaphthalene	ug/kg	670	167 J		
2-Methylphenol	ug/kg	63	199 UJ		
2-Nitroaniline	ug/kg		994 UJ		
2-Nitrophenol	ug/kg		199 UJ		
3,3`-Dichlorobenzidine	ug/kg		994 UJ		
3-Nitroaniline	ug/kg		994 UJ		
4,6-Dinitro-2-Methylphenol	ug/kg		1,990 UJ		
4-Bromophenyl phenyl ether	ug/kg		199 UJ		
4-Chloro-3-Methylphenol	ug/kg		994 UJ		
4-Chloroaniline	ug/kg		994 UJ		
4-Chlorophenyl Phenylether	ug/kg		199 UJ		
4-Methylphenol	ug/kg	670	1,830 J		
4-Nitroaniline	ug/kg		994 UJ		
4-Nitrophenol	ug/kg		994 UJ		
Benzoic acid	ug/kg	650	1,240 J		
Benzyl alcohol	ug/kg	73	366 J		
bis(2-Chloroethoxy) methane	ug/kg		199 UJ		
Bis-(2-chloroethyl) ether	ug/kg		199 UJ		
Carbazole	ug/kg		210 J		
Dibenzofuran	ug/kg	540	199 UJ		
Hexachlorobenzene	ug/kg	70	199 UJ		
Hexachlorobutadiene	ug/kg	120	199 UJ		
Hexachlorocyclopentadiene	ug/kg		994 UJ		
Hexachloroethane	ug/kg		199 UJ		
Isophorone	ug/kg		199 UJ		
Nitrobenzene	ug/kg		199 UJ		
N-Nitroso-Di-N-Propylamine	ug/kg		199 UJ		
N-Nitrosodiphenylamine	ug/kg	40	199 UJ		
Pentachlorophenol	ug/kg	690	994 UJ		
Phenol	ug/kg	1,200	278 J		
Coarse Sand	%		8.9		
Fine Gravel	%		1		
Fine Sand	%		15.5		
Medium Sand	%		10.6		
Very Coarse Sand	%		5.8		
Very Fine Sand	%		14		

Location			RCB229	
Sample Date			29 Dec 2016	
Sample Name			MKJ-122916-2	
Drainage Type			CS	
Sample Method			Grab-Manual	
Location Type			RCB	
Analyte	Unit	CSL/2LAET		
Solids, Total	%		68.96	
Total Organic Carbon	%		1.79	
Mercury	mg/kg	0.59	0.157	J
Aroclor 1016	ug/kg		18.9	U
Aroclor 1221	ug/kg		18.9	U
Aroclor 1232	ug/kg		18.9	U
Aroclor 1242	ug/kg		18.9	U
Aroclor 1248	ug/kg		23.8	
Aroclor 1254	ug/kg		53.1	
Aroclor 1260	ug/kg		86.9	
Polychlorinated Biphenyls	ug/kg	1000	163.8	

Location			ODS39	ODS40	ODS41	RCB297
Sample Date			15 Dec 2016	15 Nov 2016	15 Dec 2016	13 Jul 2016
Sample Name			MKJ-121516-1	MKJ-121516-2	MKJ-121516-3	RCB297-071316
Drainage Type			CS	CS	CS	CS
Sample Method			Grab-Manual	Grab-Manual	Grab-Manual	
Location Type			ODS	ODS	ODS	RCB
Analyte	Unit	CSL/2LAET				
Solids, Total	%		80.87	55.55	72.69	82.2
Total Organic Carbon	%		11	15.3	9.66	3.19
Arsenic	mg/kg	93				8
Copper	mg/kg	390				55.2
Lead	mg/kg	530				27
Mercury	mg/kg	0.59				0.03 U
Zinc	mg/kg	960				234
Diesel Range Hydrocarbons	mg/kg	2,000				220
Motor Oil Range	mg/kg	2,000				2,300
Acenaphthene	ug/kg	500				94 U
Acenaphthylene	ug/kg	1,300				94 U
Anthracene	ug/kg	960				94 U
Fluorene	ug/kg	540				94 U
LPAH	ug/kg	5,200				38 J
Naphthalene	ug/kg	2,100				94 U
Phenanthrene	ug/kg	1,500				38 J
Benzo(A)anthracene	ug/kg	1,600				28 J
Benzo(A)pyrene	ug/kg	1,600				47 J
Benzo(G,H,I)perylene	ug/kg	720				89 J
Benzofluoranthenes, Total	ug/kg	3,600				120 J
Chrysene	ug/kg	2,800				150
Dibenzo(A,H)anthracene	ug/kg	230				33 J
Fluoranthene	ug/kg	2,500				47 J
HPAH	ug/kg	17,000				622 J
Indeno(1,2,3-Cd)pyrene	ug/kg	690				38 J
Pyrene	ug/kg	3,300				70 J
cPAH	ug/kg	1,000				80.3 J
Bis(2-ethylhexyl)phthalate	ug/kg	1,900				1,300
Butylbenzylphthalate	ug/kg	900				140
Diethylphthalate	ug/kg	1,200				94 U
Dimethylphthalate	ug/kg	160				94 U
Di-N-Butylphthalate	ug/kg	1,400				28 J
Di-N-Octylphthalate	ug/kg	6,200				94 U
Aroclor 1016	ug/kg		17.7 U	1,850 U	885 U	19 U
Aroclor 1221	ug/kg		17.7 U	1,850 U	885 U	19 U
Aroclor 1232	ug/kg		17.7 U	1,850 U	885 U	19 U
Aroclor 1242	ug/kg		17.7 U	1,850 U	885 U	19 U
Aroclor 1248	ug/kg		154	57,200	39,500	19 U
Aroclor 1254	ug/kg		186	13,900 U	11,100 U	58
Aroclor 1260	ug/kg		163	6,610	7,410	24
Polychlorinated Biphenyls	ug/kg	1,000	503	63,810	46,910	82
1,2,4-Trichlorobenzene	ug/kg	51				94 U
1,2-Dichlorobenzene	ug/kg	50				94 U
1,3-Dichlorobenzene	ug/kg					94 U
1,4-Dichlorobenzene	ug/kg	110				94 U
1-Methylnaphthalene	ug/kg					94 U
2,2'-Oxybis(1-chloropropane)	ug/kg					94 U
2,4,5-Trichlorophenol	ug/kg					470 U
2,4,6-Trichlorophenol	ug/kg					470 U
2,4-Dichlorophenol	ug/kg					470 U
2,4-Dimethylphenol	ug/kg	29				470 U
2,4-Dinitrophenol	ug/kg					940 U
2,4-Dinitrotoluene	ug/kg					470 U
2,6-Dinitrotoluene	ug/kg					470 U
2-Chloronaphthalene	ug/kg					94 U
2-Chlorophenol	ug/kg					94 U
2-Methylnaphthalene	ug/kg	670				94 U
2-Methylphenol	ug/kg	63				94 U
2-Nitroaniline	ug/kg					470 U
2-Nitrophenol	ug/kg					94 U
3,3`-Dichlorobenzidine	ug/kg					470 U
3-Nitroaniline	ug/kg					470 U
4,6-Dinitro-2-Methylphenol	ug/kg					940 U
4-Bromophenyl phenyl ether	ug/kg					94 U
4-Chloro-3-Methylphenol	ug/kg					470 U
4-Chloroaniline	ug/kg					470 U
4-Chlorophenyl Phenylether	ug/kg					94 U
4-Methylphenol	ug/kg	670				94 U
4-Nitroaniline	ug/kg					470 U
4-Nitrophenol	ug/kg					470 U
Benzoic acid	ug/kg	650				940 UJ
Benzyl alcohol	ug/kg	73				94 U
bis(2-Chloroethoxy) methane	ug/kg					94 U
Bis-(2-chloroethyl) ether	ug/kg					94 U
Carbazole	ug/kg					94 U
Dibenzofuran	ug/kg	540				94 U
Hexachlorobenzene	ug/kg	70				94 U
Hexachlorobutadiene	ug/kg	120				94 U
Hexachlorocyclopentadiene	ug/kg					470 U
Hexachloroethane	ug/kg					94 U
Isophorone	ug/kg					94 U
Nitrobenzene	ug/kg					94 U
N-Nitroso-Di-N-Propylamine	ug/kg					94 U
N-Nitrosodiphenylamine	ug/kg	40				94 U
Pentachlorophenol	ug/kg	690				470 U
Phenol	ug/kg	1,200				61 J
Coarse Sand	%					1.6
Fine Gravel	%					0.4
Fine Sand	%					7.3
Gravel	%					0.3
Medium Sand	%					4
Very Coarse Sand	%					0.5
Very Fine Sand	%					5.1

