Delaware County Regional Water Quality Control Authority (DELCORA)
CSO Long Term Control Plan Update

Identification of Sensitive Areas and Pollutants of Concern Report (Final)

February 2016
(May 2016)

GREELEY AND HANSEN

REPORT SIGNATURE COVER SHEET

Signature of this cover signifies agreement with the content of the DELCORA Identification of Sensitive Areas and Pollutants of Concern Report.

I certify under penalty of law that the document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

DELCORA MANAGEMENT		
Executive Director	*Signature*	2/9/16 *Date*
DELCORA ENGINEERING		
Director of Engineering	*Signature*	2/9/16 *Date*
DELCORA OPERATIONS AND MAINTENANCE		
Director of Operation and Maintenance	*Signature*	2/3/16 *Date*

REVISION CONTROL

REV. NO.	DATE ISSUED	PREPARED BY	DESCRIPTION OF CHANGES
1	5/17/16	Greeley and Hansen	• Updated Sections ES-3 and ES-4 to reflect changes in the report. • Updated Section 1.1, second paragraph. • Updated Sections 1.3.1, revised text reading 13.3 to be 20 MGD. • Clarified Sections 1.3.2, and 2.1.2 • Updated Table 2-1 and Section 2.3.1.2 to address USEPA comment. • Revised Sections 2.3.2, 2.3.4, 2.3.4.2, 2.3.5.1 to address USEPA comment on sensitive areas. • Updated Figure 2-1 • Revised Sections 2.4, 2.4.1, 2.4.2 to address USEPA comments. • Revised Section 3.7 to address USEPA comments. • Updated Section 3.7.2 • Updated Attachment A and Added Attachment K

Table of Contents

Table of Contents

Table of Contents

List of Tables

List of Figures

Table of Contents

List of Attachments

Executive Summary

ES-1 Background

The Delaware County Regional Water Quality Control Authority (DELCORA) is a municipal authority originally organized under the Pennsylvania Municipal Authorities Act of 1945 (P.L. 382), as amended and supplemented, pursuant to action taken by the Delaware County Council on October 20, 1971. Under County of Delaware Ordinance 2002-1, the term of existence of DELCORA was extended to January 15, 2052.

DELCORA is in the process of developing a Long Term Control Plan (LTCP) Update for the Combined Sewer System (CSS) as part of a Consent Decree entered with the United States Environmental Protection Agency (USEPA or EPA) and the Pennsylvania Department of Environmental Protection (PADEP or DEP). DELCORA's Combined Sewer System is comprised of a sewer that accepts stormwater and sanitary wastewater which is treated at DELCORA's Western Regional Treatment Plant WRTP. As part of this comprehensive effort, DELCORA is to submit a report to the USEPA and PADEP that identifies all Sensitive Areas and Pollutants of Concern (POCs) that are impacted by Combined Sewer Overflows (CSOs) and are within the Model Area for each of its receiving waters. DELCORA is also to identify any additional areas that have been determined by DELCORA as being appropriate for prioritization.

The purpose of this report is to meet the requirement in the Consent Decree for the submission of a report that identifies the Sensitive Areas and Pollutants of Concern that are impacted by DELCORA's CSOs.

ES-2 Consent Decree Requirements

The Consent Decree was lodged in the United States District Court for the Eastern District of Pennsylvania on August 17, 2015, and was approved by the Federal District Court on November 10, 2015. The Consent Decree requires DELCORA to complete and submit a revised and updated LTCP to the USEPA and the PADEP for review and approval. Consent Decree Paragraph V.A.11 (Identification of Sensitive Areas and Pollutants of Concern) requires that within six (6) months after the Date of Lodging, DELCORA shall submit a report that identifies all Sensitive Areas and Pollutants of Concern that are impacted by CSOs and are within the Model Area for each of its receiving waters. The receiving water bodies impacted by DELCORA's CSOs include the Delaware River, Chester Creek and Ridley Creek.

For the Identification of Sensitive Areas, Section V.A.11 of the Consent Decree specifically states:

> *"For each of its Receiving Waters, DELCORA shall contact appropriate agencies, access available data sources, and collect additional data as necessary to identify Sensitive*

Areas. DELCORA shall fully document all such contacts and the associated responses, and all additional investigations carried out to identify Sensitive Areas. DELCORA shall also identify any additional areas that, while not Sensitive Areas, have been identified by DELCORA as being appropriate for prioritization ("Priority Areas")." Additionally, *"For each of its Receiving Waters, DELCORA shall conduct community outreach and appropriate studies to determine whether and to what extent primary contact recreation is occurring in each Receiving Water, and shall fully document its outreach and study methods, and its findings."*

For the Identification of Pollutants of Concern, Section V.A.11 of the Consent Decree specifically states:

"For each of its Receiving Waters, DELCORA shall review existing water quality data and recent PADEP CWA § 303(d) listings to identify POCs. Even if a water body has not been formally listed as out of compliance with its water quality standards and designated uses, if available data indicate such impairment exists and such impairment involves pollutants associated with CSOs, DELCORA shall consider the related pollutants to be POCs."

ES-3 Sensitive Areas Summary

A comprehensive review of online databases, correspondence with regulatory agencies and local environmental organizations and review of responses to the public survey was conducted to identify potential Sensitive Areas within the combined sewer system portion of the collection system.

Outstanding National Resource Waters (ONRW) are maintained and protected by Tier 3 of the USEPA's Antidegradation Policy which can be accessed through the Agency's web portal. Only waters of "exceptional ecological significance" qualify as ONRWs, and States and Tribes determine whether or not a water body will be classified as such. In Chapter 93 of the Pennsylvania Code, it is stated that a water body will be classified as having Exceptional Value (EV) if it is considered by the Commonwealth of Pennsylvania to be an ONRW. No Outstanding National Resource Waters were located within the project boundaries.

The goal of the National Marine Sanctuaries Act (Title 16, Chapter 32, Section 1431 last amended in November 2000) is to identify and designate as National Marine Sanctuaries (NMS) areas of the marine environment which are of special national significance and to manage these areas as the National Marine Sanctuary System. The Office of National Marine Sanctuaries (ONMS) is the trustee of all national marine sanctuaries and as such, it currently recognizes fourteen (14) national marine sanctuaries, none of which are located within DELCORA's service area. Therefore, none of DELCORA's receiving waters, the Delaware River, Chester Creek or Ridley Creek, are considered to be a National Marine Sanctuary.

There are no commercial shellfish harvesters that operate within the study area. The Partnership for the Delaware Estuary reported shellfish areas well downstream of the most southern outfall in DELCORA's system. The uppermost shellfish harvesting area is approximately 32 miles outside the project boundaries. No shellfish beds are located within the project boundaries.

There are numerous drinking water intakes in this geographical area but none are located on the Delaware River downstream in close proximity to DELCORA's CSOs. There are no drinking water intakes located along Chester Creek or Ridley Creek in proximity to DELCORA's service area. Therefore, the Sensitive Area criteria for Drinking Water Intakes does not apply to the Chester or Ridley Creeks.

While the US Fish and Wildlife Service identified several Endangered or Threatened species which potentially could live in the project area, critical habitat was found for Atlantic Sturgeon only. The habitat for year-of-young Atlantic Sturgeon downstream of CSO #002 in the Delaware River meets the Sensitive Area criteria for Endangered or Threatened species. The Atlantic Sturgeon is listed as a threatened species by the US Fish and Wildlife Service with documented habitat in the Delaware River downstream approximately one-half mile downstream of DELCORA's most southern outfall. Therefore, the habitat for year-of-young Atlantic Sturgeon is considered a sensitive area.

The northern reaches of Ridley Creek within DELCORA's service area are designated as Approved Trout Waters and Trout Stocked Streams. The portion of the approved trout waters from CSO #033 downstream to Chestnut Street is considered a Priority Area because of this special environmental use.

The boat launch located between CSO #007 and #008 along the Delaware River is located within the portion of the waterbody rated for primary contact and may be impacted by CSO discharge. The boat launch is considered a Priority Area.

ES-4 Pollutants of Concern Summary

A comprehensive review of existing receiving water quality data was conducted to identify the Pollutants of Concern and this review was performed in accordance with the requirements of the Consent Decree and the CSO Guidance Manual. This review included on-line USEPA STORET data from the Years 2010-2015, results of sampling performed during the preparation of DELCORA's 1999 LTCP and additional CSO sampling. A parameter associated with CSO discharges was considered to be a POC when more than 10% of the total samples reviewed indicated an exceedance of the applicable water quality standard. A secondary category called Parameters of Potential Concern (POPC) was established for those parameters associated with CSO discharges where 2 to 10% of the total samples reviewed indicated an exceedance of the applicable water quality standard.

The specific parameters identified by DELCORA as POCs in each of the receiving water bodies are listed below.

- For the lower Delaware River (Downstream of R.M. 81.8)
  - Fecal Coliform Bacteria
  - Enterococcus Bacteria
  - E. coli Bacteria
- For the upper Delaware River (Upstream of R.M. 81.8)
  - Fecal Coliform Bacteria
  - Enterococcus Bacteria
  - E. coli Bacteria
- For the Chester Creek
  - Fecal Coliform Bacteria
  - Enterococcus Bacteria
  - E. coli Bacteria
- For the Ridley Creek
  - Fecal Coliform Bacteria
  - Enterococcus Bacteria
  - E. coli Bacteria

The identified POCs for DELCORA's receiving water bodies have been listed and discussed in detail in Section 3.7. No POCP (Parameters of Potential Concern) were identified.

Section 1 Introduction

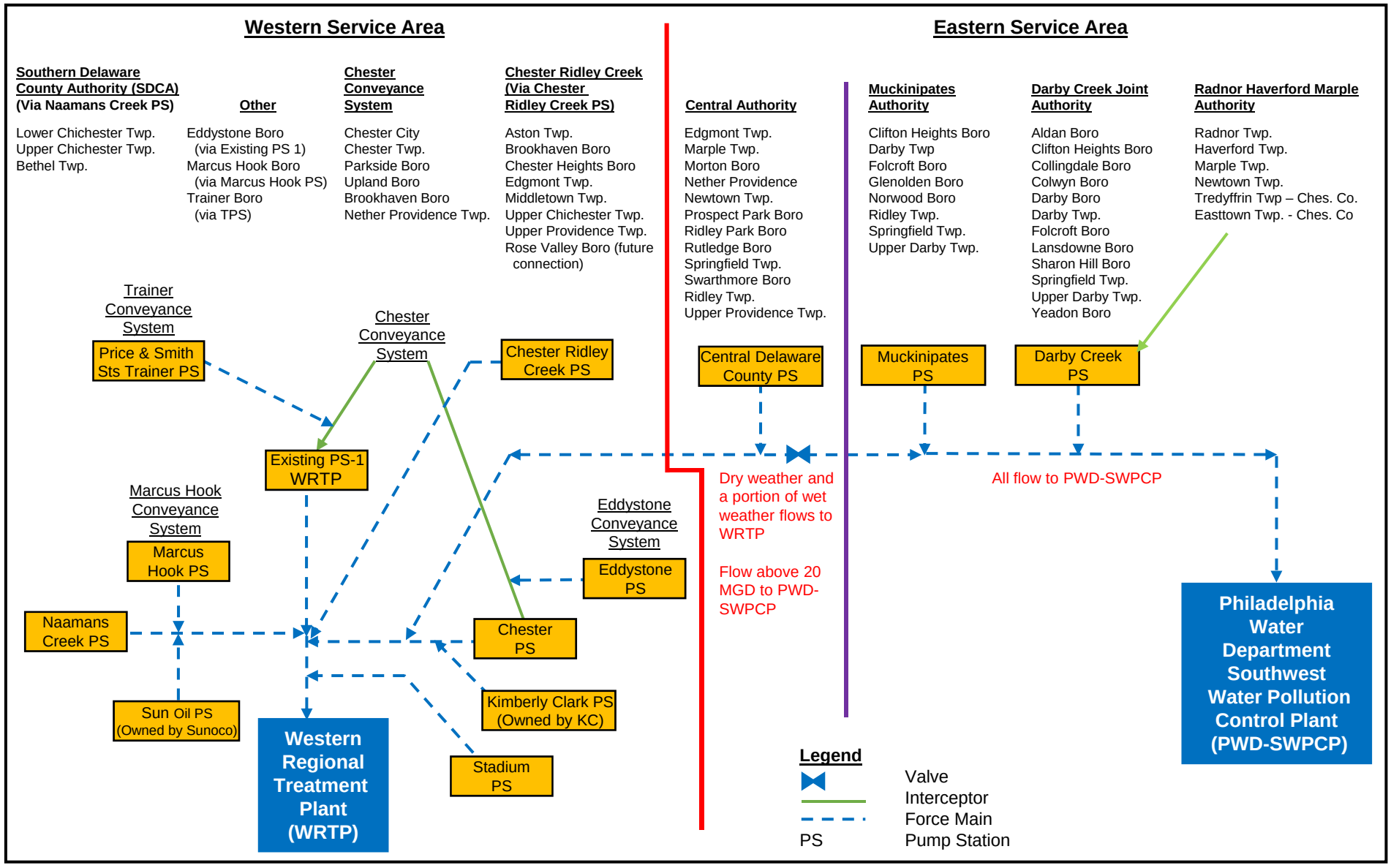
1.1 Background of DELCORA's Facilities

Delaware County Regional Water Quality Control Authority (DELCORA) is responsible for the collection, transmission, treatment and disposal of approximately 65 million gallons per day (MGD) of wastewater generated in southeastern Pennsylvania. DELCORA's facilities serve residential, commercial, institutional, and industrial customers in Delaware County. DELCORA owns and operates an extensive system of pump stations, force mains, and sewers that provide the core infrastructure for the transmission of wastewater to treatment facilities in Delaware County and the City of Philadelphia as shown diagrammatically in Figure 1-1. The total service area served by DELCORA, as shown on Figure 1-2, is approximately 82,977 acres which illustrates that DELCORA serves a significant and widespread portion of Delaware County.

The combined sewer area simulated in DELCORA's existing Hydrologic and Hydraulic model is located within the City of Chester and consists of a drainage area of approximately 1,510 acres. It comprises approximately half of Chester City's serviced area. To support the service area, DELCORA owns and operates over 129 miles of separate and combined sewers. Included in the 129 miles of sewers are: 11.7 miles of an interceptor system; 3,209 manholes; and twenty-five (25) combined sewer outfall regulators controlling storm overflows. The location of Chester City's service area is illustrated on Figure 1-2.

Historically, DELCORA has characterized its service areas as "Eastern" and "Western." The Western service area discharges to DELCORA's Western Regional Treatment Plant (WRTP). The Eastern service area discharges to the Philadelphia Water Department's Southwest Water Pollution Control Plant (PWDSWPCP). In 2002, DELCORA completed the installation of a force main that connects the Eastern Service Area's Central Delaware Pump Station (CDPS) to the Chester Force Main. This connection allows DELCORA to send flow from the CDPS to the WRTP. Flows above 20 MGD are directed to the PWDSWPCP. As such, dry weather flows and a portion of the wet weather flows (total flow less than 20 MGD) from the Central Delaware County Authority in the Eastern Service Area are discharged to the WRTP.

There are a total of 26 combined sewer overflow outfalls listed with 25 discharge points (Outfall #009 and #010 both discharge at Outfall #009) in DELCORA's existing National Pollutant Discharge Elimination System (NPDES) Permit. Under its NPDES Permit No. PA0027103, issued and administered by the Pennsylvania Department of Environmental Protection (PADEP), DELCORA is authorized to discharge from the Western Regional Treatment Plant (Outfall #001), four storm water outfalls at the WRTP (028-031) and from 26 combined sewer overflow outfalls (#002-#026, #032, #033) that ultimately discharge to the Delaware River, Chester Creek and/or Ridley Creek.



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WESTON SOLUTIONS
Restoring Resource Efficiency

Figure 1-1
DELCORA'S CONVEYANCE SYSTEM

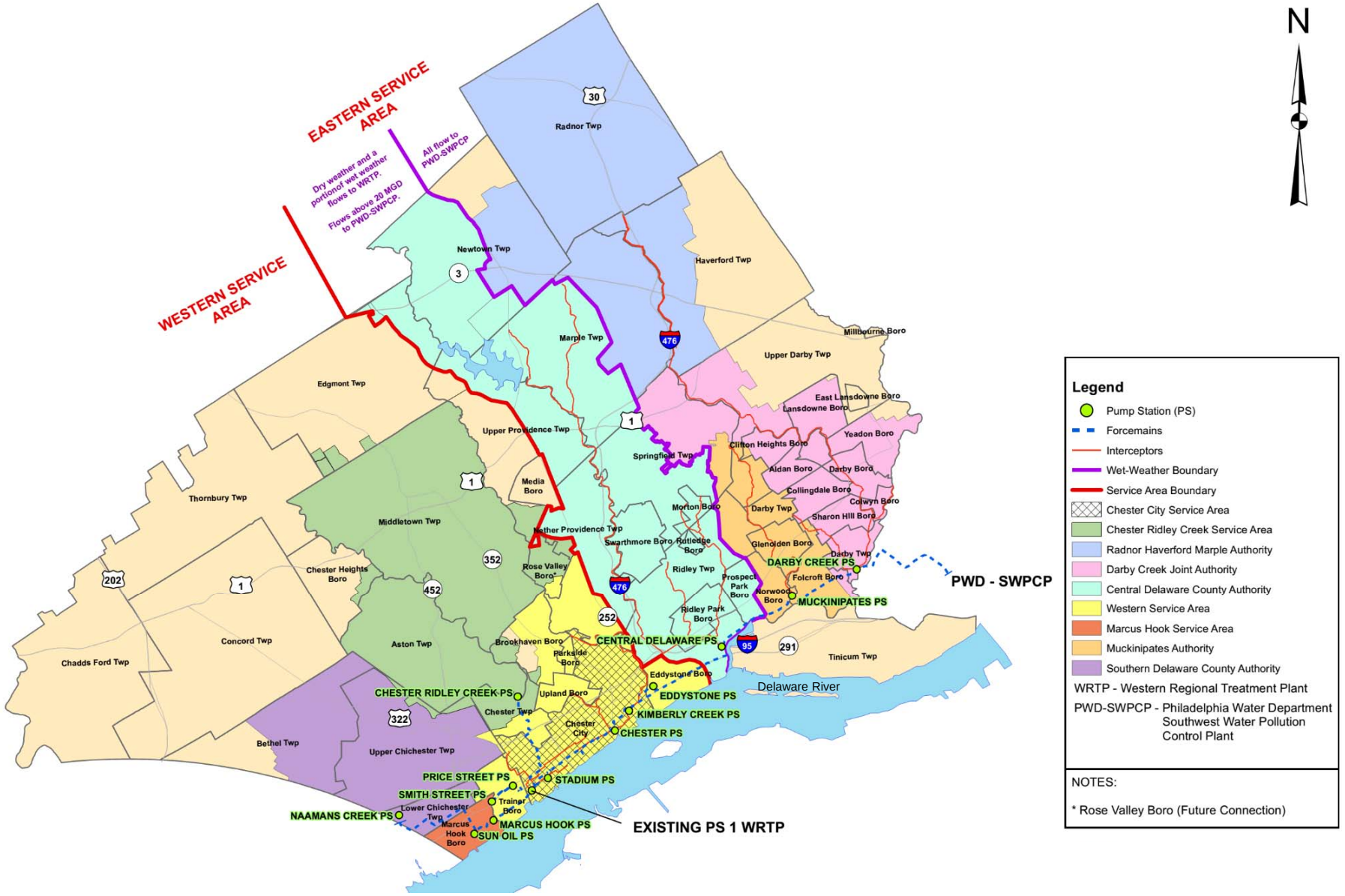

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Figure 1-2
DELCORA'S SERVICE AREA

Part C – Other Requirements, Section V – Combined Sewer Overflows of the NPDES Permit details DELCORA's responsibilities with respect to the CSO system including reporting, continued implementation of and continued compliance with the Nine Minimum Controls (NMC), and implementation of the existing Long-Term Control Plan (LTCP) dated April 1999 and the July 2008 addendum to the LTCP until the updated LTCP is approved.

1.2 Consent Decree

On August 17, 2015, a Consent Decree was lodged in the United States District Court for the Eastern District of Pennsylvania that requires DELCORA to complete and submit a revised and updated LTCP to the United States Environmental Protection Agency (USEPA or EPA) and the Pennsylvania Department of Environmental Protection (PADEP or DEP) for review and approval. Consent Decree Paragraph V.A.11 (Identification of Sensitive Areas and Pollutants of Concern) requires that within six (6) months after the Date of Lodging, DELCORA shall submit a report to the USEPA and PADEP that identifies all Sensitive Areas and Pollutants of Concern that are impacted by CSOs and are within the Model Area for each of its receiving waters. Details of the Consent Decree requirements for Sensitive Areas and POCs are respectively found in Sections 1.2 and 3.1.

1.3 CSO System Description

1.3.1 DELCORA Facilities

DELCORA's Western service area wastewater is treated at the WRTP located at 3201 W. Front Street in Chester, Pennsylvania. The WRTP treats all wastewater from Southern Delaware County Authority, Marcus Hook Borough, Trainer Borough, Upland Borough, Parkside Borough, Eddystone Borough, Chester Township and the City of Chester as well as a portion of the wastewater from Brookhaven Borough and Nether Providence Township. The City of Chester CSO system is described in detail in Section 1.3.2.

One of the facilities in the City of Chester is the 40-MGD Chester Pump Station and the 48-inch-diameter, PCCP force main that runs to the WRTP. DELCORA has completed construction of a 54-inch-diameter ductile iron force main to replace the existing force main. In 2002, DELCORA completed a force main that connects the Central Delaware Pump Station via a 3.4-mile, 24-inch ductile iron force main to the Chester Force Main. This connection allows DELCORA to send up to 27 MGD of flow from the CDPS to the WRTP, however, DELCORA's operating policy limits this flow to 20 MGD, with flows above this point to be directed to PWD SWPCP. Figure 1-1 shows the interconnections in DELCORA's system. The left side of the figure indicates the Western service area and the right side indicates the Eastern service area. This interconnectivity coupled with the legal agreements DELCORA maintains with the municipalities and conveyance authorities in Delaware County creates the complicated legal/financial framework under which DELCORA operates.

1.3.2 City of Chester CSO System

As noted in Section 1.1, the combined portion of DELCORA's sewer system is located within the City of Chester (City), and it comprises approximately half of the City's serviced area. The combined wastewater/stormwater system in the City of Chester is complicated by the fact that parts of the system are owned, operated and maintained by two governmental entities, the City and DELCORA. DELCORA owns, operates and maintains the parts of the system that convey wastewater, such as the street sewers, collectors, interceptors, and CSO regulators and CSO outfalls. The City owns, operates and maintains the inlets, stormwater-only sewers that connect to the combined sewer system and any stormwater-only outfalls. The City is also responsible for the maintenance and cleaning of the streets, planning, zoning, and development controls.

The Chester CSO system contains 26 permitted outfalls as listed in Table 1-1, and they discharge to three receiving water bodies: the Delaware River, Chester Creek, and Ridley Creek. However, there are only 25 CSO discharge locations, as CSO #010 discharges to the Delaware River through CSO #009. Figure 1-3 depicts the locations of CSO regulators and outfalls that are DELCORA's responsibility.

Table 1-1: Permitted CSOs in the City of Chester

Name of Receiving Stream	CSO Outfall	Interceptor/CSO Regulator Location	Latitude	Longitude
Delaware River	002	Front and Booth	39°49'30"N	75°23'31"W
Delaware River	003	Front and Highland	39°49'34"N	75°23'11"W
Delaware River	004	Front and Haves	39°50'36"N	75°23'07"W
Delaware River	005	Front and Townsend	39°49'46"N	75°22'53"W
Delaware River	007	Delaware and Reaney	39°49'51"N	75°22'45"W
Delaware River	008	2nd and Tilghman	39°50'05"N	75°22'22"W
Delaware River	009	2nd and Lloyd	39°50'14"N	75°22'10"W
Delaware River(1)	010	5th and Pusey	39°50'26"N	75°22'19"W
Delaware River	011	2nd and Parker	39°50'26"N	75°21'54"W
Delaware River	013	2nd and Welsh	39°50'37"N	75°21'17"W
Delaware River	014	3rd and Upland	39°50'50"N	75°21'05"W
Delaware River(2)	032	2nd and Avenue of The States	39°50'34"N	75°21'25"W
Chester Creek	012	2nd and Edgmont	39°50'42"N	75°21'38"W
Chester Creek	019	14th and Crozer Hospital	39°51'24"N	75°21'54"W
Chester Creek	020	Kerlin and Finland	39°51'24"N	75°22'27"W
Chester Creek	021	9th and Sproul	39°51'08"N	75°21'49"W
Chester Creek	022	6th and Sproul	39°50'56"N	75°21'47"W
Chester Creek	023	3rd and Edgmont	39°50'45"N	75°21'42"W
Chester Creek	024	3rd and Dock	39°50'44"N	75°21'43"W
Chester Creek	025	5th and Penn	39°50'49"N	75°21'50"W

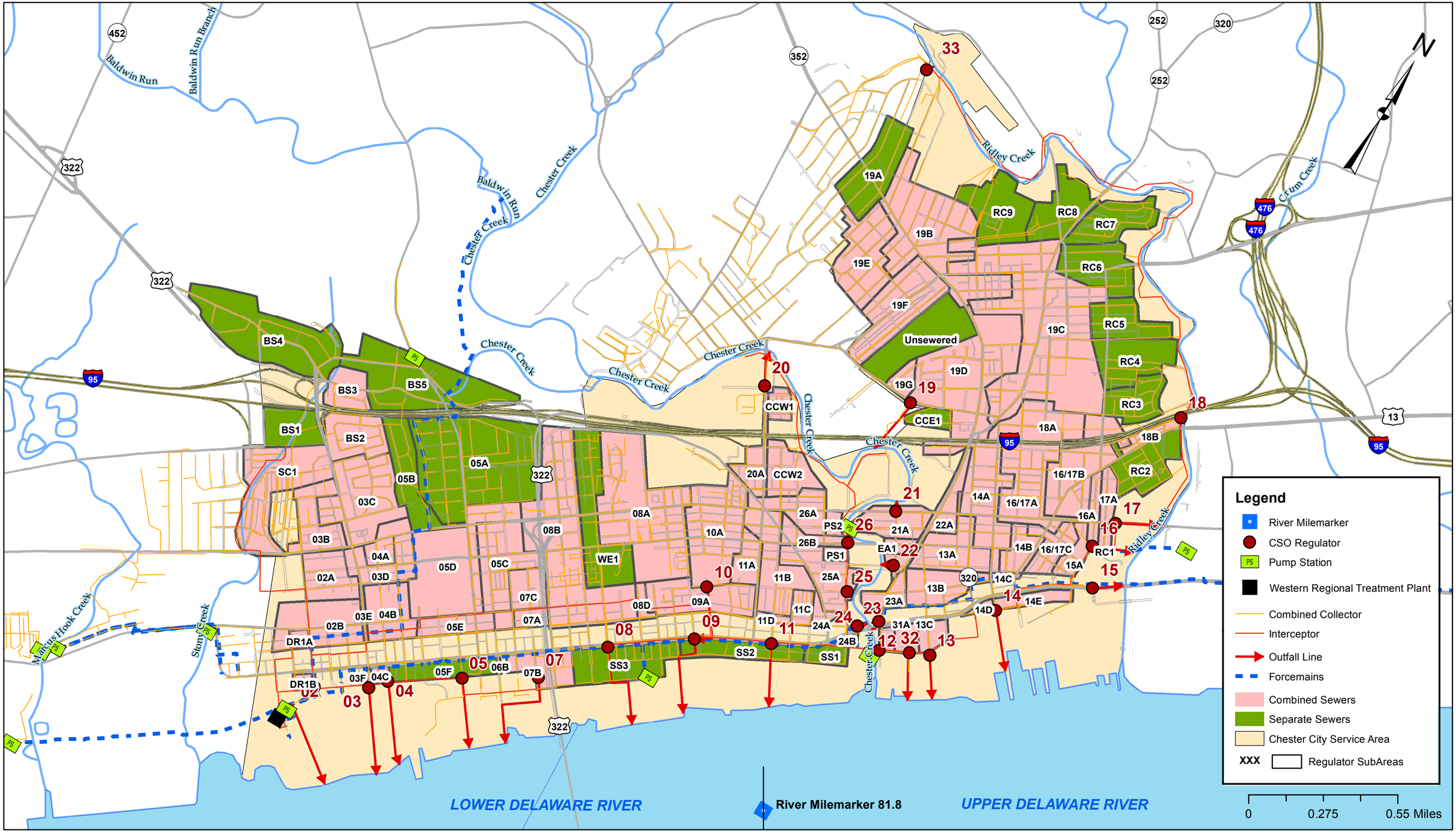
Name of Receiving Stream	CSO Outfall	Interceptor/CSO Regulator Location	Latitude	Longitude
Chester Creek	026	7th and Penn	39°50'58"N	75°21'55"W
Ridley Creek	015	4th and Melrose	39°51'03"N	75°20'48"W
Ridley Creek	016	8th and McDowell	39°51'15"N	75°20'53"W
Ridley Creek	017	9th and Campbell	39°51'16"N	75°20'51"W
Ridley Creek	018	Sun Drive and Hancock Street	39°51'47"N	75°20'57"W
Ridley Creek(2)	033	Elkington Boulevard and Ridley Creek	39°52'22"N	75°22'29"W

Notes:

(1) CSO #010 discharges to the Delaware River through CSO #009.

(2) No mechanical regulator used for this outfall.

Figure 1-3 also provides a sewer system characterization and illustrate the breakdown of each outfall and how each drainage area has combined sewers and separate sewers. Figure 1-4 is a schematic of the Chester CSO system and shows the outfalls and the interceptors that are connected to each CSO.



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Identification of Sensitive Areas and Pollutants of Concern Report

Figure 1-3
Location of Regulators and Combined Sewer Outfalls
With Drainage Areas

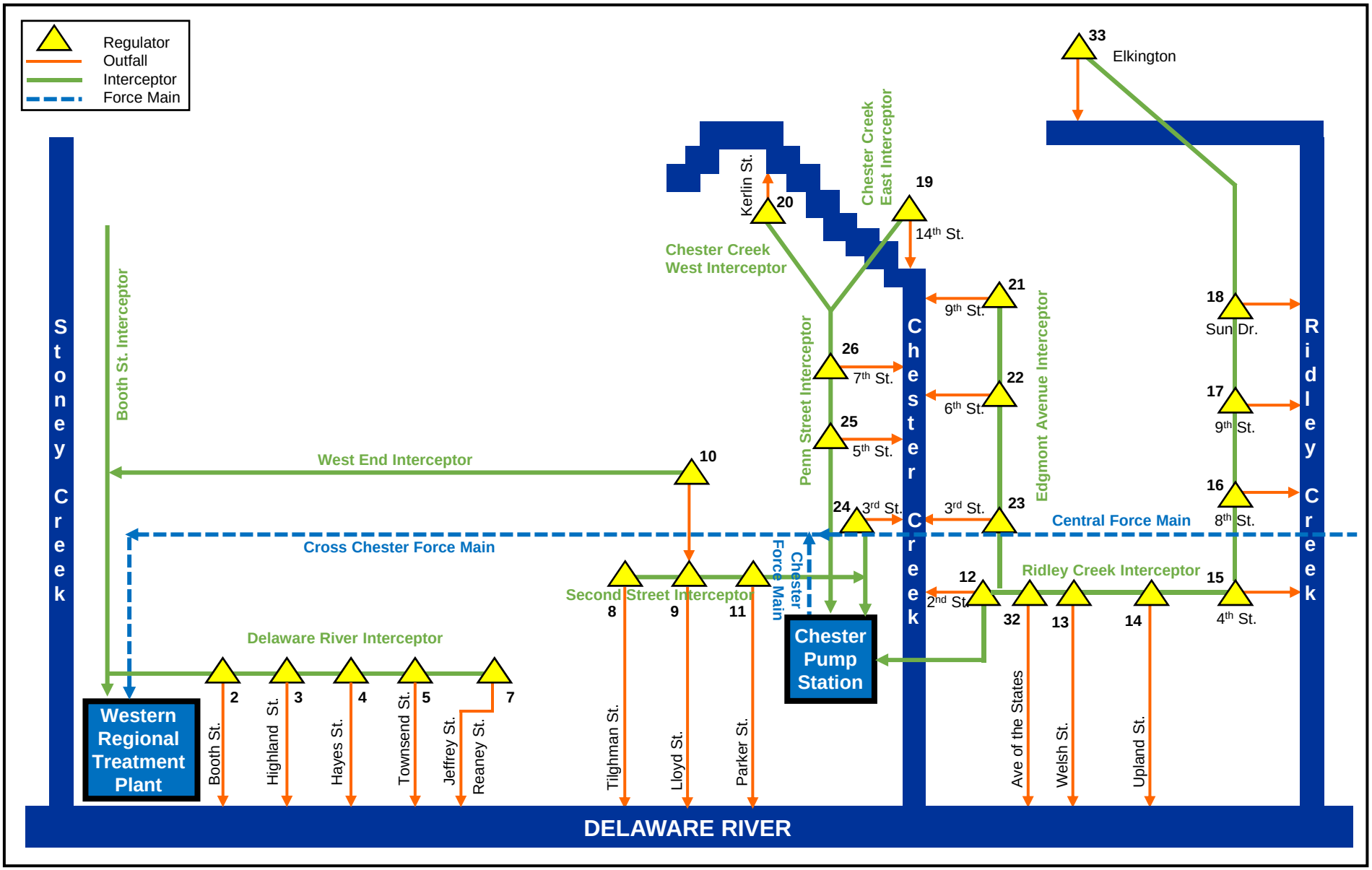

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Figure 1-4
SCHEMATIC OF CHESTER CSO SYSTEM

Section 2 Identification of Sensitive Areas

2.1 Regulatory Requirements

2.1.1 Consent Decree Requirements

For the Identification of Sensitive Areas, Section V.A.11 of the Consent Decree states:

> *"For each of its Receiving Waters, DELCORA shall contact appropriate agencies, access available data sources, and collect additional data as necessary to identify Sensitive Areas. DELCORA shall fully document all such contacts and the associated responses, and all additional investigations carried out to identify Sensitive Areas. DELCORA shall also identify any additional areas that, while not Sensitive Areas, have been identified by DELCORA as being appropriate for prioritization ("Priority Areas")."*
>
> Additionally, *"For each of its Receiving Waters, DELCORA shall conduct community outreach and appropriate studies to determine whether and to what extent primary contact recreation is occurring in each Receiving Water, and shall fully document its outreach and study methods, and its findings."*

2.1.2 Requirements of the USEPA's CSO Control Policy and Sensitive Areas Definition

The USEPA's CSO Control Policy (Federal Register 59 [April 19, 1994]: 18688-18698) "expects a permittee's long-term CSO control plan to give the highest priority to controlling overflows to sensitive areas" (Section II.C.3). The CSO Control Policy states the six (6) criteria for defining an area as a "Sensitive Area" include:

1. Designated Outstanding National Resource Waters
2. National Marine Sanctuaries
3. Waters with threatened or endangered species and their habitat
4. Waters with primary contact recreation
5. Public drinking water intakes or their designated protected areas
6. Shellfish beds

The CSO Control Policy states that if Sensitive Areas are present and impacted, the LTCP should include provisions to:

- Prohibit new or significantly increased overflows
- Eliminate or relocate overflows wherever physically possible and economically achievable

- Treat overflows where necessary
- Where elimination or treatment is not achievable, reassess impacts each permit cycle

Sensitive Areas should be considered prior to the evaluation of CSO control alternatives. This allows a CSO community to identify and estimate costs for controls that could eliminate or relocate CSOs from Sensitive Areas where pollutant loadings pose a high environmental or public health risk and where control efforts should be focused. The cost of these controls can then be considered, along with the community's financial capability, to evaluate cost-effective controls for all of the receiving waters.

2.2 Priority Areas Definition

The term "Priority Areas" is not specifically defined by the USEPA in the Consent Decree nor in the CSO Control Policy or Guidance Document. For the purposes of this report, the term "Priority Areas" is defined as follows:

> *"Areas having some environmental significance but not to the level of "sensitive areas" as defined in the federal CSO Control Policy. These priority areas may include: public access areas (i.e., near marinas, schools, playgrounds, parks, or athletic fields); or use of shallow streams for recreational activity, with something less than full contact (i.e., wading)".*

In compliance with the Consent Decree, DELCORA conducted community outreach in order to determine whether and to what extent primary contact recreation is occurring in each Receiving Water. In order to cover DELCORA's large service area, a public survey was deemed to be the most comprehensive method to actively solicit community outreach. Multiple regulatory agencies and environmental organizations were also contacted.

2.3 Assessment of Sensitive and Priority Areas

The six criteria for Sensitive Areas identified in the CSO policy were evaluated for the Delaware River, Chester Creek and Ridley Creek within DELCORA's service area including reaches upstream of the CSOs. Special consideration was given to areas downstream and within the tidal influence of DELCORA's CSOs as any potential Sensitive Areas within hydraulic proximity to outfalls that may be impacted by their discharge.

2.3.1 Methodology

In order to develop a comprehensive understanding of the presence of designated Sensitive Areas within the study area, multiple strategies were used to complete these investigations including searching online data resources, sending letters to regulatory agencies and environmental organizations, and conducting a public survey. The goal of this multi-faceted approach was to

gain a thorough understanding of the presence of sensitive and priority areas to support the development of future CSO control alternatives.

2.3.1.1 Letters with Regulatory Agencies

Letters were drafted and issued to key regulatory agencies at the federal and state levels, and environmental organizations at the state and local levels. Contacts were identified based on their governance over the three waterbodies of concern including the Delaware River, Chester Creek and Ridley Creek, or their local involvement with those associated watersheds. Agencies in New Jersey and Delaware were also contacted to further understand the surrounding environment even though the study area is limited to the boundaries of the Commonwealth of Pennsylvania. Table 2-1 lists the agencies which received requests for information. Follow-up telephone calls were made to all agencies that had not responded by November 30, 2015.

Table 2-1: Letters Issued to Agencies and Organizations

Agency	Contact	Title	Date Sent	Response Date
U.S. Fish and Wildlife Agency	Robert Anderson	Fish & Wildlife Biologist	10/29/2015	11/2/2015
U.S. Fish and Wildlife - John Heinz NWR Birds	Brendalee Phillips	Wildlife Biologist	10/29/2015	No Comments
PA DEP	Jennifer Fields	Clean Water Section Program Manager	10/29/2015	11/17/15 - phone call
Delaware River Basin Commission (DRBC)	Steve Tambini	Executive Director	10/29/2015	No Comments
PA Game Commission	Patti Barber	Endangered Bird Biologist	10/29/2015	12/29/2015 – phone call
PA Game Commission	Ian Gregg	Wildlife Biologist	10/29/2015	No Response
PA Environmental Council	Carol F. McCabe, Esq.	Chair	10/29/2015	No Response
Chester Ridley Crum Watersheds Association	Brian Byrnes	Executive Director	10/29/2015	11/23/15 – phone call

Agency	Contact	Title	Date Sent	Response Date
New Jersey Department of Environmental Protection (NJDEP)	David Chanda	Director Fish and Wildlife	10/29/2015	No Response
Delaware Department of Natural Resources and Environmental Control (DNREC)	Matt Fisher	Director Fish and Wildlife	10/29/2015	11/30/2015
PA Fish and Boat Commission (PFBC)	John Buzzar, Kathy Gipe and Greg Murphy	Fisheries Biologists	10/29/2015	12/22/15; follow-up 3/11/16 and 5/2/16
Partnership for the Delaware Estuary (PDE)	Dr. Danielle Kreeger	Science Director	10/29/2015	11/25/2015

Each letter requested information related to all six Sensitive Area criteria with the exception of the letter to the U.S. Fish and Wildlife Service, which was tailored based on telephone conversations held prior to issuance of the letter. Copies of the letters issued requesting information and responses are included in Attachment A.

2.3.1.2 Online Database Searches

An abundance of information is available online regarding the Delaware River, Chester Creek, and Ridley Creek waterbodies. The following entities and on-line databases were searched for information related to Sensitive Areas and Priority Areas within the study area boundary:

- National Oceanic and Atmospheric Administration (NOAA)
  - NOAA 2014 Environmental Sensitivity Index Maps
- United States Environmental Protection Agency
- Pennsylvania Department of Environmental Protection
- Office of National Marine Sanctuaries
- John Heinz National Wildlife Refuge
- Chester Creek Rails-to-Trails Project
- Ridley Creek State Park
- Pennsylvania Department of Conservation and Natural Resources (PA DCNR)

The results of these searches were used to determine the presence of Sensitive Areas and/or Priority Areas located within the study area boundaries.

2.3.1.3 Public Survey

DELCORA prepared a public survey requesting information from local residents specifically about how the public is using the waterbodies within the CSS. Furthermore, the public survey also asked for the frequency that the residents are using the waterbody and within what time of the year they use the waterbody. Respondents were also provided an opportunity to leave comments in an open-ended format. The survey was mailed to approximately 14,000 customers within DELCORA's service area. The individuals contacted had the option to complete a hard copy of the survey or to complete the survey online. In addition to the 14,000 customers that received a hard copy of the survey, all members of the public (not just the individuals that received a copy of the survey) had the ability to complete the survey online at DELCORA's website. A copy of the survey, survey map, and the Public Survey Tally Sheet is included as Attachment B. A summary of the responses received by the residents in the Public Survey is included in Table 2-2.

Table 2-2: River and Creeks Use Survey Summary

Rivers and Creek Use Survey Summary						
	Delaware River		Chester River		Ridley Creek	
Activities	Percent Use per Year	Percent Never Used	Percent Use per Year	Percent Never Used	Percent Use per Year	Percent Never Used
Fishing Bank/Boat	1.28%	98.72%	1.53%	98.47%	0.55%	99.45%
Fishing from Wading	0.25%	99.75%	0.84%	99.16%	0.51%	99.49%
Rowing/Canoeing	0.05%	99.95%	0.02%	99.98%	0.02%	99.98%
Motor Boating	0.55%	99.45%	0.02%	99.98%	0.02%	99.98%
Kayaking	0.05%	99.95%	0.03%	99.97%	0.02%	99.98%
Jet Skiing	0.25%	99.75%	0.01%	99.99%	0.01%	99.99%
Water Skiing	0.01%	99.99%	0.00%	100.00%	0.00%	100.00%
Swimming	0.01%	99.99%	0.03%	99.97%	0.04%	99.96%
Wading	0.24%	99.76%	0.09%	99.91%	0.26%	99.74%
Other	0.01%	99.99%	0.01%	99.99%	0.01%	99.99%

2.3.2 Outstanding National Resource Waters

Outstanding National Resource Waters (ONRW) are maintained and protected by Tier 3 of the USEPA's Antidegradation Policy which can be accessed through the Agency's web portal at http://www.epa.gov/sites/production/files/2014-10/documents/diamond-outstanding-memo.pdf. Only waters of "exceptional ecological significance" qualify as ONRWs, and States and Tribes determine whether or not a water body will be classified as such.

In Chapter 93 of the Pennsylvania Code, it is stated that a water body will be classified as having Exceptional Value (EV) if it is considered by the Commonwealth of Pennsylvania to be an

ONRW. Chapter 93 of the PA Code lists water bodies alongside their protected water uses. Neither the Delaware River, Chester Creek nor Ridley Creek are listed as being of Exceptional Value. Therefore, none of DELCORA's receiving waters, the Delaware River, Chester Creek or Ridley Creek, are considered to be an ONRW.

2.3.3 National Marine Sanctuaries

The goal of the National Marine Sanctuaries Act (Title 16, Chapter 32, Section 1431 last amended in November 2000) is to identify and designate as National Marine Sanctuaries (NMS) areas of the marine environment which are of special national significance and to manage these areas as the National Marine Sanctuary System. Receiving this designation results in the conservation and management of these special habitats, support of the natural biological communities through protection and restoration, enhances the public's awareness, understanding and appreciation for the marine sanctuary, and supports the vitality of these communities through research and Federal, State and Local government collaboration.

In order for a marine environment to be designated a National Marine Sanctuary, the United States Secretary of Commerce will determine if any of the following criteria apply:

"Criteria 1
The area's natural resources and ecological qualities are of special significance and contribute to: biological productivity or diversity; maintenance or enhancement of ecosystem structure and function; maintenance of ecologically or commercially important species or species assemblages, or both; or maintenance or enhancement of connectivity to other ecologically significant resources.

Criteria 2
The area contains submerged maritime heritage resources of special historical, cultural, or archaeological significance, that: individually or collectively are consistent with the criteria of eligibility for listing on the National Register of Historic Places; have met or which would meet the criteria for designation as a National Historic Landmark; or have special or sacred meaning to the indigenous people of the region or nation.

Criteria 3
The area supports present and potential economic uses, such as: tourism; commercial and recreational fishing; subsistence and traditional uses; diving; and other recreational uses that depend on conservation and management of the area's resources.

Criteria 4
The publically-derived benefits of the area, such as aesthetic value, public recreation, and access to places depend on conservation and management of the area's resources."

The above criteria for National Marine Sanctuaries was taken directly from the Sanctuary Nomination Process Guide which can be found at http://www.nominate.noaa.gov/guide.html#document.

The Office of National Marine Sanctuaries (ONMS) is the trustee of all national marine sanctuaries and as such, it currently recognizes fourteen (14) national marine sanctuaries, none of which are located within DELCORA's service area. Therefore, none of DELCORA's receiving waters, the Delaware River, Chester Creek or Ridley Creek, are considered to be a National Marine Sanctuary.

2.3.4 Threatened or Endangered Species Criterion

The Federal CSO Policy states "waters with threatened or endangered species and their habitat" are considered a Sensitive Area. The U.S. Fish and Wildlife Service and PA Fish and Boat Commission were contacted and the NOAA Environmental Sensitivity Index maps reviewed to identify any threatened or endangered species with habitat within the project boundaries. Threatened and endangered species that could potentially occur within the project study area are listed in Table 2-3 below. A copy of the letters received from the U.S. Fish and Wildlife Service and PA Fish and Boat Commission can be found in Attachment A to this report.

Table 2-3: Federally-Listed Threatened and Endangered Species

Species	Status
Bog Turtle	Threatened
Eastern Redbelly Turtle	Threatened
Indiana Bat	Endangered
Northern Long-Eared Bat	Endangered
Atlantic Sturgeon	Threatened
Shortnose Sturgeon	Endangered

These species could potentially use the Delaware River, Chester Creek or Ridley Creek as habitat. However, the U.S. Fish and Wildlife Service stated that no critical habitat has been designated for any of the threated and endangered listed species in the Delaware River, Chester and Ridley Creeks as of November 2015.

The NOAA Environmental Sensitivity Index Maps for the project area, ESI-18 and ESI-19, were then reviewed to locate specific habitat for the above listed species. These NOAA maps are included as Attachment K. No habitat was found for the Bog Turtle, Indiana Bat, or Northern Long-Eared Bat within the project boundaries. The NOAA ESI maps do indicate the Shortnose Sturgeon concentrations are "medium" from April through October, and "high" November through March in the Delaware River. However, the NOAA ESI maps generically state this migratory species is present in the Delaware River and does not include any specific portion of the project area as being a nursery, spawning or year-of-young habitat for the species.

The Eastern Redbelly Turtle habitat is located within the Heinz National Wildlife Refuge which enters the Delaware River approximately 2 miles upstream of the northern most CSO outfall. The Refuge is not directly on the Delaware River and outside the project boundaries.

Atlantic Sturgeon habitat is shown on NOAA map ESI-18 spanning the Pennsylvania/Delaware border. High concentrations of year-of-young Atlantic Sturgeon has been documented in this area. The most northern portion of the Atlantic Sturgeon habitat, as shown on Figure 2-1, is one-half mile from DELCORA's most down steam CSO #002. The criteria for a Sensitive Area is met because both a threatened species and its habitat are identified.

In the previously submitted 2012 DELCORA LTCP report, tidal flats were identified as a Sensitive Area meeting the criteria of critical habitat for threatened or endangered species. However, the current request for information from the U.S. Fish and Wildlife Service on threatened or endangered species and their habitat present within the project boundaries found that no critical habitat has been identified. The response from the U.S. Fish and Wildlife Service stating the same can be found in Attachment A. Therefore, the most current information is used in this report and the tidal flats are no longer considered a Sensitive Area.

2.3.4.1 Bald and Golden Eagle

Bald eagles are known to nest in the vicinity of the project area. While the bald eagle has been removed from the Federal list of threatened and endangered species, the bald eagle along with the golden eagle continues to be protected under the Bald and Golden Eagle Protection Act (BGEPA) and the Migratory Bird Treaty Act (MBTA). These Acts prohibit anyone to "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest, disturb, or otherwise harm eagles, their nests, or their eggs". Under the BGEPA, "disturb" means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available: (1) injury to an eagle; (2) decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior. Since the Bald Eagle has been removed from the Federal list of threatened and endangered species, the Sensitive Area criteria for Threatened or Endangered Species does not apply to the project study area. However, it is acknowledged that these species require special consideration. During the development of CSO abatement alternatives, the project will be evaluated for project size, location and layout in order to comply with the BGEPA and MBTA.

2.3.4.2 Special Considerations

The northern reaches of Ridley Creek within DELCORA's service area are designated as Approved Trout Waters and Trout Stocked Streams. The portion approved for stocking trout begins at Brookhaven Road upstream of CSO #033 and ends downstream of CSO #033 at Chestnut Street in Chester City as shown on Figure 2-1. The portion of the approved trout waters from CSO #033 downstream to Chestnut Street is considered a Priority Area because of

Priority Area 1: Approved Trout Waters

Priority Area 2: Boat Launch

Sensitive Area: Atlantic Sturgeon

River Milemarker 81.8

LOWER DELAWARE RIVER
(primary contact recreation)

UPPER DELAWARE RIVER
(recreation/secondary contact)

Chester Island

Legend
- River Milemarker
- CSO Regulator
- Boat Launch Ramp
- Combined Sewer Outfall
- Pump Station
- Western Regional Treatment Plant
- Upper Tidal Limit
- Trout Stocked Streams
- Approved Trout Waters
- Sensitive Area
- Priority Areas
- Chester City Service Area

0 0.5 1 Miles

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Delaware County Regional Water
Quality Control Authority

GREELEY AND HANSEN

Identification of Sensitive Areas and Pollutants of Concern Report

Figure 2-1
Sensitive and Priority Areas

this special environmental use and the need to meet water quality standards to continue to support trout stocking. Additionally, the public is provided an opportunity to use Ridley Creek for recreational purposes and that may include wading which further meets the criteria of a Priority Area.

2.3.5 Primary Contact Recreation Criterion

Primary contact is defined as an activity where people come directly in contact with the waterbody, such as at bathing beaches. The Upper Delaware River (defined as the portion of the river upstream of River Mile 81.8), Chester Creek and Ridley Creek are all designated for secondary contact and are not suitable for direct contact with the waterbody. The Lower Delaware River (downstream of River Mile 81.8), is rated for primary contact. Special water quality standards are used for water contact areas in order to protect the public from being exposed to waterborne diseases. The study area is located in a densely populated urban area with a mix of recreational uses including boating, fishing, hiking, and other uses by the public.

2.3.5.1 Delaware River

The Delaware River is designated as suitable for Water Contact (WC) Recreation below River Mile (R.M.) 81.8 (between CSO #009 and #011). It is to be noted that this stretch (Zone 4) of the Delaware River is not listed in the 2014 Pennsylvania Integrated Water Quality Monitoring and Assessment Report (PADEP, 2014) (a.k.a. the "303(d) list") as impaired for its WC use, and it has not been reported as impaired or not meeting designated uses from coliform bacteria or any other parameter commonly associated with CSOs or municipal wastewater treatment plant discharges. There are no designated bathing beaches or approved swimming facilities along the Delaware River within the project area boundaries.

There is one boat launch owned by the Chester Economic Development Authority located along the Delaware River within the project study area boundaries as shown on Figure 2-1. This boat launch is located between CSO #007 and #008 and may be impacted by CSO discharges. Additionally, this boat ramp is located within the portion of the waterbody rated for primary contact. Therefore, it was determined that this location does not qualify as a Sensitive Area because it is neither impaired, failing to meet the associated water quality standards, the public is not provided with access to the waterbody and is not using it for primary contact recreation activities according to the public survey. It is however considered a Priority Area because it provides the public with direct access to the Delaware River in a portion rated for primary contact. The Priority Area at the boat launch is shown in Figure 2-1 to extend for a total length of 500 feet along the shoreline; or 250 feet upstream and 250 feet downstream from the location of the boat launch. The Priority Area around the boat launch is also shown to extend into the river 250 feet from the shoreline. There are no defining boundaries for priority areas, however, a buffer zone of 250 feet around the boat launch includes the area one block upstream and one block downstream of the boat launch.

2.3.5.2 Chester Creek and Ridley Creek

There are no identified boat launch ramps, boat docks, or designated bathing beaches within Chester or Ridley Creek within the project area boundaries. Results of the public survey indicate the public is not using Chester Creek or Ridley Creek for primary contact activities. Of all the activities listed, fishing was the most frequently identified use of the waterbodies which does not qualify as primary contact. Of the over 460 respondents only a few reported using the waterbodies for boating, wading or swimming. It was therefore concluded these waterbodies are not considered a Sensitive Area for primary contact.

As mentioned above, the approved trout waters of Ridley Creek are being considered a Priority Area. In addition to its environmental significance as approved trout waters, they provide the public with wading access to the water for recreational fishing activities. This further supports this section of Ridley Creek being considered a Priority Area worthy of special consideration.

2.3.6 Drinking Water Intakes

Several drinking water providers are located within the study area. The majority of Delaware County is served by Aqua Pennsylvania. Chester Water Authority serves portions of western Delaware County in Thornbury Township, Chester Heights Borough, Chadds Ford Township, Concord Township, Bethel Township, Aston Township, Upper Chichester, Lower Chichester, Trainer, Brookhaven, Parkside, Upland, Chester Township, and Chester City. All drinking water intakes for both Aqua Pennsylvania and the Chester Water Authority are upstream of the CSOs and are not affected by their discharges as they are located on tributaries of the Delaware River.

Upstream of DELCORA's service area (and upstream of Center City Philadelphia), the Delaware River is still tidal and the Philadelphia's Water Department's Baxter Water Treatment Plant is located alongside the tidal portion of the river. DELCORA's most upstream CSO on the Delaware, CSO #014, is over 26 miles downstream of this drinking water intake.

Downstream of DELCORA's service area and located in the State of Delaware, United Water customers receive most of their water from the Stanton Water Treatment Plant, which is capable of treating 30 million gallons of water per day. The Stanton Plant draws water from the White Clay and Red Clay Creeks which are tributary to the Christiana River, itself a tributary to the Delaware River. DELCORA's most downstream CSO, CSO #002, is over 10 miles upstream of the confluence of the Delaware and Christiana Rivers. The Stanton's plant drinking water intake is several miles upstream of this location.

Due to the large distances of the drinking water intakes noted above to DELCORA's CSOs, the Sensitive Area criteria for Drinking Water Intakes on the Delaware River does not apply to the areas associated with DELCORA's CSO discharges.

There are no drinking water intakes located along Chester Creek or Ridley Creek in proximity to DELCORA's service area. Therefore, the Sensitive Area criteria for Drinking Water Intakes does not apply to the Chester or Ridley Creeks.

2.3.7 Shellfish Beds

There are no commercial shellfish harvesters that operate within the study area. The Partnership for the Delaware Estuary reported shellfish areas well downstream of the most southern outfall in DELCORA's system. Shellfish consumption as a DRBC designated use, only applies to DRBC WQM Zone 6. The DRBC's 2014 Delaware River and Bay Water Quality Assessment presents a map that shows the approved shellfish harvesting areas in the Delaware Bay, and this map is re-presented in this report as Figure 2-2. The uppermost shellfish harvesting area is approximately 32 miles downstream from DELCORA's closest CSO discharge (CSO #002). The influence of tidal mixing and dilution coupled with the 32 mile separation between the most downstream discharge point and beginning of the shellfish harvest zone result in the CSO discharge having a negligible impact on the shellfish beds. Therefore, the Sensitive Area criteria for Shellfish Beds does not apply to the areas associated with DELCORA's CSO discharges.

2.4 Summary of Sensitive and Priority Areas

A comprehensive review of online databases, correspondence with regulatory agencies and local environmental organizations, and responses to the public survey was conducted to identify potential Sensitive Areas and Priority Areas within the CSS portion of the collection system.

2.4.1 Summary of Sensitive Areas

The habitat for year-of-young Atlantic Sturgeon downstream of CSO #002 in the Delaware River meets the Sensitive Area criteria for Endangered or Threatened species. The Atlantic Sturgeon is listed as a threatened species by the US Fish and Wildlife Service with documented habitat in the Delaware River downstream approximately one-half mile downstream of DELCORA's most southern outfall.

There are no Outstanding National Resource Waters nor National Marine Sanctuaries within the project area. Shellfish beds are located well downstream of the CSO locations and are outside the project boundaries. There are numerous drinking water intakes in the geographical area but none are located in close proximity downstream of DELCORA's CSOs on the Delaware River. No drinking water intake locations were found that meet the criteria of a Sensitive Area.

Figure 2-2: Shellfish Harvesting Areas in Zone 6 of the Delaware River

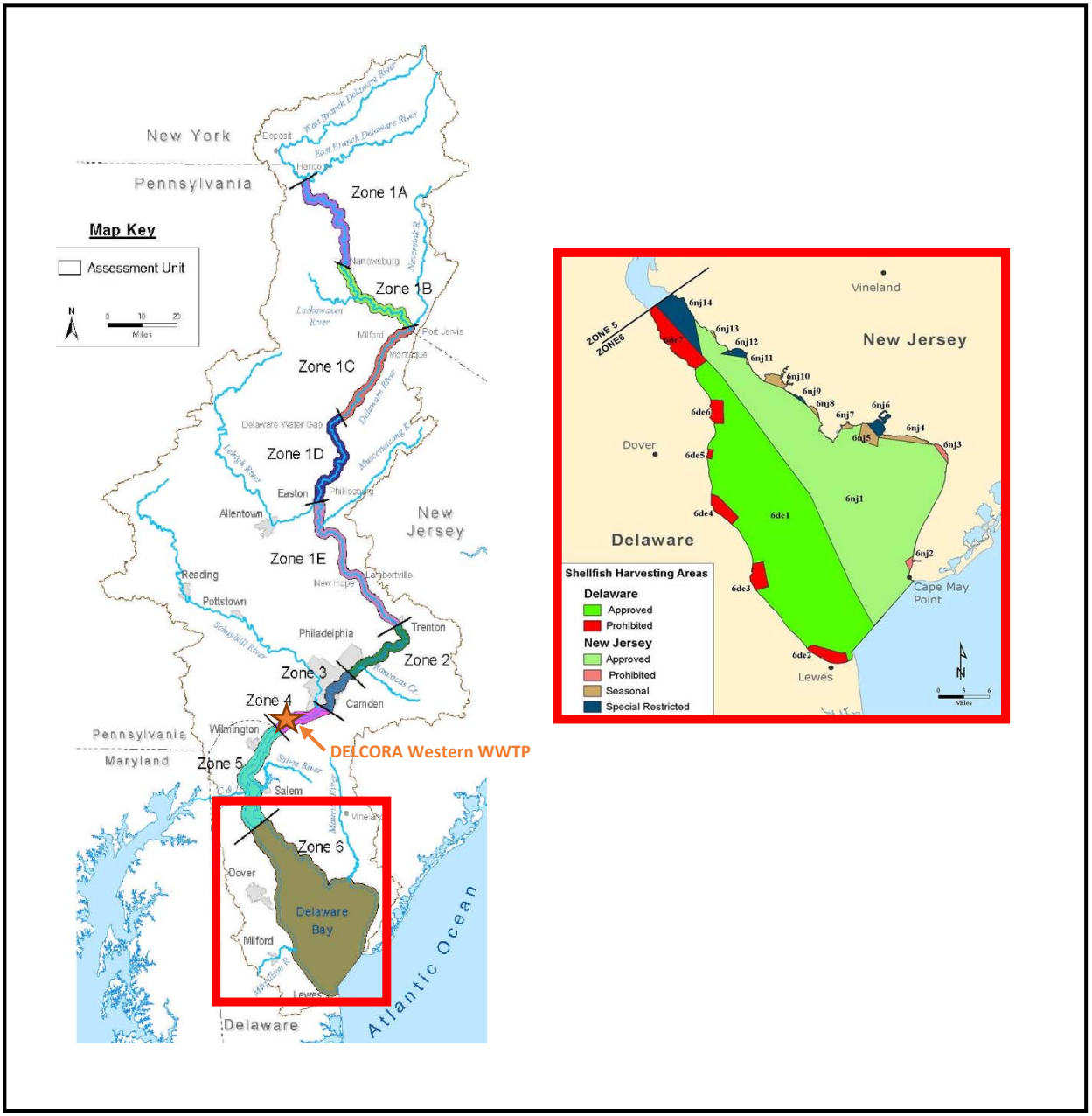

*Image courtesy of the Delaware River Basin Commission

2.4.2 Summary of Priority Areas

Priority Areas include areas having some environmental significance but not to the level of "Sensitive Areas" as defined in the federal CSO Control Policy. Two Priority Areas were identified:

- Approved trout waters in Ridley Creek,
- Chester Economic Development Authority's boat launch in Chester City.

The northern reaches of Ridley Creek within DELCORA's service area are designated as Approved Trout Waters and Trout Stocked Streams. The portion of the approved trout waters from CSO #033 downstream to Chestnut Street is considered a Priority Area because of this special environmental use.

The boat launch located between CSO #007 and #008 along the Delaware River is located within the portion of the waterbody rated for primary contact. The boat launch is considered a Priority Area due to its location to CSO #007 and #008.

Section 3 Pollutants of Concern

3.1 Regulatory Requirements

3.1.1 Consent Decree Requirements

For the Identification of Pollutants of Concern, Section V.A.11 of the Consent Decree specifically states:

> *"For each of its Receiving Waters, DELCORA shall review existing water quality data and recent PADEP CWA § 303(d) listings to identify POCs. Even if a water body has not been formally listed as out of compliance with its water quality standards and designated uses, if available data indicate such impairment exists and such impairment involves pollutants associated with CSOs, DELCORA shall consider the related pollutants to be POCs."*

3.1.2 Requirements of the USEPA's CSO Guidance Document

Section 2.5.3.3 of the USEPA's CSO Guidance document states that to assess the impacts of wet weather runoff, the water quality of the receiving waters should be understood for normal dry weather periods. The water quality data that is collected during dry weather conditions provides a basis for comparing the data collected during wet weather conditions. The CSO Guidance Document says:

> *"Receiving water monitoring should include identified parameters of concern. These parameters typically include those previously identified for combined sewage and CSO monitoring.*
>
> - *pH*
> - *BOD*
> - *TDS*
> - *TSS*
> - *Nutrients*
> - *Metals*
> - *Indicator bacteria*
>
> *Knowledge of the site-specific water quality concerns could expand the list to include dissolved oxygen, toxics, biological assessment, and sediment."*

3.2 Receiving Water Use Designations and General Water Quality Standards

Information about the applicable water quality standards (WQS) and designated uses for the three receiving water bodies impacted by DELCORA's CSOs were obtained from the PADEP's 2014 Integrated Water Quality Monitoring and Assessment Report (or "303(d) list"), the Pennsylvania Code, the Delaware River Basin Commission's (DRBC's) Water Quality Regulations (WQRs) and from the DRBC's 2014 Delaware River and Bay Water Quality Assessment.

3.2.1 2014 Pennsylvania Integrated Water Quality Monitoring and Assessment Report (303(d) list)

The primary source of information about the causes of impairment, and the Total Maximum Daily Load (TMDL) status of the water bodies (if any) is the 2014 PA Integrated Water Quality Monitoring and Assessment Report (PA Integrated Report), which satisfies Pennsylvania's requirement of both Section 303(d) and 305(b) of the Clean Water Act (CWA). The PA Integrated Report lists all impaired surface waters within Pennsylvania that are not attaining designated and existing uses, even after appropriate and required pollution control technologies have been applied. A TMDL is designed to reduce pollutant loads to impaired waters and enable these waters to meet water quality standards.

The Integrated Report uses a five-part categorization (lists) of water according to their use attainment status. The categories represent varying levels of use attainment, ranging from Category 1, where all designated water uses are met to Category 5, where impairment by pollutants required the development of a TMDL to correct. Each segment of the waterbody is placed into one of these five categories.

The PADEP's website explains the categories as follows:

- *"Category 1: Waters attaining all designated uses.*
- *Category 2: Waters where some, but not all, designated uses are met. Attainment status of the remaining designated uses maybe unknown because data are insufficient to categorize a water body consistent with the states' listing methodology or may be impaired.*
- *Category 3: Waters for which there are insufficient or no data and information to determine, consistent with the state's listing methodology, if designated uses are met.*
- *Category 4: Waters impaired for one or more designated use but not needing a TMDL. States may place these waters in one of the following three subcategories:*
    - *Category 4A: TMDL is approved.*
    - *Category 4B: Expected to meet all designated uses within a reasonable timeframe (three years).*
    - *Category 4C: Not impaired by a pollutant.*

- *Category 5:* *Waters impaired for one or more designated uses by any pollutant and requiring the development of a TMDL. Category five includes waters shown to be impaired as the result of biological assessment used to evaluate aquatic life even if the specific pollutant is not known unless the state can demonstrate that non-pollutant stressors cause impairment or that no pollutant(s) causes or contribute to the impairment.*"

The Category 5 list constitutes the Section 303(d) list that the USEPA will approve or disapprove under the CWA. For the purposes of the determination of Pollutants of Concern, Categories 4A and 5 are the relevant categories as they indicate the need for a TMDL in the receiving water body and the limiting of additional loadings for those parameters. All of the lists are sorted by an 8-digit Hydrologic Unit Code (HUC) that is particular for the water body of interest. For DELCORA's drainage area, the HUC for the Lower Delaware River (02040202) was used for searching the data in the PA Integrated Report for all three of DELCORA's receiving water bodies.

3.2.2 PA Code Chapter 25 §93.9g

The primary source of information for the Critical Use Designation for each section of the three receiving water bodies is Chapter 25 §93.9g – Drainage List from the Pennsylvania Code. The relevant Critical Use Designations for DELCORA's receiving water bodies include Warm Water Fishes (WWF), Migratory Fishes (MF), Trout Stocking (TSF), and Water Contact Sports/Recreation (WC).

- The "WWF" designation indicates the maintenance and propagation of fish species and additional flora and fauna which are indigenous to a warm water habitat.
- The "MF" designation indicates the passage, maintenance and propagation of anadromous and catadromous fishes and other fishes which move to or from flowing waters to complete their life cycle in other waters.
- The "TSF" designation indicates maintenance of stocked trout from February 15 to July 31 and maintenance and propagation of fish species and additional flora and fauna which are indigenous to a warm water habitat.
- The "WC" designation indicates the use of the water for swimming and related activities.

3.2.3 DRBC's Water Quality Regulations and PA Code Chapter 25 §93.7

The applicable water quality standards for the three receiving water bodies were found in the Delaware River Basin Commission's Water Quality Regulations, and in Water Quality Criteria lists found in Chapter 25 §93.7 and §93.8c of the Pennsylvania Code. For the Delaware River, the water quality standards are dictated by the DRBC's WQRs that have primacy over the standards in the PA Code. The water quality standards in the PA Code apply to the non-tidal

portions of the Chester Creek and Ridley Creek, and to the Delaware River if there is no standard listed for a particular parameter in the DRBC's WQRs.