Location			ODS45	
Sample Date			29 Dec 2016	
Sample Name			MKJ-122916-6	
Drainage Type			SD	
Sample Method			Grab-Manual	
Location Type			ODS	
Analyte	Unit	CSL/2LAET		
Solids, Total	%		78.78	
Total Organic Carbon	%		1.72	
Arsenic	mg/kg	93	6.73	
Copper	mg/kg	390	22.4	
Lead	mg/kg	530	18.6	
Mercury	mg/kg	0.59	0.02498	U
Zinc	mg/kg	960	105	
Diesel Range Hydrocarbons	mg/kg	2,000	347	
Motor Oil Range	mg/kg	2,000	2,140	
Acenaphthene	ug/kg	500	10.3	J
Acenaphthylene	ug/kg	1,300	36.8	U
Anthracene	ug/kg	960	16.2	J
Fluorene	ug/kg	540	36.8	U
LPAH	ug/kg	5,200	135	J
Naphthalene	ug/kg	2,100	22.2	J
Phenanthrene	ug/kg	1,500	86.7	
Benzo(A)anthracene	ug/kg	1,600	65.1	
Benzo(A)pyrene	ug/kg	1,600	79.7	
Benzo(G,H,I)perylene	ug/kg	720	86.2	
Benzofluoranthenes, Total	ug/kg	3,600	229	
Chrysene	ug/kg	2,800	165	
Dibenzo(A,H)anthracene	ug/kg	230	39.5	
Fluoranthene	ug/kg	2,500	188	
HPAH	ug/kg	17,000	1,123	
Indeno(1,2,3-Cd)pyrene	ug/kg	690	61.3	
Pyrene	ug/kg	3,300	209	
cPAH	ug/kg	1,000	133	
Bis(2-ethylhexyl)phthalate	ug/kg	1,900	460	
Butylbenzylphthalate	ug/kg	900	36.4	J
Diethylphthalate	ug/kg	1200	36.8	U
Dimethylphthalate	ug/kg	160	36.8	U
Di-N-Butylphthalate	ug/kg	1400	18.1	J
Di-N-Octylphthalate	ug/kg	6200	36.8	U
Aroclor 1016	ug/kg		17	U
Aroclor 1221	ug/kg		17	U
Aroclor 1232	ug/kg		17	U
Aroclor 1242	ug/kg		17	U
Aroclor 1248	ug/kg		17	U
Aroclor 1254	ug/kg		29.3	
Aroclor 1260	ug/kg		38	
Polychlorinated Biphenyls	ug/kg	1,000	67.3	
1,2,4-Trichlorobenzene	ug/kg	51	36.8	U
1,2-Dichlorobenzene	ug/kg	50	36.8	U
1,3-Dichlorobenzene	ug/kg		36.8	U
1,4-Dichlorobenzene	ug/kg	110	36.8	U
1-Methylnaphthalene	ug/kg		36.8	U
2,2'-Oxybis(1-chloropropane)	ug/kg		36.8	U
2,4,5-Trichlorophenol	ug/kg		184	U
2,4,6-Trichlorophenol	ug/kg		184	U
2,4-Dichlorophenol	ug/kg		184	U
2,4-Dimethylphenol	ug/kg	29	184	UJ
2,4-Dinitrophenol	ug/kg		368	UJ
2,4-Dinitrotoluene	ug/kg		184	UJ
2,6-Dinitrotoluene	ug/kg		184	U
2-Chloronaphthalene	ug/kg		36.8	U
2-Chlorophenol	ug/kg		36.8	U
2-Methylnaphthalene	ug/kg	670	17.9	J
2-Methylphenol	ug/kg	63	36.8	U
2-Nitroaniline	ug/kg		184	UJ
2-Nitrophenol	ug/kg		36.8	U
3,3`-Dichlorobenzidine	ug/kg		184	U
3-Nitroaniline	ug/kg		184	U
4,6-Dinitro-2-Methylphenol	ug/kg		368	U
4-Bromophenyl phenyl ether	ug/kg		36.8	U
4-Chloro-3-Methylphenol	ug/kg		184	U
4-Chloroaniline	ug/kg		184	U
4-Chlorophenyl Phenylether	ug/kg		36.8	U
4-Methylphenol	ug/kg	670	36.8	U
4-Nitroaniline	ug/kg		184	U
4-Nitrophenol	ug/kg		184	UJ
Benzoic acid	ug/kg	650	204	J
Benzyl alcohol	ug/kg	73	36.8	UJ
bis(2-Chloroethoxy) methane	ug/kg		36.8	U
Bis-(2-chloroethyl) ether	ug/kg		36.8	U
Carbazole	ug/kg		28.2	J
Dibenzofuran	ug/kg	540	11.4	J
Hexachlorobenzene	ug/kg	70	36.8	U
Hexachlorobutadiene	ug/kg	120	36.8	U
Hexachlorocyclopentadiene	ug/kg		184	U
Hexachloroethane	ug/kg		36.8	U
Isophorone	ug/kg		36.8	U
Nitrobenzene	ug/kg		36.8	U
N-Nitroso-Di-N-Propylamine	ug/kg		36.8	U
N-Nitrosodiphenylamine	ug/kg	40	36.8	U
Pentachlorophenol	ug/kg	690	184	U
Phenol	ug/kg	1,200	33.8	J
Coarse Sand	%		5.8	
Coarse Silt	%		16.2	
Fine Sand	%		24.6	
Medium Sand	%		13.5	
Very Coarse Sand	%		3.1	
Very Fine Sand	%		10.4	

Attachment B: Operation and Maintenance for Duwamish Source Control Needs

Attachment B - Appendix 13 O&M Programmatic Strategy Evaluation

This report is provided to comply with the 2012 NPDES Phase I Municipal Stormwater Permit, Appendix 13, which requires the City of Seattle (City) to submit a report documenting the City's evaluation efforts, results, proposed actions, schedules and performance targets. The Appendix 13 requirement is as follows:

> "Develop an operation and maintenance program for MS4 infrastructure, including municipal streets, to ensure future MS4 infrastructure operations, maintenance, and capital projects address Duwamish Source Control needs. The Permittee shall evaluate programmatic strategies for assessing existing MS4 infrastructure conditions, and planning and implementing repairs, replacement and rehabilitation projects to address LDW source control. The permittee shall submit a report documenting the evaluation effort and its results, including proposed actions, implementation schedules and performance targets."

Background

The City owns and operates municipal separate storm sewer system (MS4) infrastructure in the Lower Duwamish Waterway (LDW) basin that collects, conveys, treats or detains stormwater runoff from public roadways and private parcels to outfalls in the Duwamish River. The infrastructure consists of ditches, inlets, catch basins, maintenance holes, drainage lines, stormwater treatment facilities (e.g., oil water separators, wet vaults, water quality ponds, swales), and outfalls. Stormwater assets in the LDW are also owned and operated by others including King County, Port of Seattle, City of Tukwila, State of Washington and private entities. Figure 1 shows the approximate location of the municipal separate storm sewer system basins in the LDW.

The City currently implements an operation and maintenance program for MS4 infrastructure City-wide as required by the NPDES Phase I Municipal Stormwater Permit, Condition S5.C.9. The City's operations and maintenance program includes the following activities: adoption of maintenance standards equivalent to Chapter V of the Stormwater Management Manual for Western Washington; annual inspection of City owned catch basins; maintenance of catch basins that exceed maintenance standards; inspection of City owned stormwater flow control and water quality facilities; maintenance of stormwater flow control and water quality facilities that exceed maintenance standards; a spot check program to inspect key infrastructure after major storm events; practices, policies and procedures for lands and roads owned or maintained by the permittee; a variety of roadway improvement projects that range from minor surface repair to full road surface replacement. Information on these activities can be found in the City's Stormwater

Management Plan and Annual Reports found at:
http://www.seattle.gov/util/myservices/drainagesewer/aboutthedrainagesewersystem/stormwatermanagementplan/

Operations and Maintenance Program

SPU's Drainage and Wastewater Line of Business, Drainage and Wastewater Systems Maintenance Division is responsible for the operation and maintenance of the stormwater drainage assets in the LDW. The South District Crew (e.g., Surface Water Management, Underground, and Line and Grade) completes most of the work. The All-City Crew also completes grounds maintenance tasks for facility's that require it in the LDW, and provides first response for emergency and urgent calls. Inspection and maintenance of assets is divided by work group. Assets operate by other City Departments are inspected and maintained by these departments.

Inspection and maintenance of stormwater drainage assets are managed through routine preventive maintenance (PM) work orders, non-routine service request (SR) work orders, and work orders through the Maximo Asset Management software program, which SPU uses to manage and track drainage and wastewater assets. The Maximo system is tied to City GIS so that work order information in Maximo is tied to the spatial data for the asset in GIS. Work orders are assigned to Drainage and Wastewater System Maintenance Division Crews along with asset information and location. The Drainage and Wastewater System Maintenance Division Crews conduct the work and then document completion of work and additional maintenance needs in a mobile Maximo application. Maximo allows Field Operation Crews and Management to track and report on progress towards permit required operation and maintenance requirements.

Annual catch basin inspection and maintenance

SPU's catch basin inspection program is currently following the permit option to inspect all catch basins annually and maintain those that require maintenance within 6-months. The program is implemented by the Surface Water crews with in the Drainage and Wastewater System Maintenance Division. Inspections are completed by a one-person crew, except on busy arterials where additional crew are needed for traffic control. Each crew inspects all catch basins located within a map grid and utilizes a geographically-based catch basin inspection program to enter data, such as sediment depths measured, and general condition of lids, inlets, and traps. Conditions that indicate follow-up maintenance is necessary (such as sediment depths greater than 1.5 feet, which is generally assumed to be equivalent to 60% of the sump depth in most catch basins) result in follow-up work orders that are implemented by the underground crew with appropriate equipment (e.g., vactor trucks for removing sediment). Crews also remove sediment from inlets and debris from inlet lines during catch basin inspections.

Line cleaning

SPU's source control implementation plan is the primary mechanism for line cleaning in the LDW for the primary purpose of removing contaminated material accumulated in drainage lines to prevent it from ultimate deposition in the LDW. The source control implementation plan line cleaning program began in 2008, with a budget to clean approximately 5,000 to 10,000 linear feet of line each year in the MS4 basins that discharge to the LDW. Figure 2 generally displays line cleaning conducted by The City of Seattle.

Line cleaning in the LDW is prioritized based on factors such as (1) the potential for contaminated material accumulation, (2) length of affected line, (3) potential flooding due to reduced line capacity, and (4) video inspection needs. Line cleaning is not conducted until source tracing efforts have been thoroughly completed within the portion of the system that is slated for cleaning. Line cleaning is generally conducted by contractors, rather than City crews because of their current workload and potential for contaminated sediment. However, the "Line and Grade" crew also conducts line cleaning. Temporary decant/treatment facilities are installed by contractors near line cleaning operations to dispose and/or treat liquids and solids generated from the line cleaning activities. Water removed from and used in the line cleaning activities is treated and discharged to the wastewater collection system through permits with King County. Dewatered solid material is disposed of at an appropriate landfill facility after analyses are conducted to characterize the material.

At some locations, line cleaning is conducted by the Drainage and Wastewater Systems Maintenance Division by preventive maintenance (PM) tasks. This work is conducted at regular intervals or when work orders are initiated through closed-circuit television (CCTV) inspection, complaints or other mechanisms.

Stormwater Facilities

SPU has an inspection and maintenance program based on maintenance standards to reduce stormwater impacts associated with runoff from impervious surfaces that discharge to the City's Municipal Separate Storm Sewer System (MS4). This program follows the City's current Stormwater Code (2016). In addition, the current Director's Rule DR 21-2015, DWW-200, Vol. 3 – Project Stormwater Control, Appendix G outlines inspection, maintenance, and record keeping requirements for public and private stormwater management facilities in the City.