3.2.4 DRBC's 2014 Delaware River and Bay Water Quality Assessment

The DRBC's 2014 Delaware River and Bay Water Quality Assessment (2014 Assessment) reports the extent to which waters of the Delaware River and Bay are attaining designated uses in accordance with Delaware River Basin Commissions' Water Quality Regulations for the period October 1, 2008 through September 30, 2013. The 2014 Assessment involves the comparison of key water quality parameters with the applicable DRBC water quality regulations. The states of Pennsylvania, New Jersey, Delaware and New York consider the DRBC's Assessment report as part of their determinations as to whether sections of the Delaware River should be listed on the state 303(d) list for a certain pollutant.

3.2.5 Delaware River

3.2.5.1 303(d) List Designation

The 2014 PA Integrated Water Quality and Assessment Report ("the 303(d) List") lists a 61.02 mile segment of the Lower Delaware River in Category 4A as having an approved TMDL for polychlorinated biphenyls (PCBs) from an unknown source related to its fish consumption use. The USEPA approved a TMDL for PCBs for Zone 2 through Zones 5 in 2003, and a second PCB TMDL was approved for Zone 6 in 2006. The TMDLs for PCBs encompass the Delaware River Estuary and stretch from the mouth of the Delaware River upstream to the Trenton, NJ /Morrisville, PA Bridge. The segment of the Delaware River having an approved TMDL for PCBs is shown in yellow in the map in Figure 3-1, which was derived from the PADEP's eMapPA website. Attachment C presents an excerpt from the 2014 PA Integrated Water Quality Monitoring and Assessment Report, and includes the applicable pages for the Delaware River.

Consequently, the impacts of DELCORA's CSO discharges on the level of PCBs within the Delaware River was evaluated further and is discussed herein.

3.2.5.2 Designated Critical Uses and Specific Water Quality Criteria from PA Code

The Critical Uses for the Delaware River in the area of DELCORA's CSO discharges are designated in Chapter 25 §93.9 of the PA Code. All stretches of the Delaware River in this area are designated as Warm Water Fishes (WWF) (maintenance only) and Migratory Fishes (MF) (passage only). Additionally the Delaware River has a Water Contact (WC) designation downstream of River Mile 81.8, which is located directly adjacent to the City of Chester between CSO #009 and #011.

CSO Long Term Control Plan Update
Delaware County Regional Water
Quality Control Authority

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Identification of Sensitive Areas and Pollutants of Concern Report

Figure 3-1
Non-Attaining and TMDL Streams/River
Within DELCORA's Service Area

For WC-designated waters, Chapter 25 §93.7 of the PA Code establishes the following as the water quality criterion for fecal coliform bacteria:

- **Fecal Coliform** – A geometric mean of 200 colonies per 100 mL during the swimming season (May 1 through September 30) based on a minimum of five samples collected during a 30-day period. For the remainder of the year, the maximum fecal coliform level shall be a geometric mean of 2,000 colonies/100 mL based on a minimum of five samples collected during a 30-day period. There are no fecal coliform bacteria criteria for the Delaware River or tributaries that are not designated as WC waters or for Potable Water Supply (PWS).

For WWF and MF waters the WWF designation is the more restrictive of the two, and Chapter 25 §93.7 of the PA Code establishes the following additional standards for WWF waters:

- **Dissolved Oxygen** – The minimum value for dissolved oxygen must be above 5.0 mg/L, with the 7-day average value above 5.5 mg/L
- **Alkalinity** – A minimum of 20 mg/L as $CaCO_3$, except where naturally occurring conditions are less
- **Ammonia Nitrogen** – the maximum total ammonia nitrogen concentration (in mg/L) at all times shall be the numerical value given by un-ionized ammonia nitrogen (NH_3-N) x ($\log^{-1}[pK_T\text{-}pH] + 1$)
- **Iron** – 30-day average 1.5 mg/L as total recoverable
- **pH** – From 6.0 to 9.0 inclusive
- **Temperature** – A table is included within Chapter 25 §93.7 for maximum water temperatures in the receiving water body at various times of the year
- **Total Residual Chlorine** – Four-day average 0.011 mg/L; 1-hour average 0.019 mg/L

3.2.5.3 Designated Zone and Water Quality Regulations from the DRBC

Chapter 25 §93.9 of the PA Code lists the DRBC regulations for Water Quality Zone 4 as exceptions to PA Code's specific water quality criteria. The DRBC's water quality regulations have primacy over the standards in the PA Code for the Delaware River.

The DRBC defines Zone 4 as that part of the Delaware River extending from R.M. 78.8 to R.M. 95.0, the Pennsylvania-Delaware state boundary line to the upstream side of the Philadelphia Navy Yard, including the tidal portions of the tributaries thereof. The DRBC states that the quality of Zone 4 waters shall be maintained in a safe and satisfactory condition for the following uses:

- Industrial water supplies after reasonable treatment
- Maintenance of resident fish and other aquatic life

- Passage of anadromous fish
- Wildlife
- Recreation - secondary contact above R.M. 81.8
- Recreation (all water-contact sports) below R.M. 81.8
- Navigation

The DRBC's Stream Quality Objectives for Zone 4 are as follows:

1. **Dissolved Oxygen**
   - 24-hour average concentration shall not be less than 3.5 mg/L.
   - During the periods from April 1 to June 15, and September 16 to December 31, the DO shall not have a seasonal average less than 6.5 mg/L.

2. **Temperature** shall not exceed:
   - 5°F (2.8°C) above the average 24-hour temperature gradient displayed during the 1961-66 period, or
   - A maximum of 86°F (30.0°C), whichever is less.

   (NOTE: The DRBC's 2014 Delaware River and Bay Water Quality Assessment states that *"atmospheric temperatures and meteorological conditions are strong drivers of water temperature. DRBC previously demonstrated that water temperatures are strongly liked to air temperatures, and that a notable increase in air temperatures is observable between the temperature gradient period (1961-1966) and the current period. At present, we* [i.e., DRBC] *lack the tools to determine which portion of the exceedance is attributable to potentially controllable anthropogenic thermal inputs, and which portion is due to metrological drivers beyond our control".*

3. **pH** between 6.5 and 8.5 inclusive, unless outside this range due to natural conditions.

4. **Phenols** maximum 0.02 mg/l, unless exceeded due to natural conditions.

5. **Threshold Odor Number** not to exceed 24 at 60°C.

6. **Synthetic Detergents.** (M.B.A.S.). Maximum 30- day average 1.0 mg/L.

7. **Radioactivity**
   - Alpha emitters - maximum 3 pc/L (picocuries per liter);
   - Beta emitters - maximum 1,000 pc/L.

8. **Bacteria**
   - **Fecal Coliform**
     - Above R.M. 81.8: maximum geometric average 770 per 100 milliliters
     - Below R.M. 81.8: maximum geometric average 200 per 100 milliliters
   - **Enterococcus**
     - Above R.M. 81.8: maximum geometric average 88 per 100 milliliters
     - Below R.M. 81.8: maximum geometric average 33 per 100 milliliters

9. **Total Dissolved Solids** not to exceed 133% of background.
(NOTE: The background TDS concentration is at present undefined, according to the DRBC's 2014 Delaware River and Bay Water Quality Assessment.)

10. **Turbidity** unless exceeded due to natural conditions.
    - Maximum 30-day average 40 units (NTU)
    - Maximum 150 NTU

11. **Alkalinity** between 20 and 120 mg/L.

12. **Toxic Pollutants**
    - Applicable criteria to protect the taste and odor of ingested water and fish are presented in the DRBC's WQRs Table 4.
    - Applicable freshwater stream quality objectives for the protection of aquatic life are presented in the DRBC's WQRs Table 5.
    - Applicable freshwater stream quality objectives for the protection of human health are presented in the DRBC's WQRs Tables 6 and 7.

3.2.5.4 DRBC Evaluation of Use Attainment Status

Table 3-1 presents a summary of Table 23 from the DRBC's 2014 Delaware River and Bay Water Quality Assessment for Zone 4 of the Delaware River. Zone 4 is the portion of the Delaware River directly impacted by DELCORA's CSO discharges and it extends from R.M. 95.0 to R.M. 78.8, the Pennsylvania-Delaware state line including the tidal portions of the tributaries thereof. The extent of Zone 4 can be seen in Figure 2-2.

Table 3-1: Summary of the 2014 DRBC Integrated Assessment for Zone 4 of the Delaware River

Zone	Designated Use			
	Aquatic Life	Drinking Water	Recreation	Fish Consumption
4	NS	N/A	S	NS

Notes:
N/A - Not applicable
NS - The Designated Use is not supported
S - The Designated Use is supported

3.2.5.4.1 Water Contact Recreation

Table 3-1 shows that the designated use for Water Contact Recreation is being attained for the Delaware River below R.M. 81.8.

3.2.5.4.2 Aquatic Life

Table 3-1 shows that the designated use for Aquatic Life is not being attained. According to the DRBC's Assessment report, "*the composite aquatic life assessment for 2014 yields a result of "Not Supporting" for all assessment units* (or zones). *It is important to note, however, that this result is largely driven by the requirement to categorize as not meeting criteria any assessment unit* (or zone) *with 1 exceedance plus 1 confirmatory exceedance."*

The DRBC's Assessment Report also states: *"Data showed multiple exceedances of aluminum acute and chronic freshwater objectives for the support of aquatic life in Zone 4. Of 35 surface water samples tested for aluminum in Zone 4 during the assessment period, 34 exceeded the chronic criterion and 8 exceeded the acute criterion at 21PA_WQX-WQN0182 near Marcus Hook, PA. No exceedances of aluminum were reported in Zones 2, 3, 5 and 6."* As part of the Recommendations for Future Action at the end of the report, the DRBC states that the *"exceedances of aluminum criteria in Zone 4 warrant further attention"*.

3.2.5.4.3 Fish Consumption

Table 3-1 shows that the designated use for Fish Consumption is not being attained. The DRBC's 2014 Delaware River and Bay Water Quality Assessment report states that their assessment criterion for fish consumption is based on the presence of fish consumption advisories from the four Basin states for the mainstem of the Delaware River. If a fish consumption advisory is present, this resulted in the DRBC making an assessment of "not supporting the designated use".

The Assessment report states that the violation criteria for PCBs is also supported by the presence of measureable concentrations of PCBs in the river that exceeded the surface water quality standard. Twenty-two mainstem channel sites were sampled for PCBs in 2012, from

Biles Channel near Trenton, NJ to the ocean boundary between Cape May and Lewis. It was found that all of the samples exceeded the current PCB water quality criteria of 16 µg/L for the protection of human health from carcinogenic effects.

The 2016 Commonwealth of Pennsylvania Fish Consumption Advisories for Zones 2, 3, and 4 of the Delaware River (Trenton, NJ/Morrisville, PA Bridge to PA/DE border) are as shown below in Table 3-2. These advisories identify PCBs as a pollutant of concern in fish tissue.

Table 3-2: PA Fish Consumption Advisory Summary for PCBs in the Delaware River

Fish Species	Meal Frequency	Contaminant
White Perch	1 meal/month	PCB
Flathead Catfish	1 meal/month	PCB
Channel Catfish	1 meal/month	PCB
Striped Bass: over 28 inches in length	1 meal/month	PCB
Carp	6 meals/year	PCB
American Eel	Do Not Eat	PCB

3.2.6 Chester Creek

3.2.6.1 303(d) List Designation

Chester Creek is listed in Category 5 of the 2014 Pennsylvania Integrated Water Quality Monitoring and Assessment Report as not meeting its recreational use due to pathogens, and for not meeting its aquatic life use due to siltation. "Pathogens" were listed in 2006 for three segments totaling 0.94 miles, and a TMDL is anticipated in 2019. The source for the pathogens is listed as "unknown", and these three stream segments are all well upstream of DELCORA's service area. Therefore it appears that the noted impairment of the Chester Creek due to pathogens is not related to DELCORA' CSO discharges.

"Siltation" was listed in 2014 for four segments of the creek totaling 18.41 miles, and a TMDL is anticipated in 2027. The source for the siltation was identified as "urban runoff/storm sewers". The majority of Chester Creek is not attaining its designated use for aquatic life due to siltation, and the vast majority of these impaired segments are located upstream of DELCORA's service area and are shown in red in the map in Figure 3-1. However, one of DELCORA's CSO outfalls does discharge to the furthest downstream segment of the Chester Creek that is impaired by siltation, which is Outfall #020 near Kerlin Street and Finland Drive. Siltation is measured by the water quality parameter Turbidity with units of Nephelometric Turbidity Units (NTU). The impacts of DELCORA's CSO discharges on the levels of Turbidity within the impaired sections of the Chester Creek have been evaluated further and are discussed herein.

Category 4A lists a 0.81-mile segment of Chester Creek at its mouth that does not meet its designated use for fish consumption due to PCBs from an unknown source, and for which a TMDL for PCBs was issued in 2006. This is shown in yellow in the map in Figure 3-1, and is related to the TMDL for PCBs in the Delaware River Estuary. As a consequence, the impacts of DELCORA's CSO discharges on the level of PCBs within the section of the Chester Creek for which there is an approved TMDL for PCBs has been evaluated further and is discussed herein.

Attachment C presents an excerpt from the 2014 PA Integrated Water Quality Monitoring and Assessment Report, and includes the applicable pages for the Chester Creek. It is to be noted that the Integrated Report also identifies an approved TMDL for the protection of two segments of the creek for aquatic life, but after consultation with staff in the Clean Water Section of the PADEP's Southeast Regional Office it was determined that those two stream segments were listed in the Integrated Monitoring Report in error.

3.2.6.2 Designated Critical Uses and Specific Water Quality Criteria from PA Code

The Critical Uses for the Chester Creek in the area of DELCORA's CSO discharges are designated in Chapter 25 §93.9 of the PA Code. All stretches of the Chester Creek in this area are designated as Warm Water Fishes (WWF) (maintenance only) and Migratory Fishes (MF) (passage only). The same specific water quality criteria apply to the WWF and MF Critical Use designations for Chester Creek as was listed previously for the Delaware River in Section 3.2.5.2.

3.2.7 Ridley Creek

3.2.7.1 303(d) List Designation:

Ridley Creek is listed in Category 5 of the 2014 Pennsylvania Integrated Water Quality Monitoring and Assessment Report as not meeting its aquatic life use due to siltation. The "Siltation" was listed in 2012 for five segments totaling 26.76 miles, and a TMDL is anticipated in 2025. The source for the siltation was identified as "unknown" or from "urban runoff/storm sewers".

In actuality, it appears that the majority of Ridley Creek is not attaining its designated use for aquatic life due to siltation, and the vast majority of these impaired segments are located well upstream of DELCORA's service area and are shown in red in the map in Figure 3-1. However, all of Ridley Creek within DELCORA's service area is shown as impaired for aquatic life due to siltation. Attachment C presents an excerpt from the 2014 PA Integrated Water Quality Monitoring and Assessment Report, and includes the applicable pages for the Ridley Creek.

Siltation is measured by the water quality parameter Turbidity, and consequently the impacts of DELCORA's CSO discharges on the levels of Turbidity within the impaired sections of the Ridley Creek have been evaluated further and are discussed herein.

3.2.7.2 Designated Critical Uses and Specific Water Quality Criteria from PA Code:

The Critical Uses for the Ridley Creek in the area of DELCORA's CSO discharges are designated in Chapter 25 §93.9 of the PA Code. All stretches of the Ridley Creek in this area are designated as Warm Water Fishes (WWF) (maintenance only), Migratory Fishes (MF) (passage only), or Trout Stocking (TSF). The TSF stretch only applies in the sections of the Ridley Creek upstream of the Chestnut Street bridge crossing.

The same specific water quality criteria apply to the WWF and MF Critical Use designations for Ridley Creek as was listed previously for the Delaware River in Section 3.2.5.2, except for the parameters of Dissolved Oxygen and Temperature – which are more stringent because of the high oxygen needs of trout.

Specifically, for TSF waters Chapter 25 §93.7 of the PA Code establishes the following additional standards:

- **Dissolved Oxygen** – For the period February 15 to July 31 of any year, the minimum value for dissolved oxygen must be above 5.0 mg/L, with the 7-day average value above 6.0 mg/L. For the remainder of the year, the minimum value for dissolved oxygen must be above 5.0 mg/L, with the 7-day average value above 5.5 mg/L.
- **Temperature** – A separate table is included within Chapter 25 §93.7 for maximum water temperatures in the receiving water body at various times of the year for TSF waters.

3.3 Approach for the Identification of the Applicable Water Quality Standards

For the Delaware River and the tidal portions of its tributaries, the DRBC's Water Quality Regulations are the prime source for the water quality standards, and the PA Code Chapter 93 WQS for the designated use serves as a secondary source. The DRBC's regulations have primacy over the PA Code for the Delaware River and the tidal portions of its tributaries. For the non-tidal portions of the Chester Creek and Ridley Creek, the specific designated use for the water body in the PA Code serves as the prime source of the WQS. If a parameter is not listed in the DRBC's Water Quality Regulations or in the PA Code, then there is not a WQS for that parameter that applies to the Delaware River, Chester Creek or Ridley Creeks.

A conservative approach was taken in the identification of the applicable WQS, such that the more stringent standard was used where the standards from the DRBC's Water Quality Regulations and the PA Code overlapped. The methodology for identifying the applicable WQS was complicated by the fact that the WQS vary for the three receiving water bodies and can also vary within the same water body depending on where the sample was taken.

Attachment D in the List of Attachments contains the master table that was developed to determine the applicable water quality standards for the expanded list of Parameters Considered for the Delaware River downstream of R.M. 81.8, the Delaware River upstream of R.M. 81.8,

the Chester Creek and Ridley Creek within the area impacted by DELCORA's CSO discharges. The specific methodology for identification of the applicable water quality standards is described in greater detail below.

In order to determine WQS for metals, an average hardness value of 84 mg/l (as $CaCO_3$) was used for the Delaware River based on an average of the hardness values obtained from the USEPA's Storage and Retrieval Data Repository (STORET) study data from the Years 2010-2015 for this portion of the Delaware River. Due to unavailable hardness data on STORET for the Chester and Ridley Creeks, an average hardness value of 74 mg/l (as $CaCO_3$) was used for the Chester and Ridley Creeks based on guidance in the DRBC Water Quality Regulations, Section 4.20.05, Paragraph A.2.

3.3.1 Delaware River Downstream of R.M. 81.8 (Water Contact Use Designation)

The "lower" Delaware River downstream of R.M. 81.8 has a Water Contact designated use. Therefore, there is stricter criteria for the lower Delaware River below R.M. 81.8 than there is for the "upper" Delaware River upstream of R.M. 81.8 that does not have the Water Contact use designation.

The following bullets describe the approach that was used for the identification of the applicable water quality standards on the Delaware River downstream of R.M. 81.8:

- The basis for determining the WQRs was to first look to the DRBC's WQRs in Section 3.30.4 for Zone 4.
- If there were no listings for a parameter in Section 3.30.4, we next referred to the "Human Health Criteria" in 25 PA Code Ch. 93 WQS, 93.8c, Table 5 as the primary water quality standard, unless a more restrictive standard was listed in the PA Code that applies to the Delaware River. The Human Health Criteria includes probable modes of exposure such as, but not limited to ingestion from drinking water and fish consumption, inhalation and dermal absorption and is the most appropriate for protecting human health from water contact or immersion.
- If there were no Human Health Criteria listed in Table 5 of the PA Code, we referred to the standards in the DRBC WQRs Tables 6 and 7 and used the more restrictive standard for Fish and Water Ingestion. These tables are respectfully titled "Stream Quality Objectives for Carcinogens" and "Stream Quality Objectives for Systemic Toxicants".

3.3.2 Delaware River Upstream of R.M. 81.8 (WWF and MF Use Designation)

The following bullets describe the approach that was used for the identification of the applicable water quality standards on the Delaware River upstream of R.M. 81.8:

- The basis for determining the WQRs was to first look to the DRBC's WQRs in Section 3.30.4 for Zone 4.
- If there was no listing for a parameter in Section 3.30.4, we next referred to the DRBC's WQRs Table 5 "Stream Quality Objectives for Toxic Pollutants for the Protection of Aquatic Life" and used both the Acute and Chronic standards. If none was listed, we referred to DRBC Tables 6 and 7, and used the listed standard that is the next less restrictive than the Primary Contact standard that was used above for the Water Contact portion of the Delaware River. We used the Fish Ingestion Only criteria, not the Fish and Water Ingestion criteria for the Upper Delaware.
- If there is no DRBC standard listed for the parameter, we used the 25 PA Code Ch. 93 WQS Table 3 – "Specific Water Quality Criteria" for the particular Critical Use Designation of the water body and also the 25 PA Code Ch. 93 WQS Table 5 "Fish and Aquatic Life Criteria" (for both Acute and Chronic) as the source of the water quality standard – these tables are complimentary and do not overlap.

3.3.3 Chester Creek and Ridley Creek (TSF, WWF and MF Use Designations)

The following bullets describe the approach that was used for the identification of the applicable water quality standards on the Chester and Ridley Creeks:

- For the tidal portions of the creeks, we used as the basis the DRBC's WQRs in Section 3.30.4 for Zone 4. The DRBC regulations that were applied were for the Delaware River upstream of R.M. 81.8, since both creeks discharge to the Delaware River upstream of R.M. 81.8.
- For the non-tidal portions of the creeks, we used the 25 PA Code Ch. 93 WQS Table 3 – "Specific Water Quality Criteria" for the particular Critical Use Designation of the water body and also the 25 PA Code Ch. 93 WQS Table 5 "Fish and Aquatic Life Criteria" (for both Acute and Chronic) as the source of the water quality standard – these tables are complimentary and do not overlap.

3.4 Sampling of Select CSO Outfalls

3.4.1 Historical Sampling of Select CSO Outfalls

Under the current permit (NPDES Permit No. PA 0027103, Amendment 1, dated December 17, 2013), DELCORA is required to conduct on-going monitoring of its CSO outfalls at the following three locations within thirty (30) minutes of a rainfall:

- 2nd and Dock Streets Pump Station (wet well) (Chester Pump Station-CPS)
- CSO Outfall #018 – Sun Drive and Hancock Street
- CSO Outfall #019 – 14th Street and Crozer Hospital

The NPDES permit requires that the three (3) above locations be monitored for the five (5) parameters, sample type and at the frequency specified in Table 3-3 below. The grab samples are to be collected within the first 30 minutes of the discharge.

Table 3-3: Permit-Specified CSO Monitoring Program Parameters, Sample Type and Frequency

Parameter	Sample Type	Measurement Frequency
Biological Oxygen Demand (BOD_5)	Grab (mg/l)	Annual
Ammonia	Grab (mg/l)	Annual
Total Suspended Solids (TSS)	Grab (mg/l)	Annual
Phosphorus	Grab (mg/l)	Annual
Fecal Coliform	Grab (#/ 100 ml)	Annual

DELCORA annually obtains CSO water quality samples in conformance with the NPDES permit requirements. The permit required CSO sampling results for the most recent three years (2012, 2013 and 2014) are contained in Attachment E and summarized in Table 3-4. Analyses for the consideration of these 5 parameters as a Pollutant of Concern are included within Sections 3.7 and 3.8.

Table 3-4: Summary of NPDES Permit-Required CSO Samples (2012-2014)

Sample Location	Parameters				
	BOD5 (mg/L)	Ammonia (mg/L)	TSS (mg/L)	Phosphorus (mg/L)	Fecal Coliform (#/100 mL)
2012 Samples					
2nd & Dock Streets (Chester Pump Station) (wet well) 10/29/2012	35	2.18	106	0.823	>600,000
Sun Drive & Hancock Street (CSO #018) 10/29/2012	28	1.79	47	0.813	>600,000
14th Street & Crozer Hospital (CSO #019) 10/29/2012	21	0.81	48	0.499	>600,000
2013 Samples					
2nd & Dock Streets (Chester Pump Station) (wet well) 11/27/2013	65	2.1	204	1.32	>200,000
Sun Drive & Hancock Street (CSO #018) 11/27/2013	13	0.2	40	0.35	150,000

Sample Location	Parameters				
	BOD5 (mg/L)	Ammonia (mg/L)	TSS (mg/L)	Phosphorus (mg/L)	Fecal Coliform (#/100 mL)
14th Street & Crozer Hospital (CSO #019) 11/27/2013	40	0.9	163	1.21	190,000
2014 Samples					
2nd & Dock Streets (Chester Pump Station) (wet well) 09/25/2014	100	6.72	134	1.6	811,000
Sun Drive & Hancock Street (CSO #018) 09/25/2014	42.5	1.88	56	0.55	169,000
14th Street & Crozer Hospital (CSO #019) 09/25/2014	39.5	3.26	45	0.78	430,000

3.4.2 Additional Sampling of CSO Outfalls

Additional sampling was undertaken at the three monitored CSOs by DELCORA on November 19th and December 1st, 2015 for a much longer list of parameters than is required by the NPDES permit. The sampling results were used to confirm the actual parameters prevalent in DELCORA's CSO discharges.

Attachment F in the List of Attachments includes the laboratory data for the additional sampling of the CSOs. Wet weather samples were collected primarily to analyze for the parameters thought to have been present at the plant influent due to the industrial wastewater discharged at that location (see Section 3.6.1). These wet weather samples were also intended to capture those parameters due to the first flush during a wet weather overflow event. The wet weather samples were collected when the minimum rainfall was 0.5" with a high intensity, and the samples were collected within 30 minutes from the beginning of a wet weather overflow event as required by the NPDES permit.

Figure 3-2 presents a map that shows the locations that were used for DELCORA's sampling of the combined sewer system, select CSOs, for the historical sampling of the Chester and Ridley Creeks, and for the USEPA's STORET Database monitoring stations on the receiving water bodies.

3.5 Sampling of Receiving Waters

3.5.1 USEPA'S STORET Database

The USEPA's STORET database was used as the primary source for existing water quality data for all three receiving water bodies. Data was extracted using the appropriate hydrologic unit code for the Lower Delaware River, and all monitoring stations associated with the three receiving bodies within the area of DELCORA's CSO discharges were selected for gathering of water quality data. The water quality data was first extracted from STORET for the period of September 1, 2014 through September 1, 2015. The water quality data for this period was evaluated against the applicable water quality standards. The parameters (during this period) that were found to be exceeding the water quality standards and/or were found to be associated with CSO discharges (as "detects" through the additional CSO sampling) were considered for further evaluation. The water quality data of these particular parameters was then extracted from STORET for a five year period ranging from September 1, 2010 through September 1, 2015 and evaluated against the applicable water quality standards. This five-year STORET data was used to confirm the presence of these parameters and to calculate the total number of observations as well as exceedance percentages in the receiving bodies. The evaluation of the STORET data is discussed in detail under Section 3.7 and 3.8.

Table 3-5 shows a list of the STORET monitoring stations that were used, along with their station identification numbers. There were a total of two stations that belong to Delaware River Basin Commission on the Delaware River and three station that belong to Pennsylvania Department of Environmental Protection on the Delaware River, Chester Creek and Ridley Creek. Figure 3-2 shows the locations of the STORET database monitoring stations with their respective identification numbers.

The parameters that were searched within the STORET database from the monitoring stations in Table 3-5 were based on the expanded list of the Parameters Considered discussed in Section 3.6 of this report. Once the data from the USEPA STORET database was extracted, each parameter was sorted based on its characteristic name and station identification number.

CSO Long Term Control Plan Update
Delaware County Regional Water
Quality Control Authority

GREELEY AND HANSEN

Identification of Sensitive Areas and Pollutants of Concern Report

Figure 3-2
Sampling Locations
2010 - 2015

Table 3-5: Water Quality Monitoring Stations Used from USEPA's STORET Database

Station Name	Station Identification Number	Agency	Period of Record	Latitude	Longitude
Marcus Hook (R.M. 78.1)	332049	DRBC	9/1/2014 – 9/1/2015	39.798611	-75.430111
Eddystone (R.M. 84.0)	892062	DRBC	9/1/2014 – 9/1/2015	39.849139	-75.329628
Chester Creek	DRBC422094	PADEP	9/1/2014 – 9/1/2015	39.8447	-75.36
Ridley Creek	DRBC422120	PADEP	9/1/2014 – 9/1/2015	39.8533	-75.3461
Delaware River	WQN0182	PADEP	9/1/2014 – 9/1/2015	39,8069	-75.4064

3.5.2 Historical Sampling of Chester and Ridley Creeks

The USEPA's STORET Database only has data for one monitoring station each for both the Chester and Ridley Creeks, and those stations are each located near the mouths of the creeks. In order to supplement the receiving water data for the Chester and Ridley Creeks and to obtain representative samples of the water quality in the creeks upstream of DELCORA's CSO discharge locations, DELCORA took its own water quality samples for the Chester and Ridley Creeks on five dates in 2010. Two samples were obtained during a storm event on October 14, 2010, including a sample taken at the beginning of the storm and a second sample taken after a minimum of 0.45 inch of rain had fallen.

In addition to the parameters listed in Table 3-3 for DELCORA's NPDES permit-specified CSO monitoring program, the following in-situ field measurements were also collected during the 2010 sampling:

- Temperature
- pH
- Conductivity
- Dissolved Oxygen (DO)

Besides being specified in DELCORA's NPDES permit, the parameters in Table 3-5 are indicative of the presence of wastewater. Dissolved Oxygen can also be used to indicate a water body that is being stressed and may inhibit natural biological activity.

The sampling plan for the collection of the 2010 water quality samples from the Chester and Ridley Creeks specified collection during dry weather and during storm events in order to examine the impacts of CSO discharges on the water bodies. Discrete samples of receiving water collected for laboratory analyses were specified at four locations along the Chester and Ridley Creeks. The dry- and wet-weather water quality sampling locations that were used are listed below in Table 3-6, and are shown on the map in Figure 3-2. The data from the 2010 historical receiving water quality sampling is presented in Attachment G.

Table 3-6: Receiving Water Body Sample Locations for Chester and Ridley Creeks

Sample Location Name as Shown in Figure 3-2	Sample Collection Location	Latitude	Longitude	Closest Upstream CSO	Closest Downstream CSO	Nearest Access Road or Address
Ridley Creek 1 (RC1)	Upstream Chester Park Drive crossing of Ridley Creek	39°52'23.83"N	75°22'30.82"W	None	33	Chester Park Drive
Ridley Creek 3 (RC3)	Downstream East 2nd Street Bridge crossing of Ridley Creek	39°51'12.58"N	75°20'47.13"W	15	None	Old East 2nd Street
Chester Creek 1 (CC1)	Upstream Kerlin Street crossing of Chester Creek	39°51'20.76"N	75°22'36.02"W	None	20	1556 Kerlin Street
Chester Creek 3 (CC3)	Downstream 2nd Street Bridge crossing of Chester Creek	39°50'41.08"N	75°21'36.15"W	023, 024	12	Adjacent to Chester Pump Station

The sampling locations were carefully selected to provide an upstream (or background) sample above the furthest upstream CSO discharges on each creek to compare against a sample from a downstream location that is impacted by the CSO discharges.

3.6 Methodology for Identification of the Parameters Considered

For the identification of the POCs, DELCORA took an inclusive approach to determine that all relevant water quality parameters were appropriately considered and evaluated. The first step was to develop a comprehensive list of the overall "Parameters Considered", which was then further evaluated and refined to determine the list of the applicable POCs. Development of the list of Parameters Considered was meant to cast a wide net as the first step towards identifying any parameters that might possibly be of concern.

3.6.1 Development of the Parameters Considered List

The initial list of the Parameters Considered was compiled from six (6) primary reference sources from the USEPA, PADEP and the DRBC. The Parameters Considered list initially consisted of those specific parameters listed in the USEPA's CSO Guidance Document (as noted in Section 3.1.2). Additional parameters were added from the parameters requiring sampling per DELCORA's NPDES permit, from the PA Code's specific water quality criteria for DELCORA's three receiving water bodies, from the DRBC's Water Quality Regulations for Zone 4 of the Delaware River, from the 2014 PA Integrated Water Quality Monitoring and Assessment Report (a.k.a. "303(d) List"), and from the DRBC's 2014 Delaware River and Bay Water Quality Assessment report. Attachment H provides the full version of the table used to develop the initial Parameters Considered list and includes the reference source for each of the parameters noted.

Table 3-7 provides a summary of the initial Parameters Considered list that was developed by compiling the parameters listed in each of the six primary reference sources noted above.

Table 3-7: Initial List of Parameters Considered

Bacteria - Enterococcus	Nutrients
Bacteria - Fecal Coliform	Oil and Grease
Alkalinity	PCBs (Fish Consumption)
Aluminum (Aquatic Life)	pH
Ammonia	Phenols
Biological Oxygen Demand (BOD)	Phosphorus
Cadmium	Radioactivity - alpha emitters
CBOD20	Radioactivity - beta emitters
CBOD5	Synthetic Detergents
Chlorine	Temperature
Chlorodibromomethane	Threshold Odor Number (TON)

Copper	Total Kjeldahl Nitrogen (TKN)
Cyanide	Total Dissolved Solids (TDS)
Dichlorobromomethane	Total Phosphorus
Dissolved Oxygen	Total Residual Chlorine (TRC)
Iron	Total Suspended Solids (TSS)
Lead	Toxics
Metals	Turbidity
Nitrate	Zinc
Nitrite	

As shown in the table in Attachment H and as noted in Section 3.1.2, the USEPA's CSO Guidance Document lists "Metals", "Nutrients", and "Toxics" as parameters of concern but does not provide any further definition of the individual parameters in these three categories. Tables 3-8, 3-9, and 3-10 below list the specific parameters that were added onto the initial Parameters Considered list for Nutrients, Metals, and Toxics and the reference source stating the reason for the inclusion of each of the parameters.

Table 3-8: Nutrients Included in the Initial List of Parameters Considered

Parameter (Nutrients)	Reference Source
Ammonia	NPDES Permit Required Sampling for CSO Discharges
Nitrate	NPDES Permit Required Sampling for Outfall #001
Nitrite	NPDES Permit Required Sampling for Outfall #001
Phosphate	Implied by EPA CSO Guidance for LTCP
TKN	NPDES Permit Required Sampling for Outfall #001
Total Nitrogen	Implied by EPA CSO Guidance for LTCP
Total Phosphorus	NPDES Permit Required Sampling for CSO Discharges

Table 3-9: Metals Included in the Initial List of Parameters Considered

Parameter (Metals)	Reference Source
Aluminum (Al)	Listed in DRBC WQRs Table 5
Arsenic (trivalent) (As III)	Listed in DRBC WQRs Table 5
Cadmium (Cd)	Listed in DRBC WQRs Table 5
Chromium (trivalent) (Cr III)	Listed in DRBC WQRs Table 5
Chromium (hexavalent) (Cr VI)	Listed in DRBC WQRs Table 5
Copper (Cu)	Listed in DRBC WQRs Table 5
Iron (Fe)	PA Code for TSF, WWF, and MF Critical Use
Lead (Pb)	Listed in DRBC WQRs Table 5
Mercury (Hg)	Listed in DRBC WQRs Table 5
Nickel (Ni)	Listed in DRBC WQRs Table 5
Selenium (Se)	Listed in DRBC WQRs Table 5
Silver (Ag)	Listed in DRBC WQRs Table 5
Zinc (Zn)	Listed in DRBC WQRs Table 5

Table 3-10: Toxics Included in the Initial List of Parameters Considered

Parameter (Toxics)	Reference Source
Phenols	Required by DRBC Zone 4 WQRs
Chlorodibromomethane	NPDES Permit Required Sampling for Outfall #001
Cyanide	NPDES Permit Required Sampling for Outfall #001
Dichlorobromomethane	NPDES Permit Required Sampling for Outfall #001

Once the initial list of Parameters Considered was developed, additional parameters were added onto the list if they had been detected during the historical sampling data of the influent to the WRTP (WRTP data), and in the existing CSO monitoring data (as required by the NPDES permit). One year's worth of DELCORA's plant influent historical sampling data from September 1, 2014 through September 1, 2015 was collected and analyzed to identify additional Parameters Considered.

It is important to state that that the historical sampling data noted above for the influent to the WRTP also included industrial wastewater from DELCORA's forty-five (45) Significant Industrial Users (SIUs). The industrial wastewater from forty-three (43) of DELCORA's SIUs is trucked directly to the WRTP and is discharged downstream of all CSOs into the combined sewer flow prior to the plant's influent sampling location. Consequently, the historical sampling data for the influent to the plant detected twenty-eight (28) industrial-type chemicals from these SIUs that are not normally associated with sanitary sewage or combined sewer overflows. Since the trucked-in industrial wastewater is discharged directly to the WRTP, it is not able to migrate back into the combined sewer system and, therefore, this industrial wastewater cannot be

discharged from any of DELCORA's CSOs. However, as part of the due diligence to address all possible POCs, the 28 industrial chemicals that were detected in the historical sampling of the plant influent were added onto an expanded list of Parameters Considered.

DELCORA actively maintains an Industrial Pretreatment program, and all of its industrial users are controlled by the sewer use regulations, Resolution No. 91-03, "The DELCORA Standards, Rules and Regulations," and the Local Limits, Resolution No. 95-11. In addition, all Significant and/or Categorical Industrial Users are further controlled by a permit, which is issued for not more than four (4) years. Each SIU is reviewed to determine how its wastewater is conveyed to the treatment plant. The only two (2) SIUs that discharge into the CSS, are commercial laundries with relatively benign wastewater compared to some of the truly industrial facilities that truck their wastewater to the WRTP. All of the parameters that are required to be analyzed by these commercial laundries in their wastewater based on their permit requirements were confirmed to be on the expanded list of the Parameters Considered. The two SIUs that discharge directly into DELCORA's combined sewer system are listed in Table 3-11 below.

Table 3-11: Industrial Users Discharging into DELCORA's Combined Sewer System

ID No	Permit #	Industry	Activity	Site Address	Discharge Route
W1	1DE-01-02	Ace Linen Service, Inc.	Laundry Service	3120 W. 6th St., Chester, PA 19013	Flows to Booth St. Interceptor to Delaware Interceptor to WRTP
W32	1DE-01-12	Delco Linen	Laundry Service	2626 W. 4th St., Chester, PA 19013	To 36-inch brick sewer on 4th St., to 48-inch brick sewer on Townsend St., to CSO Regulator #005, to Delaware River Interceptor, to WRTP

To help eliminate from the expanded list of the Parameters Considered the industrial chemicals that were detected as a result of the SIUs discharging to the WRTP, it was determined that additional wet weather sampling at the CSOs was required as noted in Section 3.4.2. The purpose of the additional sampling was to verify and confirm that the industrial-type chemicals not normally associated with CSOs that were detected in the historical sampling of the plant influent were in fact actually from the trucked-in industrial wastewater and not a part of the normal flow within the CSS that might overflow at a CSO. The CSO sampling results were used to screen non-detected parameters from the list of the Parameters Considered.

Review of the November 19th and December 1st, 2015 additional sampling results allows for shortening of the list of the Parameters Considered as possible POCs by screening those parameters that were introduced from the historical sampling of the plant influent that included the trucked-in industrial wastewater. The additional sampling results more accurately reflect the actual characteristics of the wastewater discharged at the CSOs, than does the historical data at the plant influent since the trucked-in industrial wastewater only goes into the plant and does not enter into the CSS. Therefore, if a parameter on the expanded Parameters Considered list was

not detected in the November and December 2015 wet weather sampling of the CSOs, those parameters were not considered further as POCs.

3.7 Methodology for Identification of the Pollutants of Concern List

Once the Parameters Considered list was narrowed using the November/December 2015 additional sampling results at the CSOs, the parameters remaining on the narrowed list of Parameters Considered were further evaluated to determine if they are Pollutants of Concern, or Parameters of Potential Concern (POPC). A parameter is considered a "Pollutant of Concern" for a water body if more than 10% of the samples exceeded the applicable water quality standard. This criteria is based on guidance provided by the USEPA, which recommends a "greater than 10% exceedance percentage" for determining that waters only partially meet their designated use for aquatic life support. A parameter is considered a "Parameter of Potential Concern" if 2 – 10% of the samples exceeded the water quality standard.

Water quality data for the parameters on the narrowed Parameters Considered list were collected from the STORET data repository for the one-year period from September 1, 2014 to September 1, 2015, from the water quality monitoring stations on each of the three receiving water bodies as noted in Section 3.5.1.

The segments of the Delaware River, Chester Creek and Ridley Creek have unique water quality standards that apply to them depending on the regulating authority, their designated uses, and the specific location within the waterbody. The maximum concentrations detected for each of the Parameters Considered were compared against the applicable surface water quality standards to determine which parameters were exceeding their standards. Attachment I in the List of Attachments provides a table with the final Parameters Considered list for each of the three receiving water bodies for which there is a water quality standard. The Delaware River was broken down into two tables; one for the Delaware River upstream of R.M 81.8 ("upper Delaware") and one for the Delaware River downstream of R.M 81.8 ("lower Delaware") based on the Water Contact Recreation designated use for the Delaware River below R.M. 81.8 and the more stringent requirements associated with primary contact.

The receiving stream water quality data from the USEPA STORET data warehouse was compared against the applicable WQS to check for exceedances. Both the acute and chronic conditions for the Parameters Considered were compared to the WQS, where applicable, to determine if there were exceedances. In addition to listing the Parameters Considered for each receiving water body, the table in Attachment I list the applicable water quality standards for each of the receiving water bodies, and identifies those parameters were the STORET sample data exceeded the water quality standards.

A flowchart was created to help illustrate the decision-making methodology used for developing the Pollutants of Concern list. The flowchart represents the process used for answering five (5) screening questions about the Parameters Considered in order to determine if a parameter is to be

considered a Pollutant of Concern, a Parameter of Potential Concern, or neither. The 5 screening questions for each Parameter Considered are:

1. Does a Water Quality Standard Exist for the parameter?
2. Do the available data indicate impairment exists and the impairment involves pollutants associated with CSOs?
3. Do greater than 10% of the samples for the receiving water body exceed the WQS?
4. Do 2% - 10% of the samples for the receiving water body exceed the WQS?
5. Was the parameter detected in the additional sampling of the CSOs?

Figure 3-3 presents the Methodology Flowchart used for developing the list of POCs and POPCs, and the following subsections provide additional details about the methodology used to answer the 5 screening questions.

3.7.1 Screening of Parameters with No Water Quality Standard

The Methodology Flowchart for POC and POPC Determination shows that the first step is to determine if a Parameter Considered has an applicable PA State or DRBC water quality standard. If a parameter does not have an applicable water quality standard, there is no standard to exceed. Therefore, those parameters without a water quality standard are not considered further as a POC or a POPC. These include many of the Parameters Considered.

As noted previously in Section 3.1.2, the USEPA's CSO Guidance document states that receiving water monitoring should include identified parameters of concern and these typically include those previously identified for combined sewage and CSO monitoring:

- pH
- BOD
- TDS
- TSS
- Nutrients
- Metals
- Indicator bacteria

A number of the above listed parameters were screened as not a POC or POPC because they do not have an applicable surface water quality standard for the Delaware River, Chester Creek, or Ridley Creek. These include the parameters of BOD/CBOD, TDS and TSS, and the nutrients nitrate, nitrite, phosphorus, and TKN.

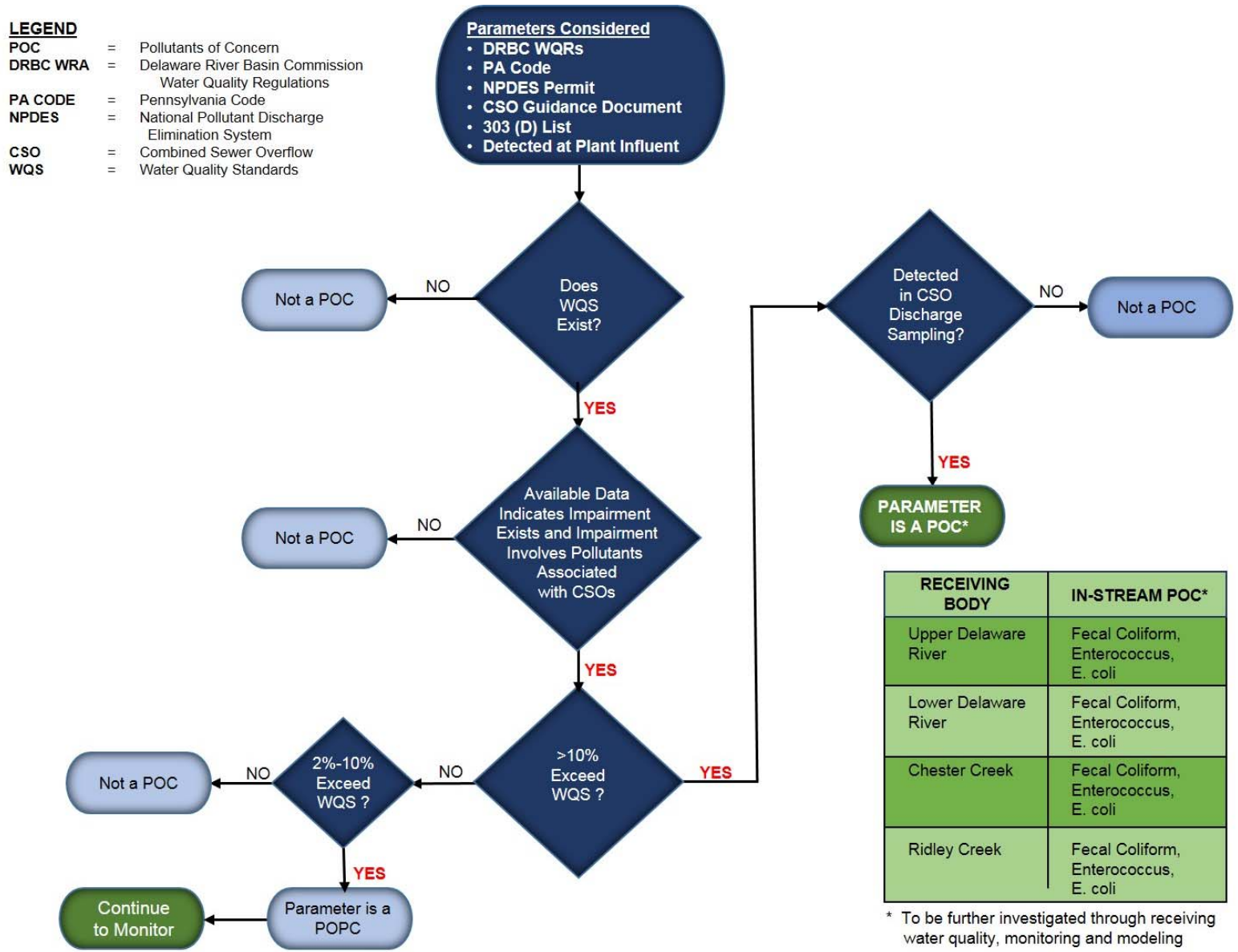

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Figure 3-3
METHODOLOGY FLOWCHART FOR POC AND POPC DETERMINATION

The table of the final Parameters Considered in Attachment I shows in gray-highlighting those Parameters Considered that were screened-out as not being a POC because they do not have an applicable water quality standard. Of the 76 Parameters Considered, 25 were removed from further consideration because they do not have an applicable water quality standard.

3.7.2 Screening of Parameters Causing Impairment and that are Associated with CSOs

For the 51 Parameters Considered that do have an applicable water quality standard, the Methodology Flowchart shows that the second screening decision is to determine if existing water quality data indicate impairment of the receiving water bodies exists and the impairment involves pollutants associated with CSOs. The inclusion of this determination comes directly from the requirements of the Consent Decree as noted in Section 3.1.1.

"Impairment" of a receiving water body is "indicated" to exist in one of two ways. First, the receiving water body is considered impaired for a particular parameter if the parameter appears in the 2014 PA Integrated Water Quality & Assessment Report (303(d) List). The PA Integrated Report identifies surface water bodies that are not attaining their designated and existing uses as "impaired".

Secondly, for the purpose of this report, a receiving water body is also considered impaired for a parameter if any of the available sampling data for that parameter in the water body shows that there had been an exceedance of the applicable water quality standard. Those parameters that showed exceedances of the WQS and that may be associated with CSOs were evaluated further to determine if they should be considered as a POC.

The 2014 PA Integrated Water Quality & Assessment Report shows the Delaware River to be impaired for Fish Consumption by PCBs from an unknown source, and there is a PCB TMDL on the Delaware River stretching far upstream to Trenton, NJ. While the Delaware River is impaired from PCBs, the PCBs are not normally associated with CSOs. Given this reason, and the fact that the PCB impairment begins well upstream of DELCORA's service area – PCBs were screened as not being a POC. Furthermore, the additional CSO sampling results from November/December 2015 in Attachment I show that PCBs were found to be at a lower concentration than the Reporting Detection Limit (RDL). For this additional reason it was determined that PCBs are not associated with DELCORA's CSO discharges.

For the Chester Creek and Ridley Creeks, the 2014 PA Integrated Water Quality & Assessment Report shows that both of the creeks are impaired for Aquatic Life from siltation, with Urban Runoff/Storm Sewers identified as the source. The impairment of the Chester Creek and Ridley Creek by siltation primarily occurs upstream of DELCORA's service area as shown in Figure 3-1. The term "Siltation" is not defined in the 2014 PA Integrated Water Quality & Assessment Report, but through various sources could be defined as:

> *"the pollution of water by fine particulate terrestrial clastic material, with a particle size dominated by silt or clay. It refers both to the increased concentration of suspended sediments, and to the increased accumulation (temporary or permanent) of fine sediments on bottoms where they are undesirable. Siltation is most often caused by soil erosion or sediment spill."*

There is not a water quality standard for "siltation", however, siltation can be considered as closely related to the widely used water quality parameter of "Turbidity", which is associated with CSO discharges. For this reason "Turbidity" was reviewed further as a surrogate for siltation to determine if it might be considered as a POC. Per available USEPA STORET data, the Turbidity concentrations on all of the three receiving water bodies were found to be below the WQS (see Attachment I) and therefore siltation was screened-out as not being a POC.

3.7.3 Screening of Parameters where > 10% of Observations Exceed WQS

The concentrations of those Parameters Considered that were detected within the receiving water bodies from USEPA's STORET data for the years 2010 - 2015 were compared to the applicable water quality standards to determine if a Parameter Considered should be viewed as a Pollutant of Concern.

If 10% or more of the total number of samples for a Parameter Considered listed in Attachment I exceeded the WQS, then the parameter was further evaluated to see if it was detected in the CSO discharges.

If 2% - 10% of the total number of samples for a Parameter Considered exceeded the WQS, then the parameter was considered a Parameter of Potential Concern. The concentrations of the Parameters of Potential Concern will continued to be monitored over time, and re-evaluated should the monitoring show their concentrations to increase over time.

Per the flowchart, if 2% - 10% of the total number of samples for a Parameter Considered do not exceed the WQS, then the parameter was not considered to be a POC or POPC.

3.7.4 Screening of Parameters Not Detected at CSO Discharges

The Methodology Flowchart shows that additional analysis is required for those parameters that exceeded the water quality standards for the receiving water bodies in more than 10% of the samples. For those parameters, the concentration of the parameter detected in the November/December 2015 sampling of the CSO discharges was reviewed.

If the parameter was "Not Detected (ND)" or was below the Reporting Detection Limit (see Attachment F) in the November/December 2015 CSO sampling results, it indicates that the parameter was not observed in DELCORA's CSO discharges. In this case, the parameter is not considered to be a POC. In this manner, the industrial-type chemicals that had been originally

detected in the historic sampling results from the influent to the WRTP were able to be removed from further consideration as a POC or POPC.

If the parameter was detected within the November/December 2015 CSO sampling results, it indicates that the parameter was in DELCORA's CSO discharge. In these cases the parameter is considered as a POC, and is to be further investigated through additional receiving water quality monitoring and modeling.

3.8 Discussion of the Pollutants of Concern and Parameters of Potential Concern

The Parameters Considered shown in Attachment I were analyzed against the WQS. The parameters that exceeded the WQS in the receiving bodies are shown in the summary table in Attachment J. The summary table also provides information on the number of observations for each parameter as well as the total number of exceedances for each parameter in all the receiving water bodies from 2010 to 2015. The POCs are shown in red highlight within the table, and POPCs are shown in yellow highlight.

The following discussion of the individual parameters is focused only on those parameters shown in the tables in Attachments I and J to be either a POC or a POPC.

3.8.1 Fecal Coliform Bacteria

Fecal coliform bacteria are the most common microbiological contaminants of natural waters, and are used to indicate contamination by human pathogens. Fecal coliform live in the digestive tracks of warm-blooded animals, including humans, and are excreted in the feces. The DRBC collects fecal coliform bacteria data at Stations 332049 and 892062 on the Delaware River. Additionally, DELCORA sampled the Chester and Ridley Creeks in 2010 for fecal coliform concentrations. The 2010 receiving water sampling results for the Chester and Ridley Creeks are presented in Attachment G.

There are no PA Code, Chapter 93 fecal coliform bacteria water quality standards for streams designated WWF, MF or TSF with no other qualifiers. However, the DRBC's Delaware River Zone 4 has a Stream Quality Objective for fecal coliform of no more than 770 CFU/100 mL for the section upstream of R.M. 81.8, which includes the tidal portions of the Chester and Ridley Creeks, and 200 CFU/100 mL for the section of the river downstream of R.M. 81.8. The tidal extent on Chester Creek and Ridley Creek is shown on Figure 3-1. Compliance with the DRBC Stream Quality Objectives for fecal coliform bacteria is based on a geometric average of samples taken at such frequency and location as to permit valid interpretation.

Of the six samples taken by DELCORA in 2010 on the Ridley Creek at RC1 (upstream) and RC3 (downstream), four show exceedances of the Stream Quality Objective for fecal coliform. These values indicate that the Ridley Creek was not meeting the DRBC Stream Quality Objective, however, more sampling is recommended to further confirm these results.

Of the six samples taken by DELCORA on the Chester Creek at CC1 (upstream) and CC3 (downstream), four show exceedances of the Stream Quality Objective for fecal coliform. These values indicate that the Chester Creek was also not meeting the DRBC WQS at that time, however as with the Ridley Creek, more sampling is recommended to further confirm these results.

The table in Attachment I shows that the available data indicates that there were no exceedances observed of fecal coliform in the Delaware River.

Given that more than 10% of the fecal coliform samples for both the Ridley and Chester Creeks exceeded the WQS, fecal coliform should be considered as a POC for the two creeks. However, although the existing data for the Delaware River has demonstrated that there were no exceedances observed of fecal coliform, since fecal coliform is a primary pollutant typically associated with CSO discharges it has been decided to also include it as a POC for the Delaware River in the interest of minimizing potential impacts to human health and the environment.

- For the lower Delaware River (Downstream of R.M. 81.8)
  - Fecal Coliform considered to be a Pollutant of Concern.
- For the upper Delaware River (Upstream of R.M. 81.8)
  - Fecal Coliform considered to be a Pollutant of Concern.
- For the Chester Creek
  - Fecal Coliform considered to be a Pollutant of Concern.
- For the Ridley Creek
  - Fecal Coliform considered to be a Pollutant of Concern.

3.8.2 Enterococcus Bacteria

Enterococcus is a second bacteria genus that also resides in the digestive system of humans and animals, and that is used to indicate the presence of human pathogens. They have been long recognized as important human pathogens and are becoming increasingly so.

Unlike fecal coliform, the DRBC does not collect enterococcus bacteria data at Stations 332049 and 892062 on the Delaware River, and DELCORA did not collect samples for enterococcus bacteria in 2010 as it did for fecal coliform. Enterococcus are used as an indicator bacteria for marine waters.

As with fecal coliform, there are no PA Code, Chapter 93 water quality standards for enterococcus bacteria for streams designated WWF, MF or TSF with no other qualifiers. However, the DRBC's Delaware River Zone 4 has a WQS for enterococcus bacteria of no more

than 88 CFU/100 mL for the section upstream of R.M. 81.8, which includes tidal portions of the Chester and Ridley Creeks, and 33 CFU/100 mL for the section of the river downstream of R.M. 81.8. Compliance with the DRBC WQS for enterococcus bacteria is based on a geometric average of samples taken at such frequency and location as to permit valid interpretation.

Very little existing data was available for enterococcus bacteria concentrations in the Delaware River, Chester Creek and Ridley Creek in the area of DELCORA's CSO discharges. However, enterococcus bacteria and fecal coliform bacteria are similar to each other, they are both produced in the human digestive tract, and are both considered to be parameters typically associated with CSOs. For this reason it was decided to also include enterococcus bacteria as a POC at the same locations identified for fecal coliform bacteria, which includes all three of DELCORA's receiving water bodies.

- For the lower Delaware River (Downstream of R.M. 81.8)
  - Enterococcus considered to be a Pollutant of Concern.
- For the upper Delaware River (Upstream of R.M. 81.8)
  - Enterococcus considered to be a Pollutant of Concern.
- For the Chester Creek
  - Enterococcus considered to be a Pollutant of Concern.
- For the Ridley Creek
  - Enterococcus considered to be a Pollutant of Concern.

3.8.3 Escherichia Coli Bacteria

Escherichia coli (also known as E. coli) is a facultative anaerobic, rod-shaped bacterium of the genus *Escherichia* that is commonly found in the lower intestine of warm-blooded organisms. E. coli is expelled into the environment within fecal matter. Fecal material can enter the environment from many sources including wastewater treatment plants, CSO discharges, livestock or poultry manure, sanitary landfills, septic systems, sewage sludge, pets and wildlife.

E. coli was not listed as an initial Parameter Considered because it is listed in the applicable reference sources from the PA Code or DRBC. However, in consultation with the PADEP it is understood that Enterococcus bacteria could be replaced with E. coli in future regulations (on the anticipation that national standards for E. coli will be adopted in Pennsylvania) and therefore E. coli is included as a POC for all the receiving water bodies.

- For the lower Delaware River (Downstream of R.M. 81.8)
  - E. coli considered to be a Pollutant of Concern.

- For the upper Delaware River (Upstream of R.M. 81.8)
  - E. coli considered to be a Pollutant of Concern.

- For the Chester Creek
  - E. coli considered to be a Pollutant of Concern.

- For the Ridley Creek
  - E. coli considered to be a Pollutant of Concern.

3.8.4 Metals

During the data analysis, it was detected that some metal concentrations, in the receiving water bodies, exceeded the water quality standards. These metals include Aluminum, Copper, Iron, Lead, and Mercury. The appropriate control measures for metals from CSO discharges are the continued implementation of and compliance with the Nine Minimum Controls (NMCs) as required by DELCORA's NPDES permit.

The NPDES permit requires DELCORA to submit an annual report each year to the PADEP, with appropriate documentation demonstrating the continued implantation of and compliance with the NMC required on a system wide basis.

Additionally, the USEPA's guidance document *Guidance for Nine Minimum Controls* states;

> *"…municipalities should immediately implement best available technology economically achievable (BAT) or best conventional pollutant control technology (BCT). At a minimum, BAT/BCT should include the nine minimum controls, which are determined on a best professional judgement (BPJ) basis by the NPDES permitting authority".*

For the removal of metals, the most applicable Nine Minimum Controls include the maximum use of the collection system for storage, the review and modification of pretreatment requirements to ensure that CSO impacts are minimized, maximization of flow to the POTW for treatment and pollution prevention programs (such as street sweeping) to reduce these contaminants in the CSOs.

Therefore, metals are not considered to be POCs.

3.9 Summary for Pollutants of Concern

In the effort to identify Pollutants of Concerns related to its CSO discharges, DELCORA has reviewed the 2014 PA Integrated Water Quality Monitoring and Assessment Report (303(d) List), the historic sampling data for the influent to the Western Regional Treatment Plant, the USEPA's STORET Data repository, historic water quality sampling data from the Chester and

Ridley Creeks, and additional sampling results from the CSOs from November and December of 2015.

Three (3) POCs were determined. These include Fecal Coliform bacteria, Enterococcus bacteria and E. coli bacteria. These three POCs are parameters typically associated with CSO discharges. The list of POCs is summarized in Table 3-12 with their respective exceedance percentage (%) for each of the receiving water bodies. The concentrations of these identified POCs in the Delaware River, Chester Creek and Ridley Creek will be further investigated through receiving water quality monitoring and modeling.

No Parameters of Potential Concern were identified at this time.

Table 3-12: List of Pollutants of Concern (POC)

No.	Upper Delaware River		Lower Delaware River		Chester Creek		Ridley Creek	
Pollutants of Concern (>10% of observed samples exceed WQS)								
1	Fecal Coliform[b]	100%	Fecal Coliform[b]	100%	Fecal Coliform[a],[b]	100%	Fecal Coliform[a],[b]	100%
2	Enterococcus [b],[c]	100%	Enterococcus [b],[c]	100%	Enterococcus [b],[c]	100%	Enterococcus [b],[c]	100%
3	E. coli[c]	100%	E. coli[c]	100%	E. coli[c]	100%	E. coli[c]	100%

[a] Based on historical sampling conducted in 2010 upstream and downstream of CSO outfalls only on Chester and Ridley Creeks.

[b] Fecal Coliform and Enterococcus are listed as POCs due to both being parameters typically associated with CSOs.

[c] DRBC regulations are available for Enterococcus and it is typically associated with CSOs and therefore it is included as a POC. However, in consultation with PADEP Enterococcus could be replaced with E. coli bacteria in the future (based on the anticipation that national standards on E. coli will be adopted in Pennsylvania) and therefore E.coli is also included as a POC.

Section 4 References

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ATTACHMENT A

Letters with Regulatory Agencies Regarding Sensitive Areas

DELCORA CSO LTCP
Sensitive Areas Contact Sheet

No.	Sensitive Area Item	Contact	Title	Agency	Street	City	State	Zip	Phone Number	Date Sent	Response Date
1	Endangered Species	Robert Anderson	Fish & Wildlife Biologist	US Fish and Wildlife Agency	110 Radnor Road, Suite 101	State College	PA	16801-7987	814-237-4090 x7447	10/28/2015	11/2/2015
2	Threatened and Endangered Birds	Brendalee Phillips	Wildlife Biologist	US Fish and Wildlife - John Heinz NWR Birds	8601 Lindbergh Blvd.	Philadelphia	PA	19153	215-365-3118 x119	10/29/2015	No Comments
3		Jennifer Fields	Program Manager jefields@pa.gov	PA DEP	2 East Main Street	Norristown	PA	19401	484-250-5192	10/29/2015	11/17/15 - phone call
4		Steve Tambini	Executive Director	Delaware River Basin Commission (DRBC)	25 State Police Drive	West Trenton	NJ	08628-0360	609-883-9500 x203	10/29/2015	No Comments
5	Threatened and Endangered Birds	Patti Barber	Endangered Bird Biologist	PA Game Commission	2001 Elmerton Ave	Harrisburg	PA	17110-9797	717-303-4482	10/29/2015	12/31/15 return call
6	Threatened and Endangered Birds	Ian Gregg	Wildlife Biologist	PA Game Commission	2001 Elmerton Ave	Harrisburg	PA	17110-9797	814-422-8239	10/29/2015	No Response
7		Carol F. McCabe, Esq.	Chair	PA Environmental Council	1315 Walnut Street, Suite 532	Philadelphia	PA	19107	215-545-4570	10/29/2015	No Response
8	Primary Contact Areas	Brian Byrnes	Executive Director	Chester Ridley Crum Watersheds Association	P.O. Box 227	Gradyville	PA	19039	610-359-1440	10/29/2015	11/23/15 - called
9		David Chanda	Director Fish and Wildlife	New Jersey Department of Environmental Protection (NJDEP)	P.O. Box 420 501 E State Street, 3rd Floor	Trenton	NJ	08625	609-292-9410	10/29/2015	No Response
10	Atlantic and Shortnose Sturgeon, river herring, shad	Matt Fisher	Director Fish and Wildlife	Delaware Department of Natural Resources and Environmental Control (DNREC)	89 Kings Highway	Dover	DE	19901	302-735-8663	10/29/2015	11/30/2015
11	Delaware River and tributaries	John Buzzar Kathy Gipe	Fisheries Biologist	PA Fish and Boat Commission (PFBC)	1601 Elmerton Ave	Harrisburg	PA	17110	717-705-7800 610-847-5983 814-359-5186	10/29/2015	12/22/2015 Follow up 3/11/16 and 5/2/16
12	Freshwater Mussels	Dr. Danielle Kreeger	Science Director	Patnership for the Delaware Estuary (PDE)	110 S Poplar Street, Suite 202	Wilmington	DE	19801	302-655-4990 x 104	10/29/2015	11/25/2015

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October 29, 2015

Carol F. McCabe, Esquire
PA Environmental Council
1315 Walnut Street
Suite 532
Philadelphia, PA 19107

Subject: Delaware County Regional Water Quality Authority
CSO Long Term Control Plan Update
Sensitive Areas Study

Dear Ms. McCabe:

Greeley and Hansen is developing a Long Term Control Plan (LTCP) for the Delaware County Regional Water Quality Control Authority (DELCORA) located in Chester, PA. A map of the study area is provided as an attachment to this letter. The goal of this LTCP is to reduce the frequency, duration and intensity of combined sewer overflow events into the local waterbodies, including portions of the Delaware River, Chester Creek and Ridley Creek. As part of this evaluation, environmentally sensitive areas within the study area need to be identified so that appropriate considerations can be made to reduce combined sewer overflows to these areas.

Sensitive Areas are defined by the United States Environmental Protection Agency (USEPA) Federal Register Combined Sewer Overflow (CSO) Control Policy and the US EPA Guidance for Long Term Control Plan as follows:

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- National Marine Sanctuaries
- Waters with threatened or endangered species and their habitat
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DELCORA is under a Consent Decree to submit this study to USEPA in February 2016. In order to meet project milestones, we respectfully request you provide a response within 30 days of receipt of this letter, no later than November 23, 2015. We appreciate your cooperation and assistance in completing this study. Should you need any additional information, please feel free to contact me at (215) 553-7919 or Julia Spicher at (215) 553-7926.

Yours very truly,

Greeley and Hansen LLC

Marlene Finizio
Project Manager

c: Robert Willert, DELCORA
Michael DeSantis, DELCORA
Edwin Bothwell, DELCORA
Michael Hope, Greeley and Hansen
Julia Spicher, Greeley and Hansen

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October 29, 2015

Ms. Patti Barber
PA Game Commission
2001 Elmerton Avenue
Harrisburg, PA 17110-9797

Subject: Delaware County Regional Water Quality Authority
CSO Long Term Control Plan Update
Sensitive Areas Study

Dear Ms. Barber:

Greeley and Hansen is developing a Long Term Control Plan (LTCP) for the Delaware County Regional Water Quality Control Authority (DELCORA) located in Chester, PA. A map of the study area is provided as an attachment to this letter. The goal of this LTCP is to reduce the frequency, duration and intensity of combined sewer overflow events into the local waterbodies, including portions of the Delaware River, Chester Creek and Ridley Creek. As part of this evaluation, environmentally sensitive areas within the study area need to be identified so that appropriate considerations can be made to reduce combined sewer overflows to these areas.

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Marlene Finizio
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October 29, 2015

Ms. Jennifer Fields
Pennsylvania Department of Environmental
Protection
2 East Main Street
Norristown, PA 19401

Subject: Delaware County Regional Water Quality Authority
CSO Long Term Control Plan Update
Sensitive Areas Study

Dear Ms. Fields:

Greeley and Hansen is developing a Long Term Control Plan (LTCP) for the Delaware County Regional Water Quality Control Authority (DELCORA) located in Chester, PA. A map of the study area is provided as an attachment to this letter. The goal of this LTCP is to reduce the frequency, duration and intensity of combined sewer overflow events into the local waterbodies, including portions of the Delaware River, Chester Creek and Ridley Creek. As part of this evaluation, environmentally sensitive areas within the study area need to be identified so that appropriate considerations can be made to reduce combined sewer overflows to these areas.

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October 29, 2015

Mr. Ian Gregg
PA Game Commission
2001 Elmerton Avenue
Harrisburg, PA 17110-9797

Subject: Delaware County Regional Water Quality Authority
CSO Long Term Control Plan Update
Sensitive Areas Study

Dear Mr. Gregg:

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October 29, 2015

Mr. Steven Tambini
Executive Director
Delaware River Basin Commission
25 State Police Drive
West Trenton, NJ 08628-0360

Subject: Delaware County Regional Water Quality Authority
CSO Long Term Control Plan Update
Sensitive Areas Study

Dear Mr. Tambini:

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October 29, 2015

Ms. Brendalee Phillips
US Fish and Wildlife - John Heinz
NWR Birds
8601 Lindbergh Boulevard
Philadelphia, PA 19153

Subject: Delaware County Regional Water Quality Authority
CSO Long Term Control Plan Update
Sensitive Areas Study

Dear Ms. Phillips:

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pennsylvania Field Office
110 Radnor Road, Suite 101
State College, Pennsylvania 16801-4850

November 2, 2015

Marlene Finizio
Greeley and Hansen LLC
1700 Market Street, Suite 2130
Philadelphia, PA 19103

RE: USFWS Project #2016-0026
PNDI Large Project

Dear Ms. Finizio:

This responds to your letter received on October 9, 2015, requesting information about federally listed and proposed endangered and threatened species within the area affected by the development of a Long Term Control Plan for the Delaware County Regional Authority. The project area is located in Delaware County, Pennsylvania. The following comments are provided pursuant to the Endangered Species Act of 1973 (Act, 87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.), the Migratory Bird Treaty Act (MBTA, 16 U.S.C. 703-712; Ch. 128; July 13, 1918; 40 Stat. 755, as amended), and the Bald and Golden Eagle Protection Act (BGEPA, 16 U.S.C. 668-668d).

Federally Listed Species

There are a number of federally listed species that are either known to occur, or have the potential to occur, in the proposed study area. We describe general information about these species, but without more specific project information and locations are not able to provide additional information regarding potential avoidance or conservation measures. We fully support your planning efforts and desires to protect sensitive areas and overall water quality. Let us know how we can be of additional assistance.

No critical habitat has been designated for any of the below listed species, at this time.

Bog turtle

The project is within the known range of the bog turtle (*Clemmys muhlenbergii*), a species that is federally listed as threatened. Bog turtles inhabit shallow, spring-fed fens, sphagnum bogs, swamps, marshy meadows, and pastures characterized by soft, muddy bottoms; clear, cool, slow-flowing water, often forming a network of rivulets; high humidity; and an open canopy. Bog

turtles usually occur in small, discrete populations occupying suitable wetland habitat dispersed along a watershed. The occupied "intermediate successional stage" wetland habitat is usually a mosaic of micro-habitats ranging from dry pockets, to areas that are saturated with water, to areas that are periodically flooded. Some wetlands occupied by bog turtles are located in agricultural areas and are subject to grazing by livestock. More information on this species can be found at: http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=C048

Indiana bat

The project area is within the range of the federally endangered Indiana bat (*Myotis sodalis*). Indiana bats hibernate in caves and abandoned mines during the winter months (November through March), and use a variety of forested upland and wetland habitats during the spring, summer, and fall. Indiana bats usually roost in dead or living trees with exfoliating bark, crevices or cavities. Female Indiana bats form nursery colonies under the exfoliating bark of dead or living trees, such as shagbark hickory, black birch, red oak, white oak, and sugar maple, in upland or riparian areas. More information on this species can be found at: http://www.fws.gov/MIDWEST/endangered/mammals/inba/index.html

Northern long-eared bat

The project is within the known range of the northern long-eared bat (*Myotis septentrionalis*), a species that is federally listed as threatened. Northern long-eared bats hibernate in caves and abandoned mines during the winter months, and use a variety of forested upland and wetland habitats during the spring, summer, and fall. More information on this species can be found at: http://www.fws.gov/midwest/endangered/mammals/nlba/index.html

Atlantic sturgeon

The project is within the known range of the Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*), a species that is federally listed as threatened. The Atlantic sturgeon is a long-lived, estuarine dependent, anadromous fish. Adult sturgeon spawn in freshwater in the spring and early summer and migrate into "estuarine" and marine waters where they spend most of their lives. The Atlantic sturgeon is under the jurisdiction of the National Marine Fisheries Service (NMFS). Please contact NMFS regarding this species or visit their website at: http://www.nmfs.noaa.gov/pr/species/fish/atlanticsturgeon.htm#status

Shortnose sturgeon

The project is within the known range of the Shortnose sturgeon (*Acipenser brevirostrum*), a species that is federally listed as endangered. The shortnose sturgeon is the smallest of the three sturgeon species that occur in eastern North America. The shortnose sturgeon is anadromous, living mainly in the slower moving riverine waters or nearshore marine waters, and migrating periodically into faster moving fresh water areas to spawn. The shortnose sturgeon is under the jurisdiction of the NMFS. Please contact NMFS regarding this species or visit their website at: http://www.nmfs.noaa.gov/pr/species/fish/shortnosesturgeon.htm

In cases where adverse effects to federally listed species cannot be avoided, further consultation with the Service would be necessary to avoid potential violations of section 9 (prohibiting "take" of listed species) and/or section 7 (requiring federal agencies to consult) of the Endangered Species Act. Information about the section 7 and section 10 consultation processes (for federal and non-federal actions, respectively) can be obtained by contacting this office or accessing the Service's Endangered Species Home Page (http://endangered.fws.gov).

Bald and golden eagles

Bald eagles (*Haliaeetus leucocephalus*) are known to nest in the vicinity of the project area. While the bald eagle has been removed from the Federal list of threatened and endangered species (August 8, 2007; 72 FR 37346), the bald eagle along with the golden eagle (*Aquila chrysaetos*) continues to be protected under the BGEPA and MBTA. Both the BGEPA and the

MBTA prohibit take as defined as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest, disturb, or otherwise harm eagles, their nests, or their eggs." Under the BGEPA, "disturb" means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available: (1) injury to an eagle; (2) decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.

We recommend that you evaluate the project type, size, location and layout in light of the National *Bald Eagle Management Guidelines* to determine whether or not bald eagles might be disturbed as a direct or indirect result of this project. If it appears that disturbance may occur, we recommend that you consider modifying your project consistent with the Guidelines. These guidelines, as well as additional eagle information, are available at http://www.fws.gov/northeast/EcologicalServices/eagle.html To assist you in making a decision regarding impacts to bald eagles, a screening form can be found at http://www.fws.gov/northeast/pafo/bald_eagle.html.

Migratory Birds

The Service is the principal Federal agency charged with protecting and enhancing populations and habitat of migratory bird species. The MBTA prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of the Interior. While the MBTA has no provision for authorizing incidental take, the Service recognizes that some birds may be killed even if all reasonable measures to avoid take are implemented.

The potential exists for avian mortality if there is habitat destruction and alteration within the project boundaries. Site-specific factors that should be considered in project siting to avoid and minimize the risk to birds include avian abundance; the quality, quantity and type of habitat; geographic location; type and extent of bird use (e.g. breeding, foraging, migrating, etc.); and landscape features. Please review the enclosed information for general recommendations for avoiding and minimizing impacts to migratory birds within and around the project area. Please

be aware that since these are general guidelines, some of them may not be applicable to the current project design or they may have already been included in the project design.

The project area is located in the vicinity of the Important Bird Area (IBA) known as Upper Ridley-Crum Creek. IBAs are designated by the Pennsylvania Ornithological Technical Committee. They are the most critical regions in the Commonwealth for conserving bird diversity and abundance, and are the primary focus of Audubon Pennsylvania's conservation efforts. To find out more information about this IBA, including which bird species breed there, visit: http://netapp.audubon.org/IBA/State/US-PA

Please contact Brian Scofield of my staff at 814-234-4090 if you have any questions or require further assistance regarding this matter.

Sincerely,

Lora L. Zimmerman
Field Office Supervisor

Enclosure

Adaptive Management Practices for Conserving Migratory Birds

The Fish and Wildlife Service is the principal Federal agency charged with protecting and enhancing populations and habitat of migratory bird species. The Migratory Bird Treaty Act (MBTA, 16 U.S.C. 703-712; Ch. 128; July 13, 1918; 40 Stat. 755, as amended) prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of the Interior. While the MBTA has no provision for authorizing incidental take, the Service recognizes that some birds may be killed even if all reasonable measures to avoid take are implemented. Unless the take is authorized, it is not possible to absolve individuals, companies or agencies from liability (even if they implement avian mortality avoidance or similar conservation measures). However, the Office of Law Enforcement focuses on those individuals, companies, or agencies that take migratory birds with disregard for their actions and the law.

The potential exists for avian mortality from habitat destruction and alteration within the project boundaries. Site-specific factors that should be considered in project siting to avoid and minimize the risk to birds include avian abundance; the quality, quantity and type of habitat; geographic location; type and extent of bird use (*e.g.* breeding, foraging, migrating, etc.); and landscape features.

We offer the following recommendations to avoid and minimize impacts to migratory birds within and around the project area:

1. Where disturbance is necessary, clear natural or semi-natural habitats (*e.g.*, forests, woodlots, reverting fields, shrubby areas) and perform maintenance activities (*e.g.*, mowing) between September 1 and March 31, which is outside the nesting season for most native bird species. Without undertaking specific analysis of breeding species and their respective nesting seasons on the project site, implementation of this seasonal restriction will avoid take of most breeding birds, their nests, and their young (*i.e.*, eggs, hatchlings, fledglings).

2. Minimize land and vegetation disturbance during project design and construction. To reduce habitat fragmentation, co-locate roads, fences, lay down areas, staging areas, and other infrastructure in or immediately adjacent to already-disturbed areas (*e.g.*, existing roads, pipelines, agricultural fields) and cluster development features (*e.g.*, buildings, roads) as opposed to distributing them throughout land parcels. Where this is not possible, minimize roads, fences, and other infrastructure.

3. Avoid permanent habitat alterations in areas where birds are highly concentrated. Examples of high concentration areas for birds are wetlands, State or Federal refuges, Audubon Important Bird Areas, private duck clubs, staging areas, rookeries, leks, roosts, and riparian areas. Avoid establishing sizable structures along known bird migration pathways or known daily movement flyways (*e.g.*, between roosting and feeding areas).

4. To conserve area-sensitive species, avoid fragmenting large, contiguous tracts of wildlife habitat, especially if habitat cannot be fully restored after construction. Maintain

contiguous habitat corridors to facilitate wildlife dispersal. Where practicable, concentrate construction activities, infrastructure, and man-made structures (*e.g.*, buildings, cell towers, roads, parking lots) on lands already altered or cultivated, and away from areas of intact and healthy native habitats. If not feasible, select fragmented or degraded habitats over relatively intact areas.

5. Develop a habitat restoration plan for the proposed site that avoids or minimizes negative impacts to birds, and that creates functional habitat for a variety of bird species. Use only plant species that are native to the local area for revegetation of the project area.

If you have any questions regarding these measures, please contact Lora Zimmerman of the Pennsylvania Field Office located in State College, PA at 814-234-4090.

GREELEY AND HANSEN

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Philadelphia, Pennsylvania 19103
p 215 563 3460
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October 29, 2015

Mr. Brian Byrnes
Executive Director
Chester Ridley Crum Watersheds Association
38 Bishop Hollow Road
Newtown Square, PA 19073

Subject: Delaware County Regional Water Quality Authority
CSO Long Term Control Plan Update
Sensitive Areas Study

Dear Mr. Byrnes:

Greeley and Hansen is developing a Long Term Control Plan (LTCP) for the Delaware County Regional Water Quality Control Authority (DELCORA) located in Chester, PA. A map of the study area is provided as an attachment to this letter. The goal of this LTCP is to reduce the frequency, duration and intensity of combined sewer overflow events into the local waterbodies, including portions of the Delaware River, Chester Creek and Ridley Creek. As part of this evaluation, environmentally sensitive areas within the study area need to be identified so that appropriate considerations can be made to reduce combined sewer overflows to these areas.

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Marlene Finizio
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October 29, 2015

Ms. Danielle Kreeger
Partnership for the Delaware Estuary
110 S. Poplar Street
Suite 202
Wilmington, DE 19801

Subject: Delaware County Regional Water Quality Authority
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Dear Ms. Kreeger:

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- Waters with primary contact recreation (i.e. beaches, boat ramps, boat launches, etc.)
- Public drinking water intakes or their designated protection areas
- Shellfish beds

USEPA requirements indicate that sensitive areas are given the highest priority during the development of technical alternatives.

This letter is being submitted to your agency as a formal request for information that your agency may have on sensitive areas within Delaware County, PA. Specifically, we are interested in sensitive areas located within the area of study as shown in GREEN on the attached map. If portions of the study area meet the above sensitive area criteria, we request that you provide the following information:

- Complete list of identified Sensitive Areas;
- Narrative description of how the sensitive area criteria listed above applies to the study area;
- Map of specific locations within our study area identifying the specific sensitive areas; and
- Any additional information you deem appropriate.

DELCORA is under a Consent Decree to submit this study to USEPA in February 2016. In order to meet project milestones, we respectfully request you provide a response within 30 days of receipt of this letter, no later than November 23, 2015. We appreciate your cooperation and assistance in completing this study. Should you need any additional information, please feel free to contact me at (215) 553-7919 or Julia Spicher at (215) 553-7926.

Yours very truly,

Greeley and Hansen LLC

Marlene Finizio
Project Manager

c: Robert Willert, DELCORA
Michael DeSantis, DELCORA
Edwin Bothwell, DELCORA
Michael Hope, Greeley and Hansen
Julia Spicher, Greeley and Hansen

Finizio, Marlene

From: Spicher, Julia
Sent: Friday, January 15, 2016 3:25 PM
To: Finizio, Marlene
Subject: FW: Sensitive Areas Study
Attachments: Sensitive Areas Study.docx

From: Kurt Cheng [mailto:kcheng@delawareestuary.org]
Sent: Tuesday, November 24, 2015 4:34 PM
To: Spicher, Julia <jspicher@greeley-hansen.com>
Cc: Danielle Kreeger <DKreeger@delawareestuary.org>
Subject: Sensitive Areas Study

Hi Julia,

On behalf of Dr. Danielle Kreeger, please find attached the sensitive areas study document. Let me know if you have any questions.

Thanks,

Kurt

--
Kurt Cheng
Shellfish Specialist

Partnership for the Delaware Estuary
110 South Poplar Street, Suite 202
Wilmington, DE 19801

302-655-4990 x107

www.delawareestuary.org

Sensitive Areas Study

Partnership for the Delaware Estuary has identified sensitive areas within the study area which are listed and described below along with a visual representation on the provided map. Additional information on the study area is also presented.

Sensitive Areas

- **Ridley Creek watershed**
- **Schuylkill River watershed**
- **Darby Creek mouth / John Heinz National Wildlife Refuge at Tinicum**

Ridley Creek watershed

Ridley Creek begins north of Delaware County and flows through the county and into the Delaware River. Healthy freshwater mussel populations comprised of the Eastern elliptio (*Elliptio complanata*) exist throughout the creek which warrants protection. Additionally, there are long term freshwater mussel monitoring studies within the creek. Therefore, the Ridley Creek watershed should be considered a sensitive area.

Schuylkill River watershed

The northeast section of Delaware County drains into the Schuylkill River which flows just east of the county. Freshwater mussel beds have been qualitatively identified and quantitatively surveyed within the Schuylkill River and include multiple species including the eastern elliptio, the alewife floater (*Anodonta implicata*), and the tidewater mucket (*Leptodea ochracea*). Surveys have also identified juvenile mussels in the river indicating the population is successfully reproducing.

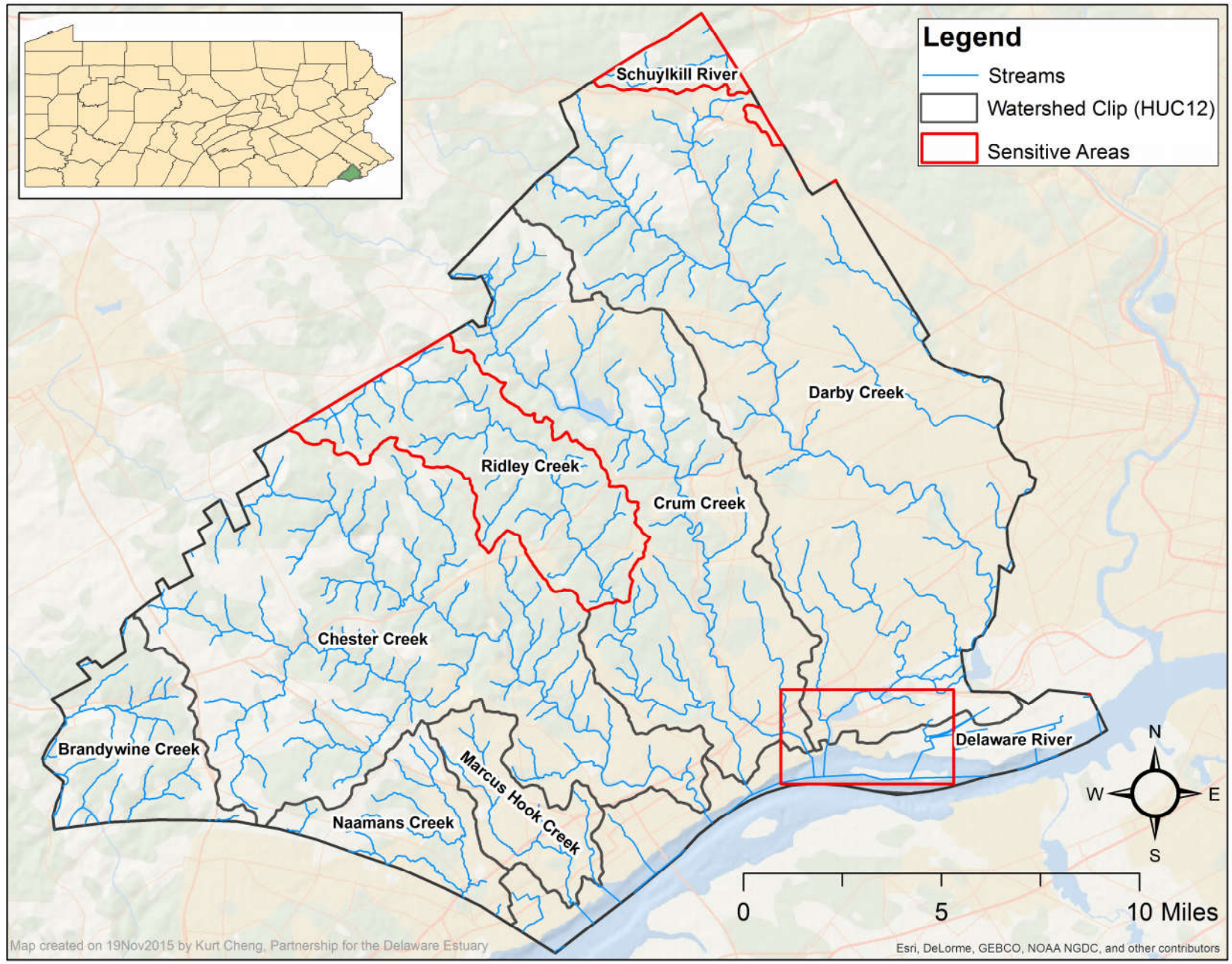
Darby Creek mouth / John Heinz National Wildlife Refuge at Tinicum

Access to Darby Creek is made possible via the Ridley Township Municipal Marina where boaters may access the Delaware River as well as the John Heinz National Wildlife Refuge at Tinicum. As well as serving as a primary contact for recreation, freshwater mussel surveys at the mouth of Darby Creek have yielded positive detections of the eastern elliptio and the alewife floater.

Although a few sensitive areas have been described above, it should be noted that Partnership for the Delaware Estuary and other organizations has only surveyed a portion of all streams in Delaware County. Historical data and museum records indicate that multiple species of freshwater mussels were found in Chester and Crum Creeks (Ortmann 1919). It is possible that additional freshwater mussel beds still exist in some streams that have not been properly surveyed. Attention should be paid to areas with hydrological connectivity to downstream sites that support freshwater mussels. In example, although outside of the highlighted study area, freshwater mussel populations as well as beds of submerged aquatic vegetation between Pennsylvania's coast and Little Tinicum Island may be impacted from waters draining the Darby Creek watershed.

Ortmann, A.E. 1919. A monograph of the naiades of Pennsylvania. Part III: Systematic account of the genera and species. Memoirs of the Carnegie Museum 8(1): xvi -385 + 21 plates.

Sensitive Areas in Delaware County, PA November 2015



GREELEY AND HANSEN

1700 Market Street, Suite 2130
Philadelphia, Pennsylvania 19103
p 215 563 3460
f 215 563 1139
www.greeley-hansen.com

October 29, 2015

Mr. John Buzzar
PA Fish and Boat Commission
1601 Elmerton Avenue
Harrisburg, PA 17110

Subject: Delaware County Regional Water Quality Authority
CSO Long Term Control Plan Update
Sensitive Areas Study

Dear Mr. Buzzar:

Greeley and Hansen is developing a Long Term Control Plan (LTCP) for the Delaware County Regional Water Quality Control Authority (DELCORA) located in Chester, PA. A map of the study area is provided as an attachment to this letter. The goal of this LTCP is to reduce the frequency, duration and intensity of combined sewer overflow events into the local waterbodies, including portions of the Delaware River, Chester Creek and Ridley Creek. As part of this evaluation, environmentally sensitive areas within the study area need to be identified so that appropriate considerations can be made to reduce combined sewer overflows to these areas.

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- Outstanding National Resource Waters (ONRW)
- National Marine Sanctuaries
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Yours very truly,

Greeley and Hansen LLC

Marlene Finizio
Project Manager

c: Robert Willert, DELCORA
Michael DeSantis, DELCORA
Edwin Bothwell, DELCORA
Michael Hope, Greeley and Hansen
Julia Spicher, Greeley and Hansen

Pennsylvania Fish & Boat Commission
established 1866

Division of Environmental Services
Natural Diversity Section
450 Robinson Lane
Bellefonte, PA 16823
814-359-5237

December 22, 2015

IN REPLY REFER TO
SIR# 45340

Greeley & Hansen
Marlene Finizio
1700 Market Street
Philadelphia, Pennsylvania 19103

RE: Species Impact Review (SIR) – Rare, Candidate, Threatened and Endangered Species
PNDI Search No.
Delaware County Regional Water Quality Authority
CSO Long Term Control Plan Update
Delaware County

Dear Ms. Finizio:

This responds to your inquiry about a Pennsylvania Natural Diversity Inventory (PNDI) Internet Database search "potential conflict" or a threatened and endangered species impact review. These projects are screened for potential conflicts with rare, candidate, threatened or endangered species under Pennsylvania Fish & Boat Commission jurisdiction (fish, reptiles, amphibians, aquatic invertebrates only) using the Pennsylvania Natural Diversity Inventory (PNDI) database and our own files. These species of special concern are listed under the Endangered Species Act of 1973, the Wild Resource Conservation Act, and the Pennsylvania Fish & Boat Code (Chapter 75), or the Wildlife Code.

Based on records maintained in the Pennsylvania Natural Diversity Inventory (PNDI) database and our own files, the following rare or protected species are known from the vicinity of the project site:

Common Name (Scientific Name, PA Status)
Atlantic Sturgeon (*Acipenser oxyrinchus*, Endangered)
Shortnose Sturgeon (*Acipenser brevirostrum*, Endangered)
Eastern Redbelly Turtle (*Pseudemys rubriventris*, Threatened)

The Shortnose and Atlantic Sturgeon, which are listed by both Pennsylvania and the U.S. Fish and Wildlife Service/National Marine Fisheries Service, occur in the Delaware River. They are especially vulnerable to physical (dredging, rip-rap, etc.) and chemical (pH, dissolved oxygen, temperature, heavy metals, and organic contaminants) changes to the aquatic environment. Although the mobile adults of these protected fish species may be capable of moving from the project area, their spawning grounds (including eggs, larvae, and immature fish) are vulnerable to burial, crushing by equipment, and siltation

from construction projects. In-stream activities during their spawning period may also disrupt the adults' reproductive behavior. Both Atlantic Sturgeon and Shortnose Sturgeon adults and juveniles may also forage and migrate through the proposed project area and could be adversely impacted by the proposed project.

The Eastern Redbelly Turtle is one of Pennsylvania's largest native aquatic turtles. This turtle species is known to inhabit relatively large, deep streams, rivers, ponds, lakes, and marshes with permanent water and ample basking sites. Redbelly turtles are documented in the Delaware River, Darby Creek, Crum Creek, Ridley Creek, and Chester Creek within the project area. They can be found in deep, slow water habitats in the creeks, as well as impoundments and nearby ponds and lakes. The existence of this turtle species is threatened by habitat destruction, poor water quality and competition with aggressive non-native turtle species that share its range and habitat (e.g. red-eared slider).

Additionally, in response to your request, we recommend that you access county information on our website, at http://fishandboat.com/county.htm for locations of public boat launches on Darby Creek and the Delaware River.

This response represents the most up-to-date summary of the PNDI data and our files and is valid for two (2) years from the date of this letter. An absence of recorded species information does not necessarily imply species absence. Our data files and the PNDI system are continuously being updated with species occurrence information. Should project plans change or additional information on listed or proposed species become available, this determination may be reconsidered, and consultation shall be re-initiated.

If you have any questions regarding this review, please contact Kathy Gipe at 814-359-5186 and refer to the SIR # 45340. Thank you for your cooperation and attention to this important matter of species conservation and habitat protection.

Sincerely,

Christopher A. Urban, Chief
Natural Diversity Section

CAU/KDG/dn

Cc: John Buzzar, PFBC

GREELEY AND HANSEN

1700 Market Street, Suite 2130
Philadelphia, Pennsylvania 19103
p 215 563 3460
f 215 563 1139
www.greeley-hansen.com

April 29, 2016

Ms. Kathy Gipe
PA Fish and Boat Commission
Division of Environmental Services
Natural Diversity Section
450 Robinson Lane
Bellefonte, PA 16823

Subject: Delaware County Regional Water Quality Authority
CSO Long Term Control Plan Update
Sensitive Areas Study
In Reply to SIR# 45340

Dear Ms. Gipe:

Greeley and Hansen is developing a Long Term Control Plan Update (LTCPU) for the Delaware County Regional Water Quality Control Authority (DELCORA) located in Chester, PA. As per our phone conversation on Wednesday, March 9, 2016, we are requesting additional information on the specific habitat location of the species listed in SIR #45340.

Two maps of the study area are provided as attachments to this letter including a map highlighting the specific focus area of Chester City and a second map showing the exact location of the combine sewer outfalls (CSOs). Per our telephone conversation, it is our understanding that a map of the specific habitat locations cannot be provided as this information is confidential. In order to properly determine if CSOs will impact these threatened and endangered species we need to better understand the species location within the focus project area. We request that you review the attached maps against your records and complete the table below.

CSO	Receiving Stream	Location	Distance Upstream to Nearest Species Habitat (miles)	Distance Downstream to Species Habitat (miles)	Above Tidal Boundary? (Yes or No)	Notes
2		Front & Booth				
3		Front & Highland				
4		Front & Hayes				
5		Front & Townsend				
7		Delaware & Reaney				
8		2nd & Tilghman				
9		2nd & Lloyd				
10		5th & Pusey				
11		2nd & Parker				
12		2nd & Edgmont				
13		2nd & Welsh				
14		3rd & Upland				
15		4th & Melrose				
16		8th & McDowell				
17		9th & Campbell				
18		Sun Drive & Hancock				
19		14th & Crozer				
20		Kerlin & Finland				
21		9th & Sproul				

CSO	Receiving Stream	Location	Distance Upstream to Nearest Species Habitat (miles)	Distance Downstream to Species Habitat (miles)	Above Tidal Boundary? (Yes or No)	Notes
22		6th & Sproul				
23		3rd & Edgmont				
24		3rd & Dock				
25		5th & Penn				

Additionally, information on the type of habitat (i.e. – spawning, nesting, siting) or other pertinent information would also be helpful. We appreciate your cooperation and assistance in completing this task. Should you need any additional information, please feel free to contact me at (215) 553-7919 or Julia Spicher at (215) 553-7926.

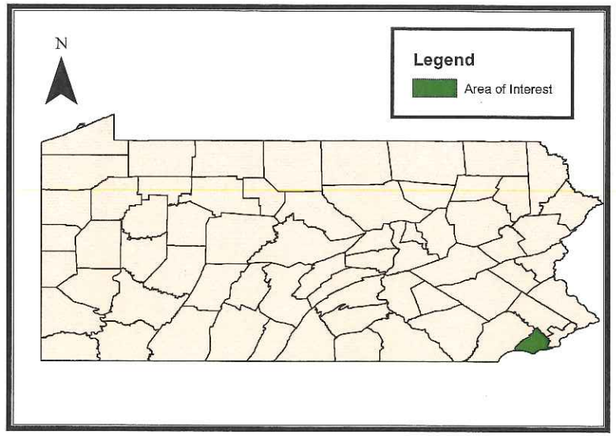
Yours very truly,

Greeley and Hansen LLC

Marlene Finizio
Project Manager

/js
Enclosures

c: Michael DeSantis, DELCORA, w/enclosures
Edwin Bothwell, DELCORA, w/enclosures
Michael Hope, Greeley and Hansen
Julia Spicher, Greeley and Hansen



N

Radnor Twp
Haverford Twp
Newtown Twp
Marple Twp
Millbourne Boro
Upper Darby Twp
Edgmont Twp
Upper Providence Twp
Upper Providence Twp
Upper Providence Twp
East Lansdowne Boro
Lansdowne Boro
Springfield Twp
Clifton Heights Boro
Yeadon Boro
Aldan Boro
Darby Boro
Collingdale Boro
Morton Boro
Darby Twp
Colwyn Boro
Sharon Hill Boro
Media Boro
Thornbury Twp
Middletown Twp
Nether Providence Twp
Swarthmore Boro
Rutledge Boro
Glenolden Boro
Darby Twp
Chester Heights Boro
Rose Valley Boro
Ridley Twp
Folcroft Boro
Prospect Park Boro
Norwood Boro
Ridley Park Boro
Concord Twp
Aston Twp
Brookhaven Boro
Parkside Boro
Tinicum Twp
Chadds Ford Twp
Upland Boro
Eddystone Boro
Chester Twp
Chester City
Bethel Twp
Upper Chichester Twp
Trainer Boro
Lower Chichester Twp
Marcus Hook Boro

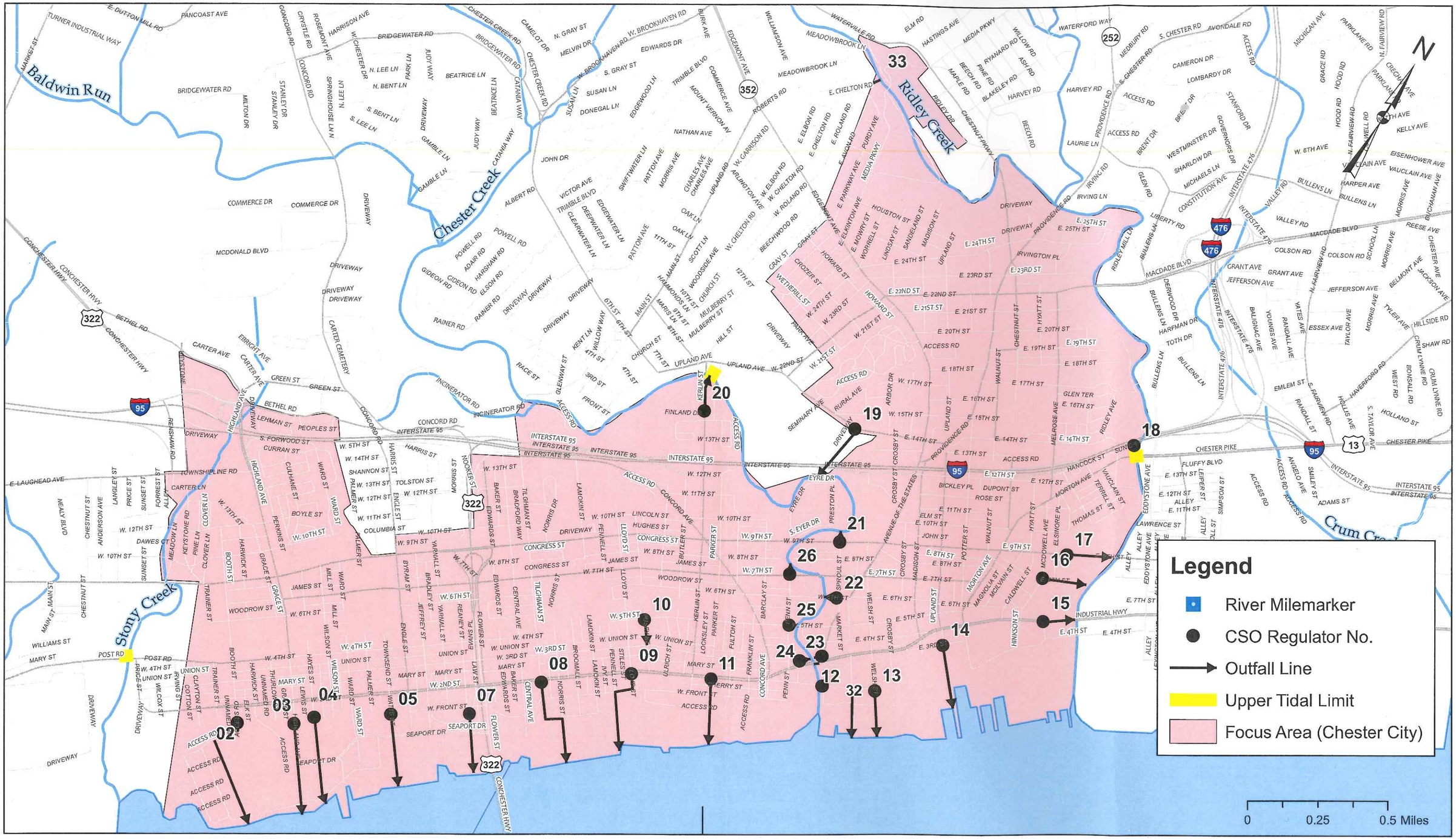
0 0.5 1 2 3 4 5 Miles

Legend
Focus Area (Chester City)
Study Area

CSO Long Term Control Plan Update
Delaware County Regional Water Quality Control Authority

IDENTIFCATION OF SENSITIVE AREAS
STUDY AREA MAP
March 2015

GREELEY AND HANSEN



CSO Long Term Control Plan Update
Delaware County Regional Water Quality Control Authority

IDENTIFCATION OF SENSITIVE AREAS
OUTFALL LOCATOIN MAP
March 2015

GREELEY AND HANSEN

GREELEY AND HANSEN

1700 Market Street, Suite 2130
Philadelphia, Pennsylvania 19103
p 215 563 3460
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www.greeley-hansen.com

October 29, 2015

Mr. Matthew Fisher
Delaware Department of Natural Resources
and Environmental Control
89 Kings Highway
Dover, DE 19901

Subject: Delaware County Regional Water Quality Authority
CSO Long Term Control Plan Update
Sensitive Areas Study

Dear Mr. Fisher:

Greeley and Hansen is developing a Long Term Control Plan (LTCP) for the Delaware County Regional Water Quality Control Authority (DELCORA) located in Chester, PA. A map of the study area is provided as an attachment to this letter. The goal of this LTCP is to reduce the frequency, duration and intensity of combined sewer overflow events into the local waterbodies, including portions of the Delaware River, Chester Creek and Ridley Creek. As part of this evaluation, environmentally sensitive areas within the study area need to be identified so that appropriate considerations can be made to reduce combined sewer overflows to these areas.

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Yours very truly,

Greeley and Hansen LLC

Marlene Finizio
Project Manager

c: Robert Willert, DELCORA
Michael DeSantis, DELCORA
Edwin Bothwell, DELCORA
Michael Hope, Greeley and Hansen
Julia Spicher, Greeley and Hansen

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES
& ENVIRONMENTAL CONTROL
DIVISION OF FISH & WILDLIFE
89 Kings Highway
Dover, Delaware 19901

Phone: (302) 739-9910
Fax: (302) 739-6157

11/25/2015

Marlene Finizio
Greeley and Hansen LLC
1700 Market St. Suite 2130
Philadelphia, Pennsylvania 19103

Dear Marlene Finizio:

In response to your request to comment on the Long Term Control Plan for the Delaware County Regional Water Quality Control Authority the Delaware Department of Natural Resources and Environmental Control Division of Fish and Wildlife would like to notify you that the Delaware River adjacent to your study area is inhabited by both the Atlantic Sturgeon, and the Shortnose Sturgeon. Both species are considered endangered and are protected by the Endangered Species Act. In addition this area is utilized by several anadromous fish species including but not limited to Striped Bass and American Shad. In regards to your specific study site, or further information on species that can be found in the Delaware River you should contact the Pennsylvania Fish and Boat Commission.

Thank You,

Ian Park

GREELEY AND HANSEN

1700 Market Street, Suite 2130
Philadelphia, Pennsylvania 19103
p 215 563 3460
f 215 563 1139
www.greeley-hansen.com

October 29, 2015

Mr. David Chanda
Director Fish and Wildlife
New Jersey Department of
Environmental Protection
P.O. Box 420
501 E. State Street, 3rd Floor
Trenton, NJ 08625

Subject: Delaware County Regional Water Quality Authority
CSO Long Term Control Plan Update
Sensitive Areas Study

Dear Mr. Chanda:

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Project Manager

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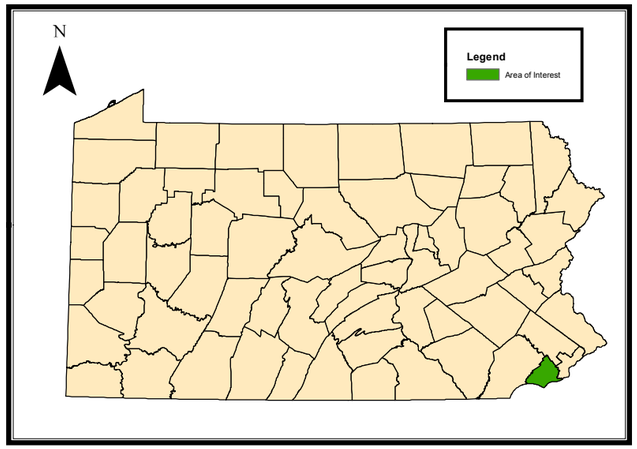

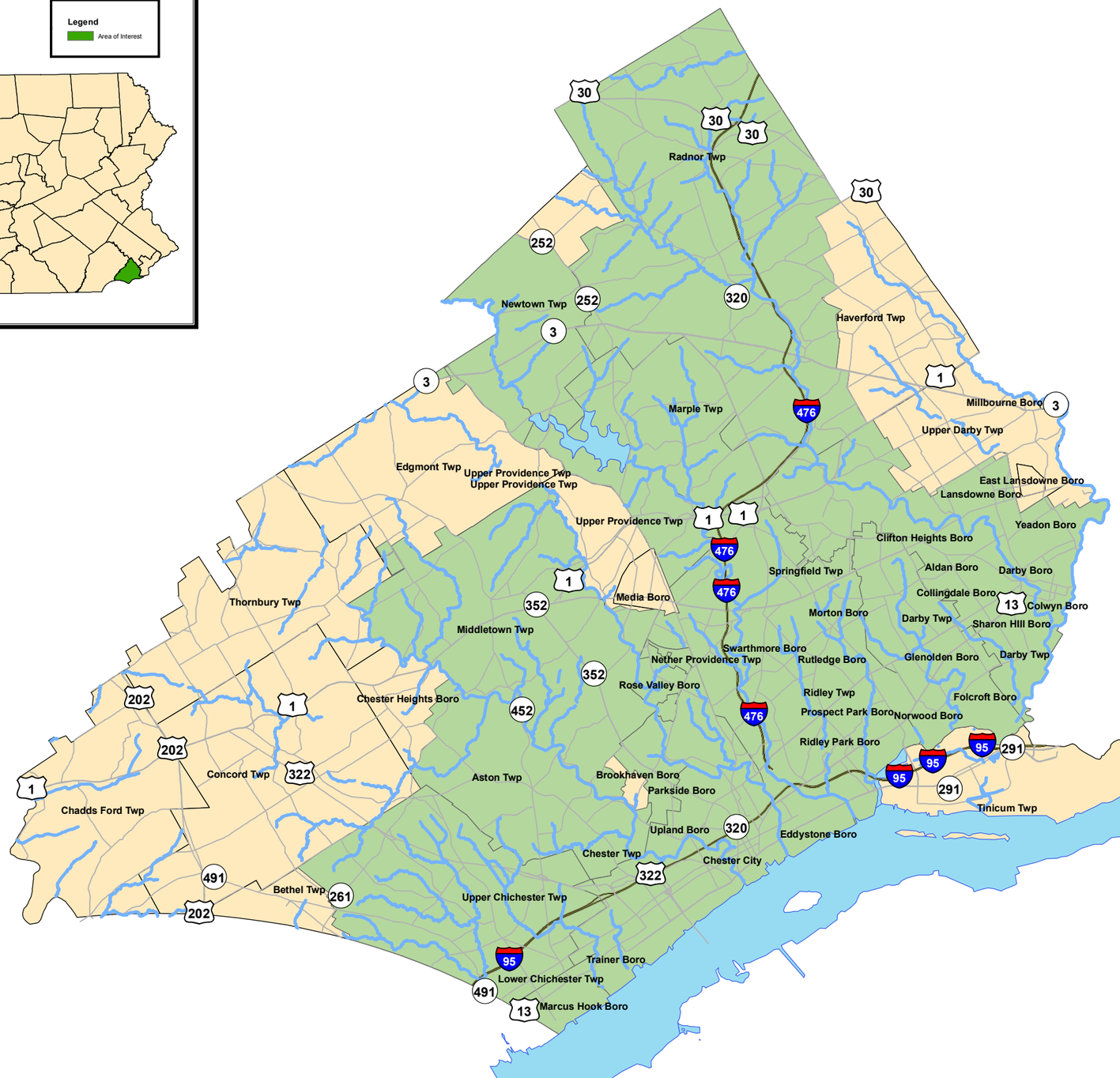

N

Legend
Study Area

0 0.5 1 2 3 4 5 Miles

IDENTIFCATION OF SENSITIVE AREAS
STUDY AREA MAP
OCTOBER 2015

DELCORA

GREELEY AND HANSEN

ATTACHMENT B

Public Survey Tally Sheet

CSO Long Term Control Plan
Delaware County Regional Water Quality Control Authority
River and Creeks Use Survey

The Delaware River, Chester Creek and Ridley Creek provide enjoyment through many recreational activities (i.e. boating, fishing). The Delaware County Regional Water Quality Control Authority (DELCORA) is committed to enhancing the quality of the River and Creeks to support these uses. To assist in planning water quality improvements, please let us know how you use the Delaware River, Chester Creek and Ridley Creek by completing this survey. You can also go online to www.DELCORA.org and click on River and Creeks Use Survey to complete the survey. This survey only pertains to specific areas along the Delaware River, Chester Creek and Ridley Creek as identified by the green area of interest on the attached map (see reverse side). Please fill out only one (1) survey per household. Please return survey in the enclosed self-addressed envelope by December 18, 2015.

1. Do you or anyone in your household use the Delaware River, Chester Creek and/or Ridley Creek for any recreational activities (i.e. boating, swimming, fishing etc)?

   YES [72] NO [421] (If no, skip questions 2 and 3)

2. Please check the appropriate water activities and how frequently you or members of your household participate in these activities along the Delaware River, Chester Creek and Ridley Creek, focusing only in the area indicated in GREEN on the map.4Participation of water activities along the river or creeks outside the green area should not be included.

Activities															
	Delaware River					***Chester Creek***					***Ridley Creek***				
	Frequency					Frequency					Frequency				
	Daily	1x week	1x month	1x year	Never	Daily	1x week	1x month	1x year	Never	Daily	1x week	1x month	1x year	Never
Fishing Bank/Boat	4	10	12	10	457	6	5	9	12	461	1	8	11	14	459
Fishing from Wading	1	1	2	7	482	3	5	7	7	471	1	8	8	4	472
Rowing/Canoeing		1	3	4	485			3	3	487			3	2	488
Motor Boating	2	2	10	5	474			3	1	489			3	1	489
Kayaking			7	4	482			4	3	486			3	2	488
Jet Skiing	1	1	2	1	488			1	1	491			1	1	491
Water Skiing			1	2	490				2	491				2	491
Swimming			2	1	490			4	3	486			6	1	486
Wading	1	1	1	1	489		2	4	2	485	1		7	5	480
Other (Define) Tubing, Sailing			1	2	490			1		492			1		492

3. Please check the appropriate time of year you or a member of your household participates in any of the water activities.

Time of Year			
	Delaware River	***Chester Creek***	***Ridley Creek***
Year Round	11	8	8
April – October	37	35	34
November - March		1	2

4. Respondent Profile (please check all that apply)

Male	178
Female	289

Age less than 18	6
Age 18-39	37

Age 40-64	179
Age 65 and over	295

5. Comments:_____

ATTACHMENT C

Applicable Pages from the 2014 PA Integrated Water Quality and Assessment Report (303(d) List)

2014 PA INTEGRATED WATER QUALITY MONITORING AND ASSESSMENT REPORT

Category 5 Streams

(Pollutants Requiring a TMDL)

2014 Pennsylvania Integrated Water Quality Monitoring and Assessment Report - Streams, Category 5 Waterbodies, Pollutants Requiring a TMDL

Stream Name
HUC
Use Assessed (Assessment ID) - Miles

Source	Cause	Date Listed	TMDL Date
Chester Creek HUC: 02040202			
Recreational (12466) - 0.57 miles			
Source Unknown	Pathogens	2006	2019
Recreational (12469) - 0.11 miles			
Source Unknown	Pathogens	2006	2019
Recreational (12474) - 0.26 miles			
Source Unknown	Pathogens	2006	2019
Aquatic Life (17135) - 7.88 miles			
Urban Runoff/Storm Sewers	Cause Unknown	2014	2027
	Siltation	2014	2027
Aquatic Life (17136) - 0.35 miles			
Urban Runoff/Storm Sewers	Cause Unknown	2014	2027
	Siltation	2014	2027
Aquatic Life (17138) - 7.68 miles			
Urban Runoff/Storm Sewers	Cause Unknown	2014	2027
	Siltation	2014	2027
Aquatic Life (17372) - 2.5 miles			
Urban Runoff/Storm Sewers	Siltation	2014	2027
Chester Creek Unnamed Of (ID:25605816) HUC: 02040202			
Aquatic Life (17136) - 0.29 miles			
Urban Runoff/Storm Sewers	Cause Unknown	2014	2027
	Siltation	2014	2027
Chester Creek Unnamed Of (ID:25606068) HUC: 02040202			
Aquatic Life (17136) - 0.39 miles			
Urban Runoff/Storm Sewers	Cause Unknown	2014	2027
	Siltation	2014	2027
Chester Creek Unnamed Of (ID:25606113) HUC: 02040202			
Aquatic Life (17136) - 0.58 miles			
Urban Runoff/Storm Sewers	Cause Unknown	2014	2027
	Siltation	2014	2027
Chester Creek Unnamed Of (ID:25606116) HUC: 02040202			
Aquatic Life (17136) - 0.21 miles			
Urban Runoff/Storm Sewers	Cause Unknown	2014	2027
	Siltation	2014	2027
Chester Creek Unnamed Of (ID:25606161) HUC: 02040202			
Aquatic Life (17136) - 0.59 miles			
Urban Runoff/Storm Sewers	Cause Unknown	2014	2027
	Siltation	2014	2027

Stream sections in red box are far upstream of DELCORA's CSO discharges

2014 Pennsylvania Integrated Water Quality Monitoring and Assessment Report - Streams, Category 5 Waterbodies, Pollutants Requiring a TMDL

Stream Name HUC Use Assessed (Assessment ID) - Miles Source	Cause	Date Listed	TMDL Date
Poquessing Creek Unnamed To (ID:25600765) HUC: 02040202			
Aquatic Life (9687) - 0.6 miles			
Urban Runoff/Storm Sewers	Excessive Algal Growth	2002	2015
Preston Run HUC: 02040202			
Aquatic Life (17117) - 1.43 miles			
Urban Runoff/Storm Sewers	Cause Unknown	2014	2027
	Siltation	2014	2027
Reeses Run HUC: 02040202			
Aquatic Life (17117) - 1.93 miles			
Urban Runoff/Storm Sewers	Cause Unknown	2014	2027
	Siltation	2014	2027
Ridley Creek HUC: 02040202			
Aquatic Life (16609) - 2.39 miles			
Urban Runoff/Storm Sewers	Cause Unknown	2012	2025
	Siltation	2012	2025
Aquatic Life (16610) - 0.64 miles			
Urban Runoff/Storm Sewers	Cause Unknown	2012	2025
	Siltation	2012	2025
Aquatic Life (16613) - 5.9 miles			
Urban Runoff/Storm Sewers	Cause Unknown	2012	2025
	Siltation	2012	2025
Aquatic Life (16619) - 5.11 miles			
Source Unknown	Cause Unknown	2012	2025
Aquatic Life (16622) - 12.72 miles			
Urban Runoff/Storm Sewers	Cause Unknown	2012	2025
	Siltation	2012	2025
Ridley Creek Unnamed Of (ID:25601429) HUC: 02040202			
Aquatic Life (16620) - 0.91 miles			
Urban Runoff/Storm Sewers	Cause Unknown	2002	2015
	Siltation	2002	2015
Ridley Creek Unnamed Of (ID:25602007) HUC: 02040202			
Aquatic Life (16608) - 0.52 miles			
Urban Runoff/Storm Sewers	Cause Unknown	2012	2025
	Siltation	2012	2025

Stream sections in red box are far upstream of DELCORA's CSO discharges

2014 PA INTEGRATED WATER QUALITY MONITORING AND ASSESSMENT REPORT

Category 4a Streams

(Approved TMDLs)

2014 Pennsylvania Integrated Water Quality Monitoring and Assessment Report - Streams, Category 4a Waterbodies, Approved TMDLs

Stream Name / *Use Designation (Assessment ID)* / *Source*	*Cause*	*Date Listed*	*TMDL Date*
Hydrologic Unit Code: 02040202-Lower Delaware			
Chester Creek			
HUC: 02040202			
Aquatic Life (9900) - 1.05 miles			
Municipal Point Source	Cause Unknown	2002	2008
Aquatic Life (17372) - 2.5 miles			
Urban Runoff/Storm Sewers	Cause Unknown	2014	2008
Fish Consumption (17455) - 0.81 miles			
Source Unknown	PCB	1996	2006
Chester Creek Unnamed Of (ID:25621262)			
HUC: 02040202			
Aquatic Life (9900) - 0.98 miles			
Municipal Point Source	Cause Unknown	2002	2008
Chester Creek Unnamed Of (ID:25621282)			
HUC: 02040202			
Aquatic Life (9900) - 0.68 miles			
Municipal Point Source	Cause Unknown	2002	2008
Chester Creek Unnamed Of (ID:25621286)			
HUC: 02040202			
Aquatic Life (9900) - 0.6 miles			
Municipal Point Source	Cause Unknown	2002	2008
Chester Creek Unnamed Of (ID:25621308)			
HUC: 02040202			
Aquatic Life (9900) - 0.59 miles			
Municipal Point Source	Cause Unknown	2002	2008
Chester Creek Unnamed To (ID:25621322)			
HUC: 02040202			
Aquatic Life (9900) - 4.89 miles			
Municipal Point Source	Cause Unknown	2002	2008
Chester Creek Unnamed To (ID:25621352)			
HUC: 02040202			
Aquatic Life (17372) - 0.65 miles			
Urban Runoff/Storm Sewers	Cause Unknown	2014	2008
Crum Creek			
HUC: 02040202			
Fish Consumption (17455) - 1.4 miles			
Source Unknown	PCB	1996	2006
Delaware River			
HUC: 02040202			
Fish Consumption (17455) - 61.02 miles			
Source Unknown	PCB	1996	2006
Delaware River Unnamed To (ID:133072413)			
HUC: 02040202			
Fish Consumption (17455) - 0.34 miles			
Source Unknown	PCB	1996	2006
Delaware River Unnamed To (ID:134395494)			
HUC: 02040202			
Fish Consumption (17455) - 2.4 miles			
Source Unknown	PCB	1996	2006

Stream sections in red box are far upstream of DELCORA's CSO discharges

ATTACHMENT D

Applicable Water Quality Standards (WQS) Master Table

DELCORA CSO LTCPU - Applicable Water Quality Standards

Rev: 12-18-2015

Parameter	Source of Standard	Applicable Water Body	WQS Type	Water Quality Standard To Use	Standard Criterion (DRBC Zone 4 WQRs) *Applies to Delaware & Tidal Portions of Chester & Ridley*	Standard Criterion (25 PA Code Ch. 93 WQS, 93.7 Table 3 for TSF, WWF, MF & WC Critical Use Designations) *Applies to Delaware, Chester, Ridley*	Freshwater Objectives (DRBC WQRs Table 5 - Stream Quality Objectives for Toxic Pollutants for the Protection of Aquatic Life) *Applies to Delaware & Tidal Portions of Chester & Ridley*		Freshwater Objectives (DRBC WQRs Table 6 - Stream Quality Objectives for Carcinogens) *Applies to Delaware & Tidal Portions of Chester & Ridley*		Freshwater Objectives (DRBC WQRs Table 7 - Stream Quality Objectives for Systemic Toxicants) *Applies to Delaware & Tidal Portions of Chester & Ridley*		Fish & Aquatic Life Criteria (25 PA Code Ch. 93 WQS, 93.8c, Table 5) *Applies to Delaware, Chester, Ridley*		Human Criteria (25 PA Code Ch. 93 WQS, 93.8c, Table 5) *Applies to Delaware, Chester, Ridley*	US EPA National *Recommended* Water Quality Criteria Aquatic Life Criteria Table *Applies to Delaware, Chester, Ridley*		Units	Notes	Parameter
							Acute	Chronic	Fish & Water Ingestion	Fish Ingestion Only	Fish & Water Ingestion	Fish Ingestion Only	Criteria Continuous Concentrations	Criteria Maximum Concentrations	Health Criteria	Acute Criteria Maximum Concentration (CMC)	Chronic Criteria Continuous Concentration (CCC)			
Alkalinity	DRBC WQRs - for Zone 4 / PA Code (WWF, MF, TSF)	**Delaware River, Chester Creek, Ridley Creek**	**Minimum**	**20**	**20**	**20**	---	---	---	---	---	---	---	---	---	---	**20**	mg/L as $CaCO_3$	Can eliminate from POCs since it is naturally occurring	Alkalinity
Alkalinity	DRBC WQRs - for Zone 4	**Delaware River**	**Maximum**	**120**	**120**		---	---	---	---	---	---	---	---	---	---	---	mg/L as $CaCO_3$	Can eliminate from POCs since it is naturally occurring	Alkalinity
Alkalinity	DRBC WQRs - for Zone 4	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Maximum**	**120**	**120**		---	---	---	---	---	---	---	---	---	---	---	mg/L as $CaCO_3$	Can eliminate from POCs since it is naturally occurring	Alkalinity
Aluminum	DRBC WQRs - Table 5 / PA Code - Table 5	**Delaware River, Chester Creek, Ridley Creek**	**Acute Maximum**	**750**	---	---	**750**	87	---	---	---	---	---	**750**	---	**750**	87	µg/L	Total recoverable, restricted to pH 6.5 - 9	Aluminum
Aluminum	DRBC WQRs - Table 5	**Delaware River**	**Chronic Maximum**	**87**	---	---	750	**87**	---	---	---	---	---	750	---	750	**87**	µg/L	Total recoverable, restricted to pH 6.5 - 9	Aluminum
Aluminum	DRBC WQRs - Table 5	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Chronic Maximum**	**87**	---	---	750	**87**	---	---	---	---	---	750	---	750	**87**	µg/L	Total recoverable, restricted to pH 6.5 - 9	Aluminum
Ammonia	PA Code (WWF, MF, TSF)	**Delaware River, Chester Creek, Ridley Creek**	**Maximum**	**$(NH_3 - N) \times (\log^{-1}[pK_T - pH] + 1)$**	---	**$(NH_3 - N) \times (\log^{-1}[pK_T - pH] + 1)$**	---	---	---	---	---	---	---	---	---	---	---	mg/L	pH dependent	Ammonia
Anthracene	DRBC WQRs - Table 7 / PA Code - Table 5	**Delaware River**	**Maximum**	**8,300**	---	---	---	---	---	---	**8,300**	40,000	---	---	**8,300**	---	---	µg/L		Anthracene
Anthracene	DRBC WQRs - Table 7	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Maximum**	**8,300**	---	---	---	---	---	---	**8,300**	40,000	---	---	**8,300**	---	---	µg/L		Anthracene
Antimony	PA Code 25 - 93.8c, Table 5	**Chester Creek upstream of OF#20, & Ridley Creek upstream from OF#18**	**Acute Maximum**	**1,100**	---	---	---	---	---	---	5.6	640	220	**1,100**	5.6	---	---	µg/L		Antimony
Antimony	PA Code 25 - 93.8c, Table 5	**Chester Creek upstream of OF#20, & Ridley Creek upstream from OF#18**	**Chronic Maximum**	**200**	---	---	---	---	---	---	5.6	640	**220**	1,100	5.6	---	---	µg/L		Antimony
Antimony	DRBC WQRs - Table 7 / PA Code - Table 5	**Delaware River**	**Maximum**	**5.6**	---	---	---	---	---	---	**5.6**	640	220	1,100	**5.6**	---	---	µg/L		Antimony
Antimony	DRBC WQRs - Table 7	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Maximum**	**5.6**	---	---	---	---	---	---	**5.6**	640	220	1,100	**5.6**	---	---	µg/L		Antimony
Arsenic (trivalent) (As III)	DRBC WQRs - Table 5 / PA Code - Table 5	**Chester Creek, Ridley Creek, Delaware Upstream of RM 81.8**	**Acute Maximum**	**340**	---	---	**340**	150	---	---	---	---	150	**340**	10	**340**	150	µg/L	Dissolved criteria	Arsenic (trivalent) (As III)
Arsenic (trivalent) (As III)	DRBC WQRs - Table 5 / PA Code - Table 5	**Chester Creek, Ridley Creek, Delaware Upstream of RM 81.8**	**Chronic Maximum**	**150**	---	---	340	**150**	---	---	---	---	**150**	340	10	340	**150**	µg/L	Dissolved criteria	Arsenic (trivalent) (As III)
Arsenic (trivalent) (As III)	PA Code 25 - 93.8c, Table 5	**Delaware River Downstream of RM 81.8**	**Maximum**	**10**	---	---	340	150	---	---	---	---	150	340	**10**	340	150	µg/L	Dissolved criteria	Arsenic (trivalent) (As III)
Bacteria - Enterococcus (Above R.M. 81.8)	DRBC WQRs - for Zone 4	**Delaware River Upstream of RM 81.8**	**Maximum Geometric Average**	**88**	**88**	---	---	---	---	---	---	---	---	---	---	---	---	CFU/100 mL		Bacteria - Enterococcus (Above R.M. 81.8)
Bacteria - Enterococcus (Below R.M. 81.8)	DRBC WQRs - for Zone 4	**Delaware River Downstream of RM 81.8**	**Maximum Geometric Average**	**33**	**33**	---	---	---	---	---	---	---	---	---	---	---	---	CFU/100 mL		Bacteria - Enterococcus (Below R.M. 81.8)
Bacteria - Enterococcus	DRBC WQRs - for Zone 4	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Maximum Geometric Average**	**88**	**88**	---	---	---	---	---	---	---	---	---	---	---	---	CFU/100 mL		Bacteria - Enterococcus (Above R.M. 81.8)
Bacteria - Fecal Coliform (Above R.M. 81.8)	DRBC WQRs - for Zone 4	**Delaware River Upstream of RM 81.8**	**Maximum Geometric Average**	**770**	**770**	---	---	---	---	---	---	---	---	---	---	---	---	CFU/100 mL		Bacteria - Fecal Coliform (Above R.M. 81.8)

Parameter	Source of Standard	Applicable Water Body	WQS Type	Water Quality Standard To Use	Standard Criterion (DRBC Zone 4 WQRs) *Applies to Delaware & Tidal Portions of Chester & Ridley*	Standard Criterion (25 PA Code Ch. 93 WQS, 93.7 Table 3 for TSF, WWF, MF & WC Critical Use Designations) *Applies to Delaware, Chester, Ridley*	Freshwater Objectives (DRBC WQRs Table 5 - Stream Quality Objectives for Toxic Pollutants for the Protection of Aquatic Life) *Applies to Delaware & Tidal Portions of Chester & Ridley*		Freshwater Objectives (DRBC WQRs Table 6 - Stream Quality Objectives for Carcinogens) *Applies to Delaware & Tidal Portions of Chester & Ridley*		Freshwater Objectives (DRBC WQRs Table 7 - Stream Quality Objectives for Systemic Toxicants) *Applies to Delaware & Tidal Portions of Chester & Ridley*		Fish & Aquatic Life Criteria (25 PA Code Ch. 93 WQS, 93.8c, Table 5) *Applies to Delaware, Chester, Ridley*		Human Criteria (25 PA Code Ch. 93 WQS, 93.8c, Table 5) *Applies to Delaware, Chester, Ridley*	US EPA National *Recommended* Water Quality Criteria Aquatic Life Criteria Table *Applies to Delaware, Chester, Ridley*		Units	Notes	Parameter
							Acute	Chronic	Fish & Water Ingestion	Fish Ingestion Only	Fish & Water Ingestion	Fish Ingestion Only	Criteria Continuous Concentrations	Criteria Maximum Concentrations	Health Criteria	Acute Criteria Maximum Concentration (CMC)	Chronic Criteria Continuous Concentration (CCC)			
Bacteria - Fecal Coliform (Below R.M. 81.8)	DRBC WQRs - for Zone 4	**Delaware River Downstream of RM 81.8**	**Maximum Geometric Average**	**200**	**200**	---	---	---	---	---	---	---	---	---	---	---	---	---	CFU/100 mL	DRBC WQRs and PA Code PA Code for WC Critical Use agree from May 1 - Sept 30, but PA Code of 2000 CFU/100 mL from Oct. 1 - April 30 for WC exceeds that allowed by DRBC Zone 4.	Bacteria - Fecal Coliform (Below R.M. 81.8)
Bacteria - Fecal Coliform	DRBC WQRs - for Zone 4	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Maximum Geometric Average**	**770**	**770**	---	---	---	---	---	---	---	---	---	---	---	---	---	CFU/100 mL		Bacteria - Fecal Coliform (Above R.M. 81.8)
Barium	PA Code 25 - 93.8c, Table 5	**Chester Creek, Ridley Creek, Delaware Upstream of RM 81.8**	**Acute Maximum**	**21,000**			---	---	---	---	---	---	4,100	**21,000**	2,400			µg/L		Barium
Barium	PA Code 25 - 93.8c, Table 5	**Chester Creek, Ridley Creek, Delaware Upstream of RM 81.8**	**Chronic Maximum**	**4,100**			---	---	---	---	---	---	**4,100**	21,000	2,400			µg/L		Barium
Barium	PA Code 25 - 93.8c, Table 5	**Delaware River Downstream of RM 81.8**	**Maximum**	**2,400**			---	---	---	---	---	---	4,100	21,000	**2,400**			µg/L		Barium
Benzene	PA Code 25 - 93.8c, Table 5	**Chester Creek upstream of OF#20, & Ridley Creek upstream from OF#18**	**Acute Maximum**	**640**	---	---	---	---	0.61	14	---	3,100	130	**640**	1.2			µg/L		Benzene
Benzene	PA Code 25 - 93.8c, Table 5	**Chester Creek upstream of OF#20, & Ridley Creek upstream from OF#18**	**Chronic Maximum**	**130**	---	---	---	---	0.61	14	---	3,100	**130**	640	1.2			µg/L		Benzene
Benzene	DRBC WQRs - Table 6	**Delaware River Upstream of RM 81.8**	**Maximum**	**14**	---	---	---	---	0.61	**14**	---	3,100	130	640	1.2			µg/L		Benzene
Benzene	DRBC WQRs - Table 6	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Maximum**	**14**	---	---	---	---	0.61	**14**	---	3,100	130	640	1.2			µg/L		Benzene
Benzene	DRBC WQRs - Table 6	**Delaware River Downstream of RM 81.8**	**Maximum**	**0.61**	---	---	---	---	**0.61**	14	---	3,100	130	640	1.2			µg/L		Benzene
benzo (a) anthracene	PA Code 25 - 93.8c, Table 5	**Chester Creek, Ridley Creek, Delaware Upstream of RM 81.8**	**Acute Maximum**	**0.5**	---	---	---	---	---	---	---	---	0.1	**0.5**	0.0038			µg/L		benzo (a) anthracene
benzo (a) anthracene	PA Code 25 - 93.8c, Table 5	**Chester Creek, Ridley Creek, Delaware Upstream of RM 81.8**	**Chronic Maximum**	**0.1**	---	---	---	---	---	---	---	---	**0.1**	0.5	0.0038			µg/L		benzo (a) anthracene
benzo (a) anthracene	PA Code 25 - 93.8c, Table 5	**Delaware River Downstream of RM 81.8**	**Maximum**	**0.0038**	---	---	---	---	---	---	---	---	0.1	0.5	**0.0038**			µg/L		benzo (a) anthracene
Beryllium	DRBC WQRs - Table 7	**Delaware River**	**Maximum**	**420**							---	**420**	---	---				µg/L		Beryllium
Beryllium	DRBC WQRs - Table 7	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Maximum**	**420**							---	**420**	---	---				µg/L		Beryllium
Biological Oxygen Demand (BOD)	No Standard						---	---	---	---	---	---	---	---	---					Biological Oxygen Demand (BOD)
Bis (2-ethylhexyl) phthalate	PA Code 25 - 93.8c, Table 5	**Chester Creek upstream of OF#20, & Ridley Creek upstream from OF#18**	**Acute Maximum**	**4,500**	---	---	---	---	1.2	2.2	---	620	910	**4,500**	1.2			µg/L		Bis (2-ethylhexyl) phthalate
Bis (2-ethylhexyl) phthalate	PA Code 25 - 93.8c, Table 5	**Chester Creek upstream of OF#20, & Ridley Creek upstream from OF#18**	**Chronic Maximum**	**910**	---	---	---	---	1.2	2.2	---	620	**910**	4,500	1.2			µg/L		Bis (2-ethylhexyl) phthalate
Bis (2-ethylhexyl) phthalate	DRBC WQRs - Table 6	**Delaware River Upstream of RM 81.8**	**Maximum**	**2.2**	---	---	---	---	1.2	**2.2**	---	620	910	4,500	1.2			µg/L		Bis (2-ethylhexyl) phthalate
Bis (2-ethylhexyl) phthalate	DRBC WQRs - Table 6	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Maximum**	**2.2**	---	---	---	---	1.2	**2.2**	---	620	910	4,500	1.2			µg/L		Bis (2-ethylhexyl) phthalate
Bis (2-ethylhexyl) phthalate	DRBC WQRs - Table 6	**Delaware River Downstream of RM 81.8**	**Maximum**	**1.2**	---	---	---	---	**1.2**	2.2	---	620	910	4,500	1.2			µg/L		Bis (2-ethylhexyl) phthalate
Bromodichloromethane (aka Dichlorobromomethane)	DRBC WQRs - Table 6	**Delaware River Upstream of RM 81.8**	**Maximum**	**17**					0.55	**17**	680	---	---	---	0.55			µg/L		Bromodichloromethane (aka Dichlorobromomethane)