The general locations of City owned and operated stormwater facilities are displayed in Figure 3.

Municipal Streets

The Seattle Department of Transportation (SDOT) implements a variety of planned activities to improve the road surfaces of municipal streets, and source control efforts, through repair or replacement. These activities range from major capital investments in full road surface replacement to small programs such as pot-hole repairs. SDOT issues street use permits for activities conducted by businesses and individuals in the right-of-way. Street use permits include best management practices to reduce and control sources of pollution. SDOT and SPU coordinate on street sweeping and rehab, replacement or rehabilitation to improve the condition of the municipal street surface and drainage infrastructure. Current coordination actions are described in this document.

Evaluation of Programmatic Strategies

Catch Basin Inspections Evaluation

As part of the evaluation of how the City could adjust its operation and maintenance practices to control source of pollution, SPU reviewed catch basin inspection data for catch basins located in the MS4 basins discharging to the LDW and evaluated alternatives to the existing inspection and maintenance program for the LDW, with potential city-wide applicability.

Current Approach

The City of Seattle implements the catch basin inspection requirement in S5.C.9 by inspecting all catch basins and maintaining those that exceed the maintenance standards within 6-months. SPU's catch basin inspection program is implemented by two crews, a crew conducting inspection and a second crew conducting the required maintenance. Inspections are completed by a one-person crew, except on busy arterials where additional crew are needed for traffic control. Each crew inspects all catch basins located within a map grid and utilizes a geographically-based catch basins inspection program to enter data, such as sediment depths measured, and general condition of lids, inlets, and traps. Conditions that indicate follow-up maintenance is necessary (such as solids depths greater than 1.5 feet, which is generally assumed to be equivalent to 60% of the sump depth in most catch basins) result in follow-up work orders that are implemented by the underground crew with appropriate equipment (e.g., vactor trucks for removing sediment). During the inspection, crews remove solids from inlets and debris from inlet lines during catch basin inspections.

Study Methodology

To evaluate programmatic strategies for catch basin inspection and maintenance, three areas were investigated during 2017 to determine if a modification or alternative approach is appropriate in the Lower Duwamish MS4 basins; evaluation of SPU catch basin inspection data, investigation into how other municipalities conduct catch basin inspections and an evaluation of the current SPU catch basin inspection program against the source tracing data collected as part of the Source Control Implementation Program. SPU was assisted with this work by AltaTerra consulting.

AltaTerra Consulting evaluated SPU's Geographic Information System (GIS) catch basin inspection data. The data was "clipped" in GIS to the Lower Duwamish MS4 basin boundary and the attribute table associated with the GIS shapefile was exported to an excel file for evaluation purposes. Eight years of data (2009 through 2016) for approximately 2,880 CBs in the Lower Duwamish MS4 basins were evaluated.

Several different parameters were evaluated for trends to understand SPU's existing catch basin inspection and maintenance program and identify potential options to improve source control actions and improve the effectiveness of the program.

- Number of catch basins that required cleaning.
- Number of times individual catch basins required cleaning within 8-year evaluation period.
- Locations of frequently cleaned catch basins relative to street sweeping routes.
- Comparison of catch basins requiring cleaning between priority and no-priority SCIP basins.

SPU prioritizes Lower Duwamish MS4 basins for source control activities based upon solids data and other factors. This prioritization was compared to the catch basin inspection data to determine if patterns or potential changes to the catch basin inspection program should be made to improve source control efforts.

Results of Catch Basin Evaluation

Evaluation of data collected by SPU crews between 2009 and 2016 as part of the catch basin inspection and maintenance program indicate that between 12% and 30% of catch basins in the LDW require cleaning each year, and 43% of all catch basins in the LDW did not require cleaning in any of the eight years for which they were inspected. The average time between catch basin cleanings is 3-years. Figure 4 displays the frequency of maintenance during the 8-year evaluation period including catch basins in the priority MS4 basins in the LDW. Figure 5 displays the frequency of cleaning of the catch basins in years in the MS4 basins in the LDW.

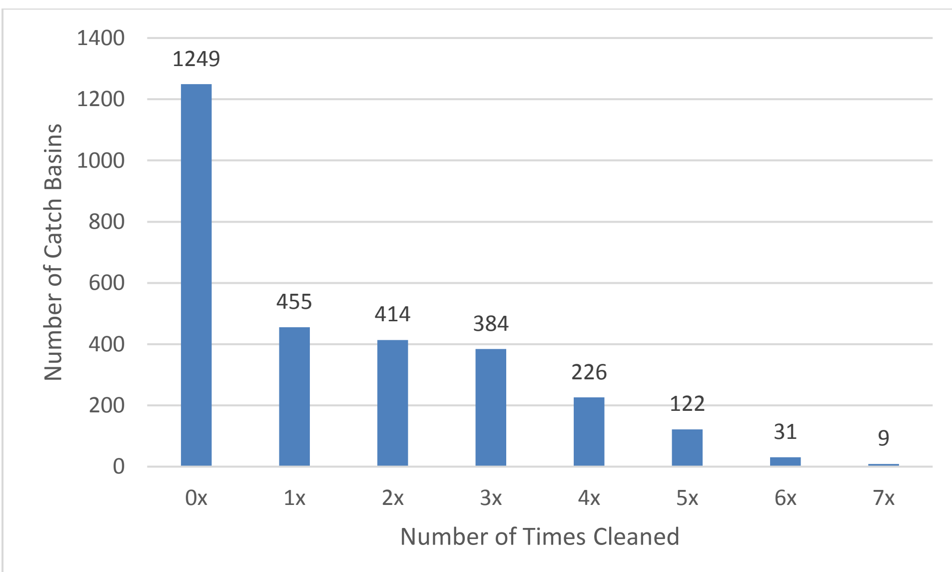

Figure 5 – Catch Basin Cleaning Frequency 2009-2016

Approaches by Other Municipalities

To evaluate how other municipalities' implement catch basin inspection and maintenance, Stormwater staff from four municipalities in the Puget Sound region were interviewed in 2016 to compare program approaches and potential transferrable strategies that could be implemented by SPU. Table 1 summarizes the approaches used by the Cities of Tacoma, Everett, and Renton, and King County. Details gained from the interviews, including pros and cons of the different approaches according to staff in charge of implementation for those municipalities.

Utility	CB Inspection and Maintenance Approach	Comments
City of Tacoma	Inspects CBs on "circuit basis" (S.5.C.9.d.i (2))	Dedicated crew inspects and cleans 25% of each sub-basin per year. Additional inspections/cleanings are conducted as time permits.
City of Everett	Does not use an alternative approach; inspects all CBs on an annual basis, and cleans those that require cleaning.	
City of Renton	Majority of City uses alternative approach S.5.C.5.d.iii "Cleans all pipes, inlets, catch basins, and ditches within a circuit once during the permit term", except for Parks and the Golf Course, which uses S.5.C.5.d.ii "inspects all catch basins once before 2017, and circuit basis thereafter".	Renton feels a high level of service is provided using this method because the entire system, including pipes and ditches are cleaned once approximately every 5 years.
King County (Duwamish/White Center only)	Varies depending on custodial agency. King County Roads has greatest responsibility and uses "circuit basis" approach to CB inspection. All other custodial agencies inspect CBs on an annual basis. King County International Airport (KCIA) implements daily mechanical sweeping and uses an alternative inspection and maintenance approach. KCIA cleans all pipes, inlets, and CBs on a circuit basis such that all assets are cleaned once every 3 years.	