Parameter	Source of Standard	Applicable Water Body	WQS Type	Water Quality Standard To Use	Standard Criterion (DRBC Zone 4 WQRs) *Applies to Delaware & Tidal Portions of Chester & Ridley*	Standard Criterion (25 PA Code Ch. 93 WQS, 93.7 Table 3 for TSF, WWF, MF & WC Critical Use Designations) *Applies to Delaware, Chester, Ridley*	Freshwater Objectives (DRBC WQRs Table 5 - Stream Quality Objectives for Toxic Pollutants for the Protection of Aquatic Life) *Applies to Delaware & Tidal Portions of Chester & Ridley*		Freshwater Objectives (DRBC WQRs Table 6 - Stream Quality Objectives for Carcinogens) *Applies to Delaware & Tidal Portions of Chester & Ridley*		Freshwater Objectives (DRBC WQRs Table 7 - Stream Quality Objectives for Systemic Toxicants) *Applies to Delaware & Tidal Portions of Chester & Ridley*		Fish & Aquatic Life Criteria (25 PA Code Ch. 93 WQS, 93.8c, Table 5) *Applies to Delaware, Chester, Ridley*		Human Criteria (25 PA Code Ch. 93 WQS, 93.8c, Table 5) *Applies to Delaware, Chester, Ridley*	US EPA National *Recommended* Water Quality Criteria Aquatic Life Criteria Table *Applies to Delaware, Chester, Ridley*		Units	Notes	Parameter
							Acute	Chronic	Fish & Water Ingestion	Fish Ingestion Only	Fish & Water Ingestion	Fish Ingestion Only	Criteria Continuous Concentrations	Criteria Maximum Concentrations	Health Criteria	Acute Criteria Maximum Concentration (CMC)	Chronic Criteria Continuous Concentration (CCC)			
Bromodichloromethane (aka Dichlorobromomethane)	DRBC WQRs - Table 6	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Maximum**	**17**					0.55	**17**	680	---	---	---	0.55			µg/L		Bromodichloromethane (aka Dichlorobromomethane)
Bromodichloromethane (aka Dichlorobromomethane)	PA Code 25 - 93.8c, Table 5 / DRBC WQRs - Table 6	**Delaware River Downstream of RM 81.8**	**Maximum**	**0.55**					**0.55**	17	680	---	---	---	**0.55**			µg/L		Bromodichloromethane (aka Dichlorobromomethane)
Butylbenzyl phthalate	PA Code 25 - 93.8c, Table 5	**Delaware River, Chester Creek, Ridley Creek**	**Acute Maximum**	**140**	---	---	---	---			1,500	1,900	35	**140**	150			µg/L		Butylbenzyl phthalate
Butylbenzyl phthalate	PA Code 25 - 93.8c, Table 5	**Delaware River, Chester Creek, Ridley Creek**	**Chronic Maximum**	**35**	---	---	---	---			1,500	1,900	**35**	140	150			µg/L		Butylbenzyl phthalate
Cadmium	DRBC WQRs - Table 5	**Delaware River**	**Acute Maximum**	**0.651*EXP(1.0166*LN(hardness)-3.924)**	---	---	**0.651*EXP(1.0166*LN(hardness)-3.924)**	0.651*EXP(0.7409*LN(hardness)-4.719)	---	---	3.4	16	(1.101672-(LN(hardness)x0.041838)) x Exp(0.7409 x LN(hardness)-4.719)	(1.136672-(LN(hardness)x0.041838)) x Exp(1.0166 x LN(hardness)-3.924)	---	2.0	0.25	µg/L	Dissolved criteria	Cadmium
Cadmium	DRBC WQRs - Table 5	**Delaware River**	**Chronic Maximum**	**0.651*EXP(0.7409*LN(hardness)-4.719)**	---	---	0.651*EXP(1.0166*LN(hardness)-3.924)	**0.651*EXP(0.7409*LN(hardness)-4.719)**	---	---	3.4	16	(1.101672-(LN(hardness)x0.041838)) x Exp(0.7409 x LN(hardness)-4.719)	(1.136672-(LN(hardness)x0.041838)) x Exp(1.0166 x LN(hardness)-3.924)	---	2.0	0.25	µg/L	Dissolved criteria	Cadmium
Cadmium	DRBC WQRs - Table 5	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Acute Maximum**	**0.651*EXP(1.0166*LN(hardness)-3.924)**	---	---	**0.651*EXP(1.0166*LN(hardness)-3.924)**	0.651*EXP(0.7409*LN(hardness)-4.719)	---	---	3.4	16	(1.101672-(LN(hardness)x0.041838)) x Exp(0.7409 x LN(hardness)-4.719)	(1.136672-(LN(hardness)x0.041838)) x Exp(1.0166 x LN(hardness)-3.924)	---	2.0	0.25	µg/L	Dissolved criteria	Cadmium
Cadmium	DRBC WQRs - Table 5	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Chronic Maximum**	**0.651*EXP(0.7409*LN(hardness)-4.719)**	---	---	0.651*EXP(1.0166*LN(hardness)-3.924)	**0.651*EXP(0.7409*LN(hardness)-4.719)**	---	---	3.4	16	(1.101672-(LN(hardness)x0.041838)) x Exp(0.7409 x LN(hardness)-4.719)	(1.136672-(LN(hardness)x0.041838)) x Exp(1.0166 x LN(hardness)-3.924)	---	2.0	0.25	µg/L	Dissolved criteria	Cadmium
Cadmium	PA Code - Table 5	**Chester Creek upstream of OF#20, & Ridley Creek upstream from OF#18**	**Acute Maximum**	**(1.136672-(LN(hardness)x0.041838)) x Exp(1.0166 x LN(hardness)-3.924)**	---	---	0.651*EXP(1.0166*LN(hardness)-3.924)	0.651*EXP(0.7409*LN(hardness)-4.719)	---	---	3.4	16	(1.101672-(LN(hardness)x0.041838)) x Exp(0.7409 x LN(hardness)-4.719)	**(1.136672-(LN(hardness)x0.041838)) x Exp(1.0166 x LN(hardness)-3.924)**	---	2.0	0.25	µg/L	Dissolved criteria	Cadmium
Cadmium	PA Code - Table 5	**Chester Creek upstream of OF#20, & Ridley Creek upstream from OF#18**	**Chronic Maximum**	**(1.101672-(LN(hardness)x0.041838)) x Exp(0.7409 x LN(hardness)-4.719)**	---	---	0.651*EXP(1.0166*LN(hardness)-3.924)	0.651*EXP(0.7409*LN(hardness)-4.719)	---	---	3.4	16	**(1.101672-(LN(hardness)x0.041838)) x Exp(0.7409 x LN(hardness)-4.719)**	(1.136672-(LN(hardness)x0.041838)) x Exp(1.0166 x LN(hardness)-3.924)	---	2.0	0.25	µg/L	Dissolved criteria	Cadmium
CBOD5	No Standard						---	---	---	---	---	---	---	---	---					CBOD5
CBOD20	No Standard						---	---	---	---	---	---	---	---	---					CBOD20
Chlorine (Total Residual Chlorine)	PA Code (WWF, MF, TSF)	**Delaware River, Chester Creek, Ridley Creek**	**4-day Average (Chronic Maximum)**	**11**		**11**	---	---	---	---	---	---				19	**11**	µg/L		Chlorine (Total Residual Chlorine)
Chlorine (Total Residual Chlorine)	PA Code (WWF, MF, TSF)	**Delaware River, Chester Creek, Ridley Creek**	**1-hour Average (Acute Maximum)**	**19**		**19**	---	---	---	---	---	---				**19**	11	µg/L		Chlorine (Total Residual Chlorine)
Chlorodibromomethane	DRBC WQRs - Table 6	**Delaware River Upstream of RM 81.8**	**Maximum**	**13**	---	---	---	---	0.4	**13**			---	---	0.4			µg/L		Chlorodibromomethane
Chlorodibromomethane	DRBC WQRs - Table 6	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Maximum**	**13**	---	---	---	---	0.4	**13**			---	---	0.4			µg/L		Chlorodibromomethane
Chlorodibromomethane	DRBC WQRs - Table 6 / PA Code Table 5	**Delaware River Downstream of RM 81.8**	**Maximum**	**0.4**	---	---	---	---	**0.4**	13			---	---	**0.4**			µg/L		Chlorodibromomethane
Chloroform	DRBC WQRs - Tables 6 & 7 / PA Code Table 5	**Chester Creek upstream of OF#20, & Ridley Creek upstream from OF#18**	**Acute Maximum**	**1,900**	---	---	---	---	5.7	470	68	2,100	390	**1,900**	5.7			µg/L		Chloroform
Chloroform	DRBC WQRs - Tables 6 & 7 / PA Code Table 5	**Chester Creek, Ridley Creek, Delaware River Upstream of RM 81.8**	**Chronic Maximum**	**390**	---	---	---	---	5.7	470	68	2,100	**390**	1,900	5.7			µg/L		Chloroform
Chloroform	DRBC Table 6	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Maximum**	**470**	---	---	---	---	5.7	**470**	68	2,100	390	1,900	**5.7**			µg/L		Chloroform
Chloroform	DRBC Table 6	**Delaware River Upstream of RM 81.8**	**Maximum**	**470**	---	---	---	---	5.7	**470**	68	2,100	390	1,900	**5.7**			µg/L		Chloroform

Parameter	Source of Standard	Applicable Water Body	WQS Type	Water Quality Standard To Use	Standard Criterion (DRBC Zone 4 WQRs) *Applies to Delaware & Tidal Portions of Chester & Ridley*	Standard Criterion (25 PA Code Ch. 93 WQS, 93.7 Table 3 for TSF, WWF, MF & WC Critical Use Designations) *Applies to Delaware, Chester, Ridley*	Freshwater Objectives (DRBC WQRs Table 5 - Stream Quality Objectives for Toxic Pollutants for the Protection of Aquatic Life) *Applies to Delaware & Tidal Portions of Chester & Ridley*		Freshwater Objectives (DRBC WQRs Table 6 - Stream Quality Objectives for Carcinogens) *Applies to Delaware & Tidal Portions of Chester & Ridley*		Freshwater Objectives (DRBC WQRs Table 7 - Stream Quality Objectives for Systemic Toxicants) *Applies to Delaware & Tidal Portions of Chester & Ridley*		Fish & Aquatic Life Criteria (25 PA Code Ch. 93 WQS, 93.8c, Table 5) *Applies to Delaware, Chester, Ridley*		Human Criteria (25 PA Code Ch. 93 WQS, 93.8c, Table 5) *Applies to Delaware, Chester, Ridley*	US EPA National *Recommended* Water Quality Criteria Aquatic Life Criteria Table *Applies to Delaware, Chester, Ridley*		Units	Notes	Parameter
							Acute	Chronic	Fish & Water Ingestion	Fish Ingestion Only	Fish & Water Ingestion	Fish Ingestion Only	Criteria Continuous Concentrations	Criteria Maximum Concentrations	Health Criteria	Acute Criteria Maximum Concentration (CMC)	Chronic Criteria Continuous Concentration (CCC)			
Chloroform	PA Code 25 - 93.8c, Table 5 / DRBC Table 6	**Delaware River Downstream of RM 81.8**	**Maximum**	**5.7**	---	---	---	---	**5.7**	470	68	2,100	390	1,900	**5.7**			µg/L		Chloroform
COD	No Standard						---	---	---	---	---	---								COD
Chromium (trivalent) (Cr III)	DRBC WQRs - Table 5	**Delaware River**	**Acute Maximum**	**0.277*EXP(0.819*LN(hardness)+3.7256)**	---	---	**0.277*EXP(0.819*LN(hardness)+3.7256)**	0.277*EXP(0.819*LN(hardness)+0.6848)	---	---	---	380,000	(0.819 x LN(hardness)+0.6848)	(0.819 x LN(hardness)+3.7256)	---	570	74	µg/L	Dissolved criteria. Values for federal regulations are based on a hardness of 100 mg/L.	Chromium (trivalent) (Cr III)
Chromium (trivalent) (Cr III)	DRBC WQRs - Table 5	**Delaware River**	**Chronic Maximum**	**0.277*EXP(0.819*LN(hardness)+0.6848)**	---	---	0.277*EXP(0.819*LN(hardness)+3.7256)	**0.277*EXP(0.819*LN(hardness)+0.6848)**	---	---	---	380,000	(0.819 x LN(hardness)+0.6848)	(0.819 x LN(hardness)+3.7256)	---	570	74	µg/L	Dissolved criteria. Values for federal regulations are based on a hardness of 100 mg/L.	Chromium (trivalent) (Cr III)
Chromium (trivalent) (Cr III)	DRBC WQRs - Table 5	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Acute Maximum**	**0.277*EXP(0.819*LN(hardness)+3.7256)**	---	---	**0.277*EXP(0.819*LN(hardness)+3.7256)**	0.277*EXP(0.819*LN(hardness)+0.6848)	---	---	---	380,000	(0.819 x LN(hardness)+0.6848)	(0.819 x LN(hardness)+3.7256)	---	570	74	µg/L	Dissolved criteria. Values for federal regulations are based on a hardness of 100 mg/L.	Chromium (trivalent) (Cr III)
Chromium (trivalent) (Cr III)	DRBC WQRs - Table 5	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Chronic Maximum**	**0.277*EXP(0.819*LN(hardness)+0.6848)**	---	---	0.277*EXP(0.819*LN(hardness)+3.7256)	**0.277*EXP(0.819*LN(hardness)+0.6848)**	---	---	---	380,000	(0.819 x LN(hardness)+0.6848)	(0.819 x LN(hardness)+3.7256)	---	570	74	µg/L	Dissolved criteria. Values for federal regulations are based on a hardness of 100 mg/L.	Chromium (trivalent) (Cr III)
Chromium (trivalent) (Cr III)	PA Code 25 - 93.8c, Table 5	**Chester Creek upstream of OF#20, & Ridley Creek upstream from OF#18**	**Acute Maximum**	**(0.819 x LN(hardness)+3.7256)**	---	---	0.277*EXP(0.819*LN(hardness)+3.7256)	0.277*EXP(0.819*LN(hardness)+0.6848)	---	---	---	380,000	(0.819 x LN(hardness)+0.6848)	**(0.819 x LN(hardness)+3.7256)**	---	570	74	µg/L	Dissolved criteria. Values for federal regulations are based on a hardness of 100 mg/L.	Chromium (trivalent) (Cr III)
Chromium (trivalent) (Cr III)	PA Code 25 - 93.8c, Table 5	**Chester Creek upstream of OF#20, & Ridley Creek upstream from OF#18**	**Chronic Maximum**	**(0.819 x LN(hardness)+0.6848)**	---	---	0.277*EXP(0.819*LN(hardness)+3.7256)	0.277*EXP(0.819*LN(hardness)+0.6848)	---	---	---	380,000	**(0.819 x LN(hardness)+0.6848)**	(0.819 x LN(hardness)+3.7256)	---	570	74	µg/L	Dissolved criteria. Values for federal regulations are based on a hardness of 100 mg/L.	Chromium (trivalent) (Cr III)
Chromium (hexavalent) (Cr VI)	DRBC WQRs - Tables 5 & 7 / PA Code - Table 5	**Delaware River, Chester Creek, Ridley Creek**	**Acute Maximum**	**16**	---	---	**16**	11	---	---	92	---	10	**16**	---	16	11	µg/L	Dissolved criteria	Chromium (hexavalent) (Cr VI)
Chromium (hexavalent) (Cr VI)	PA Code - Table 5	**Delaware River, Chester Creek, Ridley Creek**	**Chronic Maximum**	**10**	---	---	16	11	---	---	92	---	**10**	16	---	16	11	µg/L	Dissolved criteria	Chromium (hexavalent) (Cr VI)
Chyrsene	DRBC WQRs - Table 6	**Delaware River Upstream of RM 81.8**	**Maximum**	**18**	---	---	---	---	3.8	**18**	---	---	---	---	0.0038			µg/L		Chyrsene
Chyrsene	DRBC WQRs - Table 6	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Maximum**	**18**	---	---	---	---	3.8	**18**	---	---	---	---	0.0038			µg/L		Chyrsene
Chyrsene	PA Code 25 - 93.8c, Table 5	**Delaware River Downstream of RM 81.8**	**Maximum**	**0.0038**	---	---	---	---	3.8	18	---	---	---	---	**0.0038**			µg/L		Chyrsene
Copper	DRBC WQRs - Table 5	**Delaware River**	**Acute Maximum**	**0.908*EXP(0.9422*LN(hardness)-1.7)**	---	---	**0.908*EXP(0.9422*LN(hardness)-1.7)**	0.908*EXP(0.8545*LN(hardness)-1.702)	---	---	---	---	0.960 x Exp(0.8545*LN(hardness)-1.702)	0.960 x Exp(0.9422*LN(hardness)-1.70)	---	---	---	µg/L	Dissolved criteria	Copper
Copper	DRBC WQRs - Table 5	**Delaware River**	**Chronic Maximum**	**0.908*EXP(0.8545*LN(hardness)-1.702)**	---	---	0.908*EXP(0.9422*LN(hardness)-1.7)	**0.908*EXP(0.8545*LN(hardness)-1.702)**	---	---	---	---	0.960 x Exp(0.8545*LN(hardness)-1.702)	0.960 x Exp(0.9422*LN(hardness)-1.70)	---	---	---	µg/L	Dissolved criteria	Copper
Copper	DRBC WQRs - Table 5	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Acute Maximum**	**0.908*EXP(0.9422*LN(hardness)-1.7)**	---	---	**0.908*EXP(0.9422*LN(hardness)-1.7)**	0.908*EXP(0.8545*LN(hardness)-1.702)	---	---	---	---	0.960 x Exp(0.8545*LN(hardness)-1.702)	0.960 x Exp(0.9422*LN(hardness)-1.70)	---	---	---	µg/L	Dissolved criteria	Copper
Copper	DRBC WQRs - Table 5	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Chronic Maximum**	**0.908*EXP(0.8545*LN(hardness)-1.702)**	---	---	0.908*EXP(0.9422*LN(hardness)-1.7)	**0.908*EXP(0.8545*LN(hardness)-1.702)**	---	---	---	---	0.960 x Exp(0.8545*LN(hardness)-1.702)	0.960 x Exp(0.9422*LN(hardness)-1.70)	---	---	---	µg/L	Dissolved criteria	Copper
Copper	PA Code 25 - 93.8c, Table 5	**Chester Creek upstream of OF#20, & Ridley Creek upstream from OF#18**	**Acute Maximum**	**0.960 x Exp(0.9422*LN(hardness)-1.70)**	---	---	0.908*EXP(0.9422*LN(hardness)-1.7)	0.908*EXP(0.8545*LN(hardness)-1.702)	---	---	---	---	0.960 x Exp(0.8545*LN(hardness)-1.702)	**0.960 x Exp(0.9422*LN(hardness)-1.70)**	---	---	---	µg/L	Dissolved criteria	Copper
Copper	PA Code 25 - 93.8c, Table 5	**Chester Creek upstream of OF#20, & Ridley Creek upstream from OF#18**	**Chronic Maximum**	**0.960 x Exp(0.8545*LN(hardness)-1.702)**	---	---	0.908*EXP(0.9422*LN(hardness)-1.7)	0.908*EXP(0.8545*LN(hardness)-1.702)	---	---	---	---	**0.960 x Exp(0.8545*LN(hardness)-1.702)**	0.960 x Exp(0.9422*LN(hardness)-1.70)	---	---	---	µg/L	Dissolved criteria	Copper
Cyanide (free)	DRBC WQRs - Table 5 / PA Code - Table 5	**Delaware River, Chester Creek, Ridley Creek**	**Acute Maximum**	**22**	---	---	**22**	5.2	---	---	140	140	5.2	**22**	140	**22**	5.2	µg/L		Cyanide (free)
Cyanide (free)	DRBC WQRs - Table 5 / PA Code - Table 5	**Delaware River, Chester Creek, Ridley Creek**	**Chronic Maximum**	**5.2**	---	---	22	**5.2**	---	---	140	140	**5.2**	22	140	22	**5.2**	µg/L		Cyanide (free)
Dieldrin	PA Code Table 5	**Chester Creek upstream of OF#20, & Ridley Creek upstream from OF#18**	**Acute Maximum**	**0.24**	---	---	0.24	0.056	0.000052	0.000054	0.041	0.043	0.056	**0.24**	0.000052	**0.24**	0.056	µg/L		Dieldrin
Dieldrin	PA Code Table 5	**Chester Creek upstream of OF#20, & Ridley Creek upstream from OF#18**	**Chronic Maximum**	**0.056**	---	---	0.24	0.056	0.000052	0.000054	0.041	0.043	**0.056**	0.24	0.000052	0.24	**0.056**	µg/L		Dieldrin

Parameter	Source of Standard	Applicable Water Body	WQS Type	Water Quality Standard To Use	Standard Criterion (DRBC Zone 4 WQRs) *Applies to Delaware & Tidal Portions of Chester & Ridley*	Standard Criterion (25 PA Code Ch. 93 WQS, 93.7 Table 3 for TSF, WWF, MF & WC Critical Use Designations) *Applies to Delaware, Chester, Ridley*	Freshwater Objectives (DRBC WQRs Table 5 - Stream Quality Objectives for Toxic Pollutants for the Protection of Aquatic Life) *Applies to Delaware & Tidal Portions of Chester & Ridley*		Freshwater Objectives (DRBC WQRs Table 6 - Stream Quality Objectives for Carcinogens) *Applies to Delaware & Tidal Portions of Chester & Ridley*		Freshwater Objectives (DRBC WQRs Table 7 - Stream Quality Objectives for Systemic Toxicants) *Applies to Delaware & Tidal Portions of Chester & Ridley*		Fish & Aquatic Life Criteria (25 PA Code Ch. 93 WQS, 93.8c, Table 5) *Applies to Delaware, Chester, Ridley*		Human Criteria (25 PA Code Ch. 93 WQS, 93.8c, Table 5) *Applies to Delaware, Chester, Ridley*	US EPA National *Recommended* Water Quality Criteria Aquatic Life Criteria Table *Applies to Delaware, Chester, Ridley*		Units	Notes	Parameter
							Acute	Chronic	Fish & Water Ingestion	Fish Ingestion Only	Fish & Water Ingestion	Fish Ingestion Only	Criteria Continuous Concentrations	Criteria Maximum Concentrations	Health Criteria	Acute Criteria Maximum Concentration (CMC)	Chronic Criteria Continuous Concentration (CCC)			
Dieldrin	DRBC WQRs - Table 6	**Delaware River Upstream of RM 81.8**	**Maximum**	**0.000054**	---	---	0.24	0.056	0.000052	**0.000054**	0.041	0.043	0.056	0.24	0.000052	0.24	0.056	µg/L		Dieldrin
Dieldrin	DRBC WQRs - Table 6	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Maximum**	**0.000054**	---	---	0.24	0.056	0.000052	**0.000054**	0.041	0.043	0.056	0.24	0.000052	0.24	0.056	µg/L		Dieldrin
Dieldrin	DRBC WQRs - Table 6 / PA Code - Table 5	**Delaware River Downstream of RM 81.8**	**Maximum**	**0.000052**	---	---	0.24	0.056	**0.000052**	0.000054	0.041	0.043	0.056	0.24	**0.000052**	0.24	0.056	µg/L		Dieldrin
Diethylphthalate	PA Code - Table 5	**Delaware River, Chester Creek, Ridley Creek**	**Acute Maximum**	**4,000**	---	---	---	---			17,000	44,000	800	**4,000**	17,000			µg/L		Diethylphthalate
Diethylphthalate	PA Code - Table 5	**Delaware River, Chester Creek, Ridley Creek**	**Chronic Maximum**	**800**	---	---	---	---			17,000	44,000	**800**	4,000	17,000			µg/L		Diethylphthalate
Dissolved Oxygen (DO)$_1$	DRBC WQRs - for Zone 4	**Delaware River**	**24 hr. Average Minimum**	**3.5**	**3.5**		---	---	---	---	---	---						mg/L	**Year Round Minimum**	Dissolved Oxygen (DO)$_1$
Dissolved Oxygen (DO)$_1$	DRBC WQRs - for Zone 4	**Delaware River**	**24 hr. Average Minimum**	**6.5**	**6.5**		---	---	---	---	---	---						mg/L	**Minimum for April 1 to June 15 and Sept. 16 to Dec. 31**	Dissolved Oxygen (DO)$_1$
Dissolved Oxygen (DO)$_1$	DRBC WQRs - for Zone 4	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**24 hr. Average Minimum**	**3.5**	**3.5**		---	---	---	---	---	---						mg/L	**Year Round Minimum**	Dissolved Oxygen (DO)$_1$
Dissolved Oxygen (DO)$_1$	DRBC WQRs - for Zone 4	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**24 hr. Average Minimum**	**6.5**	**6.5**		---	---	---	---	---	---						mg/L	**Minimum for April 1 to June 15 and Sept. 16 to Dec. 31**	Dissolved Oxygen (DO)$_1$
Dissolved Oxygen (DO)$_2$	PA Code (WWF)	**Chester Creek upstream of OF#20, & Ridley Creek from OF#18 upstream to Rt. 320**	**7-day Average**	**5.5**		**5.5**	---	---	---	---	---	---						mg/L		Dissolved Oxygen (DO)$_2$
Dissolved Oxygen (DO)$_2$	PA Code (WWF)	**Chester Creek upstream of OF#20, & Ridley Creek from OF#18 upstream to Rt. 320**	**Minimum**	**5.0**		**5.0**	---	---	---	---	---	---						mg/L		Dissolved Oxygen (DO)$_2$
Dissolved Oxygen (DO)$_3$ (Feb. 15 - July 31)	PA Code (TSF)	**Ridley Creek from Rt. 320 upstream to Media Water Intake**	**7-day Average**	**6.0**		**6.0**	---	---	---	---	---	---						mg/L	TSF only applies to Ridley Creek for impacts by DELCORA CSOs	Dissolved Oxygen (DO)$_3$
Dissolved Oxygen (DO)$_3$ (Feb. 15 - July 31)	PA Code (TSF)	**Ridley Creek from Rt. 320 upstream to Media Water Intake**	**Minimum**	**5.0**		**5.0**	---	---	---	---	---	---						mg/L	TSF only applies to Ridley Creek for impacts by DELCORA CSOs	Dissolved Oxygen (DO)$_3$
Dissolved Oxygen (DO)$_3$ (Aug. 1 - Feb. 14)	PA Code (TSF)	**Ridley Creek from Rt. 320 upstream to Media Water Intake**	**7-day Average**	**5.5**		**5.5**												mg/L	TSF only applies to Ridley Creek for impacts by DELCORA CSOs	Dissolved Oxygen (DO)$_3$
Dissolved Oxygen (DO)$_3$ (Aug. 1 - Feb. 14)	PA Code (TSF)	**Ridley Creek from Rt. 320 upstream to Media Water Intake**	**Minimum**	**5.0**		**5.0**												mg/L	TSF only applies to Ridley Creek for impacts by DELCORA CSOs	Dissolved Oxygen (DO)$_3$
Ethylbenzene	PA Code - Table 5	**Chester Creek upstream of OF#20, & Ridley Creek upstream from OF#18**	**Acute Maximum**	**2,900**	---	---	---	---			530	2,100	580	**2,900**	530			µg/L		Ethylbenzene
Ethylbenzene	PA Code - Table 5	**Delaware River, Chester Creek, Ridley Creek**	**Chronic Maximum**	**580**	---	---	---	---			530	2,100	**580**	2,900	530			µg/L		Ethylbenzene
Ethylbenzene	DRBC WQRs - Table 7	**Delaware River Upstream of RM 81.8**	**Maximum**	**2,100**	---	---	---	---			530	**2,100**	580	2,900	530			µg/L		Ethylbenzene
Ethylbenzene	DRBC WQRs - Table 7	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Maximum**	**2,100**	---	---	---	---			530	**2,100**	580	2,900	530			µg/L		Ethylbenzene

Parameter	Source of Standard	Applicable Water Body	WQS Type	Water Quality Standard To Use	Standard Criterion (DRBC Zone 4 WQRs) *Applies to Delaware & Tidal Portions of Chester & Ridley*	Standard Criterion (25 PA Code Ch. 93 WQS, 93.7 Table 3 for TSF, WWF, MF & WC Critical Use Designations) *Applies to Delaware, Chester, Ridley*	Freshwater Objectives (DRBC WQRs Table 5 - Stream Quality Objectives for Toxic Pollutants for the Protection of Aquatic Life) *Applies to Delaware & Tidal Portions of Chester & Ridley*		Freshwater Objectives (DRBC WQRs Table 6 - Stream Quality Objectives for Carcinogens) *Applies to Delaware & Tidal Portions of Chester & Ridley*		Freshwater Objectives (DRBC WQRs Table 7 - Stream Quality Objectives for Systemic Toxicants) *Applies to Delaware & Tidal Portions of Chester & Ridley*		Fish & Aquatic Life Criteria (25 PA Code Ch. 93 WQS, 93.8c, Table 5) *Applies to Delaware, Chester, Ridley*		Human Criteria (25 PA Code Ch. 93 WQS, 93.8c, Table 5) *Applies to Delaware, Chester, Ridley*	US EPA National *Recommended* Water Quality Criteria Aquatic Life Criteria Table *Applies to Delaware, Chester, Ridley*		Units	Notes	Parameter
							Acute	Chronic	Fish & Water Ingestion	Fish Ingestion Only	Fish & Water Ingestion	Fish Ingestion Only	Criteria Continuous Concentrations	Criteria Maximum Concentrations	Health Criteria	Acute Criteria Maximum Concentration (CMC)	Chronic Criteria Continuous Concentration (CCC)			
Ethylbenzene	DRBC WQRs - Table 7 / PA Code - Table 5	**Delaware River Downstream of RM 81.8**	**Maximum**	**530**	---	---	---	---			**530**	2,100	580	2,900	**530**			µg/L		Ethylbenzene
Fluorene	DRBC WQRs - Table 7 / PA Code - Table 5	**Delaware River Upstream of RM 81.8**	**Maximum**	**5,300**	---	---	---	---			1,100	**5,300**	---	---	1,100			µg/L		Fluorene
Fluorene	DRBC WQRs - Table 7 / PA Code - Table 5	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Maximum**	**5,300**	---	---	---	---			1,100	**5,300**	---	---	1,100			µg/L		Fluorene
Fluorene	DRBC WQRs - Table 7 / PA Code - Table 5	**Delaware River Downstream of RM 81.8**	**Maximum**	**1,100**	---	---	---	---			**1,100**	5,300	---	---	**1,100**			µg/L		Fluorene
Hardness	No Standard	**Delaware River, Chester Creek, Ridley Creek**	--		--	--	---	---	---	---	---	---						$mg/L\ as\ CaCO_3$	Needed to calculate some of the metal concentrations	Hardness
Iron (Fe)	PA Code (WWF, MF, TSF)	**Delaware River, Chester Creek, Ridley Creek**	**30-day Average**	**1.5**		**1.5**	---	---	---	---	---	---						mg/L as total recoverable	Iron as total recoverable	$Iron\ (Fe)_{(1)}$
Iron (Fe)	PA Code (WWF, MF, TSF)	**Delaware River, Chester Creek, Ridley Creek**	**Maximum**	**0.3**		**0.3**	---	---	---	---	---	---				---	1.0	mg/L as dissolved	Iron as dissolved	$Iron\ (Fe)_{(2)}$
Lead	DRBC WQRs - Table 5	**Delaware River**	**Acute Maximum**	**38**	---	---	**38**	5.4	---	---	---	---	(1.46203 - (LN(hardness) x 0.145712)) x Exp(1.273 x LN(hardness) -4.705)	(1.46203 - (LN(hardness) x 0.145712)) x Exp(1.273 x LN(hardness) -1.460)	---	65	2.5	µg/L	Dissolved criteria. Values for federal regulations are based on a hardness of 100 mg/L.	Lead
Lead	DRBC WQRs - Table 5	**Delaware River**	**Chronic Maximum**	**5.4**	---	---	38	**5.4**	---	---	---	---	(1.46203 - (LN(hardness) x 0.145712)) x Exp(1.273 x LN(hardness) -4.705)	(1.46203 - (LN(hardness) x 0.145712)) x Exp(1.273 x LN(hardness) -1.460)	---	65	2.5	µg/L	Dissolved criteria. Values for federal regulations are based on a hardness of 100 mg/L.	Lead
Lead	DRBC WQRs - Table 5	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Acute Maximum**	**38**	---	---	**38**	5.4	---	---	---	---	(1.46203 - (LN(hardness) x 0.145712)) x Exp(1.273 x LN(hardness) -4.705)	(1.46203 - (LN(hardness) x 0.145712)) x Exp(1.273 x LN(hardness) -1.460)	---	65	2.5	µg/L	Dissolved criteria. Values for federal regulations are based on a hardness of 100 mg/L.	Lead
Lead	DRBC WQRs - Table 5	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Chronic Maximum**	**5.4**	---	---	38	**5.4**	---	---	---	---	(1.46203 - (LN(hardness) x 0.145712)) x Exp(1.273 x LN(hardness) -4.705)	(1.46203 - (LN(hardness) x 0.145712)) x Exp(1.273 x LN(hardness) -1.460)	---	65	2.5	µg/L	Dissolved criteria. Values for federal regulations are based on a hardness of 100 mg/L.	Lead
Lead	PA Code 25 - 93.8c, Table 5	**Chester Creek upstream of OF#20, & Ridley Creek upstream from OF#18**	**Acute Maximum**	**(1.46203 - (LN(hardness) x 0.145712)) x Exp(1.273 x LN(hardness) -1.460)**	---	---	38	5.4	---	---	---	---	(1.46203 - (LN(hardness) x 0.145712)) x Exp(1.273 x LN(hardness) -4.705)	**(1.46203 - (LN(hardness) x 0.145712)) x Exp(1.273 x LN(hardness) -1.460)**	---	65	2.5	µg/L	Dissolved criteria. Values for federal regulations are based on a hardness of 100 mg/L.	Lead
Lead	PA Code 25 - 93.8c, Table 5	**Chester Creek upstream of OF#20, & Ridley Creek upstream from OF#18**	**Chronic Maximum**	**(1.46203 - (LN(hardness) x 0.145712)) x Exp(1.273 x LN(hardness) -4.705)**	---	---	38	5.4	---	---	---	---	**(1.46203 - (LN(hardness) x 0.145712)) x Exp(1.273 x LN(hardness) -4.705)**	(1.46203 - (LN(hardness) x 0.145712)) x Exp(1.273 x LN(hardness) -1.460)	---	65	2.5	µg/L	Dissolved criteria. Values for federal regulations are based on a hardness of 100 mg/L.	Lead
Mercury (Hg)	PA Code Table 5	**Chester Creek upstream of OF#20, & Ridley Creek upstream from OF#18**	**Acute Maximum**	**1.4**	---	---	1.4	0.77	---	---	0.05	0.051	0.77 (Hg2+)	**1.4 (Hg2+)**	0.05	**1.4**	0.77	µg/L	Dissolved criteria	Mercury (Hg)
Mercury (Hg)	PA Code Table 5	**Chester Creek upstream of OF#20, & Ridley Creek upstream from OF#18**	**Chronic Maximum**	**0.77**	---	---	1.4	0.77	---	---	0.05	0.051	**0.77 (Hg2+)**	1.4 (Hg2+)	0.05	1.4	**0.77**	µg/L	Dissolved criteria	Mercury (Hg)
Mercury (Hg)	DRBC WQRs - Table 7	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Maximum**	**0.051**	---	---	1.4	0.77	---	---	0.05	**0.051**	0.77 (Hg2+)	1.4 (Hg2+)	0.05	1.4	**0.77**	µg/L	Dissolved criteria	Mercury (Hg)
Mercury (Hg)	DRBC WQRs - Table 7	**Delaware River Upstream of RM 81.8**	**Maximum**	**0.051**	---	---	1.4	0.77	---	---	0.05	**0.051**	0.77 (Hg2+)	1.4 (Hg2+)	0.05	1.4	**0.77**	µg/L	Dissolved criteria	Mercury (Hg)
Mercury (Hg)	DRBC WQRs - Table 7 / PA Code Table 5	**Delaware River Downstream of RM 81.8**	**Maximum**	**0.05**	---	---	1.4	0.77	---	---	**0.05**	0.051	0.77 (Hg2+)	1.4 (Hg2+)	**0.05**	1.4	0.77	µg/L	Dissolved criteria	Mercury (Hg)
Methylene chloride (Dichloromethane)	PA Code 25 - 93.8c, Table 5	**Chester Creek upstream of OF#20, & Ridley Creek upstream from OF#18**	**Acute Maximum**	**12,000**	---	---	---	---	---	590	---	260,000	2,400	**12,000**	4.6			µg/L		Methylene chloride (Dichloromethane)
Methylene chloride (Dichloromethane)	PA Code 25 - 93.8c, Table 5	**Chester Creek upstream of OF#20, & Ridley Creek upstream from OF#18**	**Chronic Maximum**	**2,400**	---	---	---	---	---	590	---	260,000	**2,400**	12,000	4.6			µg/L		Methylene chloride (Dichloromethane)
Methylene chloride (Dichloromethane)	DRBC WQRs - Table 6	**Delaware River Upstream of RM 81.8**	**Maximum**	**590**	---	---	---	---	---	**590**	---	260,000	2,400	12,000	4.6			µg/L		Methylene chloride (Dichloromethane)

Parameter	Source of Standard	Applicable Water Body	WQS Type	Water Quality Standard To Use	Standard Criterion (DRBC Zone 4 WQRs) *Applies to Delaware & Tidal Portions of Chester & Ridley*	Standard Criterion (25 PA Code Ch. 93 WQS, 93.7 Table 3 for TSF, WWF, MF & WC Critical Use Designations) *Applies to Delaware, Chester, Ridley*	Freshwater Objectives (DRBC WQRs Table 5 - Stream Quality Objectives for Toxic Pollutants for the Protection of Aquatic Life) *Applies to Delaware & Tidal Portions of Chester & Ridley*		Freshwater Objectives (DRBC WQRs Table 6 - Stream Quality Objectives for Carcinogens) *Applies to Delaware & Tidal Portions of Chester & Ridley*		Freshwater Objectives (DRBC WQRs Table 7 - Stream Quality Objectives for Systemic Toxicants) *Applies to Delaware & Tidal Portions of Chester & Ridley*		Fish & Aquatic Life Criteria (25 PA Code Ch. 93 WQS, 93.8c, Table 5) *Applies to Delaware, Chester, Ridley*		Human Criteria (25 PA Code Ch. 93 WQS, 93.8c, Table 5) *Applies to Delaware, Chester, Ridley*	US EPA National *Recommended* Water Quality Criteria Aquatic Life Criteria Table *Applies to Delaware, Chester, Ridley*		Units	Notes	Parameter
							Acute	Chronic	Fish & Water Ingestion	Fish Ingestion Only	Fish & Water Ingestion	Fish Ingestion Only	Criteria Continuous Concentrations	Criteria Maximum Concentrations	Health Criteria	Acute Criteria Maximum Concentration (CMC)	Chronic Criteria Continuous Concentration (CCC)			
Methylene chloride (Dichloromethane)	DRBC WQRs - Table 6	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Maximum**	**590**	---	---	---	---	---	**590**	---	260,000	2,400	12,000	4.6			µg/L		Methylene chloride (Dichloromethane)
Methylene chloride (Dichloromethane)	PA Code 25 - 93.8c, Table 5	**Delaware River Downstream of RM 81.8**	**Maximum**	**4.6**	---	---	---	---	---	590	---	260,000	2,400	12,000	**4.6**			µg/L		Methylene chloride (Dichloromethane)
Molybdenum	No Standard						---	---	---	---	---	---								Molybdenum
MTBE	No Standard						---	---	---	---	---	---								MTBE
Naphthalene	PA Code 25 - 93.8c, Table 5	**Delaware River, Chester Creek, Ridley Creek**	**Acute Maximum**	**140**			---	---	---	---	---	---	43	**140**	---			µg/L		Naphthalene
Naphthalene	PA Code 25 - 93.8c, Table 5	**Delaware River, Chester Creek, Ridley Creek**	**Chronic Maximum**	**43**			---	---	---	---	---	---	**43**	140	---			µg/L		Naphthalene
Nickel	PA Code 25 - 93.8c, Table 5	**Chester Creek upstream of OF#20, & Ridley Creek upstream from OF#18**	**Acute Maximum**	**0.998 x Exp(0.846 x LN(hardness)+2.255)**	---	---	0.846*EXP(0.846*LN(hardness)+2.255)	0.846*EXP(0.846*LN(hardness)+0.0584)	---	---	500	1,700	0.997 x Exp(0.846 x LN(hardness)+0.0584)	**0.998 x Exp(0.846 x LN(hardness)+2.255)**	610	470	52	µg/L	Dissolved criteria. Values for federal regulations are based on a hardness of 100 mg/L.	Nickel
Nickel	PA Code 25 - 93.8c, Table 5	**Chester Creek upstream of OF#20, & Ridley Creek upstream from OF#18**	**Chronic Maximum**	**0.997 x Exp(0.846 x LN(hardness)+0.0584)**	---	---	0.846*EXP(0.846*LN(hardness)+2.255)	0.846*EXP(0.846*LN(hardness)+0.0584)	---	---	500	1,700	**0.997 x Exp(0.846 x LN(hardness)+0.0584)**	0.998 x Exp(0.846 x LN(hardness)+2.255)	610	470	52	µg/L	Dissolved criteria. Values for federal regulations are based on a hardness of 100 mg/L.	Nickel
Nickel	DRBC WQRs - Table 5	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Acute Maximum**	**0.846*EXP(0.846*LN(hardness)+2.255)**	---	---	**0.846*EXP(0.846*LN(hardness)+2.255)**	0.846*EXP(0.846*LN(hardness)+0.0584)	---	---	500	1,700	0.997 x Exp(0.846 x LN(hardness)+0.0584)	0.998 x Exp(0.846 x LN(hardness)+2.255)	610	470	52	µg/L	Dissolved criteria. Values for federal regulations are based on a hardness of 100 mg/L.	Nickel
Nickel	DRBC WQRs - Table 5	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Chronic Maximum**	**0.846*EXP(0.846*LN(hardness)+0.0584)**	---	---	0.846*EXP(0.846*LN(hardness)+2.255)	**0.846*EXP(0.846*LN(hardness)+0.0584)**	---	---	500	1,700	0.997 x Exp(0.846 x LN(hardness)+0.0584)	0.998 x Exp(0.846 x LN(hardness)+2.255)	610	470	52	µg/L	Dissolved criteria. Values for federal regulations are based on a hardness of 100 mg/L.	Nickel
Nickel	DRBC WQRs - Table 5	**Delaware River Upstream of RM 81.8**	**Acute Maximum**	**0.846*EXP(0.846*LN(hardness)+2.255)**	---	---	**0.846*EXP(0.846*LN(hardness)+2.255)**	0.846*EXP(0.846*LN(hardness)+0.0584)	---	---	500	1,700	0.997 x Exp(0.846 x LN(hardness)+0.0584)	0.998 x Exp(0.846 x LN(hardness)+2.255)	610	470	52	µg/L	Dissolved criteria. Values for federal regulations are based on a hardness of 100 mg/L.	Nickel
Nickel	DRBC WQRs - Table 5	**Delaware River Upstream of RM 81.8**	**Chronic Maximum**	**0.846*EXP(0.846*LN(hardness)+0.0584)**	---	---	0.846*EXP(0.846*LN(hardness)+2.255)	**0.846*EXP(0.846*LN(hardness)+0.0584)**	---	---	500	1,700	0.997 x Exp(0.846 x LN(hardness)+0.0584)	0.998 x Exp(0.846 x LN(hardness)+2.255)	610	470	52	µg/L	Dissolved criteria. Values for federal regulations are based on a hardness of 100 mg/L.	Nickel
Nickel	DRBC WQRs - Table 7	**Delaware River Downstream of RM 81.8**	**Maximum**	**500**	---	---	0.846*EXP(0.846*LN(hardness)+2.255)	0.846*EXP(0.846*LN(hardness)+0.0584)	---	---	**500**	1,700	0.997 x Exp(0.846 x LN(hardness)+0.0584)	0.998 x Exp(0.846 x LN(hardness)+2.255)	610	470	52	µg/L	Dissolved criteria. Values for federal regulations are based on a hardness of 100 mg/L.	Nickel
Nitrate	No Standard						---	---	---	---	---	---								Nitrate
Nitrite	No Standard						---	---	---	---	---	---								Nitrite
Nitrate + Nitrate	No Standard																			Nitrate + Nitrate
N-Nitroso-di-n-propylamine	DRBC WQRs - Table 6	**Delaware River Upstream of RM 81.8**	**Maximum**	**0.51**	---	---	---	---	0.005	**0.51**					0.005			µg/L		N-Nitroso-di-n-propylamine
N-Nitroso-di-n-propylamine	DRBC WQRs - Table 6	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Maximum**	**0.51**	---	---	---	---	0.005	**0.51**					0.005			µg/L		N-Nitroso-di-n-propylamine
N-Nitroso-di-n-propylamine	DRBC WQRs - Table 6 / PA Code Table 5	**Delaware River Downstream of RM 81.8**	**Maximum**	**0.005**	---	---	---	---	**0.005**	0.51					**0.005**			µg/L		N-Nitroso-di-n-propylamine
Oil and Grease	No Standard						---	---	---	---	---	---								Oil and Grease
Osmotic Pressure (OP)	**PA Code (WWF, MF, TSF)**	**Delaware River, Chester Creek, Ridley Creek**	**Maximum**	**50**		**50**	---	---	---	---	---	---						milliosmoles/kg		Osmotic Pressure (OP)
PCBs (Total)	DRBC WQRs - Table 5 / PA Code Table 5	**Chester Creek upstream of OF#20, & Ridley Creek upstream from OF#18**	**Chronic Maximum**	**0.014**	---	---	1.0	**0.014**	0.000016	0.000016	0.008390	0.008490	**0.014**	---	0.000064	---	**0.014**	µg/L		PCBs (Total)
PCBs (Total)	DRBC WQRs - Table 6	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Maximum**	**0.000016**	---	---	1.0	0.014	**0.000016**	**0.000016**	0.008390	0.008490	0.014	---	0.000064	---	0.014	µg/L		PCBs (Total)
PCBs (Total)	DRBC WQRs - Table 6	**Delaware River**	**Maximum**	**0.000016**	---	---	1.0	0.014	**0.000016**	**0.000016**	0.008390	0.008490	0.014	---	0.000064	---	0.014	µg/L		PCBs (Total)
pH$_{(1)}$	DRBC WQRs - for Zone 4	**Delaware River**	**Maximum**	**8.5**	**8.5**		---	---	---	---	---	---				---	6.5 - 9	--	Exceeds criteria from PA Code for WWF, MF, & TSF of pH 6 - 9	pH$_{(1)}$
pH$_{(1)}$	DRBC WQRs - for Zone 4	**Delaware River**	**Minimum**	**6.5**	**6.5**		---	---	---	---	---	---						--	Exceeds criteria from PA Code for WWF, MF, & TSF of pH 6 - 9	pH$_{(1)}$

Parameter	Source of Standard	Applicable Water Body	WQS Type	Water Quality Standard To Use	Standard Criterion (DRBC Zone 4 WQRs) *Applies to Delaware & Tidal Portions of Chester & Ridley*	Standard Criterion (25 PA Code Ch. 93 WQS, 93.7 Table 3 for TSF, WWF, MF & WC Critical Use Designations) *Applies to Delaware, Chester, Ridley*	Freshwater Objectives (DRBC WQRs Table 5 - Stream Quality Objectives for Toxic Pollutants for the Protection of Aquatic Life) *Applies to Delaware & Tidal Portions of Chester & Ridley*		Freshwater Objectives (DRBC WQRs Table 6 - Stream Quality Objectives for Carcinogens) *Applies to Delaware & Tidal Portions of Chester & Ridley*		Freshwater Objectives (DRBC WQRs Table 7 - Stream Quality Objectives for Systemic Toxicants) *Applies to Delaware & Tidal Portions of Chester & Ridley*		Fish & Aquatic Life Criteria (25 PA Code Ch. 93 WQS, 93.8c, Table 5) *Applies to Delaware, Chester, Ridley*		Human Criteria (25 PA Code Ch. 93 WQS, 93.8c, Table 5) *Applies to Delaware, Chester, Ridley*	US EPA National *Recommended* Water Quality Criteria Aquatic Life Criteria Table *Applies to Delaware, Chester, Ridley*		Units	Notes	Parameter
							Acute	Chronic	Fish & Water Ingestion	Fish Ingestion Only	Fish & Water Ingestion	Fish Ingestion Only	Criteria Continuous Concentrations	Criteria Maximum Concentrations	Health Criteria	Acute Criteria Maximum Concentration (CMC)	Chronic Criteria Continuous Concentration (CCC)			
pH(1)	DRBC WQRs - for Zone 4	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Maximum**	**8.5**	**8.5**		---	---	---	---	---	---				---	6.5 - 9	--	Exceeds criteria from PA Code for WWF, MF, & TSF of pH 6 - 9	pH(1)
pH(1)	DRBC WQRs - for Zone 4	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Minimum**	**6.5**	**6.5**		---	---	---	---	---	---						--	Exceeds criteria from PA Code for WWF, MF, & TSF of pH 6 - 9	pH(1)
pH(2)	PA Code (WWF, MF, TSF)	**Chester Creek upstream of OF#20, & Ridley Creek upstream from OF#18**	**Maximum**	**9.0**		**9.0**	---	---	---	---	---	---						--	Use the more stringent standard above from DRBC Zone 4 for the Delaware River	pH(2)
pH(2)	PA Code (WWF, MF, TSF)	**Chester Creek upstream of OF#20, & Ridley Creek upstream from OF#18**	**Minimum**	**6.0**		**6.0**	---	---	---	---	---	---						--	Use the more stringent standard above from DRBC Zone 4 for the Delaware River	pH(2)
Phenanthrene	PA Code 25 - 93.8c, Table 5	**Delaware River, Chester Creek, Ridley Creek**	**Acute Maximum**	**5**			---	---	---	---	---	---	1	**5**	---			µg/L		Phenanthrene
Phenanthrene	PA Code 25 - 93.8c, Table 5	**Delaware River, Chester Creek, Ridley Creek**	**Chronic Maximum**	**1**			---	---	---	---	---	---	**1**	5	---			µg/L		Phenanthrene
Phenols	DRBC WQRs - for Zone 4	**Delaware River**	**Maximum**	**0.02**	**0.02**		---	---	---	---	---	---	---	---	10.4			mg/L		Phenols
Phenols	DRBC WQRs - for Zone 4	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Maximum**	**0.02**	**0.02**		---	---	---	---	---	---	---	---	10.4			mg/L		Phenols
Phosphate	No Standard						---	---	---	---	---	---								Phosphate
Pyrene	DRBC WQRs - Table 7	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Maximum**	**4,000**	---	---	---	---			830	**4,000**	---	---	830			µg/L		Pyrene
Pyrene	DRBC WQRs - Table 7	**Delaware River Upstream of RM 81.8**	**Maximum**	**4,000**	---	---	---	---			830	**4,000**	---	---	830			µg/L		Pyrene
Pyrene	DRBC WQRs - Table 7 / PA Code Table 5	**Delaware River Downstream of RM 81.8**	**Maximum**	**830**	---	---	---	---			**830**	4,000	---	---	**830**			µg/L		Pyrene
Radioactivity - alpha emitters	DRBC WQRs - for Zone 4	**Delaware River**	**Maximum**	**3**	**3**		---	---	---	---	---	---						pc/L		Radioactivity - alpha emitters
Radioactivity - beta emitters	DRBC WQRs - for Zone 4	**Delaware River**	**Maximum**	**1,000**	**1,000**		---	---	---	---	---	---						pc/L		Radioactivity - beta emitters
Radioactivity - alpha emitters	DRBC WQRs - for Zone 4	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Maximum**	**3**	**3**		---	---	---	---	---	---						pc/L		Radioactivity - alpha emitters
Radioactivity - beta emitters	DRBC WQRs - for Zone 4	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Maximum**	**1,000**	**1,000**		---	---	---	---	---	---						pc/L		Radioactivity - beta emitters
Selenium (Se)	DRBC WQRs - Table 5	**Delaware River**	**Acute Maximum**	**20**	---	---	**20**	5.0	---	---	170	4,200	4.6	---	---	---	5.0	µg/L	Total recoverable criteria	Selenium (Se)
Selenium (Se)	DRBC WQRs - Table 5	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Acute Maximum**	**20**	---	---	**20**	5.0	---	---	170	4,200	4.6	---	---	---	5.0	µg/L	Total recoverable criteria	Selenium (Se)
Selenium (Se)	PA Code 25 - 93.8c, Table 5	**Delaware River, Chester Creek, Ridley Creek**	**Chronic Maximum**	**4.6**	---	---	20	5.0	---	---	170	4,200	**4.6**	---	---	---	5.0	µg/L	Total recoverable criteria	Selenium (Se)
Silver (Ag)	DRBC WQRs - Tables 5 & 7 / PA Code - Table 5	**Delaware River, Chester Creek, Ridley Creek**	**Acute Maximum**	**0.85*EXP(1.72*LN(hardness)-6.59)**	---	---	**0.85*EXP(1.72*LN(hardness)-6.59)**	NA	---	---	170	40,000	---	**0.850 x Exp(1.72 x LN(hardness) - 6.590)**	---	3.2	---	µg/L	Dissolved criteria	Silver (Ag)
Sulfide	No Standard						---	---	---	---	---	---								Sulfide
Synthetic Detergents (B)	DRBC WQRs - for Zone 4	**Delaware River**	**Maximum 30-day Average**	**1.0**	**1.0**		---	---	---	---	---	---						mg/L		Synthetic Detergents (B)
Synthetic Detergents (B)	DRBC WQRs - for Zone 4	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Maximum 30-day Average**	**1.0**	**1.0**		---	---	---	---	---	---						mg/L		Synthetic Detergents (B)
Temperature (A) (1)	DRBC WQRs - for Zone 4	**Delaware River**	**Maximum**	**30**	**30**		---	---	---	---	---	---						°C		Temperature (A)
Temperature (A) (1)	DRBC WQRs - for Zone 4	**Delaware River**	**Maximum**	**2.8 Deg above 24-hr gradient during the 1961-66 period**	**2.8 Deg above 24-hr gradient during the 1961-66 period**		---	---	---	---	---	---						°C		Temperature (A)

Parameter	Source of Standard	Applicable Water Body	WQS Type	Water Quality Standard To Use	Standard Criterion (DRBC Zone 4 WQRs) *Applies to Delaware & Tidal Portions of Chester & Ridley*	Standard Criterion (25 PA Code Ch. 93 WQS, 93.7 Table 3 for TSF, WWF, MF & WC Critical Use Designations) *Applies to Delaware, Chester, Ridley*	Freshwater Objectives (DRBC WQRs Table 5 - Stream Quality Objectives for Toxic Pollutants for the Protection of Aquatic Life) *Applies to Delaware & Tidal Portions of Chester & Ridley*		Freshwater Objectives (DRBC WQRs Table 6 - Stream Quality Objectives for Carcinogens) *Applies to Delaware & Tidal Portions of Chester & Ridley*		Freshwater Objectives (DRBC WQRs Table 7 - Stream Quality Objectives for Systemic Toxicants) *Applies to Delaware & Tidal Portions of Chester & Ridley*		Fish & Aquatic Life Criteria (25 PA Code Ch. 93 WQS, 93.8c, Table 5) *Applies to Delaware, Chester, Ridley*		Human Criteria (25 PA Code Ch. 93 WQS, 93.8c, Table 5) *Applies to Delaware, Chester, Ridley*	US EPA National *Recommended* Water Quality Criteria Aquatic Life Criteria Table *Applies to Delaware, Chester, Ridley*		Units	Notes	Parameter
							Acute	Chronic	Fish & Water Ingestion	Fish Ingestion Only	Fish & Water Ingestion	Fish Ingestion Only	Criteria Continuous Concentrations	Criteria Maximum Concentrations	Health Criteria	Acute Criteria Maximum Concentration (CMC)	Chronic Criteria Continuous Concentration (CCC)			
Temperature [A] [1]	DRBC WQRs - for Zone 4	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Maximum**	**30**	**30**		---	---	---	---	---	---						°C		Temperature [A]
Temperature [A] [1]	DRBC WQRs - for Zone 4	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Maximum**	**2.8 Deg above 24-hr gradient during the 1961-66 period**	**2.8 Deg above 24-hr gradient during the 1961-66 period**		---	---	---	---	---	---						°C		Temperature [A]
Temperature [2]	PA Code (WWF, TSF)	**Chester Creek upstream of OF#20, & Ridley Creek upstream from OF#18**	**Maximum**	**Varies - see table on pg. 93-21 & 93-22**		**Varies - see table on pg. 93-21 & 93-22**	---	---	---	---	---	---						°F	Use the more stringent standard above from DRBC Zone 4 for the Delaware River	Temperature
Tetrachloroethene/ Tetrachloroethylene	PA Code 25 - 93.8c, Table 5	**Chester Creek upstream of OF#20, & Ridley Creek upstream from OF#18**	**Acute Maximum**	**700**			---	---	0.69	3.3	---	1,300	140	**700**				µg/L		Tetrachloroethene/ Tetrachloroethylene
Tetrachloroethene/ Tetrachloroethylene	PA Code 25 - 93.8c, Table 5	**Chester Creek upstream of OF#20, & Ridley Creek upstream from OF#18**	**Chronic Maximum**	**140**			---	---	0.69	3.3	---	1,300	**140**	700				µg/L		Tetrachloroethene/ Tetrachloroethylene
Tetrachloroethene/ Tetrachloroethylene	DRBC WQRs - Table 6	**Delaware River Upstream of R.M. 81.8**	**Maximum**	**3.3**			---	---	0.69	**3.3**	---	1,300	140	700				µg/L		Tetrachloroethene/ Tetrachloroethylene
Tetrachloroethene/ Tetrachloroethylene	DRBC WQRs - Table 6	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Maximum**	**3.3**			---	---	0.69	**3.3**	---	1,300	140	700				µg/L		Tetrachloroethene/ Tetrachloroethylene
Tetrachloroethene/ Tetrachloroethylene	DRBC WQRs - Table 6	**Delaware River Downstream of R.M. 81.8**	**Maximum**	**0.69**			---	---	**0.69**	3.3	---	1,300	140	700				µg/L		Tetrachloroethene/ Tetrachloroethylene
Thallium	PA Code 25 - 93.8c, Table 5	**Chester Creek upstream of OF#20, & Ridley Creek upstream from OF#18**	**Acute Maximum**	**65**							0.24	0.47	13	**65**				µg/L		Thallium
Thallium	PA Code 25 - 93.8c, Table 5	**Chester Creek upstream of OF#20, & Ridley Creek upstream from OF#18**	**Chronic Maximum**	**13**							0.24	0.47	**13**	65				µg/L		Thallium
Thallium	DRBC WQRs - Table 7	**Delaware River Upstream of R.M. 81.8**	**Maximum**	**0.47**							0.24	**0.47**	13	65				µg/L		Thallium
Thallium	DRBC WQRs - Table 7	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Maximum**	**0.47**							0.24	**0.47**	13	65				µg/L		Thallium
Thallium	DRBC WQRs - Table 7	**Delaware River Downstream of R.M. 81.8**	**Maximum**	**0.24**							**0.24**	0.47	13	65				µg/L		Thallium
Threshold Odor Number	DRBC WQRs - for Zone 4	**Delaware River**	**Maximum**	**24 at 60 °C**	**24 at 60 °C**		---	---	---	---	---	---						--		Threshold Odor Number
Threshold Odor Number	DRBC WQRs - for Zone 4	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Maximum**	**24 at 60 °C**	**24 at 60 °C**		---	---	---	---	---	---						--		Threshold Odor Number
Toluene	PA Code 25 - 93.8c, Table 5	**Chester Creek, Ridley Creek, Delaware Upstream of RM 81.8**	**Acute Maximum**	**1,700**	---	---	---	---			1,300	15,000	330	**1,700**	1,300			µg/L		Toluene
Toluene	PA Code 25 - 93.8c, Table 5	**Chester Creek, Ridley Creek, Delaware Upstream of RM 81.8**	**Chronic Maximum**	**330**	---	---	---	---			1,300	15,000	**330**	1,700	1,300			µg/L		Toluene
Toluene	PA Code 25 - 93.8c, Table 5	**Delaware River Downstream of RM 81.8**	**Maximum**	**1,300**	---	---	---	---			**1,300**	15,000	330	1,700	**1,300**			µg/L		Toluene
Total Dissolved Solids (TDS)	DRBC WQRs - for Zone 4	**Delaware River**	**Maximum**	**133% of background**	**133% of background**		---	---	---	---	---	---						mg/L		Total Dissolved Solids (TDS)
Total Dissolved Solids (TDS)	DRBC WQRs - for Zone 4	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Maximum**	**133% of background**	**133% of background**		---	---	---	---	---	---						mg/L		Total Dissolved Solids (TDS)
TKN	No Standard						---	---	---	---	---	---								TKN
Total Organic Carbon (TOC)	No Standard						---	---	---	---	---	---								Total Organic Carbon (TOC)
Total Organic Halides (T.O.X.)	No Standard						---	---	---	---	---	---								Total Organic Halides (T.O.X.)
Total Nitrogen	No Standard						---	---	---	---	---	---								Total Nitrogen
Total Petroleum Hydrocarbon (TPH)	No Standard																			Total Petroleum Hydrocarbon (TPH)

Parameter	Source of Standard	Applicable Water Body	WQS Type	Water Quality Standard To Use	Standard Criterion (DRBC Zone 4 WQRs) *Applies to Delaware & Tidal Portions of Chester & Ridley*	Standard Criterion (25 PA Code Ch. 93 WQS, 93.7 Table 3 for TSF, WWF, MF & WC Critical Use Designations) *Applies to Delaware, Chester, Ridley*	Freshwater Objectives (DRBC WQRs Table 5 - Stream Quality Objectives for Toxic Pollutants for the Protection of Aquatic Life) *Applies to Delaware & Tidal Portions of Chester & Ridley*		Freshwater Objectives (DRBC WQRs Table 6 - Stream Quality Objectives for Carcinogens) *Applies to Delaware & Tidal Portions of Chester & Ridley*		Freshwater Objectives (DRBC WQRs Table 7 - Stream Quality Objectives for Systemic Toxicants) *Applies to Delaware & Tidal Portions of Chester & Ridley*		Fish & Aquatic Life Criteria (25 PA Code Ch. 93 WQS, 93.8c, Table 5) *Applies to Delaware, Chester, Ridley*		Human Criteria (25 PA Code Ch. 93 WQS, 93.8c, Table 5) *Applies to Delaware, Chester, Ridley*	US EPA National *Recommended* Water Quality Criteria Aquatic Life Criteria Table *Applies to Delaware, Chester, Ridley*		Units	Notes	Parameter
							Acute	Chronic	Fish & Water Ingestion	Fish Ingestion Only	Fish & Water Ingestion	Fish Ingestion Only	Criteria Continuous Concentrations	Criteria Maximum Concentrations	Health Criteria	Acute Criteria Maximum Concentration (CMC)	Chronic Criteria Continuous Concentration (CCC)			
Total Phosphorus	No Standard						---	---	---	---	---	---								Total Phosphorus
Total Suspended Solids (TSS)	No Standard						---	---	---	---	---	---								Total Suspended Solids (TSS)
Turbidity [C]	DRBC WQRs - for Zone 4	**Delaware River**	**Maximum 30-day Average**	**40**	**40**		---	---	---	---	---	---						NTU		Turbidity [C]
Turbidity [C]	DRBC WQRs - for Zone 4	**Delaware River**	**Maximum**	**150**	**150**		---	---	---	---	---	---						NTU		Turbidity [C]
Turbidity [C]	DRBC WQRs - for Zone 4	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Maximum 30-day Average**	**40**	**40**		---	---	---	---	---	---						NTU		Turbidity [C]
Turbidity [C]	DRBC WQRs - for Zone 4	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Maximum**	**150**	**150**		---	---	---	---	---	---						NTU		Turbidity [C]
Xylenes (total)	PA Code 25 - 93.8c, Table 5	**Delaware River, Chester Creek, Ridley Creek**	**Acute Maximum**	**1,100**			---	---	---	---	---	---	210	**1,100**	70,000			µg/L		Xylenes (total)
Xylenes (total)	PA Code 25 - 93.8c, Table 5	**Delaware River, Chester Creek, Ridley Creek**	**Chronic Maximum**	**210**			---	---	---	---	---	---	**210**	1,100	70,000			µg/L		Xylenes (total)
Zinc	DRBC WQRs - Tables 5 & 7	**Delaware River**	**Acute Maximum**	**0.95*EXP(0.8473*LN(hardness)+0.884)**	---	---	**0.95*EXP(0.8473*LN(hardness)+0.884)**	0.95*EXP(0.8473*LN(hardness)+0.884)	---	---	7,400	26,000	0.986 x Exp(0.8473 x LN(hardness) + 0.884)	0.978 x Exp(0.8473 x LN(hardness) + 0.884)	---	120	120	µg/L	Dissolved criteria	Zinc
Zinc	DRBC WQRs - Tables 5 & 7	**Delaware River**	**Chronic Maximum**	**0.95*EXP(0.8473*LN(hardness)+0.884)**	---	---	0.95*EXP(0.8473*LN(hardness)+0.884)	**0.95*EXP(0.8473*LN(hardness)+0.884)**	---	---	7,400	26,000	0.986 x Exp(0.8473 x LN(hardness) + 0.884)	0.978 x Exp(0.8473 x LN(hardness) + 0.884)	---	120	120	µg/L	Dissolved criteria	Zinc
Zinc	DRBC WQRs - Tables 5 & 7	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Acute Maximum**	**0.95*EXP(0.8473*LN(hardness)+0.884)**	---	---	**0.95*EXP(0.8473*LN(hardness)+0.884)**	0.95*EXP(0.8473*LN(hardness)+0.884)	---	---	7,400	26,000	0.986 x Exp(0.8473 x LN(hardness) + 0.884)	0.978 x Exp(0.8473 x LN(hardness) + 0.884)	---	120	120	µg/L	Dissolved criteria	Zinc
Zinc	DRBC WQRs - Tables 5 & 7	**Chester Creek - Mouth to OF#20 (Tidal limit), & Ridley Creek - Mouth to OF#18 (Tidal limit)**	**Chronic Maximum**	**0.95*EXP(0.8473*LN(hardness)+0.884)**	---	---	0.95*EXP(0.8473*LN(hardness)+0.884)	**0.95*EXP(0.8473*LN(hardness)+0.884)**	---	---	7,400	26,000	0.986 x Exp(0.8473 x LN(hardness) + 0.884)	0.978 x Exp(0.8473 x LN(hardness) + 0.884)	---	120	120	µg/L	Dissolved criteria	Zinc
Zinc	PA Code 25 - 93.8c, Table 5	**Chester Creek upstream of OF#20, & Ridley Creek upstream from OF#18**	**Acute Maximum**	**0.978 x Exp(0.8473 x LN(hardness) + 0.884)**	---	---	0.95*EXP(0.8473*LN(hardness)+0.884)	0.95*EXP(0.8473*LN(hardness)+0.884)	---	---	7,400	26,000	0.986 x Exp(0.8473 x LN(hardness) + 0.884)	**0.978 x Exp(0.8473 x LN(hardness) + 0.884)**	---	120	120	µg/L	Dissolved criteria	Zinc
Zinc	PA Code 25 - 93.8c, Table 5	**Chester Creek upstream of OF#20, & Ridley Creek upstream from OF#18**	**Chronic Maximum**	**0.986 x Exp(0.8473 x LN(hardness) + 0.884)**	---	---	0.95*EXP(0.8473*LN(hardness)+0.884)	0.95*EXP(0.8473*LN(hardness)+0.884)	---	---	7,400	26,000	**0.986 x Exp(0.8473 x LN(hardness) + 0.884)**	0.978 x Exp(0.8473 x LN(hardness) + 0.884)	---	120	120	µg/L	Dissolved criteria	Zinc

(A) Temperature shall not exceed 5 °F (2.8 °C) above the average 24-hour temperature gradient displayed during the 1961-66 period, or a maximum of 86 °F (30.0 °C) - whichever is less.

(B) Using M.B.A.S assay, with a maximum 30-day average of 1.0 mg/L.

(C) Unless exceeded due to natural conditions.

NOTES:

DRBC standards in their WQRs are referred to as "Stream Quality Objectives". DRBC's Stream Quality Objectives have primacy over the PA Code standards for the Delaware River.

PA CODE refers to the standards as "Water Quality Standards".

Ridley Creek is "TSF & MF" Critical Use from Rt. 320 Bridge upstream to the Media Water Intake. Ridley Creek is "WWF & MF" downstream from the Rt. 320 Bridge to mouth.

Chester Creek has a "TSF" Critical Use designation as well, but this is well upstream of the CSO discharge furthest upstream on Chester Creek and does not apply for this analysis.

ATTACHMENT E

CSO Outfalls Historical Sampling Data

CSO Sampling
25 – Sept – 14

Sample Point	Parameters				
	BOD (mg/L)	Ammonia (mg/L)	TSS (mg/L)	Phosphorus (mg/L)	Fecal Coliform (# / 100mL)
2nd & Dock Street	100	6.72	134	1.6	811,000
14th & Crozer	39.5	3.26	45	0.78	430,000
Sun Drive and Hancock Street	42.5	1.88	56	0.55	169,000

ALS Environmental

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NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

October 2, 2014

Mike Krause
DELCORA
P.O. Box 999
Chester, PA 19016

Certificate of Analysis

Project Name:	**Annual Stormwaters**	Workorder:	**2031197**
Purchase Order:		Workorder ID:	**CSO Sampling**

Dear Mike Krause:

Enclosed are the analytical results for samples received by the laboratory on Thursday, September 25, 2014.

The ALS Environmental laboratory in Middletown, Pennsylvania is a National Environmental Laboratory Accreditation Program (NELAP) accredited laboratory and as such, certifies that all applicable test results meet the requirements of NELAP.

If you have any questions regarding this certificate of analysis, please contact Mrs. Vanessa N Badman (Project Coordinator) at (717) 944-5541.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program and any applicable state requirements. The test results meet requirements of the current NELAP standards or state requirements, where applicable. For a specific list of accredited analytes, refer to the certifications section of the ALS website at www.alsglobal.com/en/Our-Services/Life-Sciences/Environmental/Downloads.

ALS Spring City: 10 Riverside Drive, Spring City, PA 19475 610-948-4903

CC: Ms. Irene Fitzgerald , Joe DiMatteo

This page is included as part of the Analytical Report and must be retained as a permanent record thereof.

Vanessa N. Badman

Mrs. Vanessa N Badman
Project Coordinator

ALS Environmental

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SAMPLE SUMMARY

Workorder: 2031197 CSO Sampling

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
2031197001	14th & Crozer	Water	9/25/2014 10:00	9/25/2014 20:30	Mike Krause
2031197002	2nd & Dock	Water	9/25/2014 09:40	9/25/2014 20:30	Mike Krause
2031197003	Sun & Hancock	Water	9/25/2014 09:50	9/25/2014 20:30	Mike Krause
2031197004	14th & Crozer	Water	9/25/2014 10:00	9/25/2014 16:10	Mike Krause
2031197005	2nd & Dock	Water	9/25/2014 09:40	9/25/2014 16:10	Mike Krause
2031197006	Sun & Hancock	Water	9/25/2014 09:50	9/25/2014 16:10	Mike Krause

Notes

-- Samples collected by ALS personnel are done so in accordance with the procedures set forth in the ALS Field Sampling Plan (20 - Field Services Sampling Plan).
-- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.
-- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.
-- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
-- The Chain of Custody document is included as part of this report.
-- All Library Search analytes should be regarded as tentative identifications based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.
-- Parameters identified as "analyze immediately" require analysis within 15 minutes of collection. Any "analyze immediately" parameters not listed under the header "Field Parameters" are preformed in the laboratory and are therefore analyzed out of hold time.
-- Method references listed on this report beginning with the prefix “S” followed by a method number (such as S2310B-97) refer to methods from “Standard Methods for the Examination of Water and Wastewater”.

Standard Acronyms/Flags

J	Indicates an estimated value between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL) for the analyte
U	Indicates that the analyte was Not Detected (ND)
N	Indicates presumptive evidence of the presence of a compound
MDL	Method Detection Limit
PQL	Practical Quantitation Limit
RDL	Reporting Detection Limit
ND	Not Detected - indicates that the analyte was Not Detected at the RDL
Cntr	Analysis was performed using this container
RegLmt	Regulatory Limit
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
%Rec	Percent Recovery
RPD	Relative Percent Difference
LOD	DoD Limit of Detection
LOQ	DoD Limit of Quantitation
DL	DoD Detection Limit

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ANALYTICAL RESULTS

Workorder: 2031197 CSO Sampling

Lab ID: **2031197001** Date Collected: 9/25/2014 10:00 Matrix: Water

Sample ID: **14th & Crozer** Date Received: 9/25/2014 20:30

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Ammonia-N	3.26		mg/L	0.100	D6919-09			9/30/14 15:23	JAM	B
Biochemical Oxygen Demand	39.5		mg/L	2.0	S5210B-01			9/26/14 06:30	NAK	A
Phosphorus, Total	0.78		mg/L	0.10	EPA 365.1	9/26/14	LJF	9/30/14 06:57	LJF	B
Total Suspended Solids	45		mg/L	5	S2540D-97			9/29/14 21:30	NV	A

Vanessa N. Badman

Mrs. Vanessa N Badman
Project Coordinator

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ANALYTICAL RESULTS

Workorder: 2031197 CSO Sampling

Lab ID: **2031197002** Date Collected: 9/25/2014 09:40 Matrix: Water

Sample ID: **2nd & Dock** Date Received: 9/25/2014 20:30

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Ammonia-N	6.72		mg/L	0.100	D6919-09			9/30/14 15:43	JAM	B
Biochemical Oxygen Demand	100		mg/L	2.0	S5210B-01			9/26/14 06:30	NAK	A
Phosphorus, Total	1.6		mg/L	0.10	EPA 365.1	9/26/14	LJF	9/30/14 06:57	LJF	B
Total Suspended Solids	134		mg/L	5	S2540D-97			9/29/14 21:30	NV	A

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ANALYTICAL RESULTS

Workorder: 2031197 CSO Sampling

Lab ID: **2031197003** Date Collected: 9/25/2014 09:50 Matrix: Water

Sample ID: **Sun & Hancock** Date Received: 9/25/2014 20:30

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Ammonia-N	1.88		mg/L	0.100	D6919-09			9/30/14 16:03	JAM	B
Biochemical Oxygen Demand	42.5		mg/L	2.0	S5210B-01			9/26/14 06:30	NAK	A
Phosphorus, Total	0.55		mg/L	0.10	EPA 365.1	9/26/14	LJF	9/30/14 06:57	LJF	B
Total Suspended Solids	56		mg/L	5	S2540D-97			9/29/14 21:30	NV	A

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ANALYTICAL RESULTS

Workorder: 2031197 CSO Sampling

Lab ID: **2031197004** Date Collected: 9/25/2014 10:00 Matrix: Water

Sample ID: **14th & Crozer** Date Received: 9/25/2014 16:10

Parameters	Results	Flag	Units	RDL	Method	Prepared By	Analyzed	By	*Cntr*
Spring City-PA1504546,NJPA071									
Fecal Coliform	430000		col/100mL	1	S9222D-97		9/25/14 17:50	BSM	A

Vanessa N. Badman

Mrs. Vanessa N Badman
Project Coordinator

ALS Environmental

34 Dogwood Lane ▪ Middletown, PA 17057 ▪ Phone: 717-944-5541 ▪ Fax: 717-944-1430 ▪ www.alsglobal.com

NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2031197 CSO Sampling

Lab ID: **2031197005** Date Collected: 9/25/2014 09:40 Matrix: Water

Sample ID: **2nd & Dock** Date Received: 9/25/2014 16:10

Parameters	Results	Flag	Units	RDL	Method	Prepared By	Analyzed	By	*Cntr*
Spring City-PA1504546,NJPA071									
Fecal Coliform	811000	1	col/100mL	1	S9222D-97		9/25/14 16:45	BSM	A

Vanessa N. Badman

Mrs. Vanessa N Badman
Project Coordinator

ALS Environmental

34 Dogwood Lane ▪ Middletown, PA 17057 ▪ Phone: 717-944-5541 ▪ Fax: 717-944-1430 ▪ www.alsglobal.com

NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2031197 CSO Sampling

Lab ID: **2031197006** Date Collected: 9/25/2014 09:50 Matrix: Water

Sample ID: **Sun & Hancock** Date Received: 9/25/2014 16:10

Parameters	Results	Flag	Units	RDL	Method	Prepared By	Analyzed	By	*Cntr*
Spring City-PA1504546,NJPA071									
Fecal Coliform	169000	1	col/100mL	1	S9222D-97		9/25/14 17:08	BSM	A

Vanessa N. Badman

Mrs. Vanessa N Badman
Project Coordinator

ALS Environmental

34 Dogwood Lane ■ Middletown, PA 17057 ■ Phone: 717-944-5541 ■ Fax: 717-944-1430 ■ www.alsglobal.com

NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

PARAMETER QUALIFIERS

Lab ID	#	Sample ID	Analytical Method	Analyte
2031197005	1	2nd & Dock	S9222D-97	Fecal Coliform
This is an estimated result.				
2031197006	1	Sun & Hancock	S9222D-97	Fecal Coliform
This is an estimated result.				

ALS Environmental
34 Dogwood Lane
Middletown, PA 17057
P. 717-944-5541
F.717-944-1430

CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

COC #:

ALS Quot

2031197

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

Client Name: DELCORA
Address: 3201 W. Front Street
Chester PA 19013
Contact: Mike Krause
Phone#: 610-876-5523 x218
Project Name/#: CSO Sampling
Bill To: Same

TAT [X] Normal-Standard TAT is 10-12 business days.
[ ] Rush-Subject to ALS approval and surcharges.
Date Required: _____ Approved By: _____
Email? [X] -Y _____
Fax? [ ] -Y No.: _____

Sample Description/Location (as it will appear on the lab report)	Sample Date	Time	*G or C	**Matrix	BOD, TSS	Phosphorus, NH3	Fecal Coliform							
Container Type					plastic	plastic	plastic							
Container Size					1L	500ml	250ml							
Preservative					none	H2SO4	Na2S2O3							
ANALYSES/METHOD REQUESTED														
Enter Number of Containers Per Sample or Field Results Below.														
1 14th & Crozer	9/25/2014	10:00	C	WW	1	1	1							
2 2nd & Dock	9/25/2014	9:40	C	WW	1	1	1							
3 Sun & Hancock	9/25/2014	9:50	C	WW	1	1	1							
4														
5														
6														
7														
8														
9														
10														

Rec

Cooler Temp: 2°c Therm ID: TH294
No. of Coolers: 1

	Y	N	Initial
Custody Seals Present?			BSM
~~(if present) Seals Intact?~~			
Received on Ice?	✓		
COC/Labels Complete/Accurate?	✓		
Cont. in Good Cond.?	✓		
Correct Containers?	✓		
Correct Sample Volumes?	✓		
Correct Preservation?	✓		
Headspace/Volatiles?			

Courier/Tracking #:

Sample/COC Comments

Fecal Analyzed @ Spring City SPRC/BSM 9-25-14 1610

ALS Field Services: X Pickup _Labor
_Composite Sampling _Rental Equipment
_Other: _____

Project Comments:

LOGGED BY(signature): [signature] DATE 9/26 TIME 0229
REVIEWED BY(signature): DATE TIME

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1 [signature]	9/25/14	1300	2 [signature]	9-25	1300
3 [signature]	9.20	1830	4 [signature]	9-25-14	1830
5 [signature]	9-25-14	2030	6 [signature] 9-25	9-25	2030
7			8		
9			10		

Data Deliverables: [ ] Standard [ ] CLP-like [ ] USACE [ ]
Special Processing: USACE [ ] Navy [ ] [ ]
State Samples Collected In: [ ] NY [ ] NJ [X] PA [ ] NC [ ]
Reportable to PADEP? Yes [ ] PWSID # _____
Sample Disposal: Lab [ ] Special [ ]
EDDS: Format Type- _____

* G=Grab; C=Composite
**Matrix - Al=Air; DW=Drinking Water; GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

ALS ENVIRONMENTAL SHIPPING ADDRESS: 34 DOGWOOD LANE, MIDDLETOWN, PA 17057

Rev 10/11

C.S.O. Sampling
29-Oct-12

Sample Point	Parameters				
	BOD (mg/L)	Ammonia (mg/L)	TSS (mg/L)	Phosphorus (mg/L)	Fecal Coliform (# / 100mL)
2nd & Dock St	35	2.18	106	0.823	>600,000
14th & Crozer	21	0.81	48	0.499	>600,000
Sun Drive and Hancock St.	28	1.79	47	0.813	>600,000

QC Laboratories

Analytical Report

MIKE KRAUSE
DELCORA PRE-TREATMENT
PO BOX 999
CHESTER, PA 19016

Regarding:
MIKE KRAUSE
DELCORA PRE-TREATMENT
3201 W. FRONT STREET
CHESTER, PA 19016

Account No:AL0069, DELCORA
Project No: AL0069, DELCORA

P.O. No:

Inv. No: 1468769
PWSID No:

Sample Number Sample Description
L4369219-1 SUN & HANCOCK GRAB
Received Date/Time/Temp 10/31/12 07:45pm 1.1 C Iced (Y/N): Y

Samp. Date/Time/Temp Sampled by
10/29/12 09:40am NA C Customer

Parameter	Method	Result	RLs	Test Date, Time, Analyst
GENERAL CHEMISTRY				
AMMONIA NITROGEN AS N	SM 4500NH3 B,D	1.79 mg/l	0.100 mg/l	11/08/12 03:55PM MRP
PHOSPHORUS TOTAL	SM 4500P B.5 E	0.813 mg/l	0.0600 mg/l	11/01/12 09:00AM NM
TOTAL SUSPENDED SOLIDS	SM 2540D	47.0 mg/l	2.00 mg/l	11/01/12 12:21PM LMB

Notes:
A result of "ND" indicates that the analyte tested was either not detected or the concentration was below the RLs.
Definitions: NEG=negative; POS=positive; COL=colonies; RLs=laboratory reporting limits; L/A=laboratory accident; TNTC= Too numerous to count; pres=presumptive
A result marked with "DRY" indicates that the result was calculated and reported on a dry weight basis.
MCL= EPA recommended "maximum contaminant level", PLs = Customer-specific permit limits.
The test results meet all requirements of NELAC unless otherwise specified.
The report shall not be reproduced except in full without the written consent of the laboratory.
Unless otherwise specified, the Environmental and Food Chemistry testing except Field Parameters were performed by QC Inc. located at 1205 Industrial Blvd., Southampton, PA 18966; Pharmaceutical, Dairy and Food Microbiological tests were performed by QC Inc. located at 702 Electronic Dr., Horsham, PA 19044.
QCL Accreditations: Southampton Div: EPA ID PA00018; NELAP ID's: PA 09-00131, NJ PA166, NY 11223
State ID's: CT PH-0768, DE PA-018, MD 206, SC 89021001; FDA Reg. # : 2515238
ACL Div: NELAP ID's: PA 68-335, NJ DE568; State ID's: DE 00011, MD 138; Wind Gap Div: State ID's: PA 48-01334, NJ PA001
E. Rutherford Div: State ID: NJ 02015; Vineland Div: State ID: NJ 06005; Reading Div: State ID: PA 06-03543
The reported results relate only to the samples.
All samples are collected as "grab" samples unless otherwise identified.

Regulatory authorities are assessing substantial fines for testing omissions. Please track your sample collections and results on a weekly, monthly, or quarterly basis to ensure compliance. QC's internet program 'LIVE ACCESS' will provide you with real-time access to collection dates and results. Please contact Customer Service for further information on acquiring LIVE ACCESS.

Serial Number: 2460396

Sun & Hancock

CHAIN OF CUSTODY RECORD

Atlantic Coast Laboratories, Inc.
630 churchmans Road
Newark, Delaware 19702
(302)266-9121 * 454-8720 (FAX)

Client
Client Name Delcora
Address 3201 W Front St
Chester, PA 19013
Contact Mike Krause
Phone (610) 876-5523 x 218
Work ID

Due
Quote
Misc.
Sampled by:

Sample ID	Comp Date Time Start	Date Smpl	Time	Container Size	Container G/P	Grab Sample	Composite	No. of Containers	Sample Matrix	Preservative	TSS	Phos-phorus, NH3						Comments
Sun & Hancock		10/29/12	9:40	1000	P	X		1	WW	NONE	X							
Sun & Hancock		10/29/12	9:40	500	P	X		1	WW	H2SO4		X						

Relinquished by:	Date/Time	Received by:	Relinquished by:	Date \ Time	Received by:
[signature]	10/31/12 1035	[signature]			
Relinquished by:	Date/Time	Received by:	Relinquished by:	Date \ Time	Received for Laboratory by:

Lab Use Only	Yes	No	Remarks
Samples Iced			
Samples Prsrvd			

QC Laboratories

Analytical Report

MIKE KRAUSE
DELCORA PRE-TREATMENT
PO BOX 999
CHESTER, PA 19016

Regarding:
MIKE KRAUSE
DELCORA PRE-TREATMENT
3201 W. FRONT STREET
CHESTER, PA 19016

Account No:AL0069, DELCORA
Project No: AL0069, DELCORA

P.O. No:

Inv. No: 1468768
PWSID No:

Sample Number Sample Description
L4369218-1 2ND & DOCK GRAB
Received Date/Time/Temp 10/31/12 07:45pm 1.1 C Iced (Y/N): Y

Samp. Date/Time/Temp Sampled by
10/29/12 10:00am NA C Customer

Parameter	Method	Result	RLs	Test Date, Time, Analyst
GENERAL CHEMISTRY				
AMMONIA NITROGEN AS N	SM 4500NH3 B,D	2.18 mg/l	0.100 mg/l	11/08/12 03:55PM MRP
PHOSPHORUS TOTAL	SM 4500P B.5 E	0.823 mg/l	0.0600 mg/l	11/01/12 09:00AM NM
TOTAL SUSPENDED SOLIDS	SM 2540D	106 mg/l	2.00 mg/l	11/01/12 12:50PM LMB

Notes:
A result of "ND" indicates that the analyte tested was either not detected or the concentration was below the RLs.
Definitions: NEG=negative; POS=positive; COL=colonies; RLs=laboratory reporting limits; L/A=laboratory accident; TNTC= Too numerous to count; pres=presumptive
A result marked with "DRY" indicates that the result was calculated and reported on a dry weight basis.
MCL= EPA recommended "maximum contaminant level", PLs = Customer-specific permit limits.
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State ID's: CT PH-0768, DE PA-018, MD 206, SC 89021001; FDA Reg. # : 2515238
ACL Div: NELAP ID's: PA 68-335, NJ DE568; State ID's: DE 00011, MD 138; Wind Gap Div: State ID's: PA 48-01334, NJ PA001
E. Rutherford Div: State ID: NJ 02015; Vineland Div: State ID: NJ 06005; Reading Div: State ID: PA 06-03543
The reported results relate only to the samples.
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Serial Number: 2460395

Client
Client Name Delcora
Address 3201 W Front St
Chester, PA 19013
Contact Mike Krause
Phone (610) 876-5523 x 218
Work ID

CHAIN OF CUSTODY RECORD

Due
Quote
Misc.
Sampled by:

Atlantic Coast Laboratories, Inc.
630 churchmans Road
Newark, Delaware 19702
(302)266-9121 * 454-8720 (FAX)

Sample ID	Comp Date Time Start	Date Smpl	Time	Container Size	Container G/P	Grab Sample	Composite	No. of Containers	Sample Matrix	Preservative	TSS	Phos-phorus, NH3						Comments
2nd & Dock		10/29/12	10:00	1000	P	X		1	WW	NONE	X							
2nd & Dock		10/29/12	10:00	500	P	X		1	WW	H2SO4		X						

Relinquished by:	Date/Time	Received by:	Relinquished by:	Date \ Time	Received by:
	10/31/12 1035				
Relinquished by:	Date/Time	Received by:	Relinquished by:	Date \ Time	Received for Laboratory by:

Lab Use Only	Yes	No	Remarks
Samples Iced			
Samples Prsrvd			

QC Laboratories

Analytical Report

MIKE KRAUSE
DELCORA PRE-TREATMENT
PO BOX 999
CHESTER, PA 19016

Regarding:
MIKE KRAUSE
DELCORA PRE-TREATMENT
3201 W. FRONT STREET
CHESTER, PA 19016

Account No:AL0069, DELCORA
Project No: AL0069, DELCORA

P.O. No:

Inv. No: 1468767
PWSID No:

Sample Number Sample Description
L4369220-1 14TH & CROZER GRAB
Received Date/Time/Temp 10/31/12 07:45pm 1.1 C Iced (Y/N): Y

Samp. Date/Time/Temp Sampled by
10/29/12 09:20am NA C Customer

Parameter	Method	Result	RLs	Test Date, Time, Analyst
GENERAL CHEMISTRY				
AMMONIA NITROGEN AS N	SM 4500NH3 B,D	0.810 mg/l	0.100 mg/l	11/08/12 03:55PM MRP
PHOSPHORUS TOTAL	SM 4500P B.5 E	0.499 mg/l	0.0300 mg/l	11/02/12 08:50AM NM
TOTAL SUSPENDED SOLIDS	SM 2540D	48.0 mg/l	2.00 mg/l	11/01/12 12:50PM LMB

Notes:
A result of "ND" indicates that the analyte tested was either not detected or the concentration was below the RLs.
Definitions: NEG=negative; POS=positive; COL=colonies; RLs=laboratory reporting limits; L/A=laboratory accident; TNTC= Too numerous to count; pres=presumptive
A result marked with "DRY" indicates that the result was calculated and reported on a dry weight basis.
MCL= EPA recommended "maximum contaminant level", PLs = Customer-specific permit limits.
The test results meet all requirements of NELAC unless otherwise specified.
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State ID's: CT PH-0768, DE PA-018, MD 206, SC 89021001; FDA Reg. # : 2515238
ACL Div: NELAP ID's: PA 68-335, NJ DE568; State ID's: DE 00011, MD 138; Wind Gap Div: State ID's: PA 48-01334, NJ PA001
E. Rutherford Div: State ID: NJ 02015; Vineland Div: State ID: NJ 06005; Reading Div: State ID: PA 06-03543
The reported results relate only to the samples.
All samples are collected as "grab" samples unless otherwise identified.

Regulatory authorities are assessing substantial fines for testing omissions. Please track your sample collections and results on a weekly, monthly, or quarterly basis to ensure compliance. QC's internet program 'LIVE ACCESS' will provide you with real-time access to collection dates and results. Please contact Customer Service for further information on acquiring LIVE ACCESS.

Serial Number: 2460389

Client
Client Name Delcora
Address 3201 W Front St
Chester, PA 19013
Contact Mike Krause
Phone (610) 876-5523 x 218
Work ID

CHAIN OF CUSTODY RECORD

Due
Quote
Misc.
Sampled by:

Atlantic Coast Laboratories, Inc.
630 churchmans Road
Newark, Delaware 19702
(302)266-9121 * 454-8720 (FAX)

Sample ID	Comp Date Time Start	Date Smpl	Time	Container Size	Container G/P	Grab Sample	Composite	No. of Containers	Sample Matrix	Preservative	TSS	Phos-phorus, NH3						Comments
14th & Crozer		10/29/12	9:20	1000	P	X		1	WW	NONE	X							
14th & Crozer		10/29/12	9:20	500	P	X		1	WW	H2SO4		X						

Relinquished by:	Date/Time	Received by:	Relinquished by:	Date \ Time	Received by:
	10/29/12 1035				
Relinquished by:	Date/Time	Received by:	Relinquished by:	Date \ Time	Received for Laboratory by:

Lab Use Only	Yes	No	Remarks
Samples Iced			
Samples Prsrvd			

Fecal Daily Worksheet

	Analyst	Date	Time		
Setup & Sample Date	MK	10/29/2012	2:25 PM		
Read	MK	10/30/2012	2:00 PM		
14th & Crozer					
Dilutions	Blank 1	5TNTC	1TNTC	0.1TNTC	0.01
Raw Count (CFU)	0	TNTC	TNTC	TNTC	TNTC
Actual Density (CFU/100mL)					
Meets Target (20-40 CFU)?		Above	Above	Above	Above
Results that Meet Target					
Target Results Count/100mL					
Average (CFU/100mL)			>	600000	

	Analyst	Date	Time		
Setup & Sample Date	MK	10/29/2012	2:25 PM		
Read	MK	10/30/2012	2:00 PM		
2nd & Dock					
Dilutions	Blank 1	5TNTC	1TNTC	0.1TNTC	0.01
Raw Count (CFU)	0	TNTC	TNTC	TNTC	TNTC
Actual Density (CFU/100mL)					
Meets Target (20-40 CFU)?		Above	Above	Above	Above
Results that Meet Target					
Target Results Count/100mL					
Average (CFU/100mL)			>	600,000	

	Analyst	Date	Time		
Setup & Sample Date	MK	10/29/2012	2:25 PM		
Read	MK	10/30/2012	2:00 PM		
Sun & Hancock					
Dilutions	Blank 1	5TNTC	1TNTC	0.1TNTC	0.01
Raw Count (CFU)	0	TNTC	TNTC	TNTC	TNTC
Actual Density (CFU/100mL)					
Meets Target (20-40 CFU)?		Above	Above	Above	Above
Results that Meet Target					
Target Results Count/100mL					
Average (CFU/100mL)			>	600,000	

	Analyst	Date	Time		
Setup & Sample Date					
Read					
Dilutions	Blank 1	125	75	25	5
Raw Count (CFU)					
Actual Density (CFU/100mL)					
Meets Target (20-40 CFU)?					
Results that Meet Target					
Target Results Count/100mL					
Average (CFU/100mL)					

	Analyst	Date	Time
Setup & Sample Date			
Read			

BOD Worksheet

Date of Analysis		10/30/12
Date of WRTP Sample		10/29/12
Date of CFR Sample		
Date of CFTM Sample		
Date of SF and TB Sample		
Setup	TPB	10/30/12
Read 5 Day	MK	11/04/12
Read 20 Day		11/19/12

	LOT #	Op'd Date	EXP. Date
GGA Control	B109-01	10/7/2012	11/21/2012

Soln. T°	Calib. T°
20.5	20.4
20.8	23.6

Theor. DO

Seed Lot #	52017	3/13/2013
6L Nutrient Lot #	A2254	9/31/2017
3L Nutrient Lot #	A0316	11/15/2015
300mL Nutrient Lot #	A0344	12/31/2015
N Inhibitor Lot #	A2093	5/31/2015

CBOD5

	Bottle #	Sample Volume (mL)	Volume Fraction	Extra Nutrient	Nitr. Inhib	Initial DO	Final DO	Depletion	Seed Volume	Seed Blank	BOD5 (mg/L)	BOD5 (AVG.)	Quality Control
BLANK 1		0	0.00		x				-				
BLANK 2		0	0.00		x				-				
BLANK 3		0	0.00		x				-				
CONTROL 1		6	0.02		x				2				
CONTROL 2		6	0.02		x				2				
SEED 1		18	0.06		x				-				
SEED 2		20	0.07		x				-			0.00	
SEED 3		22	0.07		x				-				
EFF 1					x				2				
EFF 2					x				2				
EFF 3					x				2				
EFF 1					x				2				
EFF 2					x				2				RPD
EFF 3					x				2				AVG
INF 1					x				2				
INF 2					x				2				
INF 3					x				2				
CFR EFF 1					x				2				
CFR EFF 2					x				2				
CFR EFF 3					x				2				
CFTM EFF 1					x				2				
CFTM EFF 2					x				2				
CFTM EFF 3					x				2				
SF EFF 1					x				2				
SF EFF 2					x				2				
SF EFF 3					x				2				
THBY EFF 1					x				2				
THBY EFF 2					x				2				
THBY EFF 3					x				2				
RV EFF 1					x				2				
RV EFF 2					x				2				
RV EFF 3					x				2				
PP EFF 1					x				2				
PP EFF 2					x				2				
PP EFF 3					x				2				
PR EFF 1					x				2				
PR EFF 2					x				2				
PR EFF 3					x				2				

BOD5

	Bottle #	Sample Volume (mL)	Volume Fraction	Extra Nutrient	Nitr. Inhib	Initial DO	Final DO	Depletion	Seed Volume	Seed Blank	BOD5 (mg/L)	BOD5 (AVG.)	Quality Control
BLANK 1	239	0	0.00			8.63	8.37	0.26	-		0.26		
BLANK 2	215	0	0.00			8.62	8.40	0.22	-		0.22	**0.19**	
BLANK 3	12	0	0.00			8.63	8.53	0.10	-		0.10		**Pass**
CONTROL 1	231	6	0.02			8.66	3.80	4.86	2		215	**208**	
CONTROL 2	226	6	0.02			8.66	4.09	4.57	2		200		**Pass**
SEED 1	112	16	0.05			8.61	4.07	4.54	-	53%	0.57		
SEED 2	77	18	0.06			8.60	3.52	5.08	-	59%	0.56	**0.56**	
SEED 3	61	20	0.07			8.60	3.05	5.55	-	65%	0.56		
SUN 1	11	30	0.10			8.68	5.35	3.33	2		28		
SUN 2	0	60	0.20			8.72	2.63	6.09	2		28	**28**	
SUN 3	79	90	0.30			8.77	0.25		2				
14TH 1	616	30	0.10			8.66	5.94	2.72	2		22		
14th 2	123	60	0.20			8.70	3.82	4.88	2		22	**21**	
14th 3	71	90	0.30			8.73	1.97	6.76	2		21		
CPS 1	301	30	0.10			8.64	4.51	4.13	2		36		
CPS 2	272	60	0.20			8.63	1.01	7.62	2		35	**35**	
CPS 3	183	90	0.30			8.62	0.02		2				
CFR INF 1									2				Duplicate
CFR INF 2									2				Results
CFR INF 3									2				**RPD%**
CFTM INF 1									2				
CFTM INF 2									2				
CFTM INF 3									2				
SF INF 1									2				
SF INF 2									2				
SF INF 3									2				
THBY INF 1									2				
THBY INF 2									2				
THBY INF 3									2				
RV INF 1									2				
RV INF 2									2				
RV INF 3									2				
PP INF 1									2				
PP INF 2									2				
PP INF 3									2				
PR INF 1									2				
PR INF 2									2				
PP INF 3									2				

C.S.O. Sampling
27-Nov-13

Sample Point	Parameters				
	BOD (mg/L)	Ammonia (mg/L)	TSS (mg/L)	Phosphorus (mg/L)	Fecal Coliform (# / 100mL)
2nd & Dock St	65	2.1	204	1.32	>200,000
14th & Crozer	40	0.9	163	1.21	190,000
Sun Drive and Hancock St.	13	0.2	40	0.350	150,000

CERTIFICATE OF ANALYSIS
M.J. Reider Associates, Inc.

Attention: Michael Krause
Reported To: DELCORA Plant Sampling
3201 West Front St.
Chester PA 19016-0000

Date of Report: 12/06/13
Lab ID: 2991-13-0053078

Date Collected: 11/27/13 00:00
Collected By: Client

Sample Desc: CSO Outfall (Site 1) 14th + Crozer

Date Received: 11/27/13 14:05

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
CHEMISTRY								
COLORMETRIC								
Phosphorus as P, Total	1.21	mg/l	.05	1	SM 4500P-E	12/02	11:15	ALD
NITROGENS								
Nitrogen, Ammonia	0.9	mg/l	.1	1	D6919-03	11/27	17:37	JCL
OTHER								
Biochemical Oxygen Demand	40	mg/l	2	1	SM 5210B	11/27	16:00	EMW
RESIDUES								
Solids, Total Suspended	163	mg/l	1	1	SM 2540D	12/03	08:40	TMH

Distribution of Reports:

Reviewed and Approved by:

Barbara R Coyle

Barbara Coyle
Laboratory Director

THE NELAC INSTITUTE

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CERTIFICATE OF ANALYSIS
M.J. Reider Associates, Inc.

Attention: Michael Krause
Reported To: DELCORA Plant Sampling
3201 West Front St.
Chester PA 19016-0000

Date of Report: 12/06/13
Lab ID: 2991-13-0053079

Date Collected: 11/27/13 00:15
Collected By: Client

Sample Desc: CSO Outfall (Site 2) Sun + Hancock

Date Received: 11/27/13 14:05

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
CHEMISTRY								
COLORMETRIC								
Phosphorus as P, Total	0.35	mg/l	.05	1	SM 4500P-E	12/02	11:15	ALD
NITROGENS								
Nitrogen, Ammonia	0.2	mg/l	.1	1	D6919-03	11/27	17:37	JCL
OTHER								
Biochemical Oxygen Demand	13	mg/l	2	1	SM 5210B	11/27	16:00	EMW
RESIDUES								
Solids, Total Suspended	40	mg/l	1	1	SM 2540D	12/03	08:40	TMH

Distribution of Reports:

Reviewed and Approved by:

Barbara R Coyle

Barbara Coyle
Laboratory Director

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CERTIFICATE OF ANALYSIS
M.J. Reider Associates, Inc.

Attention: Michael Krause
Reported To: DELCORA Plant Sampling
3201 West Front St.
Chester PA 19016-0000

Date of Report: 12/06/13
Lab ID: 2991-13-0053080

Date Collected: 11/27/13 00:30
Collected By: Client

Sample Desc: CSO Outfall (Site 3) 2nd + Dock (CPS)

Date Received: 11/27/13 14:05

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
CHEMISTRY								
COLORMETRIC								
Phosphorus as P, Total	1.32	mg/l	.05	1	SM 4500P-E	12/02	11:15	ALD
NITROGENS								
Nitrogen, Ammonia	2.1	mg/l	.1	1	D6919-03	11/27	17:37	JCL
OTHER								
Biochemical Oxygen Demand	65	mg/l	2	1	SM 5210B	11/27	16:00	EMW
RESIDUES								
Solids, Total Suspended	204	mg/l	1	1	SM 2540D	12/03	08:40	TMH

Distribution of Reports:

Reviewed and Approved by:

Barbara R Coyle

Barbara Coyle
Laboratory Director

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brc
12/31/12 8:15:57 AM

M. J. REIDER ASSOCIATES, INC.

COFC.
Page:

Chain of Custody

Account: 2991 Work Order: 005523 Project Leader: BRC No: 211349
Work Order Description: Annual CSO Outfalls

Customer: Michael Krause

Address: DELCORA Plant Sampling
3201 West Front St.
Chester PA 19016-0000

Remarks: _____

Phone: 610.876.5523 Ext: 218

Total Sampling Time (hours): _____ Bottle Prep by: _____

Samplers: CST

Laboratory Receipt Temp: 5 Deg C. If Temp Unacceptable, On Ice? (Y) N
Approved By: _____

==========

Sample No: 1 Desc: CSO Outfall (Site 1) 14TH + CROZER
53078 nh3-n, tss, po4-p, bod, ~~fec~~

Matrix: ww Date: 11/27/13
Time: 0200
A - 1 X L BOD/TSS P w/ Cool to 6 C;
B - 1 X Pt NH3/PO4 P w/ H2S04(pH<2);
~~C - 1 X 4oz FECAL P w/ Sterile/Na2S203;~~

Sample No: 2 Desc: CSO Outfall (Site 2) SUN + HANCOCK
53079 nh3-n, tss, po4-p, bod, ~~fec~~

Matrix: ww Date: 11/27/13
Time: 0015
A - 1 X L BOD/TSS P w/ Cool to 6 C;
B - 1 X Pt NH3/PO4 P w/ H2S04(pH<2);
~~C - 1 X 4oz FECAL P w/ Sterile/Na2S203;~~

Sample No: 3 Desc: CSO Outfall (Site 3) 2ND + DOCK (CPS)
53080 nh3-n, tss, po4-p, bod, ~~fec~~

Matrix: ww Date: 11/27/13
Time: 0030
A - 1 X L BOD/TSS P w/ Cool to 6 C;
B - 1 X Pt NH3/PO4 P w/ H2S04(pH<2);
~~C - 1 X 4oz FECAL P w/ Sterile/Na2S203;~~

Relinquished by: _____ Received by: _____ Received for laboratory by: _____

Date: 11/27/13 Time: 1020 Date: 11/27/13 Time: 1905

Sample entered by: DSM

	Analyst	Date	Time
Setup & Sample Date	MK	11/27/2013	2:40 AM
Read	MK	11/28/2013	2:00 AM
14th & Crozer			

Dilutions	Blank 1	5tntc	1tntc	0.5tntc	0.1
Raw Count (CFU)	0	tntc	tntc	tntc	190
Actual Density (CFU/100mL)					190000
Meets Target (20-40 CFU)?		Above	Above	Above	Above
Results that Meet Target					
Target Results Count/100mL					
Average (CFU/100mL)	190,000				

	Analyst	Date	Time
Setup & Sample Date	MK	11/27/2013	2:40 AM
Read	MK	11/28/2013	2:00 AM
Sun & Hancock			

Dilutions	Blank 1	5tntc	1tntc	0.5tntc	0.1
Raw Count (CFU)	0	tntc	tntc	tntc	150
Actual Density (CFU/100mL)					150000
Meets Target (20-40 CFU)?		Above	Above	Above	Above
Results that Meet Target					
Target Results Count/100mL					
Average (CFU/100mL)	150,000				

	Analyst	Date	Time
Setup & Sample Date	MK	11/27/2013	2:40 AM
Read	MK	11/28/2013	2:00 AM
2nd & Dock (CPS)			

Dilutions	Blank 1	5tntc	1tntc	0.5tntc	0.1
Raw Count (CFU)		tntc	tntc	tntc	tntc
Actual Density (CFU/100mL)					
Meets Target (20-40 CFU)?		Above	Above	Above	Above
Results that Meet Target					
Target Results Count/100mL					
Average (CFU/100mL)			>	200,000	

	Analyst	Date	Time
Setup & Sample Date			
Read			
Spring Hill Farm			

Dilutions	Blank 1	125	75	25	5
Raw Count (CFU)					
Actual Density (CFU/100mL)					
Meets Target (20-40 CFU)?					
Results that Meet Target					
Target Results Count/100mL					
Average (CFU/100mL)					

	Analyst	Date	Time
Setup & Sample Date			
Read			

ATTACHMENT F

Laboratory Data for Additional Sampling of the CSO Outfalls

ALS Environmental

34 Dogwood Lane ■ Middletown, PA 17057 ■ Phone: 717-944-5541 ■ Fax: 717-944-1430 ■ www.alsglobal.com

NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

December 3, 2015

Ms. Irene Fitzgerald
DELCORA
P.O. Box 999
Chester, PA 19016

Certificate of Analysis

Project Name:	**2015-LOWER DELAWARE TESTING**	Workorder:	**2107040**
Purchase Order:		Workorder ID:	**CSO WW LTCP**

Dear Ms. Fitzgerald:

Enclosed are the analytical results for samples received by the laboratory on Tuesday, November 10, 2015.

The ALS Environmental laboratory in Middletown, Pennsylvania is a National Environmental Laboratory Accreditation Program (NELAP) accredited laboratory and as such, certifies that all applicable test results meet the requirements of NELAP.

If you have any questions regarding this certificate of analysis, please contact Mr. Brad W Kintzer (Project Coordinator) at (717) 944-5541.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program and any applicable state requirements. The test results meet requirements of the current NELAP standards or state requirements, where applicable. For a specific list of accredited analytes, refer to the certifications section of the ALS website at www.alsglobal.com/en/Our-Services/Life-Sciences/Environmental/Downloads.

ALS Spring City: 10 Riverside Drive, Spring City, PA 19475 610-948-4903

CC: Mr. Ray Rios , Mr. Mike Krause

This page is included as part of the Analytical Report and must be retained as a permanent record thereof.

Mr. Brad W Kintzer
Project Coordinator

ALS Environmental

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

SAMPLE SUMMARY

Workorder: 2107040 CSO WW LTCP

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
2107040001	CPS/EPS1 (74/26)	Water	11/10/2015 05:00	11/10/2015 12:05	Collected by Client

Notes

-- Samples collected by ALS personnel are done so in accordance with the procedures set forth in the ALS Field Sampling Plan (20 - Field Services Sampling Plan).
-- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.
-- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.
-- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
-- The Chain of Custody document is included as part of this report.
-- All Library Search analytes should be regarded as tentative identifications based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.
-- Parameters identified as "analyze immediately" require analysis within 15 minutes of collection. Any "analyze immediately" parameters not listed under the header "Field Parameters" are preformed in the laboratory and are therefore analyzed out of hold time.
-- Method references listed on this report beginning with the prefix “S” followed by a method number (such as S2310B-97) refer to methods from “Standard Methods for the Examination of Water and Wastewater”.

Standard Acronyms/Flags

J	Indicates an estimated value between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL) for the analyte
U	Indicates that the analyte was Not Detected (ND)
N	Indicates presumptive evidence of the presence of a compound
MDL	Method Detection Limit
PQL	Practical Quantitation Limit
RDL	Reporting Detection Limit
ND	Not Detected - indicates that the analyte was Not Detected at the RDL
Cntr	Analysis was performed using this container
RegLmt	Regulatory Limit
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
%Rec	Percent Recovery
RPD	Relative Percent Difference
LOD	DoD Limit of Detection
LOQ	DoD Limit of Quantitation
DL	DoD Detection Limit
I	Indicates reported value is greater than or equal to the Method Detection Limit (MDL) but less than the Report Detection Limit (RDL)
(S)	Surrogate Compound
NC	Not Calculated
*	Result outside of QC limits

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PROJECT SUMMARY

Workorder: 2107040 CSO WW LTCP

Workorder Comments

See attached subcontracted radiological results from ALS-Ft. Collins. VLF 12/1/15

Sample Comments

Lab ID: 2107040001 **Sample ID:** CPS/EPS1 (74/26) **Sample Type:** SAMPLE

MBAS calculated as LAS molecular weight 342 g/mol.

The reporting limits for GCMS volatile analytes were raised due to the dilution of the sample caused by matrix.

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ANALYTICAL RESULTS

Workorder: 2107040 CSO WW LTCP

Lab ID: **2107040001** Date Collected: 11/10/2015 05:00 Matrix: Water

Sample ID: **CPS/EPS1 (74/26)** Date Received: 11/10/2015 12:05

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	5.0	EPA 624			11/11/15 06:32	CJG	R
Bromodichloromethane	ND		ug/L	5.0	EPA 624			11/11/15 06:32	CJG	R
Chlorodibromomethane	ND		ug/L	5.0	EPA 624			11/11/15 06:32	CJG	R
Chloroform	9.0		ug/L	5.0	EPA 624			11/11/15 06:32	CJG	R
Ethylbenzene	ND		ug/L	5.0	EPA 624			11/11/15 06:32	CJG	R
Methyl t-Butyl Ether	ND		ug/L	5.0	EPA 624			11/11/15 06:32	CJG	R
Methylene Chloride	ND		ug/L	5.0	EPA 624			11/11/15 06:32	CJG	R
Tetrachloroethene	ND		ug/L	5.0	EPA 624			11/11/15 06:32	CJG	R
Toluene	ND		ug/L	5.0	EPA 624			11/11/15 06:32	CJG	R
Total Xylenes	ND		ug/L	15.0	EPA 624			11/11/15 06:32	CJG	R
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	93.5		%	72 - 142	EPA 624			11/11/15 06:32	CJG	R
4-Bromofluorobenzene (S)	89.7		%	73 - 119	EPA 624			11/11/15 06:32	CJG	R
Dibromofluoromethane (S)	87.5		%	74 - 132	EPA 624			11/11/15 06:32	CJG	R
Toluene-d8 (S)	88.8		%	75 - 133	EPA 624			11/11/15 06:32	CJG	R
SEMIVOLATILES										
Benzo(a)anthracene	ND		ug/L	1.4	EPA 625	11/16/15	LEH	11/17/15 04:41	DHF	T
Chrysene	ND		ug/L	1.4	EPA 625	11/16/15	LEH	11/17/15 04:41	DHF	T
bis(2-Ethylhexyl)phthalate	8.5		ug/L	2.8	EPA 625	11/16/15	LEH	11/17/15 04:41	DHF	T
N-Nitroso-di-n-propylamine	ND		ug/L	2.8	EPA 625	11/16/15	LEH	11/17/15 04:41	DHF	T
Phenanthrene	ND		ug/L	1.4	EPA 625	11/16/15	LEH	11/17/15 04:41	DHF	T
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2,4,6-Tribromophenol (S)	98.7		%	38 - 134	EPA 625	11/16/15	LEH	11/17/15 04:41	DHF	T
2-Fluorobiphenyl (S)	84.7		%	37 - 113	EPA 625	11/16/15	LEH	11/17/15 04:41	DHF	T
2-Fluorophenol (S)	44		%	17 - 73	EPA 625	11/16/15	LEH	11/17/15 04:41	DHF	T
Nitrobenzene-d5 (S)	73.6		%	37 - 124	EPA 625	11/16/15	LEH	11/17/15 04:41	DHF	T
Phenol-d5 (S)	29.8		%	11 - 53	EPA 625	11/16/15	LEH	11/17/15 04:41	DHF	T
Terphenyl-d14 (S)	86.3		%	33 - 125	EPA 625	11/16/15	LEH	11/17/15 04:41	DHF	T
Pesticides and PCBs										
Dieldrin	0.024		ug/L	0.019	EPA 608	11/14/15	GEC	11/17/15 20:35	RWS	V
Total Polychlorinated Biphenyl	|		ug/L		EPA 608	11/14/15	GEC	11/17/15 20:35	RWS	V
Aroclor-1016	ND		ug/L	0.46	EPA 608	11/14/15	GEC	11/17/15 20:35	RWS	V
Aroclor-1221	ND		ug/L	0.46	EPA 608	11/14/15	GEC	11/17/15 20:35	RWS	V
Aroclor-1232	ND		ug/L	0.46	EPA 608	11/14/15	GEC	11/17/15 20:35	RWS	V
Aroclor-1242	ND		ug/L	0.46	EPA 608	11/14/15	GEC	11/17/15 20:35	RWS	V

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2107040 CSO WW LTCP

Lab ID: **2107040001** Date Collected: 11/10/2015 05:00 Matrix: Water

Sample ID: **CPS/EPS1 (74/26)** Date Received: 11/10/2015 12:05

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Aroclor-1248	ND		ug/L	0.46	EPA 608	11/14/15	GEC	11/17/15 20:35	RWS	V
Aroclor-1254	ND		ug/L	0.46	EPA 608	11/14/15	GEC	11/17/15 20:35	RWS	V
Aroclor-1260	ND		ug/L	0.46	EPA 608	11/14/15	GEC	11/17/15 20:35	RWS	V
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
Decachlorobiphenyls (S)	36		%	30 - 150	EPA 608	11/14/15	GEC	11/17/15 20:35	RWS	V
Tetrachloro-m-xylene (S)	46.9		%	36 - 112	EPA 608	11/14/15	GEC	11/17/15 20:35	RWS	V
WET CHEMISTRY										
Ammonia-N	5.93		mg/L	0.100	D6919-09			11/12/15 17:43	JAM	A
Biochemical Oxygen Demand	126		mg/L	2.0	S5210B-11			11/11/15 16:30	GMM	B
Carbonaceous BOD	76.9	1	mg/L	2.0	S5210B-11			11/11/15 06:30	GMM	B
Carbonaceous BOD 20 Day	101		mg/L	2.0	S5210B-11			11/11/15 11:20	RMM	B
Cyanide, Total	ND		mg/L	0.0050	EPA 335.4	11/11/15	MMA	11/13/15 09:53	SYB	F
Dissolved Oxygen	ND		mg/L	1.0	S4500OG-01			11/16/15 08:00	RMM	B
Halogen, Total Organic (TOX)	41.8		ug/L	20.0	SW846 9020B			11/18/15 13:29	PAG	M
Hexavalent Chromium	ND		mg/L	0.010	S3500CrB-09			11/10/15 23:37	MSA	B
Nitrate-N	ND		mg/L	0.20	EPA 300.0			11/11/15 17:20	FSC	B
Nitrite-N	ND		mg/L	0.20	EPA 300.0			11/11/15 17:20	FSC	B
Odor	20		T.O.N.	1	S2150B-97			11/10/15 23:36	MSA	L
Oil/Grease Hexane Extractable	12.0		mg/L	2.2	EPA 1664B			11/15/15 13:20	AT	G
Oil/Grease Silica Gel Treated	ND		mg/L	2.2	EPA 1664B			11/15/15 13:20	AT	G
Phenolics	0.010		mg/L	0.005	EPA 420.4	11/19/15	AMH	11/25/15 15:32	AMH	I
Phosphorus, Total	2.4		mg/L	0.10	EPA 365.1	11/16/15	NV	11/20/15 13:05	C_W	A
Sulfide, Total	ND		mg/L	1.0	S4500S2F-00			11/12/15 14:30	THB	K
Surfactants (MBAS)	0.357		mg/L	0.025	S5540C-00			11/11/15 03:30	MBW	J
Total Dissolved Solids	173		mg/L	5	S2540C-11			11/12/15 12:42	ML	B
Total Kjeldahl Nitrogen	13.4		mg/L	4.0	S4500NH3G-11	11/11/15	J1H	11/11/15 13:31	DRM	A
Total Nitrogen	13.4		mg/L	1.00	Calculation			11/22/15 15:33	NJA	A
Total Suspended Solids	222		mg/L	5	S2540D-11			11/11/15 21:56	NV	B
Turbidity	69.2		NTU	0.10	S2130B-01			11/11/15 00:00	MSA	B
METALS										
Hardness	93.7		mg/L	1.7	EPA 200.7	11/11/15	JPS	11/12/15 09:58	TSS	O1
Aluminum, Total	1.8		mg/L	0.040	EPA 200.8	11/12/15	JPS	11/13/15 04:07	ZMC	O2
Antimony, Total	0.0014		mg/L	0.0010	EPA 200.8	11/12/15	JPS	11/13/15 04:07	ZMC	O2
Arsenic, Total	ND		mg/L	0.0015	EPA 200.8	11/12/15	JPS	11/13/15 04:07	ZMC	O2

ALS Environmental

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2107040 CSO WW LTCP

Lab ID: **2107040001** Date Collected: 11/10/2015 05:00 Matrix: Water

Sample ID: **CPS/EPS1 (74/26)** Date Received: 11/10/2015 12:05

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
Cadmium, Total	ND		mg/L	0.00050	EPA 200.8	11/12/15	JPS	11/13/15 04:07	ZMC	O2
Chromium, Total	0.0045		mg/L	0.0010	EPA 200.8	11/12/15	JPS	11/13/15 04:07	ZMC	O2
Copper, Total	0.056		mg/L	0.0025	EPA 200.8	11/12/15	JPS	11/13/15 04:07	ZMC	O2
Iron, Total	3.7		mg/L	0.15	EPA 200.7	11/11/15	JPS	11/12/15 09:58	TSS	O1
Lead, Total	0.021		mg/L	0.0010	EPA 200.8	11/12/15	JPS	11/13/15 04:07	ZMC	O2
Mercury, Total	0.00025		mg/L	0.00020	EPA 245.1	11/23/15	MNP	11/23/15 09:41	MNP	O3
Molybdenum, Total	0.0022		mg/L	0.0010	EPA 200.8	11/12/15	JPS	11/13/15 04:07	ZMC	O2
Selenium, Total	ND		mg/L	0.0020	EPA 200.8	11/12/15	JPS	11/13/15 04:07	ZMC	O2
Silver, Total	ND		mg/L	0.0010	EPA 200.8	11/12/15	JPS	11/13/15 04:07	ZMC	O2
Thallium, Total	ND		mg/L	0.00050	EPA 200.8	11/12/15	JPS	11/13/15 04:07	ZMC	O2
Zinc, Total	0.13		mg/L	0.0025	EPA 200.8	11/12/15	JPS	11/13/15 04:07	ZMC	O2
MICROBIOLOGY										
Enterococcus	68700		col/100mL	100	S9230D			11/10/15 12:14	LLJ	Q
Fecal Coliform	3600000	2	col/100mL	100000	S9222D-97			11/10/15 14:50	LLJ	P
Sub'd to NELAP CERTIFIED Lab										
Gross Alpha	0.00		pCi/L		EPA 900.0			11/24/15 09:30	SUB	X
Gross Alpha Uncertainty +/-	1.10		pCi/L		EPA 900.0			11/24/15 09:30	SUB	X
Gross Beta	8.20		pCi/L		EPA 900.0			11/24/15 09:30	SUB	X
Gross Beta Uncertainty +/-	2.10		pCi/L		EPA 900.0			11/24/15 09:30	SUB	X

Mr. Brad W Kintzer
Project Coordinator

PARAMETER QUALIFIERS

Lab ID	#	Sample ID	Analytical Method	Analyte
2107040001	1	CPS/EPS1 (74/26)	S5210B-11	Carbonaceous BOD
The laboratory control sample associated with this analysis was recovered at 83% which is outside the acceptance limit of 86% to 114%. Reanalysis was not performed due to holding time restrictions.				
2107040001	2	CPS/EPS1 (74/26)	S9222D-97	Fecal Coliform
Analyte was analyzed past the 8 hour holding time.				

ALS Environmental
34 Dogwood Lane
Middletown, PA 17057
P. 717-944-5541
F. 717-944-1430

CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

BWK

COC ALS

1 of 2

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

Client Name: DELCORA
Address: 3201 W. Front Street
Chester-PA 19013
Contact: Mike Krause
Phone#: 610-876-5523 x218
Project Name/#: CSO WW LTCP
Bill To: Same

TAT [x] Normal-Standard TAT is 10-12 business days.
[ ] Rush-Subject to ALS approval and surcharges.
Date Required: _____ Approved By: _____
Email? [x] -Y
Fax? [ ] -Y No.: _____

Container Type	plastic	plastic	plastic	plastic	plastic	plastic	glass	glass	glass	plastic
Container Size	250ml	1L	500ml	500ml	120ml	120ml	1L	1L	40ml	1L
Preservative	H/Zn(O2C6	none	HNO3	none	Na2S2O3	Na2S2O3	none	none	none	None

ANALYSES/METHOD REQUESTED

Sample Description/Location (as it will appear on the lab report)	Sample Date	Time	*G or C	**Matrix	Total Sulfide	CBOD5, CBOD20, BOD5	Metals, Total Hardness	Hexavalent Chromium, Triavalent Chromium	Fecal Coliform	Enterococcus	608	625	624	Gross Alpha/ Beta
					Enter Number of Containers Per Sample or Field Results Below.									
1 CPS/ EPS1 (74/26)	11/10/15	5:00	G	WW	1	2	1	1	1	1	2	2	2	1
2														
3														
4														
5														
6														
7														
8														
9														
10														

*G=Grab; C=Composite **Matrix - AI=Air; DW=Drinking Water; GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

Cooler Temp: 2° Therm ID: 771-294 (Receiving Lab)
No. of Coolers: _____

	Y	N	Initial
Custody Seals Present?			
(If present) Seals Intact?			
Received on Ice?	✓		
COC/Labels Complete/Accurate?	✓		
Cont. in Good Cond.?	✓		
Correct Containers?	✓		
Correct Sample Volumes?	✓		
Correct Preservation?	✓		
Headspace/Volatiles?			

Courier/Tracking #:

Sample/COC Comments

ALS Field Services: [x] Pickup [ ] Labor [ ] Composite Sampling [ ] Rental Equipment [ ] Other: _____

Project Comments:

LOGGED BY(signature): _____ DATE 11/10/15 TIME 1452
REVIEWED BY(signature): _____ DATE _____ TIME _____

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1 Raymond Rios	11/10/15	1000	2	11/10	1000
3	11-10	1045	4 ALS	11/10/15	1045
5 ALS	11/10/15	1205	6 ALS	11/10	1205
7			8		
9			10		

Data Deliverables: [ ] Standard [ ] CLP-like [ ] USACE [ ]
Special Processing: USACE [ ] Navy [ ] [ ]
State Samples Collected In: [ ] NY [ ] NJ [x] PA [ ] NC [ ]
Reportable to PADEP? Yes [ ] PWSID # _____
Sample Disposal: Lab [ ] Special [ ]
EDDS: Format Type- _____

ALS ENVIRONMENTAL SHIPPING ADDRESS: 34 DOGWOOD LANE, MIDDLETOWN, PA 17057

Rev 10/11

ALS Environmental
34 Dogwood Lane
Middletown, PA 17057
P. 717-944-5541
F.717-944-1430

CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

COC #: 210240 — 2 of 2
ALS Quote #: 514787

Client Name: DELCORA
Address: 3201 W. Front Street
Chester PA 19013
Contact: Mike Krause
Phone#: 610-876-5523 x218
Project Name/#: CSO WW LTCP
Bill To: Same

TAT [X] Normal-Standard TAT is 10-12 business days. [ ] Rush-Subject to ALS approval and surcharges.
Date Required: _____ Approved By: _____
Email? [X] -Y
Fax? [ ] -Y No.: _____

Sample Description/Location (as it will appear on the lab report)	Sample Date	Time	*G or C	**Matrix	Container Type	Container Size	Preservative	Oil and Grease	TPH	Nitrate, Nitrite, Turbidity	Total Cyanide	Total Phosphorus, Ammonia, TKN, Total Nitrogen	Phenolics	TOX	TSS, TDS, DO	Odor	MBAS
					glass	glass	plastic	plastic	plastic	glass	glass	plastic	glass	plastic			
					1L	1L	500ml	500ml	1L	500ml	250ml	1L	1L	2L			
					H2SO4	H2SO4	none	NaOH	H2SO4	H2SO4	H2SO4	none	none	none			
					ANALYSES/METHOD REQUESTED												
					Enter Number of Containers Per Sample or Field Results Below.												
1 CPS/ EPS1 (74/26)	11/10/15	5:00	G	WW	1	1	1	1	1	1	2	1	1	1			
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Receipt Information (completed by Receiving Lab)
Cooler Temp: 2°C Therm ID: TH-294
No. of Coolers: _____

	Y	N	Initial
Custody Seals Present?			
(if present) Seals Intact?			
Received on Ice?	✓		
COC/Labels Complete/Accurate?	✓		
Cont. in Good Cond.?	✓		
Correct Containers?	✓		
Correct Sample Volumes?	✓		
Correct Preservation?	✓		
Headspace/Volatiles?			

Courier/Tracking #:

Sample/COC Comments

ALS Field Services: Pickup Labor
Composite Sampling Rental Equipment
Other: _____

Project Comments:

LOGGED BY(signature): [signature] DATE 11/10/15 TIME 1452
REVIEWED BY(signature): [signature] DATE 11/10/15 TIME

Data Deliverables: [ ] Standard [ ] CLP-like [ ] USACE [ ]
Special Processing: USACE [ ] Navy [ ] [ ]
State Samples Collected In: [ ] NY [ ] NJ [X] PA [ ] NC [ ]
Reportable to PADEP? Yes [ ]
PWSID # _____
Sample Disposal: Lab [ ] Special [ ]
EDDS: Format Type- _____

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1 Raymond Rios	11/10/15	1000	2 [signature]	11-10	1000
3 [signature] ALS 4th 4/10	11-10	1645	4 [signature] ALS	11/10/15	1645
5 [signature] ALS	11/10/15	1265	6 [signature] ALS	11/10/15	1265
7			8		
9			10		

* G=Grab; C=Composite
**Matrix - AI=Air; DW=Drinking Water; GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

ALS ENVIRONMENTAL SHIPPING ADDRESS: 34 DOGWOOD LANE, MIDDLETOWN, PA 17057

Rev 10/11

Analytical Laboratory Services, Inc.
Environmental • Industrial Hygiene • Field Services
34 Dogwood Lane • Middletown, PA 17057 • 717.944.5541 • Fax: 717.944.1430

CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

COC #: 1 of 1

ALSI Quote #:

Client Name: ALS Environmental

Address: 34 Dogwood Lane
Middletown, PA 17057

Contact: Brad Kintzer

Phone#: (717) 944-5541

Project Name/#:

Bill To: ALS Environmental

TAT [X] Normal-Standard TAT is 10-12 business days.
[ ] Rush-Subject to ALSI approval and surcharges.

Date Required: _____ Approved By: _____

Email? [X] -Y ALMDT.Subcontract@ALSGlobal.com

Fax? [ ] -Y No.: _____

Sample Description/Location (as it will appear on the lab report)	Sample Date	Time	*G or C	**Matrix	Container Type	Container Size	Preservative	Gross Alpha & Beta								
					Plastic	1 L	NONE	ANALYSES/METHOD REQUESTED								
1 2107040 001	11/10/15	0500	G	WW				1								
2																
3																
4																
5																
6																
7																
8																
9																
10																

Receipt Information (completed by Receiving Lab)

Cooler Temp: _____ Therm. ID: _____

No. of Coolers: _____

	Y	N	Initial
Custody Seals Present?			
(if present) Seals Intact?			
Received on Ice?			
COC/Labels Complete/Accurate?			
Cont. in Good Cond.?			
Correct Containers?			
Correct Sample Volumes?			
Correct Preservation?			
Headspace/Volatiles?			

Courier tracking #: _____

Sample/COC Comments

Subcontract: ALS Ft. Collins

ALSI Field Services: ☐Pickup ☐Labor
☐Composite Sampling ☐Rental Equipment
☐Other: _____

Project Comments:

LOGGED BY(signature): _____ Date: _____ Time: _____

REVIEWED BY(signature): _____ Date: _____ Time: _____

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1	11/11/15	1530	2		
3			4		
5			6		
7			8		
9			10		

Data Deliverables: [ ] Standard [ ] CLP-like [ ] USACE

Special Processing: USACE [ ] Navy [ ]

State Samples Collected In: [ ] NY [ ] NJ [ ] PA [ ] NC [ ] other

Reportable to PADEP? Yes [ ]

PWSID #: _____

Sample Disposal: Lab [ ] Special [ ]

EDDs: Format Type: _____

* G=Grab; C=Composite **Matrix - AI=Air; DW=Drinking Water; GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

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Rev 5/05

ALS

Monday, November 30, 2015

Brad Kintzer
ALS Environmental
34 Dogwood Lane
Middletown, PA 17057

Re: ALS Workorder: 1511233
Project Name:
Project Number: 2107040

Dear Mr. Kintzer:

One water sample was received from ALS Environmental, on 11/12/2015. The sample was scheduled for the following analysis:

Gross Alpha/Beta

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental
Jeff R. Kujawa
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Connecticut (CT)	PH-0232
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
L-A-B (DoD ELAP/ISO 170250)	L2257
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

ALS Environmental

1511233

Gross Alpha/Beta:
The samples were analyzed for gross alpha and beta activity by gas flow proportional counting according to the current revision of SOP 724. Gross alpha results are referenced to ^{241}Am. Gross beta results are referenced to $^{90}Sr/Y$.

All acceptance criteria were met.

ALS Environmental -- FC

Sample Number(s) Cross-Reference Table

OrderNum: 1511233
Client Name: ALS Environmental
Client Project Name:
Client Project Number: 2107040
Client PO Number: 2107040

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
2107040001	1511233-1		WATER	10-Nov-15	5:00

Analytical Laboratory Services, Inc.
Environmental • Industrial Hygiene • Field Services
34 Dogwood Lane • Middletown, PA 17057 • 717.944.5541 • Fax: 717.944.1430

CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

COC #: 151233 | 1 of 1
ALSI Quote #:

Client Name: ALS Environmental
Address: 34 Dogwood Lane, Middletown, PA 17057
Contact: Brad Kintzer
Phone#: (717) 944-5541
Project Name/#:
Bill To: ALS Environmental

TAT: [X] Normal-Standard TAT is 10-12 business days. [ ] Rush-Subject to ALSI approval and surcharges.
Date Required: ASAP Approved By:
Email? [X] Y ALMDT.Subcontract@ALSGlobal.com
Fax? [ ] Y No

	Container Type	Container Size	Preservative
	Plastic	1 L	NONE

ANALYSES/METHOD REQUESTED: Gross Alpha & Beta

Sample Description/Location (as it will appear on the lab report)	Sample Date	Time	*G or C	**Matrix	Gross Alpha & Beta
1 2107040 001	11/10/15	0500	G	WW	1
2					
3					
4					
5					
6					
7					
8					
9					
10					

Project Comments:

LOGGED BY(signature): Date: Time:
REVIEWED BY(signature): Date: Time:

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1	11/11/15	1530	2 ALS FC	11-12-15	0940
3			4		
5			6		
7			8		
9			10		

Receipt Information (completed by Receiving Lab)
Cooler Temp: ____ Therm. ID: ____
No. of Coolers: ____

	Y	N	Initial
Custody Seals Present?			
(If present) Seals Intact?			
Received on Ice?			
COC/Labels Complete/Accurate?			
Cont. in Good Cond.?			
Correct Containers?			
Correct Sample Volumes?			
Correct Preservation?			
Headspace/Volatiles?			

Lounen tracking #:

Sample/COC Comments
Subcontract: ALS Ft. Collins

ALSI Field Services: ☐Pickup ☐Labor ☐Composite Sampling ☐Rental Equipment ☐Other:

Data Deliverables: [ ] Standard (Level) [ ] CLP-like [ ] USACE
Special Processing: [ ] USACE [ ] Navy [ ]
State Samples Collected In: [ ] NY [ ] NJ [ ] PA [ ] NC [ ] Other
Reportable to PADEP? [ ] Yes [ ]
PWSID #:
Sample Disposal: [ ] Lab [ ] Special
EDDs: Format Type:

* G=Grab; C=Composite
**Matrix - Al=Air; DW=Drinking Water; GW=Groundwater; Ol=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

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Rev 5/05

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS PA Workorder No: 1511233

Project Manager: SRK Initials: SOM Date: 11-12-15

1. Does this project require any special handling in addition to standard ALS procedures?		YES	(NO)
2. Are custody seals on shipping containers intact?	(NONE)	YES	NO
3. Are Custody seals on sample containers intact?	(NONE)	YES	NO
4. Is there a COC (Chain-of-Custody) present or other representative documents?		(YES)	NO
5. Are the COC and bottle labels complete and legible?		(YES)	NO
6. Is the COC in agreement with samples received? (IDs, dates, times, no. of samples, no. of containers, matrix, requested analyses, etc.)		(YES)	NO
7. Were airbills / shipping documents present and/or removable?	DROP OFF	(YES)	NO
8. Are all aqueous samples requiring preservation preserved correctly? (excluding volatiles)	N/A	(YES)	NO
9. Are all aqueous non-preserved samples pH 4-9?	(N/A)	YES	NO
10. Is there sufficient sample for the requested analyses?		(YES)	NO
11. Were all samples placed in the proper containers for the requested analyses?		(YES)	NO
12. Are all samples within holding times for the requested analyses?		(YES)	NO
13. Were all sample containers received intact? (not broken or leaking, etc.)		(YES)	NO
14. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, Rx CN/S, radon) headspace free? Size of bubble: ____ < green pea ____ > green pea	(N/A)	YES	NO
15. Do any water samples contain sediment? Amount of sediment: X dusting ____ moderate ____ heavy	N/A	(YES)	NO
16. Were the samples shipped on ice?		YES	(NO)
17. Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #2 #4	(GRD ONLY)	YES	NO

Cooler #:	1							
Temperature (°C):	Amb							
No. of custody seals on cooler:	0							
DOT Survey/ Acceptance Information: External µR/hr reading:	11							
DOT Survey/ Acceptance Information: Background µR/hr reading:	12							

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? (YES) NO / NA (If no, see Form 008.)