Table 1 – summary of catch basin programs in other municipalities.

Pilot Study on modified Catch Basin Approach

During 2017, SPU conducted a pilot study to determine if one of the catch basin inspection programmatic strategies allowed in S5C.9 would identify programmatic strategies to address LDW source control and efficiencies in the SPU catch basin inspection and maintenance program. The evaluation was based upon on the catch basin information gathered from other municipalities and the options in S5.C.9.

As part of the pilot, SPU reviewed 6 approaches to catch basin inspection listed in Table 2.

Alternative	Description
No Change	Existing Program – inspect all catch basins every year and conduct required maintenance using two crews, one for inspection and one for maintenance.
Option 1	Inspect all catch basins every year and conduct required maintenance using one crew that conducts inspection and maintenance at same time.

Option 2	Clean all catch basins once per permit cycle.
Option 3	Clean all catch basins once per permit cycle plus clean problem areas every year.
Option 4	Change frequency of catch basin inspection based upon data to every other year.
Option 5	Change frequency of catch basin inspections based upon data to every other year plus clean problem areas every year.

Table 2 – Catch Basin Inspection Options

Following the review of these options, the Drainage and Wastewater System Maintenance crews embarked on a pilot study to compare the Current option vs. Option 1. Options 2-5 were not evaluated at this time due to the need to coordinate with Ecology on changing the inspection frequency per S5.C.9.d.i.(1).

The pilot study was conducted in the SW Kenney St. and 1st Ave. S Lower Duwamish Drainage Basins. Both areas contain W. Marginal Way, have similar land use and have a similar number of catch basins and catch basin cleaning frequency. The study compared the efficiency of inspecting and maintaining catch basins using the data collected in 2016 using the current approach (inspect all catch basins annually with one crew, maintain as required using a second crew) vs. Option 1 (inspect all catch basins annually and maintain as required with one crew) in 2017.

The results of the pilot study of the current approach to inspection and maintenance of catch basins (2 crews) vs. Option 1, inspection and maintenance of catch basins using one crew are inconclusive. A variety of factors, such as number of parked cars, the amount of solids in catch basins and difference in traffic control between the current approach and Option 1 may have influenced the results.

Comparison of Catch Basin Program to Street Sweeping Routes

The catch basin sedimentation data within street sweeping routes was evaluated in 2017 to determine if street sweeping affects the frequency for which catch basins require cleaning. Street sweeping also supports pollution reduction and the Lower Duwamish Source Control Implementation program by routinely removing trash, debris and sediment from roadways that might otherwise wash into the storm drainage system when it rains. Some of the street sweeping routes, including South Myrtle Street, are specifically swept as part of the City's Source Control Implementation plan. The City uses high efficiency, regenerative air sweepers, and uses a reduced sweeper speed to enhance particle pick-up in MS4 areas, such as the LDW.

Comparison of the catch basin maintenance data to the sweeping routes in the LDW were inconclusive. The existing street sweeping routes do not appear to correspond positively or negatively with catch basins maintenance. This finding is similar to the findings of the Street Sweeping Pilot Study conducted in 2009 (Seattle 2009).

Comparison of Catch Basin Program to SCIP Priorities

In 2017, SPU compared the inspection and maintenance data between priority vs. non-priority SCIP basins to determine if certain areas or catch basins could be identified for different implementation schedules to address source control needs. There are no distinct patterns of inspection and maintenance between catch basins in priority vs. non-priority SCIP basins. Comparison of the average time between required cleaning is 3 years in both priority and non-priority basins. Based on this evaluation no changes will be made to the catch basin inspection and maintenance program in the LDW SCIP MS4 basins.

The South Myrtle Street catch basins are inspected quarterly as part of the Myrtle Street adaptive management and Appendix 13 of the MS4 Permit. The data reviewed supports reducing the inspection frequency of the South Myrtle Street catch basins from quarterly to annually to be in alignment with the catch basin inspection and maintenance program in the rest of the LDW basin. SPU will propose to Ecology that this adaptive management requirement be revised in the 2019 permit.

Evaluation of the Line Cleaning

An evaluation of the line cleaning program was conducted in 2017. Evaluation of the data indicates that some lines have been cleaned through the SCIP program by private contractors and segments of the same system have been cleaned through preventative maintenance triggers. This has likely resulted in duplicating efforts unnecessarily. To reduce this duplication of effort and gain effectiveness for source control actions, the Source Control Team and Drainage and System Maintenance will coordinate at the beginning of each year to identify where each program will focus line cleaning so that duplication is avoided. As part of the refinements, SPU will establish consistent PM frequencies for the line cleaning program in the Lower Duwamish Waterway.

Evaluation of Stormwater Facility Inspection and Maintenance Program

The purpose of this evaluation effort was to review SPU's program for inspection and maintenance of SPU-owned stormwater treatment facilities in the LDW and to evaluate alternatives to the existing program for the LDW to address source control. The City has an inspection and maintenance program based on maintenance standards in place to reduce stormwater impacts associated with runoff from impervious surfaces and operation and maintenance of stormwater facilities that discharge to the MS4. This program follows the City's current Stormwater Code (2016). In addition, the current Director's Rule DR 21-2015, DWW-200, Vol. 3 – Project Stormwater Control, Appendix G outlines inspection, maintenance, and record keeping requirements for public and private stormwater management facilities in the City.

Comparison to Other Utilities

Three Surface and Stormwater Utilities (Cities of Renton, Tacoma, and King County) in the Puget Sound region were interviewed in 2016 to compare program approaches to stormwater facility inspection and maintenance and potential transferrable strategies that could be implemented by SPU.

The City of Renton performs annual inspections of stormwater facilities that are completed by summer interns. The maintenance crew conducts cleaning and repair of stormwater facilities, and everyone on the crew rotates through the cleaning and repair jobs. The crews do not specialize. There are 15 maintenance workers on the drainage side. The only maintenance that is contracted out is permitted confined space entry work. The crews use GIS in the field to access facility information such as construction drawings and invert elevations for where sediment measurements should be taken.

Facility inspections for the City of Tacoma drainage utility are done by the source control representatives (business inspectors) rather than maintenance personnel. The City reports that this works well for their system. The asset management group determines maintenance needs based on the inspections (capital vs. maintenance-oriented).

King County's stormwater facilities are inspected by the asset management group and maintained by the County's Roads Department.