Additional Information: PROVIDE DETAILS BELOW FOR A NO RESPONSE TO ANY QUESTION ABOVE, EXCEPT #1 AND #16.

⇒ 15.) light dusting of sediment.

If applicable, was the client contacted? YES / NO (NA) Contact: _____ Date/Time: _____

Project Manager Signature / Date: [signature] 11-12-15

*IR Gun #2: Oakton, SN 29922500201-0066
*IR Gun #4: Oakton, SN 2372220101-0002

Form 201r24.xls (06/04/2012)

Client:	ALS Environmental	**Date:**	*30-Nov-15*
Project:	2107040	**Work Order:**	1511233
Sample ID:	2107040001	**Lab ID:**	1511233-1
Legal Location:		**Matrix:**	WATER
Collection Date:	11/10/2015 05:00	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Gross Alpha/Beta by GFPC			**PAI 724**		Prep Date: **11/20/2015**	PrepBy: **ECP**
GROSS ALPHA	ND (+/- 1.1)	U	2.6	pCi/l	NA	11/24/2015 09:30
GROSS BETA	**8.2 (+/- 2.1)**		**2.8**	**pCi/l**	NA	11/24/2015 09:30

Client:	ALS Environmental	**Date:**	*30-Nov-15*
Project:	2107040	**Work Order:**	1511233
Sample ID:	2107040001	**Lab ID:**	1511233-1
Legal Location:		**Matrix:**	WATER
Collection Date:	11/10/2015 05:00	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

U or ND - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
W - DER is greater than Warning Limit of 1.42
* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
G - Sample density differs by more than 15% of LCS density.
D - DER is greater than Control Limit
M - Requested MDC not met.
LT - Result is less than requested MDC but greater than achieved MDC.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS, Matrix Spike Recovery within control limits.
N - Matrix Spike Recovery outside control limits
NC - Not Calculated for duplicate results less than 5 times MDC
B - Analyte concentration greater than MDC.
B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).
U or ND - Indicates that the compound was analyzed for but not detected.
E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.
M - Duplicate injection precision was not met.
N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.
Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.
* - Duplicate analysis (relative percent difference) not within control limits.
S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.
B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.
E - Analyte concentration exceeds the upper level of the calibration range.
J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).
A - A tentatively identified compound is a suspected aldol-condensation product.
X - The analyte was diluted below an accurate quantitation level.
* - The spike recovery is equal to or outside the control criteria used.
+ - The relative percent difference (RPD) equals or exceeds the control criteria.
G - A pattern resembling gasoline was detected in this sample.
D - A pattern resembling diesel was detected in this sample.
M - A pattern resembling motor oil was detected in this sample.
C - A pattern resembling crude oil was detected in this sample.
4 - A pattern resembling JP-4 was detected in this sample.
5 - A pattern resembling JP-5 was detected in this sample.
H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.
L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.
Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

Batch ID: **AB151120-1-5** Instrument ID **LB4100-C** Method: **Gross Alpha/Beta by GFPC**

LCS Sample ID: **AB151120-1** Units: **pCi/l** Analysis Date: **11/24/2015 09:30**

Client ID: Run ID: **AB151120-1A** Prep Date: **11/20/2015** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
GROSS ALPHA	248 (+/- 41)	3	225.4		110	70-130					P
GROSS BETA	201 (+/- 33)	5	203.9		98.7	70-130					P,M3

MB Sample ID: **AB151120-1** Units: **pCi/l** Analysis Date: **11/24/2015 15:01**

Client ID: Run ID: **AB151120-1A** Prep Date: **11/20/2015** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
GROSS ALPHA	ND	0.94									U
GROSS BETA	ND	1.08									U

The following samples were analyzed in this batch: 1511233-1

ALS Environmental

34 Dogwood Lane ■ Middletown, PA 17057 ■ Phone: 717-944-5541 ■ Fax: 717-944-1430 ■ www.alsglobal.com

NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

December 16, 2015

Ms. Irene Fitzgerald
DELCORA
P.O. Box 999
Chester, PA 19016

Certificate of Analysis

Project Name:	**2015-LOWER DELAWARE TESTING**	Workorder:	**2109302**
Purchase Order:		Workorder ID:	**2015-LOWER DELAWARE TESTING**

Dear Ms. Fitzgerald:

Enclosed are the analytical results for samples received by the laboratory on Thursday, November 19, 2015.

The ALS Environmental laboratory in Middletown, Pennsylvania is a National Environmental Laboratory Accreditation Program (NELAP) accredited laboratory and as such, certifies that all applicable test results meet the requirements of NELAP.

If you have any questions regarding this certificate of analysis, please contact Mr. Brad W Kintzer (Project Coordinator) at (717) 944-5541.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program and any applicable state requirements. The test results meet requirements of the current NELAP standards or state requirements, where applicable. For a specific list of accredited analytes, refer to the certifications section of the ALS website at www.alsglobal.com/en/Our-Services/Life-Sciences/Environmental/Downloads.

ALS Spring City: 10 Riverside Drive, Spring City, PA 19475 610-948-4903

CC: Mr. Ray Rios , Mr. Mike Krause

This page is included as part of the Analytical Report and must be retained as a permanent record thereof.

Brad W. Kintzer

Mr. Brad W Kintzer
Project Coordinator

ALS Environmental

34 Dogwood Lane ▪ Middletown, PA 17057 ▪ Phone: 717-944-5541 ▪ Fax: 717-944-1430 ▪ www.alsglobal.com

NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

SAMPLE SUMMARY

Workorder: 2109302 2015-LOWER DELAWARE TESTING

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
2109302001	CPS/EPS1 (72/28)	Water	11/19/2015 15:20	11/19/2015 21:10	Collected by Client
2109302002	CPS1	Water	11/19/2015 15:20	11/19/2015 21:10	Collected by Client
2109302003	14th & Crozer	Water	11/19/2015 15:10	11/19/2015 21:10	Collected by Client
2109302004	Sun & Hancock	Water	11/19/2015 16:10	11/19/2015 21:10	Collected by Client

Notes

-- Samples collected by ALS personnel are done so in accordance with the procedures set forth in the ALS Field Sampling Plan (20 - Field Services Sampling Plan).
-- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.
-- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.
-- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
-- The Chain of Custody document is included as part of this report.
-- All Library Search analytes should be regarded as tentative identifications based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.
-- Parameters identified as "analyze immediately" require analysis within 15 minutes of collection. Any "analyze immediately" parameters not listed under the header "Field Parameters" are preformed in the laboratory and are therefore analyzed out of hold time.
-- Method references listed on this report beginning with the prefix “S” followed by a method number (such as S2310B-97) refer to methods from “Standard Methods for the Examination of Water and Wastewater”.

Standard Acronyms/Flags

J	Indicates an estimated value between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL) for the analyte
U	Indicates that the analyte was Not Detected (ND)
N	Indicates presumptive evidence of the presence of a compound
MDL	Method Detection Limit
PQL	Practical Quantitation Limit
RDL	Reporting Detection Limit
ND	Not Detected - indicates that the analyte was Not Detected at the RDL
Cntr	Analysis was performed using this container
RegLmt	Regulatory Limit
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
%Rec	Percent Recovery
RPD	Relative Percent Difference
LOD	DoD Limit of Detection
LOQ	DoD Limit of Quantitation
DL	DoD Detection Limit
I	Indicates reported value is greater than or equal to the Method Detection Limit (MDL) but less than the Report Detection Limit (RDL)
(S)	Surrogate Compound
NC	Not Calculated
*	Result outside of QC limits

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PROJECT SUMMARY

Workorder: 2109302 2015-LOWER DELAWARE TESTING

Workorder Comments

See attached subcontracted radiological results from ALS-Ft. Collins. VLF

Sample Comments

Lab ID: 2109302001 **Sample ID:** CPS/EPS1 (72/28) **Sample Type:** SAMPLE

MBAS calculated as LAS molecular weight 342 g/mol.

The reporting limits for GCMS volatile analytes were raised due to the dilution of the sample caused by matrix.

Lab ID: 2109302002 **Sample ID:** CPS1 **Sample Type:** SAMPLE

MBAS calculated as LAS molecular weight 342 g/mol.

The reporting limits for GCMS volatile analytes were raised due to the dilution of the sample caused by matrix.

Lab ID: 2109302003 **Sample ID:** 14th **Sample Type:** SAMPLE

MBAS calculated as LAS molecular weight 342 g/mol.

The reporting limits for GCMS volatile analytes were raised due to the dilution of the sample caused by matrix.

Lab ID: 2109302004 **Sample ID:** Sun **Sample Type:** SAMPLE

MBAS calculated as LAS molecular weight 342 g/mol.

The reporting limits for GCMS volatile analytes were raised due to the dilution of the sample caused by matrix.

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ANALYTICAL RESULTS

Workorder: 2109302 2015-LOWER DELAWARE TESTING

Lab ID: **2109302001** Date Collected: 11/19/2015 15:20 Matrix: Water

Sample ID: **CPS/EPS1 (72/28)** Date Received: 11/19/2015 21:10

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	5.0	EPA 624			11/21/15 20:54	CJG	S
Bromodichloromethane	ND		ug/L	5.0	EPA 624			11/21/15 20:54	CJG	S
Chlorodibromomethane	ND		ug/L	5.0	EPA 624			11/21/15 20:54	CJG	S
Chloroform	ND		ug/L	5.0	EPA 624			11/21/15 20:54	CJG	S
Ethylbenzene	ND		ug/L	5.0	EPA 624			11/21/15 20:54	CJG	S
Methyl t-Butyl Ether	ND		ug/L	5.0	EPA 624			11/21/15 20:54	CJG	S
Methylene Chloride	ND		ug/L	5.0	EPA 624			11/21/15 20:54	CJG	S
Tetrachloroethene	ND		ug/L	5.0	EPA 624			11/21/15 20:54	CJG	S
Toluene	ND		ug/L	5.0	EPA 624			11/21/15 20:54	CJG	S
Total Xylenes	ND		ug/L	15.0	EPA 624			11/21/15 20:54	CJG	S
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	96.4		%	72 - 142	EPA 624			11/21/15 20:54	CJG	S
4-Bromofluorobenzene (S)	110		%	73 - 119	EPA 624			11/21/15 20:54	CJG	S
Dibromofluoromethane (S)	88.4		%	74 - 132	EPA 624			11/21/15 20:54	CJG	S
Toluene-d8 (S)	98.8		%	75 - 133	EPA 624			11/21/15 20:54	CJG	S
SEMIVOLATILES										
Benzo(a)anthracene	ND		ug/L	1.4	EPA 625	11/25/15	VLM	11/29/15 22:53	GEC	U
Chrysene	ND		ug/L	1.4	EPA 625	11/25/15	VLM	11/29/15 22:53	GEC	U
bis(2-Ethylhexyl)phthalate	20.3		ug/L	2.8	EPA 625	11/25/15	VLM	11/29/15 22:53	GEC	U
N-Nitroso-di-n-propylamine	ND		ug/L	2.8	EPA 625	11/25/15	VLM	11/29/15 22:53	GEC	U
Phenanthrene	ND		ug/L	1.4	EPA 625	11/25/15	VLM	11/29/15 22:53	GEC	U
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2,4,6-Tribromophenol (S)	95.9		%	47 - 128	EPA 625	11/25/15	VLM	11/29/15 22:53	GEC	U
2-Fluorobiphenyl (S)	74.4		%	52 - 118	EPA 625	11/25/15	VLM	11/29/15 22:53	GEC	U
2-Fluorophenol (S)	38.9		%	20 - 87	EPA 625	11/25/15	VLM	11/29/15 22:53	GEC	U
Nitrobenzene-d5 (S)	84.5		%	27 - 139	EPA 625	11/25/15	VLM	11/29/15 22:53	GEC	U
Phenol-d5 (S)	27		%	10 - 81	EPA 625	11/25/15	VLM	11/29/15 22:53	GEC	U
Terphenyl-d14 (S)	71.2		%	46 - 133	EPA 625	11/25/15	VLM	11/29/15 22:53	GEC	U
Pesticides and PCBs										
Dieldrin	0.022		ug/L	0.019	EPA 608	11/20/15	JSR	11/23/15 20:34	KJH	W
Total Polychlorinated Biphenyl	0.0		ug/L		EPA 608	11/20/15	JSR	11/23/15 20:34	KJH	W
Aroclor-1016	ND		ug/L	0.46	EPA 608	11/20/15	JSR	11/23/15 20:34	KJH	W
Aroclor-1221	ND		ug/L	0.46	EPA 608	11/20/15	JSR	11/23/15 20:34	KJH	W
Aroclor-1232	ND		ug/L	0.46	EPA 608	11/20/15	JSR	11/23/15 20:34	KJH	W
Aroclor-1242	ND		ug/L	0.46	EPA 608	11/20/15	JSR	11/23/15 20:34	KJH	W

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ANALYTICAL RESULTS

Workorder: 2109302 2015-LOWER DELAWARE TESTING

Lab ID: **2109302001** Date Collected: 11/19/2015 15:20 Matrix: Water

Sample ID: **CPS/EPS1 (72/28)** Date Received: 11/19/2015 21:10

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Aroclor-1248	ND		ug/L	0.46	EPA 608	11/20/15	JSR	11/23/15 20:34	KJH	W
Aroclor-1254	ND		ug/L	0.46	EPA 608	11/20/15	JSR	11/23/15 20:34	KJH	W
Aroclor-1260	ND		ug/L	0.46	EPA 608	11/20/15	JSR	11/23/15 20:34	KJH	W
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
Decachlorobiphenyls (S)	35.7		%	30 - 150	EPA 608	11/20/15	JSR	11/23/15 20:34	KJH	W
Tetrachloro-m-xylene (S)	52.6		%	36 - 112	EPA 608	11/20/15	JSR	11/23/15 20:34	KJH	W
WET CHEMISTRY										
Ammonia-N	7.36		mg/L	0.100	D6919-09			11/20/15 16:33	JAM	A
Biochemical Oxygen Demand	140	1	mg/L	2.0	S5210B-11			11/20/15 23:22	NAK	B
Carbonaceous BOD	145	2	mg/L	2.0	S5210B-11			11/21/15 06:35	GMM	B
Carbonaceous BOD 20 Day	38.8		mg/L	2.0	S5210B-11			11/21/15 09:00	RMM	B
Cyanide, Total	ND		mg/L	0.0050	EPA 335.4	11/23/15	MMA	11/25/15 05:30	LJF	G
Dissolved Oxygen	2.4		mg/L	1.0	S4500OG-01			11/25/15 06:50	RMM	B
Halogen, Total Organic (TOX)	35.1		ug/L	20.0	SW846 9020B			11/30/15 14:02	PAG	N
Hexavalent Chromium	ND		mg/L	0.010	S3500CrB-09			11/20/15 04:56	MSA	B
Nitrate-N	ND		mg/L	0.50	EPA 300.0			11/20/15 15:08	FSC	B
Nitrite-N	ND		mg/L	0.50	EPA 300.0			11/20/15 15:08	FSC	B
Odor	40		T.O.N.	1	S2150B-97			11/21/16 10:12	MSA	M
Oil/Grease Hexane Extractable	15.0		mg/L	2.0	EPA 1664B			11/22/15 12:00	AT	H
Oil/Grease Silica Gel Treated	3.4		mg/L	2.0	EPA 1664B			11/22/15 12:00	AT	H
Phenolics	0.024		mg/L	0.005	EPA 420.4	12/9/15	NV	12/10/15 16:34	AMH	J
Phosphorus, Total	2.5		mg/L	0.10	EPA 365.1	12/7/15	LJF	12/8/15 04:21	LJF	A
Sulfide, Total	ND		mg/L	1.0	S4500S2F-00			11/25/15 21:15	DRM	L
Surfactants (MBAS)	0.652		mg/L	0.025	S5540C-00			11/21/15 05:00	MBW	K
Total Dissolved Solids	232		mg/L	5	S2540C-11			11/24/15 09:45	ML	B
Total Kjeldahl Nitrogen	19.1		mg/L	4.0	S4500NH3G-11	11/25/15	J1H	11/29/15 11:40	NJA	A
Total Nitrogen	19.1		mg/L	1.00	Calculation			12/2/15 14:27	NJA	A
Total Suspended Solids	532	3	mg/L	5	S2540D-11			11/29/15 18:05	NV	B
Turbidity	117		NTU	0.10	S2130B-01			11/21/15 07:01	MSA	B
METALS										
Hardness	94.9		mg/L	1.7	EPA 200.7	11/23/15	JPS	11/24/15 16:59	TSS	P1
Aluminum, Total	1.4		mg/L	0.20	EPA 200.8	11/23/15	JPS	11/24/15 03:21	ZMC	P2
Antimony, Total	ND		mg/L	0.0010	EPA 200.8	11/29/15	JPS	12/1/15 12:34	MO	P3
Arsenic, Total	ND		mg/L	0.0075	EPA 200.8	11/23/15	JPS	11/24/15 03:21	ZMC	P2

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ANALYTICAL RESULTS

Workorder: 2109302 2015-LOWER DELAWARE TESTING

Lab ID: **2109302001** Date Collected: 11/19/2015 15:20 Matrix: Water

Sample ID: **CPS/EPS1 (72/28)** Date Received: 11/19/2015 21:10

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
Cadmium, Total	ND		mg/L	0.0025	EPA 200.8	11/23/15	JPS	11/24/15 03:21	ZMC	P2
Chromium, Total	ND		mg/L	0.0050	EPA 200.8	11/23/15	JPS	11/24/15 03:21	ZMC	P2
Copper, Total	0.075		mg/L	0.013	EPA 200.8	11/23/15	JPS	11/24/15 03:21	ZMC	P2
Iron, Total	2.9		mg/L	0.15	EPA 200.7	11/23/15	JPS	11/24/15 16:59	TSS	P1
Lead, Total	0.027		mg/L	0.0050	EPA 200.8	11/23/15	JPS	11/24/15 03:21	ZMC	P2
Mercury, Total	0.00029		mg/L	0.00020	EPA 245.1	12/3/15	MNP	12/3/15 14:07	MNP	P4
Molybdenum, Total	0.0011		mg/L	0.0010	EPA 200.8	11/29/15	JPS	12/1/15 12:34	MO	P3
Selenium, Total	ND		mg/L	0.010	EPA 200.8	11/23/15	JPS	11/24/15 03:21	ZMC	P2
Silver, Total	ND		mg/L	0.0050	EPA 200.8	11/23/15	JPS	11/24/15 03:21	ZMC	P2
Thallium, Total	ND		mg/L	0.0025	EPA 200.8	11/23/15	JPS	11/24/15 03:21	ZMC	P2
Zinc, Total	0.22		mg/L	0.013	EPA 200.8	11/23/15	JPS	11/24/15 03:21	ZMC	P2
MICROBIOLOGY										
Enterococcus	199000		col/100mL	100	S9230D			11/19/15 21:58	ABL	R
Fecal Coliform	3200000		col/100mL	100000	SM9222D+EPA 625/R-92/013 APX F			11/19/15 22:24	ABL	Q
Sub'd to NELAP CERTIFIED Lab										
Gross Alpha	ND		pCi/L	2.70	EPA 900.0			12/2/15 12:07	SUB	Y
Gross Alpha Uncertainty +/-	1.60		pCi/L		EPA 900.0			12/2/15 12:07	SUB	Y
Gross Beta	9.00		pCi/L	2.70	EPA 900.0			12/2/15 12:07	SUB	Y
Gross Beta Uncertainty +/-	2.20		pCi/L		EPA 900.0			12/2/15 12:07	SUB	Y

Mr. Brad W Kintzer
Project Coordinator

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ANALYTICAL RESULTS

Workorder: 2109302 2015-LOWER DELAWARE TESTING

Lab ID: **2109302002** Date Collected: 11/19/2015 15:20 Matrix: Water

Sample ID: **CPS1** Date Received: 11/19/2015 21:10

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	5.0	EPA 624			11/21/15 21:16	CJG	S
Bromodichloromethane	ND		ug/L	5.0	EPA 624			11/21/15 21:16	CJG	S
Chlorodibromomethane	ND		ug/L	5.0	EPA 624			11/21/15 21:16	CJG	S
Chloroform	ND		ug/L	5.0	EPA 624			11/21/15 21:16	CJG	S
Ethylbenzene	ND		ug/L	5.0	EPA 624			11/21/15 21:16	CJG	S
Methyl t-Butyl Ether	ND		ug/L	5.0	EPA 624			11/21/15 21:16	CJG	S
Methylene Chloride	ND		ug/L	5.0	EPA 624			11/21/15 21:16	CJG	S
Tetrachloroethene	ND		ug/L	5.0	EPA 624			11/21/15 21:16	CJG	S
Total Xylenes	ND		ug/L	15.0	EPA 624			11/21/15 21:16	CJG	S
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	100		%	72 - 142	EPA 624			11/21/15 21:16	CJG	S
4-Bromofluorobenzene (S)	115		%	73 - 119	EPA 624			11/21/15 21:16	CJG	S
Dibromofluoromethane (S)	89.6		%	74 - 132	EPA 624			11/21/15 21:16	CJG	S
Toluene-d8 (S)	101		%	75 - 133	EPA 624			11/21/15 21:16	CJG	S
SEMIVOLATILES										
Benzo(a)anthracene	ND		ug/L	1.4	EPA 625	11/25/15	VLM	11/29/15 23:18	GEC	U
Chrysene	ND		ug/L	1.4	EPA 625	11/25/15	VLM	11/29/15 23:18	GEC	U
bis(2-Ethylhexyl)phthalate	12.0		ug/L	2.8	EPA 625	11/25/15	VLM	11/29/15 23:18	GEC	U
N-Nitroso-di-n-propylamine	ND		ug/L	2.8	EPA 625	11/25/15	VLM	11/29/15 23:18	GEC	U
Phenanthrene	ND		ug/L	1.4	EPA 625	11/25/15	VLM	11/29/15 23:18	GEC	U
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2,4,6-Tribromophenol (S)	96.5		%	47 - 128	EPA 625	11/25/15	VLM	11/29/15 23:18	GEC	U
2-Fluorobiphenyl (S)	76.5		%	52 - 118	EPA 625	11/25/15	VLM	11/29/15 23:18	GEC	U
2-Fluorophenol (S)	45.3		%	20 - 87	EPA 625	11/25/15	VLM	11/29/15 23:18	GEC	U
Nitrobenzene-d5 (S)	90.8		%	27 - 139	EPA 625	11/25/15	VLM	11/29/15 23:18	GEC	U
Phenol-d5 (S)	30.9		%	10 - 81	EPA 625	11/25/15	VLM	11/29/15 23:18	GEC	U
Terphenyl-d14 (S)	71.2		%	46 - 133	EPA 625	11/25/15	VLM	11/29/15 23:18	GEC	U
Pesticides and PCBs										
Dieldrin	ND		ug/L	0.019	EPA 608	11/20/15	JSR	11/23/15 20:56	KJH	W
Total Polychlorinated Biphenyl	0.0		ug/L		EPA 608	11/20/15	JSR	11/23/15 20:56	KJH	W
Aroclor-1016	ND		ug/L	0.46	EPA 608	11/20/15	JSR	11/23/15 20:56	KJH	W
Aroclor-1221	ND		ug/L	0.46	EPA 608	11/20/15	JSR	11/23/15 20:56	KJH	W
Aroclor-1232	ND		ug/L	0.46	EPA 608	11/20/15	JSR	11/23/15 20:56	KJH	W
Aroclor-1242	ND		ug/L	0.46	EPA 608	11/20/15	JSR	11/23/15 20:56	KJH	W
Aroclor-1248	ND		ug/L	0.46	EPA 608	11/20/15	JSR	11/23/15 20:56	KJH	W

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ANALYTICAL RESULTS

Workorder: 2109302 2015-LOWER DELAWARE TESTING

Lab ID: **2109302002** Date Collected: 11/19/2015 15:20 Matrix: Water

Sample ID: **CPS1** Date Received: 11/19/2015 21:10

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Aroclor-1254	ND		ug/L	0.46	EPA 608	11/20/15	JSR	11/23/15 20:56	KJH	W
Aroclor-1260	ND		ug/L	0.46	EPA 608	11/20/15	JSR	11/23/15 20:56	KJH	W
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
Decachlorobiphenyls (S)	29.1	4	%	30 - 150	EPA 608	11/20/15	JSR	11/23/15 20:56	KJH	W
Tetrachloro-m-xylene (S)	49.5		%	36 - 112	EPA 608	11/20/15	JSR	11/23/15 20:56	KJH	W
WET CHEMISTRY										
Ammonia-N	7.47		mg/L	0.100	D6919-09			11/21/15 01:03	JAM	A
Biochemical Oxygen Demand	57.7	1	mg/L	2.0	S5210B-11			11/20/15 23:22	NAK	B
Carbonaceous BOD	81.5	2	mg/L	2.0	S5210B-11			11/21/15 06:35	GMM	B
Carbonaceous BOD 20 Day	7.7		mg/L	2.0	S5210B-11			11/21/15 09:00	RMM	B
Cyanide, Total	ND		mg/L	0.0050	EPA 335.4	11/23/15	MMA	11/25/15 05:30	LJF	G
Dissolved Oxygen	2.5		mg/L	1.0	S4500OG-01			11/25/15 06:50	RMM	B
Halogen, Total Organic (TOX)	26.0		ug/L	20.0	SW846 9020B			11/30/15 15:46	PAG	N
Hexavalent Chromium	ND		mg/L	0.010	S3500CrB-09			11/20/15 04:56	MSA	B
Nitrate-N	ND		mg/L	0.50	EPA 300.0			11/20/15 15:21	FSC	B
Nitrite-N	ND		mg/L	0.50	EPA 300.0			11/20/15 15:21	FSC	B
Odor	30		T.O.N.	1	S2150B-97			11/21/16 10:12	MSA	M
Oil/Grease Hexane Extractable	14.8		mg/L	2.1	EPA 1664B			11/22/15 12:00	AT	H
Oil/Grease Silica Gel Treated	ND		mg/L	2.1	EPA 1664B			11/22/15 12:00	AT	H
Phenolics	0.068		mg/L	0.005	EPA 420.4	12/9/15	NV	12/10/15 16:35	AMH	J
Phosphorus, Total	2.1		mg/L	0.10	EPA 365.1	12/7/15	LJF	12/8/15 04:21	LJF	A
Sulfide, Total	1.3		mg/L	1.0	S4500S2F-00			11/25/15 21:15	DRM	L
Surfactants (MBAS)	0.557		mg/L	0.025	S5540C-00			11/21/15 05:00	MBW	K
Total Dissolved Solids	186		mg/L	5	S2540C-11			11/24/15 09:45	ML	B
Total Kjeldahl Nitrogen	21.2		mg/L	4.0	S4500NH3G-11	11/25/15	J1H	11/29/15 11:40	NJA	A
Total Nitrogen	21.2		mg/L	1.00	Calculation			12/2/15 14:27	NJA	A
Total Suspended Solids	108	3	mg/L	5	S2540D-11			11/29/15 18:05	NV	B
Turbidity	126		NTU	0.10	S2130B-01			11/21/15 07:01	MSA	B
METALS										
Hardness	85.2		mg/L	0.33	EPA 200.7	11/23/15	JPS	11/24/15 17:44	TSS	P1
Aluminum, Total	1.2		mg/L	0.20	EPA 200.8	11/23/15	JPS	11/24/15 03:25	ZMC	P2
Antimony, Total	ND		mg/L	0.0010	EPA 200.8	11/29/15	JPS	12/1/15 12:38	MO	P3
Arsenic, Total	ND		mg/L	0.0075	EPA 200.8	11/23/15	JPS	11/24/15 03:25	ZMC	P2
Cadmium, Total	ND		mg/L	0.0025	EPA 200.8	11/23/15	JPS	11/24/15 03:25	ZMC	P2

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ANALYTICAL RESULTS

Workorder: 2109302 2015-LOWER DELAWARE TESTING

Lab ID: **2109302002** Date Collected: 11/19/2015 15:20 Matrix: Water

Sample ID: **CPS1** Date Received: 11/19/2015 21:10

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
Chromium, Total	0.011		mg/L	0.0050	EPA 200.8	11/23/15	JPS	11/24/15 03:25	ZMC	P2
Copper, Total	0.042		mg/L	0.013	EPA 200.8	11/23/15	JPS	11/24/15 03:25	ZMC	P2
Iron, Total	2.9		mg/L	0.030	EPA 200.7	11/23/15	JPS	11/24/15 17:44	TSS	P1
Lead, Total	0.028		mg/L	0.0050	EPA 200.8	11/23/15	JPS	11/24/15 03:25	ZMC	P2
Mercury, Total	0.00020		mg/L	0.00020	EPA 245.1	12/3/15	MNP	12/3/15 14:08	MNP	P4
Molybdenum, Total	0.0013		mg/L	0.0010	EPA 200.8	11/29/15	JPS	12/1/15 12:38	MO	P3
Selenium, Total	ND		mg/L	0.010	EPA 200.8	11/23/15	JPS	11/24/15 03:25	ZMC	P2
Silver, Total	ND		mg/L	0.0010	EPA 200.8	11/29/15	JPS	12/1/15 12:38	MO	P3
Thallium, Total	ND		mg/L	0.0025	EPA 200.8	11/23/15	JPS	11/24/15 03:25	ZMC	P2
Zinc, Total	0.22		mg/L	0.0025	EPA 200.8	11/29/15	JPS	12/1/15 12:38	MO	P3
MICROBIOLOGY										
Enterococcus	>241960 COL/100 ML		col/100mL	100	S9230D			11/19/15 21:58	ABL	R
Fecal Coliform	2600000		col/100mL	100000	SM9222D+EPA 625/R-92/013 APX F			11/19/15 22:24	ABL	Q
Sub'd to NELAP CERTIFIED Lab										
Gross Alpha	2.70		pCi/L	2.10	EPA 900.0			12/2/15 12:07	SUB	Y
Gross Alpha Uncertainty +/-	1.40		pCi/L		EPA 900.0			12/2/15 12:07	SUB	Y
Gross Beta	7.80		pCi/L	2.70	EPA 900.0			12/2/15 12:07	SUB	Y
Gross Beta Uncertainty +/-	2.00		pCi/L		EPA 900.0			12/2/15 12:07	SUB	Y

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ANALYTICAL RESULTS

Workorder: 2109302 2015-LOWER DELAWARE TESTING

Lab ID: **2109302003** Date Collected: 11/19/2015 15:10 Matrix: Water

Sample ID: **14th & Crozer** Date Received: 11/19/2015 21:10

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	5.0	EPA 624			11/21/15 21:38	CJG	S
Bromodichloromethane	ND		ug/L	5.0	EPA 624			11/21/15 21:38	CJG	S
Chlorodibromomethane	ND		ug/L	5.0	EPA 624			11/21/15 21:38	CJG	S
Chloroform	ND		ug/L	5.0	EPA 624			11/21/15 21:38	CJG	S
Ethylbenzene	ND		ug/L	5.0	EPA 624			11/21/15 21:38	CJG	S
Methyl t-Butyl Ether	ND		ug/L	5.0	EPA 624			11/21/15 21:38	CJG	S
Methylene Chloride	ND		ug/L	5.0	EPA 624			11/21/15 21:38	CJG	S
Tetrachloroethene	ND		ug/L	5.0	EPA 624			11/21/15 21:38	CJG	S
Toluene	ND		ug/L	5.0	EPA 624			11/21/15 21:38	CJG	S
Total Xylenes	ND		ug/L	15.0	EPA 624			11/21/15 21:38	CJG	S
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	101		%	72 - 142	EPA 624			11/21/15 21:38	CJG	S
4-Bromofluorobenzene (S)	112		%	73 - 119	EPA 624			11/21/15 21:38	CJG	S
Dibromofluoromethane (S)	90		%	74 - 132	EPA 624			11/21/15 21:38	CJG	S
Toluene-d8 (S)	100		%	75 - 133	EPA 624			11/21/15 21:38	CJG	S
SEMIVOLATILES										
Benzo(a)anthracene	ND		ug/L	1.4	EPA 625	11/25/15	VLM	11/29/15 21:38	GEC	U
Chrysene	ND		ug/L	1.4	EPA 625	11/25/15	VLM	11/29/15 21:38	GEC	U
bis(2-Ethylhexyl)phthalate	4.4		ug/L	2.8	EPA 625	11/25/15	VLM	11/29/15 21:38	GEC	U
N-Nitroso-di-n-propylamine	ND		ug/L	2.8	EPA 625	11/25/15	VLM	11/29/15 21:38	GEC	U
Phenanthrene	ND		ug/L	1.4	EPA 625	11/25/15	VLM	11/29/15 21:38	GEC	U
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2,4,6-Tribromophenol (S)	90.8		%	47 - 128	EPA 625	11/25/15	VLM	11/29/15 21:38	GEC	U
2-Fluorobiphenyl (S)	75		%	52 - 118	EPA 625	11/25/15	VLM	11/29/15 21:38	GEC	U
2-Fluorophenol (S)	40.3		%	20 - 87	EPA 625	11/25/15	VLM	11/29/15 21:38	GEC	U
Nitrobenzene-d5 (S)	86.7		%	27 - 139	EPA 625	11/25/15	VLM	11/29/15 21:38	GEC	U
Phenol-d5 (S)	27.4		%	10 - 81	EPA 625	11/25/15	VLM	11/29/15 21:38	GEC	U
Terphenyl-d14 (S)	69.3		%	46 - 133	EPA 625	11/25/15	VLM	11/29/15 21:38	GEC	U
Pesticides and PCBs										
Dieldrin	ND		ug/L	0.019	EPA 608	11/20/15	JSR	11/23/15 17:14	KJH	W
Total Polychlorinated Biphenyl	0.0		ug/L		EPA 608	11/20/15	JSR	11/23/15 17:14	KJH	W
Aroclor-1016	ND		ug/L	0.46	EPA 608	11/20/15	JSR	11/23/15 17:14	KJH	W
Aroclor-1221	ND		ug/L	0.46	EPA 608	11/20/15	JSR	11/23/15 17:14	KJH	W
Aroclor-1232	ND		ug/L	0.46	EPA 608	11/20/15	JSR	11/23/15 17:14	KJH	W
Aroclor-1242	ND		ug/L	0.46	EPA 608	11/20/15	JSR	11/23/15 17:14	KJH	W

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ANALYTICAL RESULTS

Workorder: 2109302 2015-LOWER DELAWARE TESTING

Lab ID: **2109302003** Date Collected: 11/19/2015 15:10 Matrix: Water

Sample ID: **14th & Crozer** Date Received: 11/19/2015 21:10

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Aroclor-1248	ND		ug/L	0.46	EPA 608	11/20/15	JSR	11/23/15 17:14	KJH	W
Aroclor-1254	ND		ug/L	0.46	EPA 608	11/20/15	JSR	11/23/15 17:14	KJH	W
Aroclor-1260	ND		ug/L	0.46	EPA 608	11/20/15	JSR	11/23/15 17:14	KJH	W
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
Decachlorobiphenyls (S)	46.9		%	30 - 150	EPA 608	11/20/15	JSR	11/23/15 17:14	KJH	W
Tetrachloro-m-xylene (S)	49.7		%	36 - 112	EPA 608	11/20/15	JSR	11/23/15 17:14	KJH	W
WET CHEMISTRY										
Ammonia-N	4.85		mg/L	0.100	D6919-09			11/20/15 16:52	JAM	A
Biochemical Oxygen Demand	51.8	1	mg/L	2.0	S5210B-11			11/20/15 23:22	NAK	B
Carbonaceous BOD	66.7	2	mg/L	2.0	S5210B-11			11/21/15 06:35	GMM	B
Carbonaceous BOD 20 Day	12.8		mg/L	2.0	S5210B-11			11/21/15 09:00	RMM	B
Cyanide, Total	ND		mg/L	0.0050	EPA 335.4	11/23/15	MMA	11/25/15 05:30	LJF	G
Dissolved Oxygen	4.3		mg/L	1.0	S4500OG-01			11/25/15 06:50	RMM	B
Halogen, Total Organic (TOX)	26.8		ug/L	20.0	SW846 9020B			12/1/15 13:58	PAG	N
Hexavalent Chromium	ND		mg/L	0.010	S3500CrB-09			11/20/15 04:56	MSA	B
Nitrate-N	0.85		mg/L	0.50	EPA 300.0			11/20/15 15:35	FSC	B
Nitrite-N	ND		mg/L	0.50	EPA 300.0			11/20/15 15:35	FSC	B
Odor	20		T.O.N.	1	S2150B-97			11/21/16 10:12	MSA	M
Oil/Grease Hexane Extractable	7.2		mg/L	2.0	EPA 1664B			11/22/15 12:00	AT	H
Oil/Grease Silica Gel Treated	2.3		mg/L	2.0	EPA 1664B			11/22/15 12:00	AT	H
Phenolics	0.016		mg/L	0.005	EPA 420.4	12/9/15	NV	12/10/15 16:36	AMH	J
Phosphorus, Total	1.4		mg/L	0.10	EPA 365.1	12/7/15	LJF	12/8/15 04:21	LJF	A
Sulfide, Total	ND		mg/L	1.0	S4500S2F-00			11/25/15 21:15	DRM	L
Surfactants (MBAS)	0.485		mg/L	0.025	S5540C-00			11/21/15 05:00	MBW	K
Total Dissolved Solids	150		mg/L	5	S2540C-11			11/24/15 09:45	ML	B
Total Kjeldahl Nitrogen	14.1		mg/L	4.0	S4500NH3G-11	11/25/15	J1H	11/29/15 11:40	NJA	A
Total Nitrogen	15.0		mg/L	1.00	Calculation			12/7/15 21:21	NJA	A
Total Suspended Solids	140	3	mg/L	5	S2540D-11			11/29/15 18:05	NV	B
Turbidity	37.2		NTU	0.10	S2130B-01			11/21/15 07:01	MSA	B
METALS										
Hardness	58.1		mg/L	0.33	EPA 200.7	11/23/15	JPS	11/24/15 17:48	TSS	P1
Aluminum, Total	0.64		mg/L	0.20	EPA 200.8	11/23/15	JPS	11/24/15 03:36	ZMC	P2
Antimony, Total	0.0013		mg/L	0.0010	EPA 200.8	11/29/15	JPS	12/1/15 12:42	MO	P3
Arsenic, Total	ND		mg/L	0.0075	EPA 200.8	11/23/15	JPS	11/24/15 03:36	ZMC	P2

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ANALYTICAL RESULTS

Workorder: 2109302 2015-LOWER DELAWARE TESTING

Lab ID: **2109302003** Date Collected: 11/19/2015 15:10 Matrix: Water

Sample ID: **14th & Crozer** Date Received: 11/19/2015 21:10

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
Cadmium, Total	ND		mg/L	0.0025	EPA 200.8	11/23/15	JPS	11/24/15 03:36	ZMC	P2
Chromium, Total	0.0094		mg/L	0.0050	EPA 200.8	11/23/15	JPS	11/24/15 03:36	ZMC	P2
Copper, Total	0.033		mg/L	0.013	EPA 200.8	11/23/15	JPS	11/24/15 03:36	ZMC	P2
Iron, Total	0.76		mg/L	0.030	EPA 200.7	11/23/15	JPS	11/24/15 17:48	TSS	P1
Lead, Total	0.016		mg/L	0.0050	EPA 200.8	11/23/15	JPS	11/24/15 03:36	ZMC	P2
Mercury, Total	ND		mg/L	0.00020	EPA 245.1	12/3/15	MNP	12/3/15 14:09	MNP	P4
Molybdenum, Total	0.0027		mg/L	0.0010	EPA 200.8	11/29/15	JPS	12/1/15 12:42	MO	P3
Selenium, Total	ND		mg/L	0.010	EPA 200.8	11/23/15	JPS	11/24/15 03:36	ZMC	P2
Silver, Total	ND		mg/L	0.0050	EPA 200.8	11/23/15	JPS	11/24/15 03:36	ZMC	P2
Thallium, Total	ND		mg/L	0.0025	EPA 200.8	11/23/15	JPS	11/24/15 03:36	ZMC	P2
Zinc, Total	0.11		mg/L	0.013	EPA 200.8	11/23/15	JPS	11/24/15 03:36	ZMC	P2
MICROBIOLOGY										
Enterococcus	77000		col/100mL	100	S9230D			11/19/15 21:58	ABL	R
Fecal Coliform	470000		col/100mL	10000	SM9222D+EPA 625/R-92/013 APX F			11/19/15 22:24	ABL	Q
Sub'd to NELAP CERTIFIED Lab										
Gross Alpha	2.30		pCi/L	2.30	EPA 900.0			12/2/15 12:07	SUB	Y
Gross Alpha Uncertainty +/-	1.30		pCi/L		EPA 900.0			12/2/15 12:07	SUB	Y
Gross Beta	10.7		pCi/L	2.60	EPA 900.0			12/2/15 12:07	SUB	Y
Gross Beta Uncertainty +/-	2.40		pCi/L		EPA 900.0			12/2/15 12:07	SUB	Y

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ANALYTICAL RESULTS

Workorder: 2109302 2015-LOWER DELAWARE TESTING

Lab ID: **2109302004** Date Collected: 11/19/2015 16:10 Matrix: Water

Sample ID: **Sun & Hancock** Date Received: 11/19/2015 21:10

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	5.0	EPA 624			11/21/15 22:00	CJG	S
Bromodichloromethane	ND		ug/L	5.0	EPA 624			11/21/15 22:00	CJG	S
Chlorodibromomethane	ND		ug/L	5.0	EPA 624			11/21/15 22:00	CJG	S
Chloroform	ND		ug/L	5.0	EPA 624			11/21/15 22:00	CJG	S
Ethylbenzene	ND		ug/L	5.0	EPA 624			11/21/15 22:00	CJG	S
Methyl t-Butyl Ether	ND		ug/L	5.0	EPA 624			11/21/15 22:00	CJG	S
Methylene Chloride	ND		ug/L	5.0	EPA 624			11/21/15 22:00	CJG	S
Tetrachloroethene	ND		ug/L	5.0	EPA 624			11/21/15 22:00	CJG	S
Toluene	ND		ug/L	5.0	EPA 624			11/21/15 22:00	CJG	S
Total Xylenes	ND		ug/L	15.0	EPA 624			11/21/15 22:00	CJG	S
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	101		%	72 - 142	EPA 624			11/21/15 22:00	CJG	S
4-Bromofluorobenzene (S)	115		%	73 - 119	EPA 624			11/21/15 22:00	CJG	S
Dibromofluoromethane (S)	92.3		%	74 - 132	EPA 624			11/21/15 22:00	CJG	S
Toluene-d8 (S)	99.9		%	75 - 133	EPA 624			11/21/15 22:00	CJG	S
SEMIVOLATILES										
Benzo(a)anthracene	ND		ug/L	1.5	EPA 625	11/25/15	VLM	11/29/15 23:43	GEC	U
Chrysene	ND		ug/L	1.5	EPA 625	11/25/15	VLM	11/29/15 23:43	GEC	U
bis(2-Ethylhexyl)phthalate	11.8		ug/L	3.1	EPA 625	11/25/15	VLM	11/29/15 23:43	GEC	U
N-Nitroso-di-n-propylamine	ND		ug/L	3.1	EPA 625	11/25/15	VLM	11/29/15 23:43	GEC	U
Phenanthrene	ND		ug/L	1.5	EPA 625	11/25/15	VLM	11/29/15 23:43	GEC	U
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2,4,6-Tribromophenol (S)	96.9		%	47 - 128	EPA 625	11/25/15	VLM	11/29/15 23:43	GEC	U
2-Fluorobiphenyl (S)	76.5		%	52 - 118	EPA 625	11/25/15	VLM	11/29/15 23:43	GEC	U
2-Fluorophenol (S)	46.8		%	20 - 87	EPA 625	11/25/15	VLM	11/29/15 23:43	GEC	U
Nitrobenzene-d5 (S)	87.1		%	27 - 139	EPA 625	11/25/15	VLM	11/29/15 23:43	GEC	U
Phenol-d5 (S)	31.8		%	10 - 81	EPA 625	11/25/15	VLM	11/29/15 23:43	GEC	U
Terphenyl-d14 (S)	80.3		%	46 - 133	EPA 625	11/25/15	VLM	11/29/15 23:43	GEC	U
Pesticides and PCBs										
Dieldrin	ND		ug/L	0.019	EPA 608	11/20/15	JSR	11/23/15 14:16	KJH	W
Total Polychlorinated Biphenyl	0.0		ug/L		EPA 608	11/20/15	JSR	11/23/15 14:16	KJH	W
Aroclor-1016	ND		ug/L	0.46	EPA 608	11/20/15	JSR	11/23/15 14:16	KJH	W
Aroclor-1221	ND		ug/L	0.46	EPA 608	11/20/15	JSR	11/23/15 14:16	KJH	W
Aroclor-1232	ND		ug/L	0.46	EPA 608	11/20/15	JSR	11/23/15 14:16	KJH	W
Aroclor-1242	ND		ug/L	0.46	EPA 608	11/20/15	JSR	11/23/15 14:16	KJH	W

ALS Environmental

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NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2109302 2015-LOWER DELAWARE TESTING

Lab ID: **2109302004** Date Collected: 11/19/2015 16:10 Matrix: Water

Sample ID: **Sun & Hancock** Date Received: 11/19/2015 21:10

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Aroclor-1248	ND		ug/L	0.46	EPA 608	11/20/15	JSR	11/23/15 14:16	KJH	W
Aroclor-1254	ND		ug/L	0.46	EPA 608	11/20/15	JSR	11/23/15 14:16	KJH	W
Aroclor-1260	ND		ug/L	0.46	EPA 608	11/20/15	JSR	11/23/15 14:16	KJH	W
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
Decachlorobiphenyls (S)	56.1		%	30 - 150	EPA 608	11/20/15	JSR	11/23/15 14:16	KJH	W
Tetrachloro-m-xylene (S)	50.7		%	36 - 112	EPA 608	11/20/15	JSR	11/23/15 14:16	KJH	W
WET CHEMISTRY										
Ammonia-N	1.63		mg/L	0.100	D6919-09			11/20/15 17:11	JAM	A
Biochemical Oxygen Demand	26.2	1	mg/L	2.0	S5210B-11			11/20/15 23:22	NAK	B
Carbonaceous BOD	17.3	2	mg/L	2.0	S5210B-11			11/21/15 06:35	GMM	B
Carbonaceous BOD 20 Day	ND		mg/L	20.0	S5210B-11			11/21/15 09:00	RMM	B
Cyanide, Total	ND		mg/L	0.0050	EPA 335.4	11/23/15	MMA	11/25/15 05:30	LJF	G
Dissolved Oxygen	5.4		mg/L	1.0	S4500OG-01			11/25/15 06:50	RMM	B
Halogen, Total Organic (TOX)	ND		ug/L	20.0	SW846 9020B			12/1/15 14:34	PAG	N
Hexavalent Chromium	ND		mg/L	0.010	S3500CrB-09			11/20/15 04:56	MSA	B
Nitrate-N	ND		mg/L	0.50	EPA 300.0			11/20/15 15:48	FSC	B
Nitrite-N	ND		mg/L	0.50	EPA 300.0			11/20/15 15:48	FSC	B
Odor	2		T.O.N.	1	S2150B-97			11/21/16 10:12	MSA	M
Oil/Grease Hexane Extractable	ND		mg/L	2.1	EPA 1664B			11/22/15 12:00	AT	H
Oil/Grease Silica Gel Treated	ND		mg/L	2.1	EPA 1664B			11/22/15 12:00	AT	H
Phenolics	0.012		mg/L	0.005	EPA 420.4	12/9/15	NV	12/10/15 16:37	AMH	J
Phosphorus, Total	0.56		mg/L	0.10	EPA 365.1	12/7/15	LJF	12/8/15 04:21	LJF	A
Sulfide, Total	ND		mg/L	1.0	S4500S2F-00			11/25/15 21:15	DRM	L
Surfactants (MBAS)	0.123		mg/L	0.025	S5540C-00			11/21/15 05:00	MBW	K
Total Dissolved Solids	39		mg/L	5	S2540C-11			11/24/15 09:45	ML	B
Total Kjeldahl Nitrogen	5.3	4	mg/L	1.0	S4500NH3G-11	12/1/15	DRM	12/1/15 12:57	DRM	A
Total Nitrogen	5.30		mg/L	1.00	Calculation			12/7/15 21:21	NJA	A
Total Suspended Solids	76	3	mg/L	5	S2540D-11			11/29/15 18:05	NV	B
Turbidity	26.2		NTU	0.10	S2130B-01			11/21/15 07:01	MSA	B
METALS										
Hardness	18.9		mg/L	0.33	EPA 200.7	11/23/15	JPS	11/24/15 17:52	TSS	P1
Aluminum, Total	0.47		mg/L	0.040	EPA 200.8	11/23/15	JPS	11/24/15 03:40	ZMC	P2
Antimony, Total	0.0023		mg/L	0.0010	EPA 200.8	11/30/15	JPS	12/1/15 12:49	MO	P3
Arsenic, Total	ND		mg/L	0.0015	EPA 200.8	11/23/15	JPS	11/24/15 03:40	ZMC	P2

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NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2109302 2015-LOWER DELAWARE TESTING

Lab ID: **2109302004** Date Collected: 11/19/2015 16:10 Matrix: Water

Sample ID: **Sun & Hancock** Date Received: 11/19/2015 21:10

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
Cadmium, Total	ND		mg/L	0.00050	EPA 200.8	11/23/15	JPS	11/24/15 03:40	ZMC	P2
Chromium, Total	0.0032		mg/L	0.0010	EPA 200.8	11/23/15	JPS	11/24/15 03:40	ZMC	P2
Copper, Total	0.025		mg/L	0.0025	EPA 200.8	11/23/15	JPS	11/24/15 03:40	ZMC	P2
Iron, Total	0.72		mg/L	0.030	EPA 200.7	11/23/15	JPS	11/24/15 17:52	TSS	P1
Lead, Total	0.0081		mg/L	0.0010	EPA 200.8	11/23/15	JPS	11/24/15 03:40	ZMC	P2
Mercury, Total	ND		mg/L	0.00020	EPA 245.1	12/3/15	MNP	12/3/15 14:10	MNP	P4
Molybdenum, Total	0.0031		mg/L	0.0010	EPA 200.8	11/30/15	JPS	12/1/15 12:49	MO	P3
Selenium, Total	ND		mg/L	0.0020	EPA 200.8	11/23/15	JPS	11/24/15 03:40	ZMC	P2
Silver, Total	ND		mg/L	0.0010	EPA 200.8	11/23/15	JPS	11/24/15 03:40	ZMC	P2
Thallium, Total	ND		mg/L	0.00050	EPA 200.8	11/23/15	JPS	11/24/15 03:40	ZMC	P2
Zinc, Total	0.14		mg/L	0.0025	EPA 200.8	11/23/15	JPS	11/24/15 03:40	ZMC	P2
MICROBIOLOGY										
Enterococcus	8160		col/100mL	10	S9230D			11/19/15 21:58	ABL	R
Fecal Coliform	1260000		col/100mL	10000	SM9222D+EPA 625/R-92/013 APX F			11/19/15 22:24	ABL	Q
Sub'd to NELAP CERTIFIED Lab										
Gross Alpha	2.30		pCi/L	2.20	EPA 900.0			12/2/15 12:07	SUB	Y
Gross Alpha Uncertainty +/-	1.30		pCi/L		EPA 900.0			12/2/15 12:07	SUB	Y
Gross Beta	6.50		pCi/L	2.70	EPA 900.0			12/2/15 12:07	SUB	Y
Gross Beta Uncertainty +/-	1.90		pCi/L		EPA 900.0			12/2/15 12:07	SUB	Y

Mr. Brad W Kintzer
Project Coordinator

PARAMETER QUALIFIERS

Lab ID	#	Sample ID	Analytical Method	Analyte
2109302001	1	CPS/EPS1 (72/28)	S5210B-11	Biochemical Oxygen Demand
The dilution water blank associated with this analyte had a dissolved oxygen depletion of 0.26 mg/l. Criteria states that the depletion should be at a maximum 0.2 mg/l.				
2109302001	2	CPS/EPS1 (72/28)	S5210B-11	Carbonaceous BOD
The dilution water blank associated with this analyte had a dissolved oxygen depletion of 0.22 mg/l. Criteria states that the depletion should be at a maximum 0.2 mg/l.				
2109302001	3	CPS/EPS1 (72/28)	S2540D-11	Total Suspended Solids
This sample was analyzed after the 7 day holding time for total suspended solids had expired.				
2109302002	1	CPS1	S5210B-11	Biochemical Oxygen Demand
The dilution water blank associated with this analyte had a dissolved oxygen depletion of 0.26 mg/l. Criteria states that the depletion should be at a maximum 0.2 mg/l.				
2109302002	2	CPS1	S5210B-11	Carbonaceous BOD
The dilution water blank associated with this analyte had a dissolved oxygen depletion of 0.22 mg/l. Criteria states that the depletion should be at a maximum 0.2 mg/l.				
2109302002	3	CPS1	S2540D-11	Total Suspended Solids
This sample was analyzed after the 7 day holding time for total suspended solids had expired.				
2109302002	4	CPS1	EPA 608	Decachlorobiphenyls
The surrogate Decachlorobiphenyls for method EPA 608 was outside of control limits. The % Recovery was reported as 29.1 and the control limits were 30 to 150. This result was reported at a dilution of 1.				
2109302003	1	14th & Crozer	S5210B-11	Biochemical Oxygen Demand
The dilution water blank associated with this analyte had a dissolved oxygen depletion of 0.26 mg/l. Criteria states that the depletion should be at a maximum 0.2 mg/l.				
2109302003	2	14th & Crozer	S5210B-11	Carbonaceous BOD
The dilution water blank associated with this analyte had a dissolved oxygen depletion of 0.22 mg/l. Criteria states that the depletion should be at a maximum 0.2 mg/l.				
2109302003	3	14th & Crozer	S2540D-11	Total Suspended Solids
This sample was analyzed after the 7 day holding time for total suspended solids had expired.				
2109302004	1	Sun & Hancock	S5210B-11	Biochemical Oxygen Demand
The dilution water blank associated with this analyte had a dissolved oxygen depletion of 0.26 mg/l. Criteria states that the depletion should be at a maximum 0.2 mg/l.				
2109302004	2	Sun & Hancock	S5210B-11	Carbonaceous BOD
The dilution water blank associated with this analyte had a dissolved oxygen depletion of 0.22 mg/l. Criteria states that the depletion should be at a maximum 0.2 mg/l.				
2109302004	3	Sun & Hancock	S2540D-11	Total Suspended Solids
This sample was analyzed after the 7 day holding time for total suspended solids had expired.				
2109302004	4	Sun & Hancock	S4500NH3G-11	Total Kjeldahl Nitrogen
The recovery of the Matrix Spike (MS) associated to this analyte was outside of the established control limits.				

ALS Environmental
34 Dogwood Lane
Middletown, PA 17057
P. 717-944-5541
F. 717-944-1430

CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

B

COC ALS

2109302

1 of 2

Client Name: DELCORA
Address: 3201 W. Front Street
Chester PA 19013
Contact: Mike Krause
Phone#: 610-876-5523 x218
Project Name/#: CSO WW LTCP
Bill To: Same

TAT [x] Normal-Standard TAT is 10-12 business days. [ ] Rush-Subject to ALS approval and surcharges.
Date Required: _____ Approved By: _____
Email? [x] -Y
Fax? [ ] -Y No.: _____

Sample Description/Location (as it will appear on the lab report)	Sample Date	Time	*G or C	**Matrix	Total Sulfide	CBOD5, CBOD20, BOD5	Metals, Total Hardness	Hexavalent Chromium, Trivalent Chromium	Fecal Coliform	Enterococcus	608	625	624	Gross Alpha/ Beta
Container Type					plastic	plastic	plastic	plastic	plastic	plastic	glass	glass	glass	plastic
Container Size					250ml	1L	500ml	500ml	120ml	120ml	1L	1L	40ml	1L
Preservative					H/Zn(O2C	none	HNO3	none	Na2S2O3	Na2S2O3	none	none	none	None
					ANALYSES/METHOD REQUESTED									
					Enter Number of Containers Per Sample or Field Results Below.									
1 CPS/ EPS1 (72/28)	11/19/15	15:20	G	WW	1	2	1	1	1	1	2	2	2	1
2 CPS1	11/19/15	15:20	G	WW	1	2	1	1	1	1	2	2	2	1
3 14th & Crozer	11/19/15	15:10	G	WW	1	2	1	1	1	1	2	2	2	1
4 Sun & Hancock	11/19/15	16:10	G	WW	1	2	1	1	1	1	2	2	2	1
5														
6														
7														
8														
9														
10														

Receipt Information (completed by Receiving Lab)
Cooler Temp: 1 Therm ID: 2.4
No. of Coolers: _____

	Y	N	Initial
Custody Seals Present?			
(If present) Seals Intact?	✓		
Received on Ice?	✓		
COC/Labels Complete/Accurate?	✓		
Cont. in Good Cond.?	✓		
Correct Containers?	✓		
Correct Sample Volumes?	✓		
Correct Preservation?	✓		
Headspace/Volatiles?		✓	✓

Courier/Tracking #:

Sample/COC Comments

MICRO REC'D 11/20/15 ADB 910

ALS Field Services: _Pickup _Labor _Composite Sampling _Rental Equipment _Other: _____

Project Comments:

LOGGED BY(signature): DATE 11/20/15 TIME 910
REVIEWED BY(signature): DATE TIME

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1 Raymond Rice	11/19/15	1704	2	11-19	1705
3	11-19	1905	4	11/19	1905
5	11/19	2110	6	11/19/15	2110
7			8		
9			10		

Data Deliverables: [ ] Standard [ ] CLP-like [ ] USACE [ ]
Special Processing: USACE [ ] Navy [ ]
State Samples Collected In: [ ] NY [ ] NJ [x] PA [ ] NC [ ]
Reportable to PADEP? Yes [ ] PWSID # _____
Sample Disposal: Lab [ ] Special [ ]
EDDS: Format Type- _____

* G=Grab; C=Composite
**Matrix - Al=Air; DW=Drinking Water; GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

ALS ENVIRONMENTAL SHIPPING ADDRESS: 34 DOGWOOD LANE, MIDDLETOWN, PA 17057

Rev 10/11

ALS Environmental
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Middletown, PA 17057
P. 717-944-5541
F.717-944-1430

CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

COC #: 210930 — 2 of 2
ALS Quote #: 514787

Client Name: DELCORA
Address: 3201 W. Front Street
Chester PA 19013
Contact: Mike Krause
Phone#: 610-876-5523 x218
Project Name/#: CSO WW LTCP
Bill To: Same

TAT: [x] Normal-Standard TAT is 10-12 business days. [ ] Rush-Subject to ALS approval and surcharges.
Date Required: _____ Approved By: _____
Email? [x] -Y
Fax? [ ] -Y No.: _____

Sample Description/Location (as it will appear on the lab report)	Sample Date	Time	*G or C	**Matrix	Oil and Grease	TPH	Nitrate, Nitrite, Turbidity	Total Cyanide	Total Phosphorus, Ammonia, TKN, Total Nitrogen	Phenolics	TOX	TSS, TDS, DO	Odor	MBAS
Container Type					glass	glass	plastic	plastic	plastic	glass	glass	plastic	glass	plastic
Container Size					1L	1L	500ml	500ml	1L	500ml	250ml	1L	1L	2L
Preservative					H2SO4	H2SO4	none	NaOH	H2SO4	H2SO4	H2SO4	none	none	none
1 CPS/ EPS1 (72/28)	11-19-15	15:20	G	WW	1	1	1	1	1	1	2	1	1	1
2 CPS1	11-19-15	15:20	G	WW	1	1	1	1	1	1	2	1	1	1
3 14th & Crozer	11-19-15	15:10	G	WW	1	1	1	1	1	1	2	1	1	1
4 Sun & Hancock	11-19-15	16:10	G	WW	1	1	1	1	1	1	2	1	1	1
5	FB#1119													
6														
7														
8														
9														
10														

Enter Number of Containers Per Sample or Field Results Below.

Receipt Information (completed by Receiving Lab)
Cooler Temp: 1 Therm ID: 244
No. of Coolers: _____

	Y	N	Initial
Custody Seals Present?			
(if present) Seals Intact?			
Received on Ice?	✓		
COC/Labels Complete/Accurate?	✓		
Cont. in Good Cond.?	✓		
Correct Containers?	✓		
Correct Sample Volumes?	✓		
Correct Preservation?	✓		
Headspace/Volatiles?		✓	

Courier/Tracking #:

Sample/COC Comments

ALS Field Services: __Pickup __Labor __Composite Sampling __Rental Equipment __Other: _____

Project Comments:

LOGGED BY(signature): _____ DATE: 11/20/15 TIME: 0940
REVIEWED BY(signature): _____ DATE: _____ TIME: _____

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1 Raymond Reed	11/19/15	17:05	2 Fed Ex	11/19	17:05
3	11-19	1805	4	11/19	1805
5	11/19	2100	6	11/20-15	2110
7			8		
9			10		

Data Deliverables: [ ] Standard [ ] CLP-like [ ] USACE [ ]
Special Processing: USACE [ ] Navy [ ]
State Samples Collected In: [ ] NY [ ] NJ [x] PA [ ] NC [ ]
Reportable to PADEP? Yes [ ]
PWSID # _____
Sample Disposal: Lab [ ] Special [ ]
EDDS: Format Type- _____

*G=Grab; C=Composite **Matrix - AI=Air; DW=Drinking Water; GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

ALS ENVIRONMENTAL SHIPPING ADDRESS: 34 DOGWOOD LANE, MIDDLETOWN, PA 17057

Rev 10/11

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P. 717-944-5541
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CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

COC #: _____ of _____

ALS Quote #: _____

Client Name: ALS Environmental - Middletown

Address: 34 Dogwood Lane
Middletown, PA 17057

Contact: Brad Kintzer

Phone#:

Project Name/#: DELCORA

Bill To:

TAT [X] Normal-Standard TAT is 10-12 business days.
[ ] Rush-Subject to ALS approval and surcharges.

Date Required: _____ Approved By: _____

Email? [x] -Y

Fax? [ ] -Y No.: _____

Sample Description/Location (as it will appear on the lab report)	Sample Date	Time	*G or C	**Matrix	Container Type	Container Size	Preservative	Gross Alpha/Beta					Subcontract to: ALS - Ft. Collins			
					P	1L	HNO3									
					ANALYSES/METHOD REQUESTED											
					Enter Number of Containers Per Sample or Field Results Below.											
1 2109302001	11/19/15	1520	G	WW				1								
2 2109302002	11/19/15	1520	G	WW				1								
3 2109302003	11/19/15	1510	G	WW				1								
4 2109302~~003~~ 004	11/19/15	1610	G	WW				1								
5 SSL	11/24/15	23														
6																
7																
8																
9																
10																

Receipt Information (completed by Receiving Lab)

Cooler Temp: _____ Therm ID: _____

	Y	N	Initial
No. of Coolers:			
Custody Seals Present?			
(if present) Seals Intact?			
Received on Ice?			
COC/Labels Complete/Accurate?			
Cont. in Good Cond.?			
Correct Containers?			
Correct Sample Volumes?			
Correct Preservation?			
Headspace/Volatiles?			

Courier/Tracking #:

Sample/COC Comments

ALS Field Services: _Pickup _Labor
_Composite Sampling _Rental Equipment
_Other: _____

Project Comments:

LOGGED BY(signature): DATE: TIME:

REVIEWED BY(signature): DATE: TIME:

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1 [signature]	11/23/15	1520	2		
3			4		
5			6		
7			8		
9			10		

Data Deliverables: [ ] Standard [ ] CLP-like [ ] USACE [ ]

Special Processing: USACE [ ] Navy [ ]

State Samples Collected In: [ ] NY [ ] NJ [ ] PA [ ] NC [ ]

Reportable to PADEP? Yes [ ]

PWSID # _____

Sample Disposal: Lab [ ] Special [ ]

EDDS: Format Type- _____

* G=Grab; C=Composite

**Matrix - AI=Air; DW=Drinking Water; GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

ALS ENVIRONMENTAL SHIPPING ADDRESS: 34 DOGWOOD LANE, MIDDLETOWN, PA 17057

Rev 10/11

Thursday, December 10, 2015

Brad Kintzer
ALS Environmental
34 Dogwood Lane
Middletown, PA 17057

Re: ALS Workorder: 1511447
Project Name:
Project Number: 2109302

Dear Mr. Kintzer:

Four water samples were received from ALS Environmental, on 11/24/2015. The samples were scheduled for the following analysis:

Gross Alpha/Beta

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental
Jeff R. Kujawa
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Connecticut (CT)	PH-0232
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
L-A-B (DoD ELAP/ISO 170250)	L2257
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

ALS Environmental

1511451

Gross Alpha/Beta:
The sample was analyzed for gross alpha and beta activity by gas flow proportional counting according to the current revision of SOP 724. Gross alpha results are referenced to ^{241}Am. Gross beta results are referenced to $^{90}Sr/Y$.

All acceptance criteria were met.

ALS Environmental -- FC

Sample Number(s) Cross-Reference Table

OrderNum: 1511447
Client Name: ALS Environmental
Client Project Name:
Client Project Number: 2109302
Client PO Number: 2109302

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
2109302001	1511447-1		WATER	19-Nov-15	15:20
2109302002	1511447-2		WATER	19-Nov-15	15:20
2109302003	1511447-3		WATER	19-Nov-15	15:10
2109302004	1511447-4		WATER	19-Nov-15	16:10

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F.717-944-1430

CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

COC #: 151447 of
ALS Quote #:

Client Name: ALS Environmental - Middletown
Address: 34 Dogwood Lane
Middletown, PA 17057
Contact: Brad Kintzer
Phone#:
Project Name/#: DELCORA
Bill To:
TAT: [X] Normal-Standard TAT is 10-12 business days [ ] Rush-Subject to ALS approval and surcharges.
Date Required: Approved By:
Email? [X] Y
Fax? [ ] Y No

Sample Description/Location (as it will appear on the lab report)	Sample Date	Time	*G or C	**Matrix	Container Type	Container Size	Preservative	Gross Alpha/Beta	Subcontract to ALS-Ft Collins	Enter Number of Containers Per Sample or Field Results Below.
					P	1L	HNO3			
1 2109302001 (1)	11/19/15	1520	G	WW						
2 2109302002 (2)	11/19/15	1520	G	WW						
3 2109302003 (3)	11/19/15	1510	G	WW						
4 2109302003 (4)	11/19/15	1610	G	WW				1		
5										
6										
7										
8										
9										
10										

ANALYSES/METHOD REQUESTED

Receipt Information (completed by Receiving Lab)
Cooler Temp: ____ Therm ID: ____
No. of Coolers: ____

	Y	N	Initial
Custody Seals Present?			
(if present) Seals Intact?			
Received on Ice?			
COC/Labels Complete/Accurate?			
Cont. in Good Cond.?			
Correct Containers?			
Correct Sample Volumes?			
Correct Preservation?			
Headspace/Volatiles?			

Courier/Tracking #:

Sample/COC Comments

ALS Field Services: _Pickup _Labor _Composite Sampling _Rental Equipment _Other:

Project Comments:

LOGGED BY(signature): Date:
REVIEWED BY(signature): Date:

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1	11/23/15	1520	2 ALS FC	11/24/15	0950
3			4		
5			6		
7			8		
9			10		

Deliverables: [ ] Standard [ ] CLP-like [ ] USACE
Special Processing: [ ] USACE [ ] Navy [ ]
State Samples Collected In: [ ] NY [ ] NJ [ ] PA [ ] NC [ ]
Reportable to PADEP? [ ] Yes
PWSID #:
Sample Disposal: [ ] Lab [ ] Special
EDDS: Format Type:

* G=Grab; C=Composite **Matrix - Al=Air; DW=Drinking Water; GW=Groundwater; Ol=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

ALS ENVIRONMENTAL SHIPPING ADDRESS: 34 DOGWOOD LANE, MIDDLETOWN, PA 17057

Rev 10/11

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS PA Workorder No: 15 11447

Project Manager: JRK Initials: SDM Date: 11-24-15

1. Does this project require any special handling in addition to standard ALS procedures?		YES	(NO)
2. Are custody seals on shipping containers intact?	(NONE)	YES	NO
3. Are Custody seals on sample containers intact?	(NONE)	YES	NO
4. Is there a COC (Chain-of-Custody) present or other representative documents?		(YES)	NO
5. Are the COC and bottle labels complete and legible?		(YES)	NO
6. Is the COC in agreement with samples received? (IDs, dates, times, no. of samples, no. of containers, matrix, requested analyses, etc.)		YES	(NO)
7. Were airbills / shipping documents present and/or removable?	DROP OFF	(YES)	NO
8. Are all aqueous samples requiring preservation preserved correctly? (excluding volatiles)	N/A	(YES)	NO
9. Are all aqueous non-preserved samples pH 4-9?	(N/A)	YES	NO
10. Is there sufficient sample for the requested analyses?		(YES)	NO
11. Were all samples placed in the proper containers for the requested analyses?		(YES)	NO
12. Are all samples within holding times for the requested analyses?		(YES)	NO
13. Were all sample containers received intact? (not broken or leaking, etc.)		(YES)	NO
14. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, Rx CN/S, radon) headspace free? Size of bubble: ____ < green pea ____ > green pea	(N/A)	YES	NO
15. Do any water samples contain sediment? Amount Amount of sediment: X dusting ____ moderate ____ heavy	N/A	(YES)	NO
16. Were the samples shipped on ice?		YES	(NO)
17. Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #2 #4	(RAD ONLY)	YES	NO

Cooler #:	1							
Temperature (°C):	4.6							
No. of custody seals on cooler:	0							
DOT Survey/ Acceptance Information External µR/hr reading:	12							
Background µR/hr reading:	12							

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? (YES) / NO / NA (If no, see Form 008.)

Additional Information: PROVIDE DETAILS BELOW FOR A NO RESPONSE TO ANY QUESTION ABOVE, EXCEPT #1 AND #16.

6.) Sample 4 ⇒ Sample ID on bottle says ⇒ 2109302004
COC says 2109302003 ⇒ Sample date & time match.

15.) Samples 1 through 4 have a dusting of sediment.

If applicable, was the client contacted? YES / NO / (NA) Contact: _____ Date/Time: _____

Project Manager Signature / Date: _____ 11-24-15

*IR Gun #2: Oakton, SN 29922500201-0066
*IR Gun #4: Oakton, SN 2372220101-0002

Form 201r24.xls (06/04/2012)

Page 1 of 1

ORIGIN ID:MDTA (717) 944-5541
STEVE SMITH
34 DOGWOOD LANE
MIDDLETOWN, PA 17057
UNITED STATES US

SHIP DATE: 23NOV15
ACTWGT: 42.00 LB
CAD: 107353163/INET3670

BILL SENDER

TO AMY WOLF
ALSENV. - FORT COLLINS
225 COMMERCE DR
FORT COLLINS CO 80524
(000) 000-0000
INV:
PO:
REF: AEF-001
DEPT: ADMIN

539J2/0F56A100

TUE - 24 NOV 3:00P
STANDARD OVERNIGHT

TRK# 0201 7750 4462 5706

NA FTCA

80524
CO-US DEN

After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.
Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com. FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery, misdelivery, or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim. Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental, consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss. Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

Client:	ALS Environmental	**Date:**	*10-Dec-15*
Project:	2109302	**Work Order:**	1511447
Sample ID:	2109302001	**Lab ID:**	1511447-1
Legal Location:		**Matrix:**	WATER
Collection Date:	11/19/2015 15:20	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Gross Alpha/Beta by GFPC		**PAI 724**			Prep Date: **11/30/2015**	PrepBy: **ECP**
GROSS ALPHA	ND (+/- 1.6)	U	2.7	pCi/l	NA	12/2/2015 12:07
GROSS BETA	**9 (+/- 2.2)**		**2.7**	**pCi/l**	NA	12/2/2015 12:07

Client:	ALS Environmental	**Date:**	*10-Dec-15*
Project:	2109302	**Work Order:**	1511447
Sample ID:	2109302002	**Lab ID:**	1511447-2
Legal Location:		**Matrix:**	WATER
Collection Date:	11/19/2015 15:20	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Gross Alpha/Beta by GFPC		**PAI 724**			Prep Date: **11/30/2015**	PrepBy: **ECP**
GROSS ALPHA	2.7 (+/- 1.4)	LT	2.1	pCi/l	NA	12/2/2015 12:07
GROSS BETA	**7.8 (+/- 2)**		**2.7**	**pCi/l**	NA	12/2/2015 12:07

Client:	ALS Environmental	**Date:**	*10-Dec-15*
Project:	2109302	**Work Order:**	1511447
Sample ID:	2109302003	**Lab ID:**	1511447-3
Legal Location:		**Matrix:**	WATER
Collection Date:	11/19/2015 15:10	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Gross Alpha/Beta by GFPC		**PAI 724**			Prep Date: **11/30/2015**	PrepBy: **ECP**
GROSS ALPHA	2.3 (+/- 1.3)	LT	2.3	pCi/l	NA	12/2/2015 12:07
GROSS BETA	**10.7 (+/- 2.4)**		**2.6**	**pCi/l**	NA	12/2/2015 12:07

Client:	ALS Environmental	**Date:**	*10-Dec-15*
Project:	2109302	**Work Order:**	1511447
Sample ID:	2109302004	**Lab ID:**	1511447-4
Legal Location:		**Matrix:**	WATER
Collection Date:	11/19/2015 16:10	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Gross Alpha/Beta by GFPC		**PAI 724**			Prep Date: **11/30/2015**	PrepBy: **ECP**
GROSS ALPHA	2.3 (+/- 1.3)	LT	2.2	pCi/l	NA	12/2/2015 12:07
GROSS BETA	**6.5 (+/- 1.9)**		**2.7**	**pCi/l**	NA	12/2/2015 12:07

Client:	ALS Environmental	**Date:**	*10-Dec-15*
Project:	2109302	**Work Order:**	1511447
Sample ID:	2109302004	**Lab ID:**	1511447-4
Legal Location:		**Matrix:**	WATER
Collection Date:	11/19/2015 16:10	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.

- Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.

G - Sample density differs by more than 15% of LCS density.

D - DER is greater than Control Limit

M - Requested MDC not met.

LT - Result is less than requested MDC but greater than achieved MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

ALS Environmental -- FC

Client: ALS Environmental
Work Order: 1511447
Project: 2109302

Date: *12/10/2015 4:58*

QC BATCH REPORT

Batch ID: **AB151130-1-3** Instrument ID **LB4100-C** Method: **Gross Alpha/Beta by GFPC**

LCS Sample ID: **AB151130-1** Units: **pCi/l** Analysis Date: **12/2/2015 13:39**
Client ID: Run ID: **AB151130-1A** Prep Date: **11/30/2015** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
GROSS ALPHA	239 (+/- 43)	7	225.4		106	70-130					P,M3
GROSS BETA	197 (+/- 34)	12	203.8		96.6	70-130					P,M3

LCSD Sample ID: **AB151130-1** Units: **pCi/l** Analysis Date: **12/2/2015 13:39**
Client ID: Run ID: **AB151130-1A** Prep Date: **11/30/2015** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
GROSS ALPHA	208 (+/- 39)	7	225.4		92.5	70-130		239	0.5	2.1	P,M3
GROSS BETA	200 (+/- 35)	11	203.8		98.2	70-130		197	0.07	2.1	P,M3

MB Sample ID: **AB151130-1** Units: **pCi/l** Analysis Date: **12/3/2015 12:06**
Client ID: Run ID: **AB151130-1A** Prep Date: **11/30/2015** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
GROSS ALPHA	ND	0.81									U
GROSS BETA	ND	1.04									U

The following samples were analyzed in this batch: 1511447-1 1511447-2 1511447-3 1511447-4

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

January 7, 2016

Ms. Irene Fitzgerald
DELCORA
P.O. Box 999
Chester, PA 19016

Certificate of Analysis

Revised Report - 1/7/2016 6:17:18 AM - See workorder comment section for explanation

Project Name:	**2015-LOWER DELAWARE TESTING**	Workorder:	**2110770**
Purchase Order:		Workorder ID:	**2015-LOWER DELAWARE TESTING**

Dear Ms. Fitzgerald:

Enclosed are the analytical results for samples received by the laboratory on Tuesday, December 1, 2015.

The ALS Environmental laboratory in Middletown, Pennsylvania is a National Environmental Laboratory Accreditation Program (NELAP) accredited laboratory and as such, certifies that all applicable test results meet the requirements of NELAP.

If you have any questions regarding this certificate of analysis, please contact Mr. Brad W Kintzer (Project Coordinator) at (717) 944-5541.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program and any applicable state requirements. The test results meet requirements of the current NELAP standards or state requirements, where applicable. For a specific list of accredited analytes, refer to the certifications section of the ALS website at www.alsglobal.com/en/Our-Services/Life-Sciences/Environmental/Downloads.

ALS Spring City: 10 Riverside Drive, Spring City, PA 19475 610-948-4903

CC: Mr. Ray Rios , Mr. Mike Krause

This page is included as part of the Analytical Report and must be retained as a permanent record thereof.

Mr. Brad W Kintzer
Project Coordinator

ALS Environmental

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

SAMPLE SUMMARY

Workorder: 2110770 2015-LOWER DELAWARE TESTING

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
2110770001	CPS/EPS1 (72/28) LTCPWWCSO	Water	12/1/2015 09:43	12/1/2015 13:55	Mr. Ray Rios
2110770002	CPS1	Water	12/1/2015 09:43	12/1/2015 13:55	Mr. Ray Rios
2110770003	14th & Crozer	Water	12/1/2015 09:20	12/1/2015 13:55	Mr. Ray Rios
2110770004	Sun & Hancock	Water	12/1/2015 11:00	12/1/2015 13:55	Mr. Ray Rios

Notes

-- Samples collected by ALS personnel are done so in accordance with the procedures set forth in the ALS Field Sampling Plan (20 - Field Services Sampling Plan).
-- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.
-- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.
-- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
-- The Chain of Custody document is included as part of this report.
-- All Library Search analytes should be regarded as tentative identifications based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.
-- Parameters identified as "analyze immediately" require analysis within 15 minutes of collection. Any "analyze immediately" parameters not listed under the header "Field Parameters" are preformed in the laboratory and are therefore analyzed out of hold time.
-- Method references listed on this report beginning with the prefix “S” followed by a method number (such as S2310B-97) refer to methods from “Standard Methods for the Examination of Water and Wastewater”.

Standard Acronyms/Flags

J	Indicates an estimated value between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL) for the analyte
U	Indicates that the analyte was Not Detected (ND)
N	Indicates presumptive evidence of the presence of a compound
MDL	Method Detection Limit
PQL	Practical Quantitation Limit
RDL	Reporting Detection Limit
ND	Not Detected - indicates that the analyte was Not Detected at the RDL
Cntr	Analysis was performed using this container
RegLmt	Regulatory Limit
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
%Rec	Percent Recovery
RPD	Relative Percent Difference
LOD	DoD Limit of Detection
LOQ	DoD Limit of Quantitation
DL	DoD Detection Limit
I	Indicates reported value is greater than or equal to the Method Detection Limit (MDL) but less than the Report Detection Limit (RDL)
(S)	Surrogate Compound
NC	Not Calculated
*	Result outside of QC limits

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PROJECT SUMMARY

Workorder: 2110770 2015-LOWER DELAWARE TESTING

Workorder Comments

See attached subcontracted radiological results from ALS-Ft. Collins. VLF 12/23/15

This report was modified on 1/6/16 to add Total Nitogen to all samples. BWK

Sample Comments

Lab ID: 2110770001 **Sample ID:** CPS/EPS1 (72/28) LTCPWWCSO **Sample Type:** SAMPLE

MBAS calculated as LAS molecular weight 342 g/mol.

The reporting limits for GCMS volatile analytes were raised due to the dilution of the sample caused by matrix.

Lab ID: 2110770002 **Sample ID:** CPS1 **Sample Type:** SAMPLE

MBAS calculated as LAS molecular weight 342 g/mol.

The reporting limits for GCMS volatile analytes were raised due to the dilution of the sample caused by matrix.

Lab ID: 2110770003 **Sample ID:** 14th **Sample Type:** SAMPLE

MBAS calculated as LAS molecular weight 342 g/mol.

The reporting limits for GCMS volatile analytes were raised due to the dilution of the sample caused by matrix.

Lab ID: 2110770004 **Sample ID:** Sun **Sample Type:** SAMPLE

MBAS calculated as LAS molecular weight 342 g/mol.

The reporting limits for GCMS volatile analytes were raised due to the dilution of the sample caused by matrix.

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2110770 2015-LOWER DELAWARE TESTING

Lab ID: **2110770001** Date Collected: 12/1/2015 09:43 Matrix: Water

Sample ID: **CPS/EPS1 (72/28) LTCPWWCSO** Date Received: 12/1/2015 13:55

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	5.0	EPA 624			12/2/15 23:49	DD	S
Bromodichloromethane	ND		ug/L	5.0	EPA 624			12/2/15 23:49	DD	S
Chlorodibromomethane	ND		ug/L	5.0	EPA 624			12/2/15 23:49	DD	S
Chloroform	5.7		ug/L	5.0	EPA 624			12/2/15 23:49	DD	S
Ethylbenzene	ND		ug/L	5.0	EPA 624			12/2/15 23:49	DD	S
Methyl t-Butyl Ether	ND		ug/L	5.0	EPA 624			12/2/15 23:49	DD	S
Methylene Chloride	ND		ug/L	5.0	EPA 624			12/2/15 23:49	DD	S
Tetrachloroethene	ND		ug/L	5.0	EPA 624			12/2/15 23:49	DD	S
Toluene	8.6		ug/L	5.0	EPA 624			12/2/15 23:49	DD	S
Total Xylenes	ND		ug/L	15.0	EPA 624			12/2/15 23:49	DD	S
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	100		%	72 - 142	EPA 624			12/2/15 23:49	DD	S
4-Bromofluorobenzene (S)	97.4		%	73 - 119	EPA 624			12/2/15 23:49	DD	S
Dibromofluoromethane (S)	86		%	74 - 132	EPA 624			12/2/15 23:49	DD	S
Toluene-d8 (S)	90.5		%	75 - 133	EPA 624			12/2/15 23:49	DD	S
SEMIVOLATILES										
Benzo(a)anthracene	ND		ug/L	1.4	EPA 625	12/3/15	CAC	12/4/15 09:54	DHF	U
Chrysene	ND		ug/L	1.4	EPA 625	12/3/15	CAC	12/4/15 09:54	DHF	U
bis(2-Ethylhexyl)phthalate	9.1		ug/L	2.8	EPA 625	12/3/15	CAC	12/4/15 09:54	DHF	U
N-Nitroso-di-n-propylamine	ND		ug/L	2.8	EPA 625	12/3/15	CAC	12/4/15 09:54	DHF	U
Phenanthrene	ND		ug/L	1.4	EPA 625	12/3/15	CAC	12/4/15 09:54	DHF	U
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2,4,6-Tribromophenol (S)	100		%	47 - 128	EPA 625	12/3/15	CAC	12/4/15 09:54	DHF	U
2-Fluorobiphenyl (S)	74		%	52 - 118	EPA 625	12/3/15	CAC	12/4/15 09:54	DHF	U
2-Fluorophenol (S)	35.2		%	20 - 87	EPA 625	12/3/15	CAC	12/4/15 09:54	DHF	U
Nitrobenzene-d5 (S)	72.4		%	27 - 139	EPA 625	12/3/15	CAC	12/4/15 09:54	DHF	U
Phenol-d5 (S)	28		%	10 - 81	EPA 625	12/3/15	CAC	12/4/15 09:54	DHF	U
Terphenyl-d14 (S)	81		%	46 - 133	EPA 625	12/3/15	CAC	12/4/15 09:54	DHF	U
Pesticides and PCBs										
Dieldrin	0.023		ug/L	0.019	EPA 608	12/7/15	JSR	12/9/15 17:33	RWS	W
Total Polychlorinated Biphenyl	|		ug/L		EPA 608	12/7/15	JSR	12/9/15 17:33	RWS	W
Aroclor-1016	ND		ug/L	0.47	EPA 608	12/7/15	JSR	12/9/15 17:33	RWS	W
Aroclor-1221	ND		ug/L	0.47	EPA 608	12/7/15	JSR	12/9/15 17:33	RWS	W
Aroclor-1232	ND		ug/L	0.47	EPA 608	12/7/15	JSR	12/9/15 17:33	RWS	W
Aroclor-1242	ND		ug/L	0.47	EPA 608	12/7/15	JSR	12/9/15 17:33	RWS	W

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2110770 2015-LOWER DELAWARE TESTING

Lab ID: **2110770001** Date Collected: 12/1/2015 09:43 Matrix: Water

Sample ID: **CPS/EPS1 (72/28) LTCPWWCSO** Date Received: 12/1/2015 13:55

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Aroclor-1248	ND		ug/L	0.47	EPA 608	12/7/15	JSR	12/9/15 17:33	RWS	W
Aroclor-1254	ND		ug/L	0.47	EPA 608	12/7/15	JSR	12/9/15 17:33	RWS	W
Aroclor-1260	ND		ug/L	0.47	EPA 608	12/7/15	JSR	12/9/15 17:33	RWS	W
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
Decachlorobiphenyls (S)	43.6		%	30 - 150	EPA 608	12/7/15	JSR	12/9/15 17:33	RWS	W
Tetrachloro-m-xylene (S)	52.3		%	36 - 112	EPA 608	12/7/15	JSR	12/9/15 17:33	RWS	W
WET CHEMISTRY										
Ammonia-N	27.4		mg/L	0.100	D6919-09			12/2/15 19:05	JAM	A
Biochemical Oxygen Demand	119		mg/L	2.0	S5210B-11			12/2/15 04:20	GMM	B
Carbonaceous BOD	105		mg/L	2.0	S5210B-11			12/2/15 06:55	GMM	B
Carbonaceous BOD 20 Day	260		mg/L	2.0	S5210B-11			12/2/15 11:27	GMM	B
Cyanide, Total	ND		mg/L	0.0050	EPA 335.4	12/14/15	MMA	12/15/15 00:20	LJF	G
Dissolved Oxygen	2.2		mg/L	1.0	S4500OG-01			12/7/15 07:28	RMM	B
Halogen, Total Organic (TOX)	53.4		ug/L	20.0	SW846 9020B			12/9/15 11:01	PAG	N
Hexavalent Chromium	ND		mg/L	0.010	S3500CrB-09			12/2/15 01:11	MSA	B
Nitrate-N	0.65		mg/L	0.50	EPA 300.0			12/2/15 11:57	JP	B
Nitrite-N	ND		mg/L	0.50	EPA 300.0			12/2/15 11:57	JP	B
Odor	10		T.O.N.	1	S2150B-97			12/2/15 04:05	MSA	M
Oil/Grease Hexane Extractable	20.7		mg/L	2.0	EPA 1664B			12/6/15 14:00	AT	H
Oil/Grease Silica Gel Treated	ND		mg/L	2.0	EPA 1664B			12/6/15 14:00	AT	H
Phenolics	0.050		mg/L	0.005	EPA 420.4	12/14/15	NV	12/17/15 11:42	AMH	J
Phosphorus, Total	3.4		mg/L	0.10	EPA 365.1	12/4/15	NV	12/10/15 04:17	LJF	A
Sulfide, Total	ND		mg/L	1.0	S4500S2F-00			12/2/15 19:10	DRM	L
Surfactants (MBAS)	0.539		mg/L	0.025	S5540C-00			12/3/15 02:25	MBW	K
Total Dissolved Solids	300		mg/L	5	S2540C-11			12/2/15 08:53	ML	B
Total Kjeldahl Nitrogen	33.9		mg/L	4.0	S4500NH3G-11	12/3/15	J1H	12/8/15 11:00	C_W	A
Total Nitrogen	34.6		mg/L	1.20	Calculation			1/6/16 20:51	NJA	A
Total Suspended Solids	190		mg/L	5	S2540D-11			12/1/15 22:18	NV	B
Turbidity	87.2		NTU	0.10	S2130B-01			12/3/15 03:09	MSA	B
METALS										
Hardness	137		mg/L	0.66	EPA 200.7	12/2/15	JPS	12/3/15 13:05	TSS	P1
Trivalent Chromium	ND		mg/L	0.010	Calculation			12/15/15 10:51	AGM	B
Aluminum, Total	0.75		mg/L	0.040	EPA 200.8	12/3/15	JPS	12/4/15 04:29	ZMC	P2
Antimony, Total	ND		mg/L	0.0010	EPA 200.8	12/3/15	JPS	12/4/15 04:29	ZMC	P2

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2110770 2015-LOWER DELAWARE TESTING

Lab ID: **2110770001** Date Collected: 12/1/2015 09:43 Matrix: Water

Sample ID: **CPS/EPS1 (72/28) LTCPWWCSO** Date Received: 12/1/2015 13:55

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
Arsenic, Total	ND		mg/L	0.0015	EPA 200.8	12/3/15	JPS	12/4/15 04:29	ZMC	P2
Cadmium, Total	ND		mg/L	0.00050	EPA 200.8	12/3/15	JPS	12/4/15 04:29	ZMC	P2
Chromium, Total	0.0048		mg/L	0.0010	EPA 200.8	12/3/15	JPS	12/4/15 04:29	ZMC	P2
Copper, Total	0.066		mg/L	0.0025	EPA 200.8	12/3/15	JPS	12/4/15 04:29	ZMC	P2
Iron, Total	2.7		mg/L	0.060	EPA 200.7	12/2/15	JPS	12/3/15 13:05	TSS	P1
Lead, Total	0.0094		mg/L	0.0010	EPA 200.8	12/3/15	JPS	12/4/15 04:29	ZMC	P2
Mercury, Total	ND		mg/L	0.00020	EPA 245.1	12/10/15	MNP	12/10/15 12:09	MNP	P3
Molybdenum, Total	0.0018		mg/L	0.0010	EPA 200.8	12/3/15	JPS	12/4/15 04:29	ZMC	P2
Selenium, Total	ND		mg/L	0.0020	EPA 200.8	12/3/15	JPS	12/4/15 04:29	ZMC	P2
Silver, Total	ND		mg/L	0.0010	EPA 200.8	12/3/15	JPS	12/4/15 04:29	ZMC	P2
Thallium, Total	ND		mg/L	0.00050	EPA 200.8	12/3/15	JPS	12/4/15 04:29	ZMC	P2
Zinc, Total	0.12		mg/L	0.0025	EPA 200.8	12/3/15	JPS	12/4/15 04:29	ZMC	P2
MICROBIOLOGY										
Enterococcus	242000		col/100mL	100	S9230D			12/1/15 14:18	LLJ	R
Fecal Coliform	21000000		col/100mL	1000000	SM9222D+EPA 625/R-92/013 APX F			12/1/15 15:04	LLJ	Q
Sub'd to NELAP CERTIFIED Lab										
Gross Alpha	ND		pCi/L	2.60	EPA 900.0			12/11/15 10:43	SUB	Y
Gross Alpha Uncertainty +/-	1.20		pCi/L		EPA 900.0			12/11/15 10:43	SUB	Y
Gross Beta	10.5		pCi/L	2.80	EPA 900.0			12/11/15 10:43	SUB	Y
Gross Beta Uncertainty +/-	2.40		pCi/L		EPA 900.0			12/11/15 10:43	SUB	Y

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ANALYTICAL RESULTS

Workorder: 2110770 2015-LOWER DELAWARE TESTING

Lab ID: **2110770002** Date Collected: 12/1/2015 09:43 Matrix: Water

Sample ID: **CPS1** Date Received: 12/1/2015 13:55

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	5.0	EPA 624			12/2/15 23:27	DD	S
Bromodichloromethane	ND		ug/L	5.0	EPA 624			12/2/15 23:27	DD	S
Chlorodibromomethane	ND		ug/L	5.0	EPA 624			12/2/15 23:27	DD	S
Chloroform	ND		ug/L	5.0	EPA 624			12/2/15 23:27	DD	S
Ethylbenzene	ND		ug/L	5.0	EPA 624			12/2/15 23:27	DD	S
Methyl t-Butyl Ether	ND		ug/L	5.0	EPA 624			12/2/15 23:27	DD	S
Methylene Chloride	ND		ug/L	5.0	EPA 624			12/2/15 23:27	DD	S
Tetrachloroethene	ND		ug/L	5.0	EPA 624			12/2/15 23:27	DD	S
Toluene	ND		ug/L	5.0	EPA 624			12/2/15 23:27	DD	S
Total Xylenes	ND		ug/L	15.0	EPA 624			12/2/15 23:27	DD	S
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	97.1		%	72 - 142	EPA 624			12/2/15 23:27	DD	S
4-Bromofluorobenzene (S)	97.8		%	73 - 119	EPA 624			12/2/15 23:27	DD	S
Dibromofluoromethane (S)	86.1		%	74 - 132	EPA 624			12/2/15 23:27	DD	S
Toluene-d8 (S)	89.4		%	75 - 133	EPA 624			12/2/15 23:27	DD	S
SEMIVOLATILES										
Benzo(a)anthracene	ND		ug/L	1.4	EPA 625	12/3/15	CAC	12/4/15 10:21	DHF	U
Chrysene	ND		ug/L	1.4	EPA 625	12/3/15	CAC	12/4/15 10:21	DHF	U
bis(2-Ethylhexyl)phthalate	7.3		ug/L	2.8	EPA 625	12/3/15	CAC	12/4/15 10:21	DHF	U
N-Nitroso-di-n-propylamine	ND		ug/L	2.8	EPA 625	12/3/15	CAC	12/4/15 10:21	DHF	U
Phenanthrene	ND		ug/L	1.4	EPA 625	12/3/15	CAC	12/4/15 10:21	DHF	U
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2,4,6-Tribromophenol (S)	98.4		%	47 - 128	EPA 625	12/3/15	CAC	12/4/15 10:21	DHF	U
2-Fluorobiphenyl (S)	74		%	52 - 118	EPA 625	12/3/15	CAC	12/4/15 10:21	DHF	U
2-Fluorophenol (S)	35		%	20 - 87	EPA 625	12/3/15	CAC	12/4/15 10:21	DHF	U
Nitrobenzene-d5 (S)	74.3		%	27 - 139	EPA 625	12/3/15	CAC	12/4/15 10:21	DHF	U
Phenol-d5 (S)	26.6		%	10 - 81	EPA 625	12/3/15	CAC	12/4/15 10:21	DHF	U
Terphenyl-d14 (S)	82.4		%	46 - 133	EPA 625	12/3/15	CAC	12/4/15 10:21	DHF	U
Pesticides and PCBs										
Dieldrin	0.020		ug/L	0.019	EPA 608	12/7/15	JSR	12/9/15 17:55	RWS	W
Total Polychlorinated Biphenyl	|		ug/L		EPA 608	12/7/15	JSR	12/9/15 17:55	RWS	W
Aroclor-1016	ND		ug/L	0.47	EPA 608	12/7/15	JSR	12/9/15 17:55	RWS	W
Aroclor-1221	ND		ug/L	0.47	EPA 608	12/7/15	JSR	12/9/15 17:55	RWS	W
Aroclor-1232	ND		ug/L	0.47	EPA 608	12/7/15	JSR	12/9/15 17:55	RWS	W
Aroclor-1242	ND		ug/L	0.47	EPA 608	12/7/15	JSR	12/9/15 17:55	RWS	W

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2110770 2015-LOWER DELAWARE TESTING

Lab ID: **2110770002** Date Collected: 12/1/2015 09:43 Matrix: Water

Sample ID: **CPS1** Date Received: 12/1/2015 13:55

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Aroclor-1248	ND		ug/L	0.47	EPA 608	12/7/15	JSR	12/9/15 17:55	RWS	W
Aroclor-1254	ND		ug/L	0.47	EPA 608	12/7/15	JSR	12/9/15 17:55	RWS	W
Aroclor-1260	ND		ug/L	0.47	EPA 608	12/7/15	JSR	12/9/15 17:55	RWS	W
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
Decachlorobiphenyls (S)	32.1		%	30 - 150	EPA 608	12/7/15	JSR	12/9/15 17:55	RWS	W
Tetrachloro-m-xylene (S)	51.2		%	36 - 112	EPA 608	12/7/15	JSR	12/9/15 17:55	RWS	W
WET CHEMISTRY										
Ammonia-N	20.0		mg/L	0.100	D6919-09			12/2/15 19:24	JAM	A
Biochemical Oxygen Demand	94.0		mg/L	2.0	S5210B-11			12/2/15 04:20	GMM	B
Carbonaceous BOD	92.3		mg/L	2.0	S5210B-11			12/2/15 06:55	GMM	B
Carbonaceous BOD 20 Day	151		mg/L	2.0	S5210B-11			12/2/15 11:27	GMM	B
Cyanide, Total	ND		mg/L	0.0050	EPA 335.4	12/14/15	MMA	12/15/15 00:20	LJF	G
Dissolved Oxygen	2.5		mg/L	1.0	S4500OG-01			12/7/15 07:28	RMM	B
Halogen, Total Organic (TOX)	36.1		ug/L	20.0	SW846 9020B			12/9/15 11:36	PAG	N
Hexavalent Chromium	ND		mg/L	0.010	S3500CrB-09			12/2/15 01:11	MSA	B
Nitrate-N	0.90		mg/L	0.50	EPA 300.0			12/2/15 12:10	JP	B
Nitrite-N	ND		mg/L	0.50	EPA 300.0			12/2/15 12:10	JP	B
Odor	5		T.O.N.	1	S2150B-97			12/2/15 04:05	MSA	M
Oil/Grease Hexane Extractable	12.4		mg/L	2.1	EPA 1664B			12/6/15 14:00	AT	H
Oil/Grease Silica Gel Treated	ND		mg/L	2.1	EPA 1664B			12/6/15 14:00	AT	H
Phenolics	0.028		mg/L	0.005	EPA 420.4	12/14/15	NV	12/17/15 11:43	AMH	J
Phosphorus, Total	2.5		mg/L	0.10	EPA 365.1	12/4/15	NV	12/10/15 04:17	LJF	A
Sulfide, Total	ND		mg/L	1.0	S4500S2F-00			12/2/15 19:10	DRM	L
Surfactants (MBAS)	0.505		mg/L	0.025	S5540C-00			12/3/15 02:25	MBW	K
Total Dissolved Solids	277		mg/L	5	S2540C-11			12/2/15 08:53	ML	B
Total Kjeldahl Nitrogen	23.5		mg/L	4.0	S4500NH3G-11	12/3/15	J1H	12/8/15 11:00	C_W	A
Total Nitrogen	24.4		mg/L	1.20	Calculation			12/14/15 14:11	NJA	A
Total Suspended Solids	186		mg/L	5	S2540D-11			12/1/15 22:18	NV	B
Turbidity	81.9		NTU	0.10	S2130B-01			12/3/15 03:09	MSA	B
METALS										
Hardness	127		mg/L	0.66	EPA 200.7	12/2/15	JPS	12/3/15 13:17	TSS	P1
Trivalent Chromium	ND		mg/L	0.010	Calculation			12/15/15 10:52	AGM	B
Aluminum, Total	0.40		mg/L	0.040	EPA 200.8	12/3/15	JPS	12/4/15 04:33	ZMC	P2
Antimony, Total	ND		mg/L	0.0010	EPA 200.8	12/3/15	JPS	12/4/15 04:33	ZMC	P2

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ANALYTICAL RESULTS

Workorder: 2110770 2015-LOWER DELAWARE TESTING

Lab ID: **2110770002** Date Collected: 12/1/2015 09:43 Matrix: Water

Sample ID: **CPS1** Date Received: 12/1/2015 13:55

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
Arsenic, Total	ND		mg/L	0.0015	EPA 200.8	12/3/15	JPS	12/4/15 04:33	ZMC	P2
Cadmium, Total	ND		mg/L	0.00050	EPA 200.8	12/3/15	JPS	12/4/15 04:33	ZMC	P2
Chromium, Total	0.0014		mg/L	0.0010	EPA 200.8	12/3/15	JPS	12/4/15 04:33	ZMC	P2
Copper, Total	0.041		mg/L	0.0025	EPA 200.8	12/3/15	JPS	12/4/15 04:33	ZMC	P2
Iron, Total	1.3		mg/L	0.060	EPA 200.7	12/2/15	JPS	12/3/15 13:17	TSS	P1
Lead, Total	0.0096		mg/L	0.0010	EPA 200.8	12/3/15	JPS	12/4/15 04:33	ZMC	P2
Mercury, Total	ND		mg/L	0.00020	EPA 245.1	12/10/15	MNP	12/10/15 12:10	MNP	P3
Molybdenum, Total	0.0012		mg/L	0.0010	EPA 200.8	12/3/15	JPS	12/4/15 04:33	ZMC	P2
Selenium, Total	ND		mg/L	0.0020	EPA 200.8	12/3/15	JPS	12/4/15 04:33	ZMC	P2
Silver, Total	ND		mg/L	0.0010	EPA 200.8	12/3/15	JPS	12/4/15 04:33	ZMC	P2
Thallium, Total	ND		mg/L	0.00050	EPA 200.8	12/3/15	JPS	12/4/15 04:33	ZMC	P2
Zinc, Total	0.13		mg/L	0.0025	EPA 200.8	12/3/15	JPS	12/4/15 04:33	ZMC	P2
MICROBIOLOGY										
Enterococcus	199000		col/100mL	100	S9230D			12/1/15 14:18	LLJ	R
Fecal Coliform	3700000		col/100mL	100000	SM9222D+EPA 625/R-92/013 APX F			12/1/15 16:28	LLJ	Q
Sub'd to NELAP CERTIFIED Lab										
Gross Alpha	ND		pCi/L	2.50	EPA 900.0			12/11/15 10:43	SUB	Y
Gross Alpha Uncertainty +/-	1.00		pCi/L		EPA 900.0			12/11/15 10:43	SUB	Y
Gross Beta	9.50		pCi/L	2.70	EPA 900.0			12/11/15 10:43	SUB	Y
Gross Beta Uncertainty +/-	2.20		pCi/L		EPA 900.0			12/11/15 10:43	SUB	Y

Mr. Brad W Kintzer
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ANALYTICAL RESULTS

Workorder: 2110770 2015-LOWER DELAWARE TESTING

Lab ID: **2110770003** Date Collected: 12/1/2015 09:20 Matrix: Water

Sample ID: **14th & Crozer** Date Received: 12/1/2015 13:55

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	5.0	EPA 624			12/3/15 00:11	DD	S
Bromodichloromethane	ND		ug/L	5.0	EPA 624			12/3/15 00:11	DD	S
Chlorodibromomethane	ND		ug/L	5.0	EPA 624			12/3/15 00:11	DD	S
Chloroform	ND		ug/L	5.0	EPA 624			12/3/15 00:11	DD	S
Ethylbenzene	ND		ug/L	5.0	EPA 624			12/3/15 00:11	DD	S
Methyl t-Butyl Ether	ND		ug/L	5.0	EPA 624			12/3/15 00:11	DD	S
Methylene Chloride	ND		ug/L	5.0	EPA 624			12/3/15 00:11	DD	S
Tetrachloroethene	ND		ug/L	5.0	EPA 624			12/3/15 00:11	DD	S
Toluene	ND		ug/L	5.0	EPA 624			12/3/15 00:11	DD	S
Total Xylenes	ND		ug/L	15.0	EPA 624			12/3/15 00:11	DD	S
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	100		%	72 - 142	EPA 624			12/3/15 00:11	DD	S
4-Bromofluorobenzene (S)	98		%	73 - 119	EPA 624			12/3/15 00:11	DD	S
Dibromofluoromethane (S)	83.4		%	74 - 132	EPA 624			12/3/15 00:11	DD	S
Toluene-d8 (S)	90.5		%	75 - 133	EPA 624			12/3/15 00:11	DD	S
SEMIVOLATILES										
Benzo(a)anthracene	ND		ug/L	1.4	EPA 625	12/4/15	CAC	12/6/15 18:58	GEC	U
Chrysene	ND		ug/L	1.4	EPA 625	12/4/15	CAC	12/6/15 18:58	GEC	U
bis(2-Ethylhexyl)phthalate	8.0		ug/L	2.8	EPA 625	12/4/15	CAC	12/6/15 18:58	GEC	U
N-Nitroso-di-n-propylamine	ND		ug/L	2.8	EPA 625	12/4/15	CAC	12/6/15 18:58	GEC	U
Phenanthrene	ND		ug/L	1.4	EPA 625	12/4/15	CAC	12/6/15 18:58	GEC	U
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2,4,6-Tribromophenol (S)	99.3		%	47 - 128	EPA 625	12/4/15	CAC	12/6/15 18:58	GEC	U
2-Fluorobiphenyl (S)	64.3		%	52 - 118	EPA 625	12/4/15	CAC	12/6/15 18:58	GEC	U
2-Fluorophenol (S)	40.9		%	20 - 87	EPA 625	12/4/15	CAC	12/6/15 18:58	GEC	U
Nitrobenzene-d5 (S)	68.9		%	27 - 139	EPA 625	12/4/15	CAC	12/6/15 18:58	GEC	U
Phenol-d5 (S)	31		%	10 - 81	EPA 625	12/4/15	CAC	12/6/15 18:58	GEC	U
Terphenyl-d14 (S)	85.6		%	46 - 133	EPA 625	12/4/15	CAC	12/6/15 18:58	GEC	U
Pesticides and PCBs										
Dieldrin	ND		ug/L	0.019	EPA 608	12/7/15	JSR	12/9/15 18:18	RWS	W
Total Polychlorinated Biphenyl	|		ug/L		EPA 608	12/7/15	JSR	12/9/15 18:18	RWS	W
Aroclor-1016	ND		ug/L	0.47	EPA 608	12/7/15	JSR	12/9/15 18:18	RWS	W
Aroclor-1221	ND		ug/L	0.47	EPA 608	12/7/15	JSR	12/9/15 18:18	RWS	W
Aroclor-1232	ND		ug/L	0.47	EPA 608	12/7/15	JSR	12/9/15 18:18	RWS	W
Aroclor-1242	ND		ug/L	0.47	EPA 608	12/7/15	JSR	12/9/15 18:18	RWS	W

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ANALYTICAL RESULTS

Workorder: 2110770 2015-LOWER DELAWARE TESTING

Lab ID: **2110770003** Date Collected: 12/1/2015 09:20 Matrix: Water

Sample ID: **14th & Crozer** Date Received: 12/1/2015 13:55

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Aroclor-1248	ND		ug/L	0.47	EPA 608	12/7/15	JSR	12/9/15 18:18	RWS	W
Aroclor-1254	ND		ug/L	0.47	EPA 608	12/7/15	JSR	12/9/15 18:18	RWS	W
Aroclor-1260	ND		ug/L	0.47	EPA 608	12/7/15	JSR	12/9/15 18:18	RWS	W
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
Decachlorobiphenyls (S)	23.9	2	%	30 - 150	EPA 608	12/7/15	JSR	12/9/15 18:18	RWS	W
Tetrachloro-m-xylene (S)	43.8		%	36 - 112	EPA 608	12/7/15	JSR	12/9/15 18:18	RWS	W
WET CHEMISTRY										
Ammonia-N	13.4		mg/L	0.100	D6919-09			12/2/15 19:43	JAM	A
Biochemical Oxygen Demand	81.9		mg/L	2.0	S5210B-11			12/2/15 04:20	GMM	B
Carbonaceous BOD	63.4		mg/L	2.0	S5210B-11			12/2/15 06:55	GMM	B
Carbonaceous BOD 20 Day	72.2		mg/L	2.0	S5210B-11			12/2/15 11:27	GMM	B
Cyanide, Total	ND		mg/L	0.0050	EPA 335.4	12/14/15	MMA	12/15/15 00:20	LJF	G
Dissolved Oxygen	1.5		mg/L	1.0	S4500OG-01			12/7/15 07:28	RMM	B
Halogen, Total Organic (TOX)	41.2		ug/L	20.0	SW846 9020B			12/9/15 12:08	PAG	N
Hexavalent Chromium	ND		mg/L	0.010	S3500CrB-09			12/2/15 01:11	MSA	B
Nitrate-N	2.0		mg/L	0.50	EPA 300.0			12/2/15 07:51	JP	B
Nitrite-N	ND		mg/L	0.50	EPA 300.0			12/2/15 07:51	JP	B
Odor	10		T.O.N.	1	S2150B-97			12/2/15 04:05	MSA	M
Oil/Grease Hexane Extractable	8.4		mg/L	2.0	EPA 1664B			12/6/15 14:00	AT	H
Oil/Grease Silica Gel Treated	ND		mg/L	2.0	EPA 1664B			12/6/15 14:00	AT	H
Phenolics	0.016		mg/L	0.005	EPA 420.4	12/14/15	NV	12/17/15 11:44	AMH	J
Phosphorus, Total	2.3		mg/L	0.10	EPA 365.1	12/4/15	NV	12/10/15 04:17	LJF	A
Sulfide, Total	ND		mg/L	1.0	S4500S2F-00			12/2/15 19:10	DRM	L
Surfactants (MBAS)	0.383		mg/L	0.025	S5540C-00			12/3/15 02:25	MBW	K
Total Dissolved Solids	230		mg/L	5	S2540C-11			12/2/15 08:53	ML	B
Total Kjeldahl Nitrogen	21.0		mg/L	4.0	S4500NH3G-11	12/3/15	J1H	12/8/15 11:00	C_W	A
Total Nitrogen	23.0		mg/L	1.20	Calculation			12/14/15 14:11	NJA	A
Total Suspended Solids	112		mg/L	5	S2540D-11			12/1/15 22:18	NV	B
Turbidity	57.4		NTU	0.10	S2130B-01			12/3/15 03:09	MSA	B
METALS										
Hardness	102		mg/L	0.66	EPA 200.7	12/2/15	JPS	12/3/15 13:21	TSS	P1
Trivalent Chromium	ND		mg/L	0.010	Calculation			12/15/15 10:52	AGM	B
Aluminum, Total	0.25		mg/L	0.040	EPA 200.8	12/3/15	JPS	12/4/15 04:37	ZMC	P2
Antimony, Total	ND		mg/L	0.0010	EPA 200.8	12/3/15	JPS	12/4/15 04:37	ZMC	P2

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ANALYTICAL RESULTS

Workorder: 2110770 2015-LOWER DELAWARE TESTING

Lab ID: **2110770003** Date Collected: 12/1/2015 09:20 Matrix: Water

Sample ID: **14th & Crozer** Date Received: 12/1/2015 13:55

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
Arsenic, Total	ND		mg/L	0.0015	EPA 200.8	12/3/15	JPS	12/4/15 04:37	ZMC	P2
Cadmium, Total	ND		mg/L	0.00050	EPA 200.8	12/3/15	JPS	12/4/15 04:37	ZMC	P2
Chromium, Total	ND		mg/L	0.0010	EPA 200.8	12/3/15	JPS	12/4/15 04:37	ZMC	P2
Copper, Total	0.029		mg/L	0.0025	EPA 200.8	12/3/15	JPS	12/4/15 04:37	ZMC	P2
Iron, Total	0.47		mg/L	0.060	EPA 200.7	12/2/15	JPS	12/3/15 13:21	TSS	P1
Lead, Total	0.0060		mg/L	0.0010	EPA 200.8	12/3/15	JPS	12/4/15 04:37	ZMC	P2
Mercury, Total	ND		mg/L	0.00020	EPA 245.1	12/10/15	MNP	12/10/15 12:11	MNP	P3
Molybdenum, Total	ND		mg/L	0.0010	EPA 200.8	12/3/15	JPS	12/4/15 04:37	ZMC	P2
Selenium, Total	ND		mg/L	0.0020	EPA 200.8	12/3/15	JPS	12/4/15 04:37	ZMC	P2
Silver, Total	ND		mg/L	0.0010	EPA 200.8	12/3/15	JPS	12/4/15 04:37	ZMC	P2
Thallium, Total	ND		mg/L	0.00050	EPA 200.8	12/3/15	JPS	12/4/15 04:37	ZMC	P2
Zinc, Total	0.067		mg/L	0.0025	EPA 200.8	12/3/15	JPS	12/4/15 04:37	ZMC	P2
MICROBIOLOGY										
Enterococcus	173000		col/100mL	100	S9230D			12/1/15 14:18	LLJ	R
Fecal Coliform	1030000	1	col/100mL	10000	SM9222D+EPA 625/R-92/013 APX F			12/1/15 16:28	LLJ	Q
Sub'd to NELAP CERTIFIED Lab										
Gross Alpha	ND		pCi/L	2.30	EPA 900.0			12/11/15 10:43	SUB	Y
Gross Alpha Uncertainty +/-	1.20		pCi/L		EPA 900.0			12/11/15 10:43	SUB	Y
Gross Beta	8.20		pCi/L	2.70	EPA 900.0			12/11/15 10:43	SUB	Y
Gross Beta Uncertainty +/-	2.10		pCi/L		EPA 900.0			12/11/15 10:43	SUB	Y

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ANALYTICAL RESULTS

Workorder: 2110770 2015-LOWER DELAWARE TESTING

Lab ID: **2110770004** Date Collected: 12/1/2015 11:00 Matrix: Water

Sample ID: **Sun & Hancock** Date Received: 12/1/2015 13:55

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	5.0	EPA 624			12/3/15 00:33	DD	S
Bromodichloromethane	ND		ug/L	5.0	EPA 624			12/3/15 00:33	DD	S
Chlorodibromomethane	ND		ug/L	5.0	EPA 624			12/3/15 00:33	DD	S
Chloroform	ND		ug/L	5.0	EPA 624			12/3/15 00:33	DD	S
Ethylbenzene	ND		ug/L	5.0	EPA 624			12/3/15 00:33	DD	S
Methyl t-Butyl Ether	ND		ug/L	5.0	EPA 624			12/3/15 00:33	DD	S
Methylene Chloride	ND		ug/L	5.0	EPA 624			12/3/15 00:33	DD	S
Tetrachloroethene	ND		ug/L	5.0	EPA 624			12/3/15 00:33	DD	S
Toluene	ND		ug/L	5.0	EPA 624			12/3/15 00:33	DD	S
Total Xylenes	ND		ug/L	15.0	EPA 624			12/3/15 00:33	DD	S
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	98.7		%	72 - 142	EPA 624			12/3/15 00:33	DD	S
4-Bromofluorobenzene (S)	95		%	73 - 119	EPA 624			12/3/15 00:33	DD	S
Dibromofluoromethane (S)	85.1		%	74 - 132	EPA 624			12/3/15 00:33	DD	S
Toluene-d8 (S)	90.7		%	75 - 133	EPA 624			12/3/15 00:33	DD	S
SEMIVOLATILES										
Benzo(a)anthracene	ND		ug/L	1.4	EPA 625	12/4/15	CAC	12/6/15 19:23	GEC	U
Chrysene	ND		ug/L	1.4	EPA 625	12/4/15	CAC	12/6/15 19:23	GEC	U
bis(2-Ethylhexyl)phthalate	4.9		ug/L	2.8	EPA 625	12/4/15	CAC	12/6/15 19:23	GEC	U
N-Nitroso-di-n-propylamine	ND		ug/L	2.8	EPA 625	12/4/15	CAC	12/6/15 19:23	GEC	U
Phenanthrene	ND		ug/L	1.4	EPA 625	12/4/15	CAC	12/6/15 19:23	GEC	U
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2,4,6-Tribromophenol (S)	45.9	2	%	47 - 128	EPA 625	12/4/15	CAC	12/6/15 19:23	GEC	U
2-Fluorobiphenyl (S)	69.3		%	52 - 118	EPA 625	12/4/15	CAC	12/6/15 19:23	GEC	U
2-Fluorophenol (S)	17.5	1	%	20 - 87	EPA 625	12/4/15	CAC	12/6/15 19:23	GEC	U
Nitrobenzene-d5 (S)	76.9		%	27 - 139	EPA 625	12/4/15	CAC	12/6/15 19:23	GEC	U
Phenol-d5 (S)	23.6		%	10 - 81	EPA 625	12/4/15	CAC	12/6/15 19:23	GEC	U
Terphenyl-d14 (S)	88.4		%	46 - 133	EPA 625	12/4/15	CAC	12/6/15 19:23	GEC	U
Pesticides and PCBs										
Dieldrin	ND		ug/L	0.019	EPA 608	12/7/15	JSR	12/9/15 18:40	RWS	W
Total Polychlorinated Biphenyl	|		ug/L		EPA 608	12/7/15	JSR	12/9/15 18:40	RWS	W
Aroclor-1016	ND		ug/L	0.47	EPA 608	12/7/15	JSR	12/9/15 18:40	RWS	W
Aroclor-1221	ND		ug/L	0.47	EPA 608	12/7/15	JSR	12/9/15 18:40	RWS	W
Aroclor-1232	ND		ug/L	0.47	EPA 608	12/7/15	JSR	12/9/15 18:40	RWS	W
Aroclor-1242	ND		ug/L	0.47	EPA 608	12/7/15	JSR	12/9/15 18:40	RWS	W

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ANALYTICAL RESULTS

Workorder: 2110770 2015-LOWER DELAWARE TESTING

Lab ID: **2110770004** Date Collected: 12/1/2015 11:00 Matrix: Water

Sample ID: **Sun & Hancock** Date Received: 12/1/2015 13:55

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Aroclor-1248	ND		ug/L	0.47	EPA 608	12/7/15	JSR	12/9/15 18:40	RWS	W
Aroclor-1254	ND		ug/L	0.47	EPA 608	12/7/15	JSR	12/9/15 18:40	RWS	W
Aroclor-1260	ND		ug/L	0.47	EPA 608	12/7/15	JSR	12/9/15 18:40	RWS	W
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
Decachlorobiphenyls (S)	39.8		%	30 - 150	EPA 608	12/7/15	JSR	12/9/15 18:40	RWS	W
Tetrachloro-m-xylene (S)	52.9		%	36 - 112	EPA 608	12/7/15	JSR	12/9/15 18:40	RWS	W
WET CHEMISTRY										
Ammonia-N	3.63		mg/L	0.100	D6919-09			12/2/15 20:02	JAM	A
Biochemical Oxygen Demand	70.7		mg/L	2.0	S5210B-11			12/2/15 04:20	GMM	B
Carbonaceous BOD	49.4		mg/L	2.0	S5210B-11			12/2/15 06:55	GMM	B
Carbonaceous BOD 20 Day	96.8		mg/L	2.0	S5210B-11			12/2/15 11:27	GMM	B
Cyanide, Total	ND		mg/L	0.0050	EPA 335.4	12/14/15	MMA	12/15/15 00:20	LJF	G
Dissolved Oxygen	4.4		mg/L	1.0	S4500OG-01			12/7/15 07:28	RMM	B
Halogen, Total Organic (TOX)	ND		ug/L	20.0	SW846 9020B			12/9/15 12:40	PAG	N
Hexavalent Chromium	ND		mg/L	0.010	S3500CrB-09			12/2/15 01:11	MSA	B
Nitrate-N	ND		mg/L	0.50	EPA 300.0			12/2/15 09:26	JP	B
Nitrite-N	ND		mg/L	0.50	EPA 300.0			12/2/15 09:26	JP	B
Odor	2		T.O.N.	1	S2150B-97			12/2/15 04:05	MSA	M
Oil/Grease Hexane Extractable	2.6		mg/L	2.1	EPA 1664B			12/6/15 14:00	AT	H
Oil/Grease Silica Gel Treated	ND		mg/L	2.1	EPA 1664B			12/6/15 14:00	AT	H
Phenolics	0.009		mg/L	0.005	EPA 420.4	12/14/15	NV	12/17/15 11:45	AMH	J
Phosphorus, Total	1.4		mg/L	0.10	EPA 365.1	12/4/15	NV	12/10/15 04:17	LJF	A
Sulfide, Total	ND		mg/L	1.0	S4500S2F-00			12/2/15 19:10	DRM	L
Surfactants (MBAS)	0.067		mg/L	0.025	S5540C-00			12/3/15 02:25	MBW	K
Total Dissolved Solids	26		mg/L	5	S2540C-11			12/2/15 08:53	ML	B
Total Kjeldahl Nitrogen	8.3		mg/L	4.0	S4500NH3G-11	12/3/15	J1H	12/8/15 11:00	C_W	A
Total Nitrogen	8.30		mg/L	1.20	Calculation			12/14/15 14:11	NJA	A
Total Suspended Solids	200		mg/L	5	S2540D-11			12/1/15 22:18	NV	B
Turbidity	80.6		NTU	0.10	S2130B-01			12/3/15 03:09	MSA	B
METALS										
Hardness	31.5		mg/L	1.7	EPA 200.7	12/3/15	JPS	12/4/15 07:50	TSS	P1
Trivalent Chromium	ND		mg/L	0.010	Calculation			12/15/15 10:53	AGM	B
Aluminum, Total	0.44		mg/L	0.040	EPA 200.8	12/3/15	JPS	12/4/15 04:40	ZMC	P2
Antimony, Total	0.0018		mg/L	0.0010	EPA 200.8	12/3/15	JPS	12/4/15 04:40	ZMC	P2

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ANALYTICAL RESULTS

Workorder: 2110770 2015-LOWER DELAWARE TESTING

Lab ID: **2110770004** Date Collected: 12/1/2015 11:00 Matrix: Water

Sample ID: **Sun & Hancock** Date Received: 12/1/2015 13:55

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
Arsenic, Total	ND		mg/L	0.0015	EPA 200.8	12/3/15	JPS	12/4/15 04:40	ZMC	P2
Cadmium, Total	ND		mg/L	0.00050	EPA 200.8	12/3/15	JPS	12/4/15 04:40	ZMC	P2
Chromium, Total	0.0031		mg/L	0.0010	EPA 200.8	12/3/15	JPS	12/4/15 04:40	ZMC	P2
Copper, Total	0.032		mg/L	0.0025	EPA 200.8	12/3/15	JPS	12/4/15 04:40	ZMC	P2
Iron, Total	1.5		mg/L	0.15	EPA 200.7	12/3/15	JPS	12/4/15 07:50	TSS	P1
Lead, Total	0.020		mg/L	0.0010	EPA 200.8	12/3/15	JPS	12/4/15 04:40	ZMC	P2
Mercury, Total	0.0011		mg/L	0.00020	EPA 245.1	12/10/15	MNP	12/10/15 12:12	MNP	P3
Molybdenum, Total	ND		mg/L	0.0010	EPA 200.8	12/3/15	JPS	12/4/15 04:40	ZMC	P2
Selenium, Total	ND		mg/L	0.0020	EPA 200.8	12/3/15	JPS	12/4/15 04:40	ZMC	P2
Silver, Total	ND		mg/L	0.0010	EPA 200.8	12/3/15	JPS	12/4/15 04:40	ZMC	P2
Thallium, Total	ND		mg/L	0.00050	EPA 200.8	12/3/15	JPS	12/4/15 04:40	ZMC	P2
Zinc, Total	0.20		mg/L	0.0025	EPA 200.8	12/3/15	JPS	12/4/15 04:40	ZMC	P2
MICROBIOLOGY										
Enterococcus	34500		col/100mL	100	S9230D			12/1/15 14:18	LLJ	R
Fecal Coliform	2100000		col/100mL	100000	SM9222D+EPA 625/R-92/013 APX F			12/1/15 16:28	LLJ	Q
Sub'd to NELAP CERTIFIED Lab										
Gross Alpha	2.70		pCi/L	2.40	EPA 900.0			12/11/15 10:43	SUB	Y
Gross Alpha Uncertainty +/-	1.50		pCi/L		EPA 900.0			12/11/15 10:43	SUB	Y
Gross Beta	4.20		pCi/L	2.70	EPA 900.0			12/11/15 10:43	SUB	Y
Gross Beta Uncertainty +/-	1.60		pCi/L		EPA 900.0			12/11/15 10:43	SUB	Y

Mr. Brad W Kintzer
Project Coordinator

PARAMETER QUALIFIERS

Lab ID	#	Sample ID	Analytical Method	Analyte
2110770003	1	14th & Crozer	SM9222D+EPA 625/R-92/013 APX F	Fecal Coliform
This is an estimated result.				
2110770003	2	14th & Crozer	EPA 608	Decachlorobiphenyls
The surrogate Decachlorobiphenyls for method EPA 608 was outside of control limits. The % Recovery was reported as 23.9 and the control limits were 30 to 150. This result was reported at a dilution of 1.				
2110770004	1	Sun & Hancock	EPA 625	2-Fluorophenol
The surrogate 2-Fluorophenol for method EPA 625 was outside of control limits. The % Recovery was reported as 17.5 and the control limits were 20 to 87. This result was reported at a dilution of 1.				
2110770004	2	Sun & Hancock	EPA 625	2,4,6-Tribromophenol
The surrogate 2,4,6-Tribromophenol for method EPA 625 was outside of control limits. The % Recovery was reported as 45.9 and the control limits were 47 to 128. This result was reported at a dilution of 1.				

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CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

* 2 1 1 0 7 7 0 *

Client Name: DELCORA
Address: 3201 W. Front Street
Chester PA 19013
Contact: Mike Krause
Phone#: 610-876-5523 x218
Project Name/#: CSO WW LTCP
Bill To: Same

TAT: [x] Normal-Standard TAT is 10-12 business days. [ ] Rush-Subject to ALS approval and surcharges.
Date Required: _____ Approved By: _____
Email? [x] -Y
Fax? [ ] -Y No.: _____

Sample Description/Location (as it will appear on the lab report)	Sample Date	Time	*G or C	**Matrix	Total Sulfide	CBOD5, CBOD20, BOD5	Metals, Total Hardness	Hexavalent Chromium, Trivalent Chromium	Fecal Coliform	Enterococcus	608	625	624	Gross Alpha/ Beta
Container Type					plastic	plastic	plastic	plastic	plastic	plastic	glass	glass	gla	
Container Size					250ml	1L	500ml	500ml	120ml	120ml	1L	1L	40ml	1L
Preservative					H/Zn(O2C	none	HNO3	none	Na2S2O3	Na2S2O3	none	none	none	None
					Enter Number of Containers Per Sample or Field Results Below.									
1 CPS/ EPS1 (72/28) *	12/1/2015	9:43	G	WW	1	2	1	1	1	1	2	2	2	1
2 CPS1 - Labeled as CPS	12/1/2015	9:43	G	WW	1	2	1	1	1	1	2	2	2	1
3 14th & Crozer	12/1/2015	9:20	G	WW	1	2	1	1	1	1	2	2	2	1
4 Sun & Hancock	12/1/2015	11:00	G	WW	1	2	1	1	1	1	2	2	2	1
5 * Labeled as LTCPWWCSO	AS 12/1/15													
6														
7 MICRO REC'D	W 12/1/15 1355													
8														
9														
10														

Cooler Temp: 4°c Therm ID: IR-284
No. of Coolers: _____ Y N (initial)

	Y	N	(initial)
Custody Seals Present?			
(if present) Seals Intact?			
Received on Ice?	✓		
COC/Labels Complete/Accurate?	✓		
Cont. in Good Cond.?	✓		
Correct Containers?	✓		
Correct Sample Volumes?	✓		
Correct Preservation?	✓		
Headspace/Volatiles?			N/A

Courier/Tracking #:

Sample/COC Comments

ALS Field Services: [x] Pickup [ ] Labor [ ] Composite Sampling [ ] Rental Equipment [ ] Other: _____

Project Comments:

LOGGED BY(signature): _____ DATE 12-1-15 TIME 1223
REVIEWED BY(signature): _____ DATE _____ TIME _____

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1 Raymond Rig	12/1/15	1135	2 Ron Horner	12-1	1135
3	12-1	1305	4 ALS	12/1/15	1305
5 ALS	12/1/15	1355	6	12/1/15	1355
7			8		
9			10		

Data Deliverables: [ ] Standard [ ] CLP-like [ ] USACE [ ]
Special Processing: USACE [ ] Navy [ ] [ ]
State Samples Collected In: [ ] NY [ ] NJ [x] PA [ ] NC [ ]
Reportable to PADEP? Yes [ ] PWSID # _____
Sample Disposal: Lab [ ] Special [ ]
EDDS: Format Type- _____

* G=Grab; C=Composite **Matrix - AI=Air; DW=Drinking Water; GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

ALS ENVIRONMENTAL SHIPPING ADDRESS: 34 DOGWOOD LANE, MIDDLETOWN, PA 17057

Rev 10/11

ALS Environmental
34 Dogwood Lane
Middletown, PA 17057
P. 717-944-5541
F. 717-944-1430

CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

COC #: 2110770 — 2 of 2
ALS Quote #: 514787

Client Name: DELCORA
Address: 3201 W. Front Street, Chester-PA-19013
Contact: Mike Krause
Phone#: 610-876-5523 x218
Project Name/#: CSO WW LTCP
Bill To: Same

TAT: [x] Normal-Standard TAT is 10-12 business days. [ ] Rush-Subject to ALS approval and surcharges.
Date Required: _____ Approved By: _____
Email? [x] -Y
Fax? [ ] -Y No.: _____

Sample Description/Location (as it will appear on the lab report)	Sample Date	Time	*G or C	**Matrix	Oil and Grease	TPH	Nitrate, Nitrite, Turbidity	Total Cyanide	Total Phosphorus, Ammonia, TKN, Total Nitrogen	Phenolics	TOX	TSS, TDS, DO	Odor	MBAS
Container Type					glass	glass	plastic	plastic	plastic	glass	glass	plastic	glass	plastic
Container Size					1L	1L	500ml	500ml	1L	500ml	250ml	1L	1L	2L
Preservative					H2SO4	H2SO4	none	NaOH	H2SO4	H2SO4	H2SO4	none	none	none
					Enter Number of Containers Per Sample or Field Results Below.									
1 CPS/ EPS1 (72/28)	12/1/2015	9:43	G	WW	1	1	1	1	1	1	2	1	1	1
2 CPS1	12/1/2015	9:43	G	WW	1	1	1	1	1	1	2	1	1	1
3 14th & Crozer	12/1/2015	9:20	G	WW	1	1	1	1	1	1	2	1	1	1
4 Sun & Hancock	12/1/2015	11:00	G	WW	1	1	1	1	1	1	2	1	1	1
5														
6														
7														
8														
9														
10														

ANALYSES/METHOD REQUESTED

Receipt Information (completed by Receiving Lab)
Cooler Temp: 4°C Therm ID: TH-294
No. of Coolers: _____

	Y	N	Initial
Custody Seals Present?		✓	AM
(if present) Seals Intact?			
Received on Ice?	✓		
COC/Labels Complete/Accurate?	✓		
Cont. in Good Cond.?	✓		
Correct Containers?	✓		
Correct Sample Volumes?	✓		
Correct Preservation?	✓		
Headspace/Volatiles?			

Courier/Tracking #:

Sample/COC Comments

ALS Field Services: [x] Pickup [ ] Labor [ ] Composite Sampling [ ] Rental Equipment [ ] Other: _____

Project Comments:

LOGGED BY(signature): _____ DATE 12-1-15 TIME 1725
REVIEWED BY(signature): _____ DATE _____ TIME _____

Data Deliverables: [ ] Standard [ ] CLP-like [ ] USACE [ ]
Special Processing: USACE [ ] Navy [ ]
State Samples Collected In: [ ] NY [ ] NJ [x] PA [ ] NC [ ]
Reportable to PADEP? Yes [ ] PWSID # _____
Sample Disposal: Lab [ ] Special [ ]
EDDS: Format Type- _____

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1 Raymond Rios	12.1.15	1135	2 Ron Horgan	12.1	1135
3 Ron H	12.4	1355	4 ALS	12/4/15	1355
5 ALS	12/4/15	1355	6	12/4/15	1355
7			8		
9			10		

*G=Grab; C=Composite
**Matrix - AI=Air; DW=Drinking Water; GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

ALS ENVIRONMENTAL SHIPPING ADDRESS: 34 DOGWOOD LANE, MIDDLETOWN, PA 17057

Rev 10/11

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Environmental • Industrial Hygiene • Field Services
34 Dogwood Lane • Middletown, PA 17057 • 717.944.5541 • Fax: 717.944.1430

CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

COC #: 1 of 1
ALSI Quote #:

Client Name: ALS Environmental
Address: 34 Dogwood Lane
Middletown, PA 17057
Contact: Brad Kintzer
Phone#: (717) 944-5541
Project Name/#:
Bill To: ALS Environmental

TAT [X] Normal-Standard TAT is 10-12 business days.
[ ] Rush-Subject to ALSI approval and surcharges.
Date Required: _____ Approved By: _____
Email? [X] -Y ALMDT.Subcontract@ALSGlobal.com
Fax? [ ] -Y No.: _____

Sample Description/Location (as it will appear on the lab report)	Sample Date	Time	*G or C	**Matrix	Container Type	Container Size	Preservative	Gross Alpha & Beta
					Plastic	1 L	NONE	ANALYSES/METHOD REQUESTED
1 2110770 001	12/1/15	0943	G	WW				1
2 2110770 002	12/1/15	0943	G	WW				1
3 2110770 003	12/1/15	0920	G	WW				1
4 2110770 004	12/1/15	1100	G	WW				1
5								
6								
7								
8								
9								
10								

Receipt Information (completed by Receiving Lab)
Cooler Temp: _____ Therm. ID: _____
No. of Coolers: _____

	Y	N	Initial
Custody Seals Present?			
(If present) Seals Intact?			
Received on Ice?			
COC/Labels Complete/Accurate?			
Cont. in Good Cond.?			
Correct Containers?			
Correct Sample Volumes?			
Correct Preservation?			
Headspace/Volatiles?			