The City of Seattle's current program is to have all facilities on a preventative maintenance schedule and issue work orders annually to inspect all stormwater facilities to determine if maintenance is required. If maintenance is required, a work order is established to complete the maintenance within 1-year for typical maintenance. The Drainage and Wastewater Maintenance division conducts the inspections and maintenance.

The evaluation determined that the current approach by SPU Drainage and Wastewater Maintenance Division will be continued. The evaluation identified that work should be done to evaluate the current preventative maintenance and job plans for the stormwater facilities to adjust inspection frequencies if necessary and clarify information about the facilities. SPU has recently assigned this work to the Systems Operation, Planning and Analysis group who will be working with the SPU Drainage and Wastewater Maintenance Division to make these adjustments.

Infrastructure Repair, Replacement and Rehabilitation

Move Seattle

The Seattle Department of Transportation (SDOT) Move Seattle Levy project list contains over 50 arterial paving projects, 18 bridge projects, and over a dozen corridor (transit, freight) projects. Move Seattle projects planned for 2016 through 2018 in the LDW are; 4th Ave. S, E. Marginal Way, Michigan/Bailey/Corson and S. Dearborn St. Move Seattle projects will involve construction activities over or near SPU assets. Some of these projects may offer opportunities for SPU to repair or replace assets at reduced costs through shared pavement restoration, mobilization, and traffic control costs.

Additionally, there is an expectation from the Mayor's Office for improved right-of-way coordination and reduced impacts to the public from construction activities. To meet this requirement, SPU has implemented a programmatic approach to evaluate SPU assets in Move Seattle and other potential roadway project areas.

The evaluation consists of reviewing CCTV and other asset condition information to determine the condition and potential needs around repair, replacement and rehabilitation of drainage infrastructure. Based on this information, SPU identifies three partnering categories that reflect a progression of SPU involvement in roadway projects that present an opportunity to repair, replace and rehabilitate MS4 infrastructure. Categories are determined by the existing conditions of DWW and Water assets, unavoidable impacts from right-of-way projects to SPU systems, and opportunities to partner to replace underperforming assets at reduced costs. The three categories are:

1. Asset Protection and Rehabilitation - The purpose of this category is to preserve existing service levels at least cost and maintain system function. Category 1 actions include protection of SPU assets from construction impacts, standard asset replacement, and condition driven rehabilitation.
2. Impact Driven Improvements - Category 2 projects require an increased level of SPU participation. In this category, protection and rehabilitation of assets are not sufficient to address project impacts to SPU infrastructure; relocation or reconfiguration of SPU assets is required.
3. Opportunity Improvements - Category 3 projects are initiated to improve service levels, reduce risk, reduce future capital and O&M costs, and/or provide service where there currently is none. This category represents the highest level of SPU participation, and it is the most resource-intensive category. Category 3 projects will likely include many Category 1 protection and/or rehabilitation actions and minor Category 2 impact-driven actions.

As opportunity and budget allow, SPU will be implementing repair, replacement and rehabilitation projects of MS4 infrastructure that are identified during evaluation of Move Seattle opportunities. It is anticipated that these actions will help address source control needs.

South Park Conveyance Project

SPU, in partnership with SDOT, will be implementing a project to improve road surfaces and construct right-of-way and drainage conveyance improvements for approximately 3,600 linear feet of roadway and 880 linear feet of storm pipe, within the 7th Ave. South MS4 basin. The 7th Ave. South MS4 basin is a SCIP priority basin and this project will address source control needs by repairing, replacing or rehabilitating stormwater and roadway infrastructure. Most roads in this area are in poor condition. SPU and SDOT have partnered to address these long-standing needs by leveraging investments from both departments. Although the area may not be at the top of each department's individual priorities, when looked at from a City-wide perspective, the benefit to each department presents a significant opportunity to make improvements.

Performance targets and Implementation Schedules

SPU will continue with the current approach to inspection and maintenance of catch basins. The schedule will be to inspect all catch basin annually, including those on S. Myrtle St, and to perform maintenance as needed within 6-months. The performance target is the target contained in the permit under S5.C.9.d.iii, inspect all catch basins and achieve at least 95% of required inspections.

SPU will continue with the current approach to annual inspection and maintenance of stormwater facilities owned and operated by the permittee. The performance target is the target contained in the permit under S5.C.9.c iii, inspect all sites and achiever at least 95% of required inspections.

SPU will continue with the current approach to line cleaning in the Lower Duwamish SCIP basins as detailed in Section 7 of the 2015-2020 Source Control Implementation plan which is designed to clean a minimum of 4,000 linear feet of storm drain line each year. SPU will be working to establish consistent PM frequencies as part of the refinements to planning and scheduling associated with the line cleaning program in the Lower Duwamish Waterway. SPU will hold an annual meeting between the Source Control Team and the Drainage and Wastewater Maintenance team to coordinate line cleaning efforts between contracted crews and SPU crews.

SPU will report on progress and accomplishments made towards completion of the South Park Conveyance Project in the 2021 Annual Report.

SPU will continue the development and refinement of preventative maintenance and job plans for City owned stormwater infrastructure and report on status in the 2021 Annual Report.

References

City of Seattle, 2009. Seattle Street Sweeping Pilot Study.

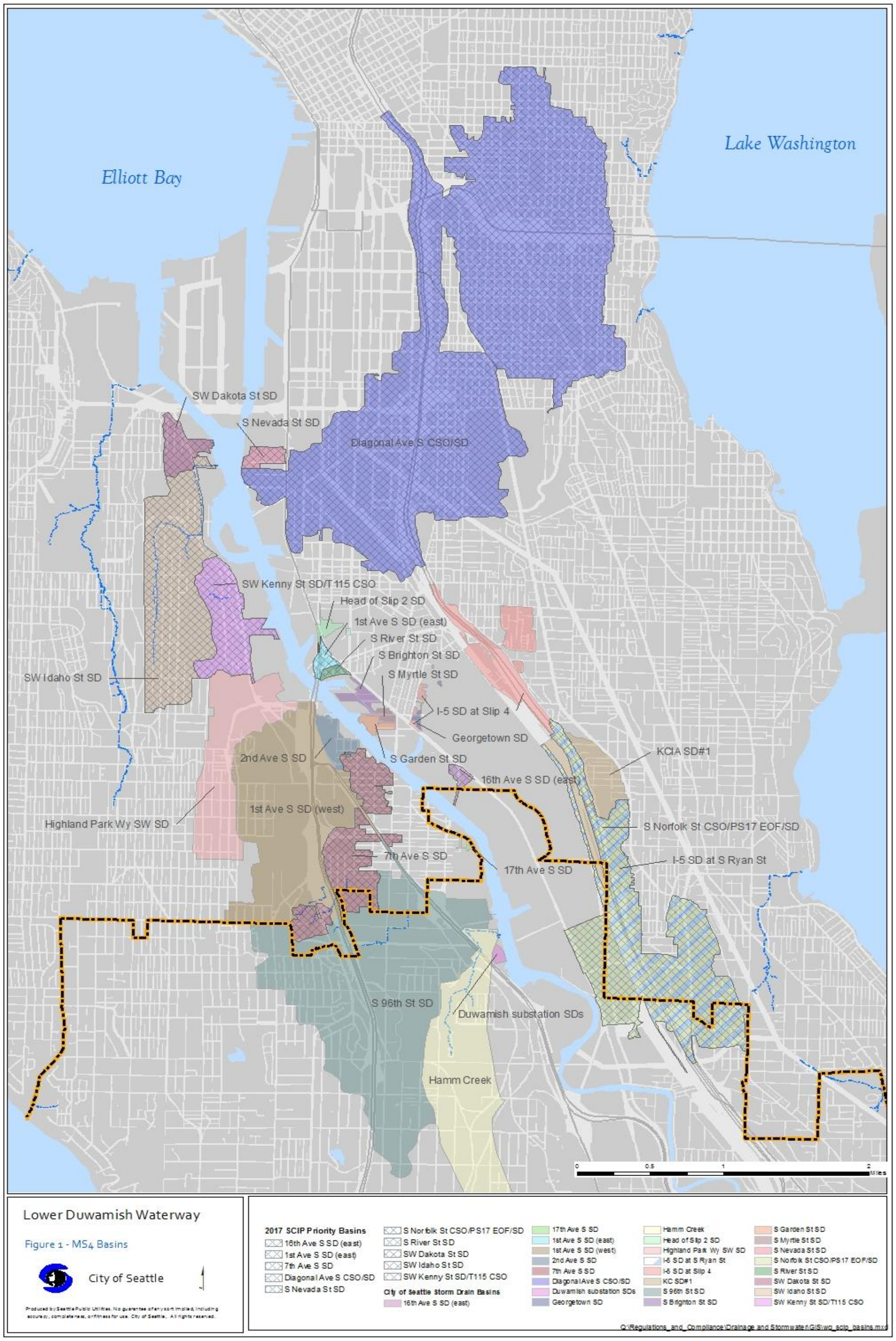

Figure 1. Location of the municipal separate storm sewer system basins in the LDW.

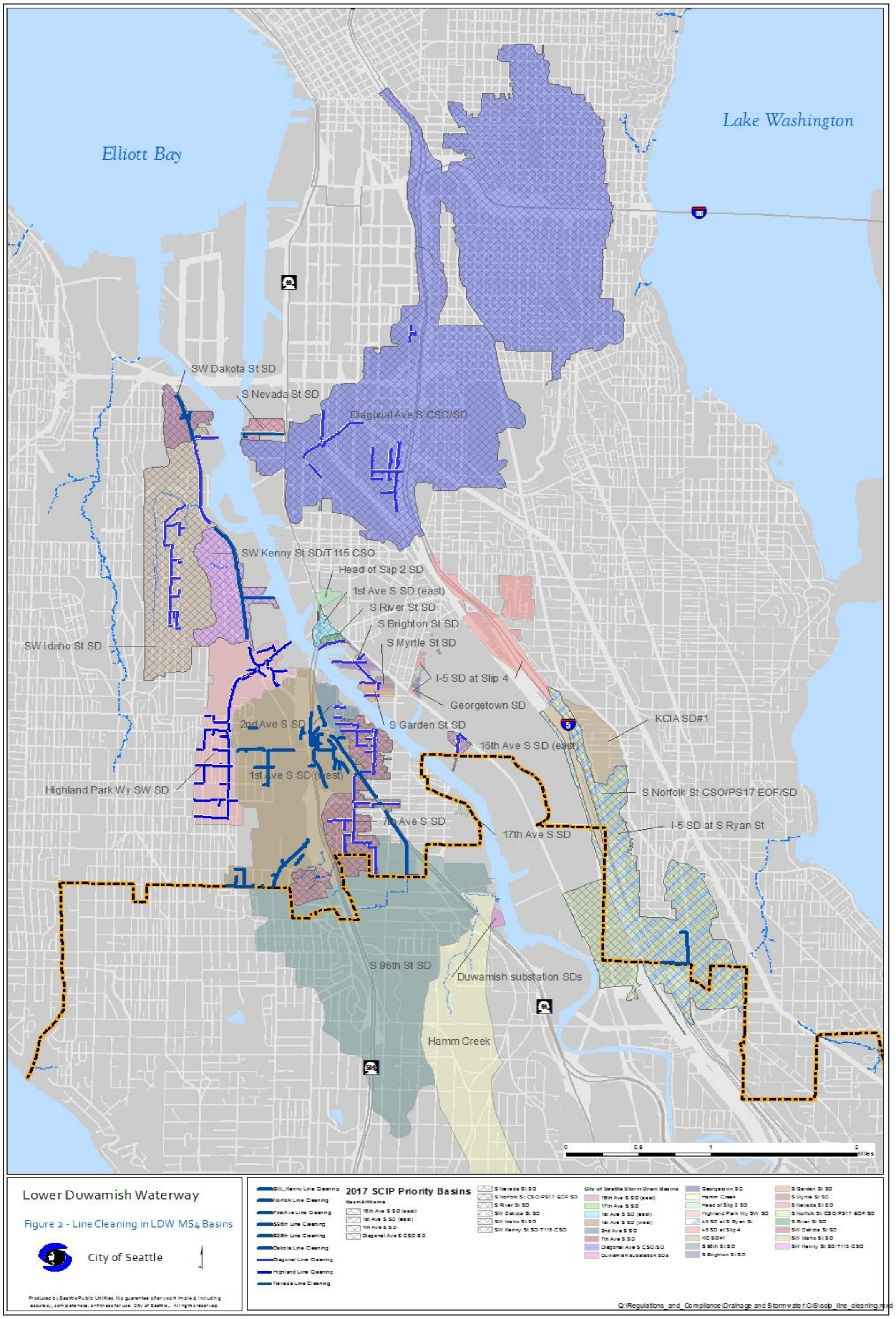

Figure 2. Line cleaning conducted by The City of Seattle in the LDW.

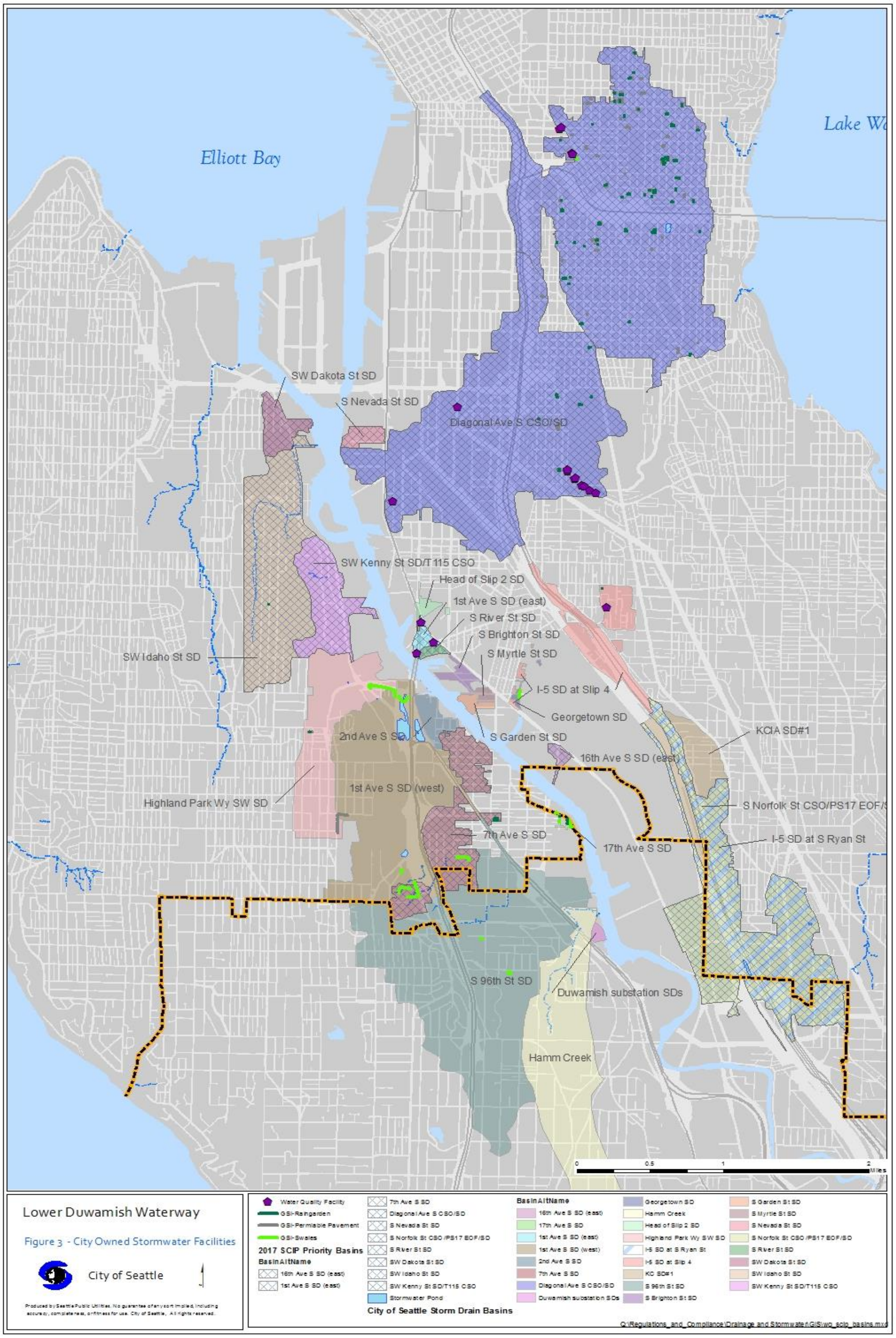

Figure 3. Locations of City owned and operated stormwater facilities in the LDW.

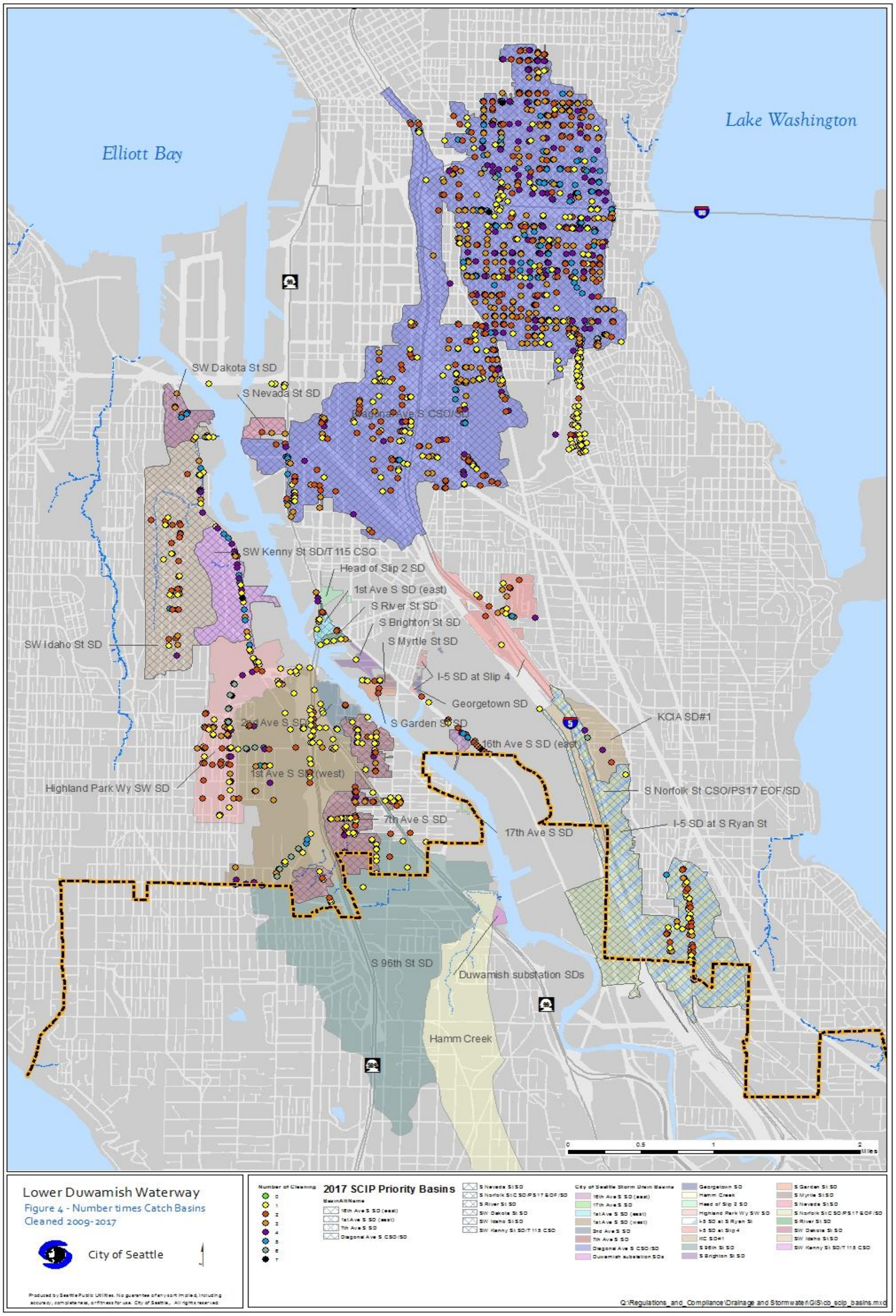

Figure 4. Frequency of catch basin maintenance during the 8-year evaluation period including catch basins in the priority MS4 basins in the Source Control Implementation Plan.