Courier Tracking #: _____

Sample/COC Comments
Subcontract: ALS Ft. Collins

ALSI Field Services: ☐Pickup ☐Labor
☐Composite Sampling ☐Rental Equipment
☐Other: _____

Project Comments:

LOGGED BY(signature): Date: Time:
REVIEWED BY(signature): Date: Time:

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1	12/2/15	1602	2		
3			4		
5			6		
7			8		
9			10		

Data Deliverables: [ ] Standard [ ] CLP-like [ ] USACE [ ]
Special Processing: USACE [ ] Navy [ ]
State Samples Collected In: [ ] NY [ ] NJ [ ] PA [ ] NC [ ] other
Reportable to PADEP? Yes [ ]
PWSID # _____
Sample Disposal: Lab [ ] Special [ ]
EDDs: Format Type: _____

* G=Grab; C=Composite
**Matrix - Al=Air; DW=Drinking Water; GW=Groundwater; Oil=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

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Rev 5/05

Tuesday, December 22, 2015

Brad Kintzer
ALS Environmental
34 Dogwood Lane
Middletown, PA 17057

Re: ALS Workorder: 1512056
Project Name:
Project Number: 2110770

Dear Mr. Kintzer:

Four water samples were received from ALS Environmental, on 12/3/2015. The samples were scheduled for the following analysis:

Gross Alpha/Beta

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental
Jeff R. Kujawa
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Connecticut (CT)	PH-0232
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
L-A-B (DoD ELAP/ISO 170250)	L2257
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

ALS Environmental

1512056

Gross Alpha/Beta:
The samples were analyzed for gross alpha and beta activity by gas flow proportional counting according to the current revision of SOP 724. Gross alpha results are referenced to ^{241}Am. Gross beta results are referenced to $^{90}Sr/Y$.

All acceptance criteria were met.

ADDRESS 225 Commerce Drive, Fort Collins Colorado 80524 USA | PHONE +1 970 490 1511 | FAX +1 970 490 1522
ALS GROUP USA, CORP. Part of the ALS Group An ALS Limited Company

ALS Environmental -- FC

Sample Number(s) Cross-Reference Table

OrderNum: 1512056
Client Name: ALS Environmental
Client Project Name:
Client Project Number: 2110770
Client PO Number: 2110770

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
2110770001	1512056-1		WATER	01-Dec-15	9:43
2110770002	1512056-2		WATER	01-Dec-15	9:43
2110770003	1512056-3		WATER	01-Dec-15	9:20
2110770004	1512056-4		WATER	01-Dec-15	11:00

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CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

COC #: 1 of 1
ALSI Quote #:

Client Name: ALS Environmental
Address: 34 Dogwood Lane, Middletown, PA 17057
Contact: Brad Kintzer
Phone#: (717) 944-5541
Project Name/#:
Bill To: ALS Environmental

TAT [X] Normal-Standard TAT is 10-12 business days. [ ] Rush-Subject to ALSI approval and surcharges.
Date Required: Approved By:
Email? [X] Y ALMOT.Subcontract@ALSGlobal.com
Fax? [ ] Y No:

Sample Description/Location (as it will appear on the lab report)	Sample Date	Time	*G or C	**Matrix	Container Type	Container Size	Preservative	Gross Alpha & Beta								
					Plastic	1L	NONE	ANALYSES/METHOD REQUESTED								
1 2110770 001	12/1/15	0943	G	WW				1								
2 2110770 002	12/1/15	0943	G	WW				1								
3 2110770 003	12/1/15	0920	G	WW				1								
4 2110770 004	12/1/15	1100	G	WW				1								
5																
6																
7																
8																
9																
10																

1 2 3 4

Project Comments:
LOGGED BY(signature): Date Time
REVIEWED BY(signature): Date Time

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1	12/2/15	1602	ALS Environmental	12/5/15	1000
3			4		
5			6		
7			8		
9			10		

Receipt Information (completed by Receiving Lab)
Cooler Temp: Therm. ID:
No. of Coolers:

	Y	N	Initial
Custody Seals Present?			
(if present) Seals Intact?			
Received on Ice?			
COC/Labels Complete/Accurate?			
Cont. in Good Cond.?			
Correct Containers?			
Correct Sample Volumes?			
Correct Preservation?			
Headspace/Volatiles?			

Courier tracking #:

Sample/COC Comments
Subcontract: ALS Ft. Collins

ALSI Field Services: ☐Pickup ☐Labor ☐Composite Sampling ☐Rental Equipment ☐Other:

Data Deliverables: [ ] Standard [ ] CLP-like [X] USACE
Special Processing: USACE [X] Navy [ ]
State Samples Collected in: [ ] NY [ ] NJ [ ] PA [ ] NC [ ] other

Reportable to PADEP? [ ] Yes
Sample Disposal: Lab [ ] Special [ ]
PWSID #:
EDDs: Format Type:

* G=Grab; C=Composite **Matrix - Al=Air; DW=Drinking Water; GW=Groundwater; Oi=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

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5 of 13

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS Penn Workorder No: 1512056

Project Manager: ARK 12.03.15 13:30 JRK Initials: AM Date: 12/3/15

1. Does this project require any special handling in addition to standard ALS procedures?		YES	(NO)
2. Are custody seals on shipping containers intact?	(NONE)	YES	NO
3. Are Custody seals on sample containers intact?	(NONE)	YES	NO
4. Is there a COC (Chain-of-Custody) present or other representative documents?		(YES)	NO
5. Are the COC and bottle labels complete and legible?		(YES)	NO
6. Is the COC in agreement with samples received? (IDs, dates, times, no. of samples, no. of containers, matrix, requested analyses, etc.)		(YES)	NO
7. Were airbills / shipping documents present and/or removable?	(DROP OFF)	(YES)	NO
8. Are all aqueous samples requiring preservation preserved correctly? (excluding volatiles)	N/A	(YES)	NO
9. Are all aqueous non-preserved samples pH 4-9?	(N/A)	YES	NO
10. Is there sufficient sample for the requested analyses?		(YES)	NO
11. Were all samples placed in the proper containers for the requested analyses?		(YES)	NO
12. Are all samples within holding times for the requested analyses?		(YES)	NO
13. Were all sample containers received intact? (not broken or leaking, etc.)		(YES)	NO
14. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, Rx CN/S, radon) headspace free? Size of bubble: ____ < green pea ____ > green pea	(N/A)	YES	NO
15. Do any water samples contain sediment? Amount of sediment: ____ dusting X moderate ____ heavy	N/A	(YES)	NO
16. Were the samples shipped on ice?		YES	(NO)
17. Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #2 #4	(RAD ONLY)	YES	NO

Cooler #:	1						
Temperature (°C):	AMB						
No. of custody seals on cooler:	0						
DOT Survey/ Acceptance Information — External µR/hr reading:	10						
Background µR/hr reading:	11						

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? (YES) NO / NA (If no, see Form 008.)

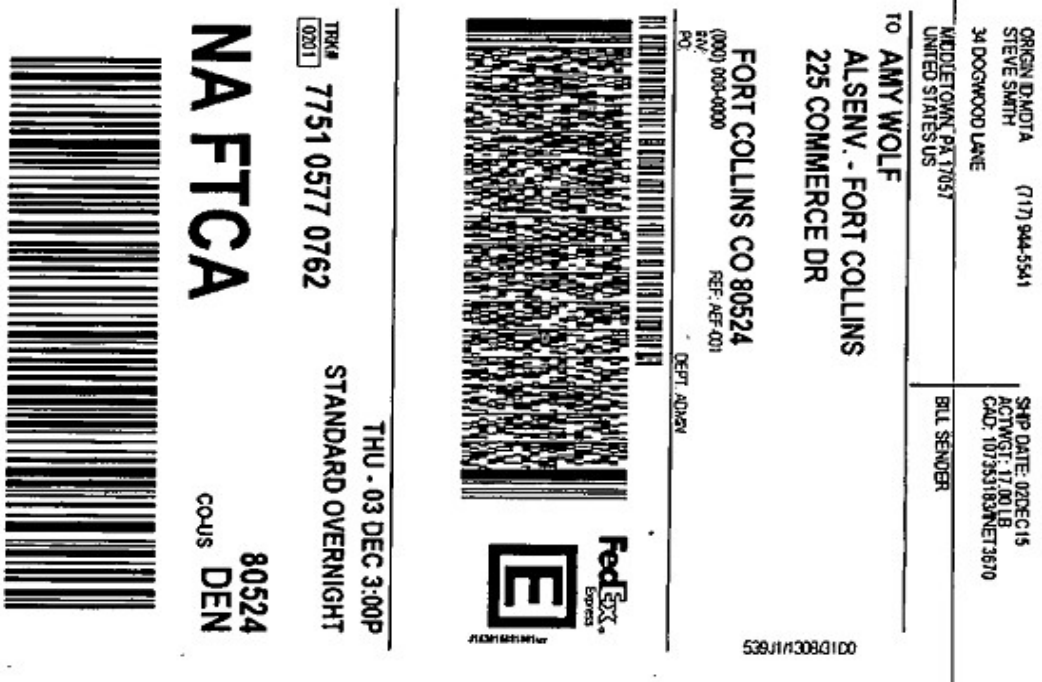
Additional Information: PROVIDE DETAILS BELOW FOR A NO RESPONSE TO ANY QUESTION ABOVE, EXCEPT #1 AND #16.

If applicable, was the client contacted? YES / NO (NA) Contact: _____ Date/Time: _____

Project Manager Signature / Date: 12-3-15

*IR Gun #2: Oakton, SN 29922500201-0066
*IR Gun #4: Oakton, SN 2372220101-0002

Form 201r24.xls (06/04/2012)



After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.
Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

Client:	ALS Environmental	**Date:**	*22-Dec-15*
Project:	2110770	**Work Order:**	1512056
Sample ID:	2110770001	**Lab ID:**	1512056-1
Legal Location:		**Matrix:**	WATER
Collection Date:	12/1/2015 09:43	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Gross Alpha/Beta by GFPC			**PAI 724**		Prep Date: **12/9/2015**	PrepBy: **ECP**
GROSS ALPHA	ND (+/- 1.2)	U	2.6	pCi/l	NA	12/11/2015 10:43
GROSS BETA	**10.5 (+/- 2.4)**		**2.8**	**pCi/l**	NA	12/11/2015 10:43

Client:	ALS Environmental	**Date:**	*22-Dec-15*
Project:	2110770	**Work Order:**	1512056
Sample ID:	2110770002	**Lab ID:**	1512056-2
Legal Location:		**Matrix:**	WATER
Collection Date:	12/1/2015 09:43	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Gross Alpha/Beta by GFPC		**PAI 724**			Prep Date: **12/9/2015**	PrepBy: **ECP**
GROSS ALPHA	ND (+/- 1)	U	2.5	pCi/l	NA	12/11/2015 10:43
GROSS BETA	**9.6 (+/- 2.2)**		**2.7**	**pCi/l**	NA	12/11/2015 10:43

Client:	ALS Environmental	**Date:**	*22-Dec-15*
Project:	2110770	**Work Order:**	1512056
Sample ID:	2110770003	**Lab ID:**	1512056-3
Legal Location:		**Matrix:**	WATER
Collection Date:	12/1/2015 09:20	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Gross Alpha/Beta by GFPC			**PAI 724**		Prep Date: **12/9/2015**	PrepBy: **ECP**
GROSS ALPHA	ND (+/- 1.2)	U	2.3	pCi/l	NA	12/11/2015 10:43
GROSS BETA	**8.2 (+/- 2.1)**		**2.7**	**pCi/l**	NA	12/11/2015 10:43

Client:	ALS Environmental	**Date:**	*22-Dec-15*
Project:	2110770	**Work Order:**	1512056
Sample ID:	2110770004	**Lab ID:**	1512056-4
Legal Location:		**Matrix:**	WATER
Collection Date:	12/1/2015 11:00	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Gross Alpha/Beta by GFPC		**PAI 724**			Prep Date: **12/9/2015**	PrepBy: **ECP**
GROSS ALPHA	2.7 (+/- 1.5)	LT	2.4	pCi/l	NA	12/11/2015 10:43
GROSS BETA	**4.2 (+/- 1.6)**		**2.7**	**pCi/l**	NA	12/11/2015 10:43

Client:	ALS Environmental	**Date:**	*22-Dec-15*
Project:	2110770	**Work Order:**	1512056
Sample ID:	2110770004	**Lab ID:**	1512056-4
Legal Location:		**Matrix:**	WATER
Collection Date:	12/1/2015 11:00	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

U or ND - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
W - DER is greater than Warning Limit of 1.42
* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
G - Sample density differs by more than 15% of LCS density.
D - DER is greater than Control Limit
M - Requested MDC not met.
LT - Result is less than requested MDC but greater than achieved MDC.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS, Matrix Spike Recovery within control limits.
N - Matrix Spike Recovery outside control limits
NC - Not Calculated for duplicate results less than 5 times MDC
B - Analyte concentration greater than MDC.
B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).
U or ND - Indicates that the compound was analyzed for but not detected.
E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.
M - Duplicate injection precision was not met.
N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.
Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.
* - Duplicate analysis (relative percent difference) not within control limits.
S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.
B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.
E - Analyte concentration exceeds the upper level of the calibration range.
J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).
A - A tentatively identified compound is a suspected aldol-condensation product.
X - The analyte was diluted below an accurate quantitation level.
* - The spike recovery is equal to or outside the control criteria used.
+ - The relative percent difference (RPD) equals or exceeds the control criteria.
G - A pattern resembling gasoline was detected in this sample.
D - A pattern resembling diesel was detected in this sample.
M - A pattern resembling motor oil was detected in this sample.
C - A pattern resembling crude oil was detected in this sample.
4 - A pattern resembling JP-4 was detected in this sample.
5 - A pattern resembling JP-5 was detected in this sample.
H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.
L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.
Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

QC BATCH REPORT

Batch ID: **AB151209-3-2** Instrument ID **LB4100-C** Method: **Gross Alpha/Beta by GFPC**

LCS Sample ID: **AB151209-3** Units: **pCi/l** Analysis Date: **12/10/2015 13:22**
Client ID: Run ID: **AB151209-3A** Prep Date: **12/9/2015** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
GROSS ALPHA	235 (+/- 43)	7	225.4		104	70-130					P,M3
GROSS BETA	204 (+/- 35)	12	203.7		100	70-130					P,M3

LCSD Sample ID: **AB151209-3** Units: **pCi/l** Analysis Date: **12/10/2015 13:22**
Client ID: Run ID: **AB151209-3A** Prep Date: **12/9/2015** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
GROSS ALPHA	249 (+/- 45)	8	225.4		111	70-130		235	0.2	2.1	P,M3
GROSS BETA	201 (+/- 35)	12	203.7		98.8	70-130		204	0.05	2.1	P,M3

MB Sample ID: **AB151209-3** Units: **pCi/l** Analysis Date: **12/20/2015 09:01**
Client ID: Run ID: **AB151209-3A** Prep Date: **12/9/2015** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
GROSS ALPHA	ND	0.85									U
GROSS BETA	ND	1.11									U

The following samples were analyzed in this batch:

1512056-1	1512056-2	1512056-3
1512056-4	1511473-9	

ATTACHMENT G

Historical Receiving Water Sampling for the Chester and Ridley Creeks

Dry Events

Sample Date	Site	Test	Result	Units	RDL	Method	Analysis Date
7/20/2010 (Test Run)	CC1	DO	8.38	mg/L		Multimeter Probe	7/20/2010 16:21 PM
		Temperature	25.9	^{0}C			7/20/2010 16:21 PM
		Conductivity	461	µS			7/20/2010 16:21 PM
		pH	7.81	pH			7/20/2010 16:21 PM
		BOD-5	<3	mg/L	3	SM 5210 B	7/21/10 7:45 AM
		TSS	4	mg/L	4	SM 2540D	7/26/10 12:34 PM
		Ammonia as N	<0.2		0.2	SM 4500 NH3 G	7/26/10 11:44 AM
		Digestion, TKN-TP	7/22/2010	Date completed	N/A	EPA 351.2	
		Total Phosphorous as P	0.42	mg/L	0.05	EPA 365.2	7/23/10 11:30 AM
		Fecal Coliform, MF	3400	colonies/100mL	N/A	SM 9222 D	7/20/10 5:49 PM
		Antimony, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 2:29 P.M.
		Arsenic, Total , MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 2:29 P.M.
		Beryllium, Total , MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 2:29 P.M.
		Cadmium, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 2:29 P.M.
		Chromium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 2:29 P.M.
		Copper, Total, ICP	<0.005	mg/L	0.005	EPA 200.7	2/4/2011 10:59 P.M.
		ICP-OES	2/4/2011	Date completed	N/A	EPA 200.7	
		Lead, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 2:29 P.M.
		Metals Preparation, D2002	2/2/2011	Date completed	N/A	EPA 200.2	
		Nickel, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 2:29 P.M.
		Selenium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 2:29 P.M.
		Silver, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 2:29 P.M.
		Thallium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 2:29 P.M.
		Zinc, Total, ICP	0.011	mg/L	0.005	EPA 200.7	2/4/2011 10:59 P.M.
	CC3	DO	6.6	mg/L			7/20/2010 15:05:00 PM
		Temperature	25	^{0}C			7/20/2010 15:05:00 PM
		Conductivity	447	µS			7/20/2010 15:05:00 PM
		pH	7.54	pH			7/20/2010 15:05:00 PM
		BOD-5	<3	mg/L	3	SM 5210 B	7/21/10 7:45 AM
		TSS	6	mg/L	4	SM 2540D	7/26/10 12:34 PM
		Ammonia as N	<0.2		0.2	SM 4500 NH3 G	7/26/10 11:44 AM
		Digestion, TKN-TP	7/22/2010	Date completed	N/A	EPA 351.2	
		Total Phosphorous as P	0.39	mg/L	0.05	EPA 365.2	7/23/10 11:30 AM
		Fecal Coliform, MF	7400	colonies/100mL	N/A	SM 9222 D	7/20/10 5:49 PM
		Antimony, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 2:33 P.M.
		Arsenic, Total , MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 2:33 P.M.
		Beryllium, Total , MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 2:33 P.M.
		Cadmium, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 2:33 P.M.
		Chromium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 2:33 P.M.
		Copper, Total, ICP	<0.005	mg/L	0.005	EPA 200.7	2/4/2011 11:05 P.M.
		ICP-OES	2/4/2011	Date completed	N/A	EPA 200.7	
		Lead, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 2:33 P.M.
		Metals Preparation, D2002	2/2/2011	Date completed	N/A	EPA 200.2	
		Nickel, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 2:33 P.M.
		Selenium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 2:33 P.M.
		Silver, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 2:33 P.M.
		Thallium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 2:33 P.M.
		Zinc, Total, ICP	0.011	mg/L	0.005	EPA 200.7	2/4/2011 11:05 P.M.

Dry Events

Sample Date	Site	Test	Result	Units	RDL	Method	Analysis Date
7/20/2010 (Test Run)	RC1	DO	8.53	mg/L			7/20/2010 15:55 PM
		Temperature	25.6	^{0}C			7/20/2010 15:55 PM
		Conductivity	311	µS			7/20/2010 15:55 PM
		pH	8.05	pH			7/20/2010 15:55 PM
		BOD-5	<3	mg/L	3	SM 5210 B	7/21/10 7:45 AM
		TSS	5	mg/L	4	SM 2540D	7/26/10 12:34 PM
		Ammonia as N	<0.2		0.2	SM 4500 NH3 G	7/26/10 11:44 AM
		Digestion, TKN-TP	7/22/2010	Date completed	N/A	EPA 351.2	
		Total Phosphorous as P	0.13	mg/L	0.05	EPA 365.2	7/23/10 11:30 AM
		Fecal Coliform, MF	1300	colonies/100mL	N/A	SM 9222 D	7/20/10 5:49 PM
		Antimony, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 2:52 P.M.
		Arsenic, Total , MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 2:52 P.M.
		Beryllium, Total , MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 2:52 P.M.
		Cadmium, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 2:52 P.M.
		Chromium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 2:52 P.M.
		Copper, Total, ICP	<0.005	mg/L	0.005	EPA 200.7	2/4/2011 11:11 P.M.
		ICP-OES	2/4/2011	Date completed	N/A	EPA 200.7	
		Lead, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 2:52 P.M.
		Metals Preparation, D2002	2/2/2011	Date completed	N/A	EPA 200.2	
		Nickel, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 2:52 P.M.
		Selenium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 2:52 P.M.
		Silver, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 2:52 P.M.
		Thallium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 2:52 P.M.
		Zinc, Total, ICP	0.012	mg/L	0.005	EPA 200.7	2/4/2011 11:11 P.M.
	RC3	DO	7.39	mg/L			7/20/2010 15:25 AM
		Temperature	26	^{0}C			7/20/2010 15:25 AM
		Conductivity	333	µS			7/20/2010 15:25 AM
		pH	7.57	pH			7/20/2010 15:25 AM
		BOD-5	<3	mg/L	3	SM 5210 B	7/21/10 7:45 AM
		TSS	13	mg/L	4	SM 2540D	7/26/10 12:34 PM
		Ammonia as N	<0.2		0.2	SM 4500 NH3 G	7/26/10 11:44 AM
		Digestion, TKN-TP	7/22/2010	Date completed	N/A	EPA 351.2	
		Total Phosphorous as P	0.16	mg/L	0.05	EPA 365.2	7/23/10 11:30 AM
		Fecal Coliform, MF	3200	colonies/100mL	N/A	SM 9222 D	7/20/10 5:49 PM
		Antimony, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 2:56 P.M.
		Arsenic, Total , MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 2:56 P.M.
		Beryllium, Total , MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 2:56 P.M.
		Cadmium, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 2:56 P.M.
		Chromium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 2:56 P.M.
		Copper, Total, ICP	<0.005	mg/L	0.005	EPA 200.7	2/4/2011 11:17 P.M.
		ICP-OES	2/4/2011	Date completed	N/A	EPA 200.7	
		Lead, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 2:56 P.M.
		Metals Preparation, D2002	2/2/2011	Date completed	N/A	EPA 200.2	
		Nickel, Total, MS	0.002	mg/L	0.002	EPA 200.8	2/4/2011 2:56 P.M.
		Selenium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 2:56 P.M.
		Silver, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 2:56 P.M.
		Thallium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 2:56 P.M.
		Zinc, Total, ICP	0.014	mg/L	0.005	EPA 200.7	2/4/2011 11:17 P.M.

Dry Events

Sample Date	Site	Test	Result	Units	RDL	Method	Analysis Date
7/23/2010 (Run 1)	CC1	DO	8.44	mg/L		Multimeter Probe	7/23/10 10:05 AM
		Temperature	25.2	^{0}C			7/23/10 10:05 AM
		Conductivity	483	µS			7/23/10 10:05 AM
		pH	7.81	pH			7/23/10 10:05 AM
		BOD-5	<3	mg/L	3	SM 5210 B	7/23/10 4:00 PM
		TSS	<4	mg/L	4	SM 2540D	7/29/10 10:09 AM
		Ammonia as N	<0.2		0.2	SM 4500 NH3 G	7/26/10 3:30 PM
		Digestion, TKN-TP	07/30/010	Date completed	N/A	EPA 351.2	
		Total Phosphorous as P	0.36	mg/L	0.05	EPA 365.2	7/30/10 10:01 AM
		Fecal Coliform, MF	1400	colonies/100mL	N/A	SM 9222 D	7/23/10 2:55 PM
		Antimony, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:00 P.M.
		Arsenic, Total , MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:00 P.M.
		Beryllium, Total , MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 3:00 P.M.
		Cadmium, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 3:00 P.M.
		Chromium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:00 P.M.
		Copper, Total, ICP	<0.005	mg/L	0.005	EPA 200.7	2/4/2011 11:23 P.M.
		ICP-OES	2/4/2011	Date completed	N/A	EPA 200.7	
		Lead, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:00 P.M.
		Metals Preparation, D2002	2/2/2011	Date completed	N/A	EPA 200.2	
		Nickel, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:00 P.M.
		Selenium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:00 P.M.
		Silver, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 3:00 P.M.
		Thallium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:00 P.M.
		Zinc, Total, ICP	0.016	mg/L	0.005	EPA 200.7	2/4/2011 11:23 P.M.
	CC3	DO	5.86	mg/L			7/23/10 9:10 AM
		Temperature	25.7	^{0}C			7/23/10 9:10 AM
		Conductivity	390	µS			7/23/10 9:10 AM
		pH	7.54	pH			7/23/10 9:10 AM
		BOD-5	<9	mg/L	3	SM 5210 B	7/23/10 4:00 PM
		TSS	18	mg/L	4	SM 2540D	7/29/10 10:09 AM
		Ammonia as N	<0.2		0.2	SM 4500 NH3 G	7/26/10 3:30 PM
		Digestion, TKN-TP	7/30/2010	Date completed	N/A	EPA 351.2	
		Total Phosphorous as P	0.09	mg/L	0.05	EPA 365.2	7/30/10 10:01 AM
		Fecal Coliform, MF	580	colonies/100mL	N/A	SM 9222 D	7/23/10 2:55 PM
		Antimony, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:04 P.M.
		Arsenic, Total , MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:04 P.M.
		Beryllium, Total , MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 3:04 P.M.
		Cadmium, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 3:04 P.M.
		Chromium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:04 P.M.
		Copper, Total, ICP	<0.005	mg/L	0.005	EPA 200.7	2/4/2011 11:34 P.M.
		ICP-OES	2/4/2011	Date completed	N/A	EPA 200.7	
		Lead, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:04 P.M.
		Metals Preparation, D2002	2/2/2011	Date completed	N/A	EPA 200.2	
		Nickel, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:04 P.M.
		Selenium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:04 P.M.
		Silver, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 3:04 P.M.
		Thallium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:04 P.M.
		Zinc, Total, ICP	0.011	mg/L	0.005	EPA 200.7	2/4/2011 11:34 P.M.

Dry Events

Sample Date	Site	Test	Result	Units	RDL	Method	Analysis Date
7/23/2010 (Run 1)	RC1	DO	9.18	mg/L			7/23/10 9:50 AM
		Temperature	24.4	^{o}C			7/23/10 9:50 AM
		Conductivity	332	µS			7/23/10 9:50 AM
		pH	8.03	pH			7/23/10 9:50 AM
		BOD-5	<3	mg/L	3	SM 5210 B	7/23/10 4:00 PM
		TSS	<4	mg/L	4	SM 2540D	7/29/10 10:09 AM
		Ammonia as N	<0.2		0.2	SM 4500 NH3 G	7/26/10 3:30 PM
		Digestion, TKN-TP	7/30/2010	Date completed	N/A	EPA 351.2	
		Total Phosphorous as P	0.16	mg/L	0.05	EPA 365.2	7/30/10 10:01 AM
		Fecal Coliform, MF	590	colonies/100mL	N/A	SM 9222 D	7/23/10 2:55 PM
		Antimony, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:28 P.M.
		Arsenic, Total , MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:28 P.M.
		Beryllium, Total , MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 3:28 P.M.
		Cadmium, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 3:28 P.M.
		Chromium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:28 P.M.
		Copper, Total, ICP	<0.005	mg/L	0.005	EPA 200.7	2/5/2011 12:09 A.M.
		ICP-OES	2/5/2011	Date completed	N/A	EPA 200.7	
		Lead, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:28 P.M.
		Metals Preparation, D2002	2/2/2011	Date completed	N/A	EPA 200.2	
		Nickel, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:28 P.M.
		Selenium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:28 P.M.
		Silver, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 3:28 P.M.
		Thallium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:28 P.M.
		Zinc, Total, ICP	0.006	mg/L	0.005	EPA 200.7	2/5/2011 12:09 A.M.
	RC3	DO	6.12	mg/L			7/23/10 9:25 AM
		Temperature	28.6	^{o}C			7/23/10 9:25 AM
		Conductivity	366	µS			7/23/10 9:25 AM
		pH	7.39	pH			7/23/10 9:25 AM
		BOD-5	5	mg/L	3	SM 5210 B	7/23/10 4:00 PM
		TSS	22	mg/L	4	SM 2540D	7/29/10 10:09 AM
		Ammonia as N	<0.2		0.2	SM 4500 NH3 G	7/26/10 3:30 PM
		Digestion, TKN-TP	7/30/2010	Date completed	N/A	EPA 351.2	
		Total Phosphorous as P	0.07	mg/L	0.05	EPA 365.2	7/30/10 10:01 AM
		Fecal Coliform, MF	540	colonies/100mL	N/A	SM 9222 D	7/23/10 2:55 PM
		Antimony, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:32 P.M.
		Arsenic, Total , MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:32 P.M.
		Beryllium, Total , MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 3:32 P.M.
		Cadmium, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 3:32 P.M.
		Chromium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:32 P.M.
		Copper, Total, ICP	<0.005	mg/L	0.005	EPA 200.7	2/5/2011 12:15 A.M.
		ICP-OES	2/5/2011	Date completed	N/A	EPA 200.7	
		Lead, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:32 P.M.
		Metals Preparation, D2002	2/2/2011	Date completed	N/A	EPA 200.2	
		Nickel, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:32 P.M.
		Selenium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:32 P.M.
		Silver, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 3:32 P.M.
		Thallium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:32 P.M.
		Zinc, Total, ICP	0.014	mg/L	0.005	EPA 200.7	2/5/2011 12:15 A.M.

Dry Events

Sample Date	Site	Test	Result	Units	RDL	Method	Analysis Date
8/12/2010 (Attempted Wet Run, Rained but not hard enough)	CC1	DO	5.65	mg/L		Multimeter Probe	8/12/10 10:02 AM
		Temperature	25.1	^{0}C			8/12/10 10:02 AM
		Conductivity	597	µS			8/12/10 10:02 AM
		pH	7.39	pH			8/12/10 10:02 AM
		BOD-5	229	mg/L	3	SM 5210 B	8/12/10 2:50 PM
		TSS	7	mg/L	4	SM 2540D	8/17/10 2:10 PM
		Ammonia as N	<0.2		0.2	SM 4500 NH3 G	8/18/10 10:49 AM
		Digestion, TKN-TP	8/17/2010	Date completed	N/A	EPA 351.2	
		Total Phosphorous as P	0.57	mg/L	0.05	EPA 365.2	8/17/10 1:39 PM
		Fecal Coliform, MF	9700	colonies/100mL	N/A	SM 9222 D	8/12/10 2:38 PM
		Antimony, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:36 P.M.
		Arsenic, Total , MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:36 P.M.
		Beryllium, Total , MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 3:36 P.M.
		Cadmium, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 3:36 P.M.
		Chromium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:36 P.M.
		Copper, Total, ICP	0.007	mg/L	0.005	EPA 200.7	2/5/2011 12:21 A.M.
		ICP-OES	2/5/2011	Date completed	N/A	EPA 200.7	
		Lead, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:36 P.M.
		Metals Preparation, D2002	2/2/2011	Date completed	N/A	EPA 200.2	
		Nickel, Total, MS	0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:36 P.M.
		Selenium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:36 P.M.
		Silver, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 3:36 P.M.
		Thallium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:36 P.M.
		Zinc, Total, ICP	0.019	mg/L	0.005	EPA 200.7	2/5/2011 12:21 A.M.
	CC3	DO	5.42	mg/L			8/12/10 9:09 AM
		Temperature	25.1	^{0}C			8/12/10 9:09 AM
		Conductivity	651	µS			8/12/10 9:09 AM
		pH	7.47	pH			8/12/10 9:09 AM
		BOD-5	<3	mg/L	3	SM 5210 B	8/13/10 11:00 AM
		TSS	12	mg/L	4	SM 2540D	8/17/10 2:10 PM
		Ammonia as N	<.2		0.2	SM 4500 NH3 G	8/18/10 10:49 AM
		Digestion, TKN-TP	8/17/2010	Date completed	N/A	EPA 351.2	
		Total Phosphorous as P	0.5	mg/L	0.05	EPA 365.2	8/17/10 1:39 PM
		Fecal Coliform, MF	830	colonies/100mL	N/A	SM 9222 D	8/12/10 2:38 PM
		Antimony, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:56 P.M.
		Arsenic, Total , MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:56 P.M.
		Beryllium, Total , MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 3:56 P.M.
		Cadmium, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 3:56 P.M.
		Chromium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:56 P.M.
		Copper, Total, ICP	0.006	mg/L	0.005	EPA 200.7	2/5/2011 12:26 A.M.
		ICP-OES	2/5/2011	Date completed	N/A	EPA 200.7	
		Lead, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:56 P.M.
		Metals Preparation, D2002	2/2/2011	Date completed	N/A	EPA 200.2	
		Nickel, Total, MS	0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:56 P.M.
		Selenium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:56 P.M.
		Silver, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 3:56 P.M.
		Thallium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:56 P.M.
		Zinc, Total, ICP	0.018	mg/L	0.005	EPA 200.7	2/5/2011 12:26 A.M.

Dry Events

Sample Date	Site	Test	Result	Units	RDL	Method	Analysis Date
8/12/2010 (Attempted Wet Run, Rained but not hard enough)	RC1	DO	6.85	mg/L			8/12/10 9:49 AM
		Temperature	24.4	^{o}C			8/12/10 9:49 AM
		Conductivity	407	µS			8/12/10 9:49 AM
		pH	7.38	pH			8/12/10 9:49 AM
		BOD-5	<3	mg/L	3	SM 5210 B	8/13/10 11:00 AM
		TSS	<4	mg/L	4	SM 2540D	8/17/10 2:10 PM
		Ammonia as N	<.2		0.2	SM 4500 NH3 G	8/18/10 10:49 AM
		Digestion, TKN-TP	8/17/2010	Date completed	N/A	EPA 351.2	
		Total Phosphorous as P	0.3	mg/L	0.05	EPA 365.2	8/17/10 1:39 PM
		Fecal Coliform, MF	720	colonies/100mL	N/A	SM 9222 D	8/12/10 2:38 PM
		Antimony, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:59 P.M.
		Arsenic, Total , MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:59 P.M.
		Beryllium, Total , MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 3:59 P.M.
		Cadmium, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 3:59 P.M.
		Chromium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:59 P.M.
		Copper, Total, ICP	<0.005	mg/L	0.005	EPA 200.7	2/5/2011 12:32 A.M.
		ICP-OES	2/5/2011	Date completed	N/A	EPA 200.7	
		Lead, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:59 P.M.
		Metals Preparation, D2002	2/2/2011	Date completed	N/A	EPA 200.2	
		Nickel, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:59 P.M.
		Selenium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:59 P.M.
		Silver, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 3:59 P.M.
		Thallium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 3:59 P.M.
		Zinc, Total, ICP	0.012	mg/L	0.005	EPA 200.7	2/5/2011 12:32 A.M.
	RC3	DO		mg/L			8/12/10 9:22 AM
		Temperature	25.4	^{o}C			8/12/10 9:22 AM
		Conductivity		µS			8/12/10 9:22 AM
		pH	7.2	pH			8/12/10 9:22 AM
		BOD-5	<3	mg/L	3	SM 5210 B	8/13/10 11:00 AM
		TSS	8	mg/L	4	SM 2540D	8/17/10 2:10 PM
		Ammonia as N	<.2		0.2	SM 4500 NH3 G	8/18/10 10:49 AM
		Digestion, TKN-TP	8/17/2010	Date completed	N/A	EPA 351.2	
		Total Phosphorous as P	0.27	mg/L	0.05	EPA 365.2	8/17/10 1:39 PM
		Fecal Coliform, MF	880	colonies/100mL	N/A	SM 9222 D	8/12/10 2:38 PM
		Antimony, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 4:03 P.M.
		Arsenic, Total , MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 4:03 P.M.
		Beryllium, Total , MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 4:03 P.M.
		Cadmium, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 4:03 P.M.
		Chromium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 4:03 P.M.
		Copper, Total, ICP	<0.005	mg/L	0.005	EPA 200.7	2/5/2011 12:38 A.M.
		ICP-OES	2/5/2011	Date completed	N/A	EPA 200.7	
		Lead, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 4:03 P.M.
		Metals Preparation, D2002	2/2/2011	Date completed	N/A	EPA 200.2	
		Nickel, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 4:03 P.M.
		Selenium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 4:03 P.M.
		Silver, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 4:03 P.M.
		Thallium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 4:03 P.M.
		Zinc, Total, ICP	0.01	mg/L	0.005	EPA 200.7	2/5/2011 12:38 A.M.

Dry Events

Sample Date	Site	Test	Result	Units	RDL	Method	Analysis Date
9/30/2010	CC1	DO	8.36	mg/L		Multimeter Probe	9/30/10 10:12 AM
		Temperature	21	^{0}C			9/30/10 10:12 AM
		Conductivity	202	µS			9/30/10 10:12 AM
		pH	7.76	pH			9/30/10 10:12 AM
		BOD-5	<4	mg/L	3	SM 5210 B	10/1/10 11:15 AM
		TSS	158	mg/L	4	SM 2540D	10/4/10 1:50 PM
		Ammonia as N	<.2		0.2	SM 4500 NH3 G	10/2/10 11:50 AM
		Digestion, TKN-TP	10/5/2010	Date completed	N/A	EPA 351.2	
		Total Phosphorous as P	0.46	mg/L	0.05	EPA 365.2	10/11/10 11:58 AM
		Fecal Coliform, MF	>10000	colonies/100mL	N/A	SM 9222 D	9/30/10 2:32 PM
		Antimony, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 4:23 P.M.
		Arsenic, Total , MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 4:23 P.M.
		Beryllium, Total , MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 4:23 P.M.
		Cadmium, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 4:23 P.M.
		Chromium, Total, MS	0.016	mg/L	0.002	EPA 200.8	2/4/2011 4:23 P.M.
		Copper, Total, ICP	0.017	mg/L	0.005	EPA 200.7	2/8/2011 3:27 P.M.
		ICP-OES	2/8/2011	Date completed	N/A	EPA 200.7	
		Lead, Total, MS	0.013	mg/L	0.002	EPA 200.8	2/4/2011 4:23 P.M.
		Metals Preparation, D2002	2/2/2011	Date completed	N/A	EPA 200.2	
		Nickel, Total, MS	0.019	mg/L	0.002	EPA 200.8	2/4/2011 4:23 P.M.
		Selenium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 4:23 P.M.
		Silver, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 4:23 P.M.
		Thallium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 4:23 P.M.
		Zinc, Total, ICP	0.051	mg/L	0.005	EPA 200.7	2/8/2011 3:27 P.M.
	CC3	DO	7.33	mg/L			9/30/10 10:28 AM
		Temperature	21.5	^{0}C			9/30/10 10:28 AM
		Conductivity	206	µS			9/30/10 10:28 AM
		pH	7.73	pH			9/30/10 10:28 AM
		BOD-5	8	mg/L	3	SM 5210 B	10/1/10 11:15 AM
		TSS	56	mg/L	4	SM 2540D	10/4/10 1:50 PM
		Ammonia as N	<.2		0.2	SM 4500 NH3 G	10/2/10 11:50 AM
		Digestion, TKN-TP	10/5/2010	Date completed	N/A	EPA 351.2	
		Total Phosphorous as P	0.21	mg/L	0.05	EPA 365.2	10/11/10 11:58 AM
		Fecal Coliform, MF	>10000	colonies/100mL	N/A	SM 9222 D	9/30/10 2:32 PM
		Antimony, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:07 P.M.
		Arsenic, Total , MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:07 P.M.
		Beryllium, Total , MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 5:07 P.M.
		Cadmium, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 5:07 P.M.
		Chromium, Total, MS	0.005	mg/L	0.002	EPA 200.8	2/4/2011 5:07 P.M.
		Copper, Total, ICP	0.008	mg/L	0.005	EPA 200.7	2/8/2011 3:50 P.M.
		ICP-OES	2/8/2011	Date completed	N/A	EPA 200.7	
		Lead, Total, MS	0.006	mg/L	0.002	EPA 200.8	2/4/2011 5:07 P.M.
		Metals Preparation, D2002	2/2/2011	Date completed	N/A	EPA 200.2	
		Nickel, Total, MS	0.003	mg/L	0.002	EPA 200.8	2/4/2011 5:07 P.M.
		Selenium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:07 P.M.
		Silver, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 5:07 P.M.
		Thallium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:07 P.M.
		Zinc, Total, ICP	0.027	mg/L	0.005	EPA 200.7	2/8/2011 3:50 P.M.

Dry Events

Sample Date	Site	Test	Result	Units	RDL	Method	Analysis Date
9/30/2010	RC1	DO	7.49	mg/L			9/30/10 9:48 AM
		Temperature	21.4	^{o}C			9/30/10 9:48 AM
		Conductivity	209	µS			9/30/10 9:48 AM
		pH	6.3	pH			9/30/10 9:48 AM
		BOD-5	<4	mg/L	3	SM 5210 B	10/1/10 11:15 AM
		TSS	58	mg/L	4	SM 2540D	10/4/10 1:50 PM
		Ammonia as N	<.2		0.2	SM 4500 NH3 G	10/2/10 11:50 AM
		Digestion, TKN-TP	10/5/2010	Date completed	N/A	EPA 351.2	
		Total Phosphorous as P	0.26	mg/L	0.05	EPA 365.2	10/11/10 11:58 AM
		Fecal Coliform, MF	>10000	colonies/100mL	N/A	SM 9222 D	9/30/10 2:32 PM
		Antimony, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:10 P.M.
		Arsenic, Total , MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:10 P.M.
		Beryllium, Total , MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 5:10 P.M.
		Cadmium, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 5:10 P.M.
		Chromium, Total, MS	0.005	mg/L	0.002	EPA 200.8	2/4/2011 5:10 P.M.
		Copper, Total, ICP	0.015	mg/L	0.005	EPA 200.7	2/8/2011 3:56 P.M.
		ICP-OES	2/8/2011	Date completed	N/A	EPA 200.7	
		Lead, Total, MS	0.008	mg/L	0.002	EPA 200.8	2/4/2011 5:10 P.M.
		Metals Preparation, D2002	2/2/2011	Date completed	N/A	EPA 200.2	
		Nickel, Total, MS	0.006	mg/L	0.002	EPA 200.8	2/4/2011 5:10 P.M.
		Selenium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:10 P.M.
		Silver, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 5:10 P.M.
		Thallium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:10 P.M.
		Zinc, Total, ICP	0.034	mg/L	0.005	EPA 200.7	2/8/2011 3:56 P.M.
	RC3	DO	7.09	mg/L			9/30/10 9:53 AM
		Temperature	21.6	^{o}C			9/30/10 9:53 AM
		Conductivity	172.5	µS			9/30/10 9:53 AM
		pH	7.52	pH			9/30/10 9:53 AM
		BOD-5	6	mg/L	3	SM 5210 B	10/1/10 11:15 AM
		TSS	44	mg/L	4	SM 2540D	10/4/10 1:50 PM
		Ammonia as N	<.2		0.2	SM 4500 NH3 G	10/2/10 11:50 AM
		Digestion, TKN-TP	10/5/2010	Date completed	N/A	EPA 351.2	
		Total Phosphorous as P	0.2	mg/L	0.05	EPA 365.2	10/11/10 11:58 AM
		Fecal Coliform, MF	>10000	colonies/100mL	N/A	SM 9222 D	9/30/10 2:32 PM
		Antimony, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:14 P.M.
		Arsenic, Total , MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:14 P.M.
		Beryllium, Total , MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 5:14 P.M.
		Cadmium, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 5:14 P.M.
		Chromium, Total, MS	0.003	mg/L	0.002	EPA 200.8	2/4/2011 5:14 P.M.
		Copper, Total, ICP	0.009	mg/L	0.005	EPA 200.7	2/8/2011 4:02 P.M.
		ICP-OES	2/8/2011	Date completed	N/A	EPA 200.7	
		Lead, Total, MS	0.004	mg/L	0.002	EPA 200.8	2/4/2011 5:14 P.M.
		Metals Preparation, D2002	2/2/2011	Date completed	N/A	EPA 200.2	
		Nickel, Total, MS	0.004	mg/L	0.002	EPA 200.8	2/4/2011 5:14 P.M.
		Selenium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:14 P.M.
		Silver, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 5:14 P.M.
		Thallium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:14 P.M.
		Zinc, Total, ICP	0.029	mg/L	0.005	EPA 200.7	2/8/2011 4:02 P.M.

Wet Events

T+0							
Sample Date	**Site**	**Test**	**Result**	**Units**	**RDL**	**Method**	**Analysis Date**
10/14/2010	CC1	DO	8.5	mg/L		Multimeter Probe	12:54 P.M.
		Temperature	14.5	^{0}C			12:54 P.M.
		Conductivity	497	µS			12:54 P.M.
		pH	7.6				12:54 P.M.
		BOD-5	<4	mg/L	3	SM 5210 B	10/15/2010 11:00 A.M.
		TSS	<4	mg/L	4	SM 2540D	10/18/2010 9:31 A.M.
		Ammonia as N	<0.2		0.2	SM 4500 NH3 G	10/21/2010 1:04 P.M.
		Digestion, TKN-TP	10/18/2010	Date completed	N/A	EPA 351.2	
		Total Phosphorous as P	0.31	mg/L	0.05	EPA 365.2	10/19/2010 12:39 P.M.
		Fecal Coliform, MF	240	colonies/100mL	N/A	SM 9221 E	10/14/2010 5:35 P.M.
		Antimony, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:18 P.M.
		Arsenic, Total , MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:18 P.M.
		Beryllium, Total , MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 5:18 P.M.
		Cadmium, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 5:18 P.M.
		Chromium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:18 P.M.
		Copper, Total, ICP	0.007	mg/L	0.005	EPA 200.7	2/8/2011 4:08 P.M.
		ICP-OES	2/8/2011	Date completed	N/A	EPA 200.7	
		Lead, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:18 P.M.
		Metals Preparation, D2002	2/2/2011	Date completed	N/A	EPA 200.2	
		Nickel, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:18 P.M.
		Selenium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:18 P.M.
		Silver, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 5:18 P.M.
		Thallium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:18 P.M.
		Zinc, Total, ICP	0.02	mg/L	0.005	EPA 200.7	2/8/2011 4:08 P.M.
	CC3	DO	7.2	mg/L			11:45 A.M.
		Temperature	15.1	^{0}C			11:45 A.M.
		Conductivity	480	µS			11:45 A.M.
		pH	7.34				11:45 A.M.
		BOD-5	<4	mg/L	3	SM 5210 B	10/15/2010 11:00 A.M.
		TSS	<4	mg/L	4	SM 2540D	10/18/2010 9:31 A.M.
		Ammonia as N	<0.2		0.2	SM 4500 NH3 G	10/21/2010 1:01 P.M.
		Digestion, TKN-TP	10/19/2010	Date completed	N/A	EPA 351.2	
		Total Phosphorous as P	0.33	mg/L	0.05	EPA 365.2	10/19/2010 12:39 P.M.
		Fecal Coliform, MF	350	colonies/100mL	N/A	SM 9221 E	10/14/2010 5:21 P.M.
		Antimony, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:22 P.M.
		Arsenic, Total , MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:22 P.M.
		Beryllium, Total , MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 5:22 P.M.
		Cadmium, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 5:22 P.M.
		Chromium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:22 P.M.
		Copper, Total, ICP	0.007	mg/L	0.005	EPA 200.7	2/8/2011 4:25 P.M.
		ICP-OES	2/8/2011	Date completed	N/A	EPA 200.7	
		Lead, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:22 P.M.
		Metals Preparation, D2002	2/2/2011	Date completed	N/A	EPA 200.2	
		Nickel, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:22 P.M.
		Selenium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:22 P.M.
		Silver, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 5:22 P.M.
		Thallium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:22 P.M.
		Zinc, Total, ICP	0.025	mg/L	0.005	EPA 200.7	2/8/2011 4:25 P.M.

Wet Events

T+0							
Sample Date	**Site**	**Test**	**Result**	**Units**	**RDL**	**Method**	**Analysis Date**
10/14/2010	RC1	DO	7.6	mg/L			12:24 PM
		Temperature	13.6	^{0}C			12:24 PM
		Conductivity	345	µS			12:24 PM
		pH	7.69				12:24 PM
		BOD-5	<4	mg/L	3	SM 5210 B	10/15/2010 11:00 A.M.
		TSS	<4	mg/L	4	SM 2540D	10/18/2010 9:31 A.M.
		Ammonia as N	<0.2		0.2	SM 4500 NH3 G	10/21/2010 1:04 P.M.
		Digestion, TKN-TP	10/19/2010	Date completed	N/A	EPA 351.2	
		Total Phosphorous as P	0.17	mg/L	0.05	EPA 365.2	10/19/2010 12:39 P.M.
		Fecal Coliform, MF	240	colonies/100mL	N/A	SM 9221 E	10/14/2010 5:32 P.M.
		Antimony, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:26 P.M.
		Arsenic, Total , MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:26 P.M.
		Beryllium, Total , MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 5:26 P.M.
		Cadmium, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 5:26 P.M.
		Chromium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:26 P.M.
		Copper, Total, ICP	0.006	mg/L	0.005	EPA 200.7	2/8/2011 4:31 P.M.
		ICP-OES	2/8/2011	Date completed	N/A	EPA 200.7	
		Lead, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:26 P.M.
		Metals Preparation, D2002	2/2/2011	Date completed	N/A	EPA 200.2	
		Nickel, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:26 P.M.
		Selenium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:26 P.M.
		Silver, Total, MS	0.001	mg/L	0.001	EPA 200.8	2/4/2011 5:26 P.M.
		Thallium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:26 P.M.
		Zinc, Total, ICP	0.013	mg/L	0.005	EPA 200.7	2/8/2011 4:31 P.M.
	RC3	DO	8.4	mg/L			11:56 A.M.
		Temperature	13.6	^{0}C			11:56 A.M.
		Conductivity	349	µS			11:56 A.M.
		pH	7.11				11:56 A.M.
		BOD-5	8	mg/L	3	SM 5210 B	10/15/2010 11:00 A.M.
		TSS	<4	mg/L	4	SM 2540D	10/18/2010 9:31 A.M.
		Ammonia as N	<0.2		0.2	SM 4500 NH3 G	10/21/2010 1:04 P.M.
		Digestion, TKN-TP	10/19/2010	Date completed	N/A	EPA 351.2	
		Total Phosphorous as P	0.16	mg/L	0.05	EPA 365.2	10/19/2010 12:39 P.M.
		Fecal Coliform, MF	>1600	colonies/100mL	N/A	SM 9221 E	10/14/2010 5:29 P.M.
		Antimony, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:30 P.M.
		Arsenic, Total , MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:30 P.M.
		Beryllium, Total , MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 5:30 P.M.
		Cadmium, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 5:30 P.M.
		Chromium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:30 P.M.
		Copper, Total, ICP	0.006	mg/L	0.005	EPA 200.7	2/8/2011 4:37 P.M.
		ICP-OES	2/8/2011	Date completed	N/A	EPA 200.7	
		Lead, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:30 P.M.
		Metals Preparation, D2002	2/2/2011	Date completed	N/A	EPA 200.2	
		Nickel, Total, MS	0.004	mg/L	0.002	EPA 200.8	2/4/2011 5:30 P.M.
		Selenium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:30 P.M.
		Silver, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 5:30 P.M.
		Thallium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:30 P.M.
		Zinc, Total, ICP	0.013	mg/L	0.005	EPA 200.7	2/8/2011 4:37 P.M.

Wet Events After Storm

T+0							
Sample Date	**Site**	**Test**	**Result**	**Units**	**RDL**	**Method**	**Analysis Date**
10/14/2010	CC1	DO	9.3	mg/L		Multimeter Probe	3:53 P.M.
		Temperature	14.3	^{0}C			3:53 P.M.
		Conductivity	442	µS			3:53 P.M.
		pH	7.52				3:53 P.M.
		BOD-5	15	mg/L	3	SM 5210 B	10/15/10 11:00 AM
		TSS	13	mg/L	4	SM 2540D	10/18/10 9:31 AM
		Ammonia as N	<0.2		0.2	SM 4500 NH3 G	10/21/10 1:04 PM
		Digestion, TKN-TP	10/18/2010	Date completed	N/A	EPA 351.2	
		Total Phosphorous as P	0.31	mg/L	0.05	EPA 365.2	10/19/10 12:39 PM
		Fecal Coliform, MF	1600	colonies/100mL	N/A	SM 9221 E	10/14/10 5:20 PM
		Antimony, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:34 P.M.
		Arsenic, Total , MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:34 P.M.
		Beryllium, Total , MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 5:34 P.M.
		Cadmium, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 5:34 P.M.
		Chromium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:34 P.M.
		Copper, Total, ICP	0.011	mg/L	0.005	EPA 200.7	2/8/2011 4:43 P.M.
		ICP-OES	2/8/2011	Date completed	N/A	EPA 200.7	
		Lead, Total, MS	0.003	mg/L	0.002	EPA 200.8	2/4/2011 5:34 P.M.
		Metals Preparation, D2002	2/2/2011	Date completed	N/A	EPA 200.2	
		Nickel, Total, MS	0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:34 P.M.
		Selenium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:34 P.M.
		Silver, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 5:34 P.M.
		Thallium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:34 P.M.
		Zinc, Total, ICP	0.031	mg/L	0.005	EPA 200.7	2/8/2011 4:43 P.M.
	CC3	DO	6.7	mg/L			3:08 P.M.
		Temperature	16.4	^{0}C			3:08 P.M.
		Conductivity	218	µS			3:08 P.M.
		pH	6.95				3:08 P.M.
		BOD-5	7	mg/L	3	SM 5210 B	10/15/10 11:00 AM
		TSS	28	mg/L	4	SM 2540D	10/18/10 9:31 AM
		Ammonia as N	<0.2		0.2	SM 4500 NH3 G	10/21/10 1:04 PM
		Digestion, TKN-TP	10/18/2010	Date completed	N/A	EPA 351.2	
		Total Phosphorous as P	0.12	mg/L	0.05	EPA 365.2	10/19/10 12:39 PM
		Fecal Coliform, MF	240	colonies/100mL	N/A	SM 9221 E	10/14/10 5:26 PM
		Antimony, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:54 P.M.
		Arsenic, Total , MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:54 P.M.
		Beryllium, Total , MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 5:54 P.M.
		Cadmium, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 5:54 P.M.
		Chromium, Total, MS	0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:54 P.M.
		Copper, Total, ICP	0.008	mg/L	0.005	EPA 200.7	2/8/2011 4:48 P.M.
		ICP-OES	2/8/2011	Date completed	N/A	EPA 200.7	
		Lead, Total, MS	0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:54 P.M.
		Metals Preparation, D2002	2/2/2011	Date completed	N/A	EPA 200.2	
		Nickel, Total, MS	0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:54 P.M.
		Selenium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:54 P.M.
		Silver, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 5:54 P.M.
		Thallium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:54 P.M.
		Zinc, Total, ICP	0.017	mg/L	0.005	EPA 200.7	2/8/2011 4:48 P.M.

Wet Events After Storm

T+0							
Sample Date	**Site**	**Test**	**Result**	**Units**	**RDL**	**Method**	**Analysis Date**
		DO	9.3	mg/L		Multimeter Probe	3:53 P.M.
10/14/2010	RC1	DO	8.9	mg/L			3:40 P.M.
		Temperature	14.3	^{0}C			3:40 P.M.
		Conductivity	287	µS			3:40 P.M.
		pH	7.39				3:40 P.M.
		BOD-5	11	mg/L	3	SM 5210 B	10/15/10 11:00 AM
		TSS	4	mg/L	4	SM 2540D	10/18/10 9:31 AM
		Ammonia as N	<0.2		0.2	SM 4500 NH3 G	10/21/10 1:04 PM
		Digestion, TKN-TP	10/18/2010	Date completed	N/A	EPA 351.2	
		Total Phosphorous as P	0.13	mg/L	0.05	EPA 365.2	10/19/10 12:39 PM
		Fecal Coliform, MF	1600	colonies/100mL	N/A	SM 9221 E	10/14/10 5:23 PM
		Antimony, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:58 P.M.
		Arsenic, Total , MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:58 P.M.
		Beryllium, Total , MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 5:58 P.M.
		Cadmium, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 5:58 P.M.
		Chromium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:58 P.M.
		Copper, Total, ICP	0.008	mg/L	0.005	EPA 200.7	2/8/2011 5:00 P.M.
		ICP-OES	2/8/2011	Date completed	N/A	EPA 200.7	
		Lead, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:58 P.M.
		Metals Preparation, D2002	2/2/2011	Date completed	N/A	EPA 200.2	
		Nickel, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:58 P.M.
		Selenium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:58 P.M.
		Silver, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 5:58 P.M.
		Thallium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 5:58 P.M.
		Zinc, Total, ICP	0.022	mg/L	0.005	EPA 200.7	2/8/2011 5:00 P.M.
	RC3	DO	8.3	mg/L			3:17 P.M.
		Temperature	16.4	^{0}C			3:17 P.M.
		Conductivity	204	µS			3:17 P.M.
		pH	6.72				3:17 P.M.
		BOD-5	13	mg/L	3	SM 5210 B	10/15/10 11:00 AM
		TSS	10	mg/L	4	SM 2540D	10/18/10 9:31 AM
		Ammonia as N	<0.2		0.2	SM 4500 NH3 G	10/21/10 1:04 PM
		Digestion, TKN-TP	10/18/2010	Date completed	N/A	EPA 351.2	
		Total Phosphorous as P	0.09	mg/L	0.05	EPA 365.2	10/19/10 12:39 PM
		Fecal Coliform, MF	80	colonies/100mL	N/A	SM 9221 E	10/14/10 5:16 PM
		Antimony, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 6:21 P.M.
		Arsenic, Total , MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 6:21 P.M.
		Beryllium, Total , MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 6:21 P.M.
		Cadmium, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 6:21 P.M.
		Chromium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 6:21 P.M.
		Copper, Total, ICP	0.007	mg/L	0.005	EPA 200.7	2/8/2011 5:34 P.M.
		ICP-OES	2/8/2011	Date completed	N/A	EPA 200.7	
		Lead, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 6:21 P.M.
		Metals Preparation, D2002	2/2/2011	Date completed	N/A	EPA 200.2	
		Nickel, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 6:21 P.M.
		Selenium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 6:21 P.M.
		Silver, Total, MS	<0.001	mg/L	0.001	EPA 200.8	2/4/2011 6:21 P.M.
		Thallium, Total, MS	<0.002	mg/L	0.002	EPA 200.8	2/4/2011 6:21 P.M.
		Zinc, Total, ICP	0.017	mg/L	0.005	EPA 200.7	2/8/2011 5:34 P.M.

ATTACHMENT H

Development of the Initial Parameters Considered List

DEVELOPMENT OF THE INITIAL PARAMETERS CONSIDERED LIST

REFERENCES FOR THE LIST								SUMMARY
From 2014 PA Integrated Water Quality Monitoring and Assessment Report [aka 303(d) List]	**From PA Code CH 93, 25 §93.7 for TSF, WWF & MF Designations**	**From DRBC for Zone 4**	**From DRBC's 2014 Delaware River and Bay Water Quality Assessment**	**FROM NPDES PERMIT - required sampling of CSO discharges**	**FROM NPDES PERMIT - required sampling of Stormwater Outfall #28 at Plant**	**FROM NPDES PERMIT - required sampling of Plant's Effluent at Outfall 001**	**FROM EPA's CSO Guidance Document (Pg. 2-32)**	**INITIAL LIST OF PARAMETERS CONSIDERED**
PCBs (Fish Consumption)	Alkalinity	Alkalinity	Aluminum (Aquatic Life)	Ammonia	CBOD5	Ammonia	Indicator Bacteria	Bacteria - Enterococcus
Siltation (TSS)	Ammonia	Bacteria - Enterococcus	PCBs (Fish Consumption)	Biological Oxygen Demand	Chemical Oxygen Demand	Bacteria - Fecal Coliform	BOD	Bacteria - Fecal Coliform
	Bacteria - Fecal Coliform	Bacteria - Fecal Coliform		Fecal Coliform	Dissolved Iron	Cadmium	Metals	Alkalinity
	Total Residual Chlorine (TRC)	Dissolved Oxygen (DO)		Phosphorus	pH	CBOD20	Nutrients	Aluminum (Aquatic Life)
	Dissolved Oxygen (DO)	pH		TSS	Oil and Grease	CBOD5	pH	Ammonia
	Fecal Coliform Bacteria	Phenols			TKN	Chlorine	TDS	Biological Oxygen Demand (BOD)
	Iron (Fe)	Radioactivity - alpha emitters			Total Phosphorus	Chlorodibromomethane	TSS	Cadmium
	Osmotic Pressure	Radioactivity - beta emitters			TSS	Copper	Dissolved Oxygen (DO)	CBOD20
	pH	Synthetic Detergents				Cyanide	Toxics	CBOD5
	Temperature	Temperature				Dichlorobromomethane	Biological Assessment	Chlorine
		Threshold Odor Number (TON)				Lead	Sediment	Chlorodibromomethane
		Total Dissolved Solids (TDS)				Nitrate		Copper
		Turbidity				Nitrite		Cyanide
						Oil and Grease		Dichlorobromomethane
						PCBs		Dissolved Oxygen (DO)
						pH		Iron (Fe)
						TDS		Lead
						Total Kjeldahl Nitrogen (TKN)		Metals
						TSS		Nitrate
						Zinc		Nitrite
								Nutrients
								Oil and Grease
								PCBs (Fish Consumption)
								pH
								Phenols
								Phosphorus
								Radioactivity - alpha emitters
								Radioactivity - beta emitters
								Synthetic Detergents
								Temperature
								Threshold Odor Number (TON)
								Total Kjeldahl Nitrogen (TKN)
								Total Dissolved Solids (TDS)
								Total Phosphorus
								Total Residual Chlorine (TRC)
								Total Suspended Solids (TSS)
								Toxics
								Turbidity
								Zinc

ATTACHMENT I

Final Parameters Considered List with STORET Data

DELCORA LTCPU
POI Sampling Results Comparison
1/15/2016

Parameter of Interest (POIs)	Units	Upper Delaware 100% WQS	WET WEATHER CPS WET WELL SAMPLING RESULTS		STORET/ Dry Upper Delaware River Sampling results				Lower Delaware 100% WQS	STORET/ Dry Lower Delaware River Sampling results				STORET/ Wet Lower Delaware River Sampling results	Chester 100% WQS	WET WEATHER CSO 19 SAMPLING RESULTS		Historical Chester Creek Sampling results						STORET/ Chester Creek Wet Sampling results	Ridley 100% WQS	WET WEATHER CSO 18 SAMPLING RESULTS		Historical Ridley Creek Sampling results						STORET/ Ridley Creek Wet Sampling results
Sampling Date Sampling location			Nov 19, 2015 CPS1	Dec 1, 2015 CPS1	9/15/2014 892062 1.16 miles Upstream of Outfall 14	10/20/2014 892062 1.16 miles Upstream of Outfall 14	4/21/2015 892062 1.16 miles Upstream of Outfall 14	5/19/2015 892062 1.16 miles Upstream of Outfall 14		9/15/2014 332049 2.82 miles Downstream of Outfall 2	10/20/2014 332049 2.82 miles Downstream of Outfall 2	4/21/2015 332049 2.82 miles Downstream of Outfall 2	5/19/2015 332049 2.82 miles Downstream of Outfall 2	12/3/2014 WQN0182 1.98 miles Downstream of Outfall 2		Nov 19, 2015 14TH & CROZER	Dec 1, 2015 14TH & CROZER	8/12/2010 Baseline/ Upstream of 14TH & CROZER	9/30/2010 Baseline/ Upstream of 14TH & CROZER	10/14/2010 Baseline/ Upstream of 14TH & CROZER	8/12/2010 Downstream of 14TH & CROZER	9/30/2010 Downstream of 14TH & CROZER	10/14/2010 Downstream of 14TH & CROZER	5/12/2010 DRBC422094 0.09 miles Downstream of Outfall 12		Nov 19, 2015 SUN & HANCOCK	Dec 1, 2015 SUN & HANCOCK	8/12/2010 Baseline/ Upstream of SUN & HANCOCK	9/30/2010 Baseline/ Upstream of SUN & HANCOCK	10/14/2010 Baseline/ Upstream of SUN & HANCOCK	8/12/2010 Downstream of SUN & HANCOCK	9/30/2010 Downstream of SUN & HANCOCK	10/14/2010 Downstream of SUN & HANCOCK	5/12/2010 DRBC422120 0.13 miles Downstream of Outfall 15
Benzene	ug/L	14	ND	ND					0.61						14	ND	ND								14	ND	ND							
Bromodichloromethane	ug/L	17	ND	ND					0.55						17	ND	ND								17	ND	ND							
Chlorodibromomethane	ug/L	13	ND	ND					0.4						13	ND	ND								13	ND	ND							
Chloroform	ug/L	470	ND	ND					1900						470	ND	ND							0.5	470	ND	ND							0.5
Ethylbenzene	ug/L	2100	ND	ND					530						2100	ND	ND							0.5	2100	ND	ND							0.5
Methyl t-Butyl Ether	ug/L	No Standard	ND	ND					No Standard						No Standard	ND	ND							0.5	No Standard	ND	ND							0.5
Methylene Chloride	ug/L	590	ND	ND					4.6						590	ND	ND								590	ND	ND							
Tetrachloroethene	ug/L	3.3	ND	ND					0.69						3.3	ND	ND								3.3	ND	ND							
Toluene	ug/L	1700	ND	ND					1300						1700	ND	ND							0.5	1700	ND	ND							0.5
Total Xylenes, Acute	ug/L	1100	ND	ND					1100						1100	ND	ND								1100	ND	ND							
Total Xylenes, Chronic	ug/L	210	ND	ND					210						210	ND	ND								210	ND	ND							
Benzo(a)anthracene, Acute	ug/L	0.5	ND	ND	ND	ND			0.0038	ND	ND				0.5	ND	ND								0.5	ND	ND							
Benzo(a)anthracene, Chronic	ug/L	0.1	ND	ND	ND	ND			0.0038	ND	ND				0.1	ND	ND								0.1	ND	ND							
Chrysene	ug/L	18	ND	ND					0.0038	ND	ND				18	ND	ND								18	ND	ND							
bis(2-Ethylhexyl)phthalate	ug/L	2.2	12.0	7.3					1.2						2.2	4.4	8.0								2.2	11.8	4.9							
N-Nitroso-di-n-propylamine	ug/L	0.51	ND	ND			ND	ND	0.005	ND	ND				0.51	ND	ND								0.51	ND	ND							
Phenanthrene, Acute	ug/L	5	ND	ND					5						5	ND	ND								5	ND	ND							
Phenanthrene, Chronic	ug/L	1	ND	ND					1						1	ND	ND								1	ND	ND							
Dieldrin	ug/L	0.000054	ND	0.020					0.000052						0.000054	ND	ND								0.000054	ND								
Total Polychlorinated Biphenyl (PCB)	ug/L	0.000016	0.0	|					0.000016						0.000016	0.0	|								0.000016	0.0	|							
Aroclor-1016	ug/L	No Standard	ND	ND					No Standard						No Standard	ND	ND								No Standard	ND	ND							
Aroclor-1221	ug/L	No Standard	ND	ND					No Standard						No Standard	ND	ND								No Standard	ND	ND							
Aroclor-1232	ug/L	No Standard	ND	ND					No Standard						No Standard	ND	ND								No Standard	ND	ND							
Aroclor-1242	ug/L	No Standard	ND	ND					No Standard						No Standard	ND	ND								No Standard	ND	ND							
Aroclor-1248	ug/L	No Standard	ND	ND					No Standard						No Standard	ND	ND								No Standard	ND	ND							
Aroclor-1254	ug/L	No Standard	ND	ND					No Standard						No Standard	ND	ND								No Standard	ND	ND							
Aroclor-1260	ug/L	No Standard	ND	ND					No Standard						No Standard	ND	ND								No Standard	ND	ND							
Ammonia-N	mg/L	10.45[a]	7.47	20.0					10.45[a]						10.45[a]	4.85	13.4								10.45[a]	1.63	3.63							
Biochemical Oxygen Demand	mg/L	No Standard	57.7	94.0					No Standard						No Standard	51.8	81.9								No Standard	26.2	70.7							
Carbonaceous BOD	mg/L	No Standard	81.5	92.3					No Standard						No Standard	66.7	63.4								No Standard	17.3	49.4							
Carbonaceous BOD 20 Day	mg/L	No Standard	7.7	151					No Standard						No Standard	12.8	72.2								No Standard	ND	96.8							
Cyanide, Acute	mg/L	22	ND	ND					22						22	ND	ND								22	ND	ND							
Cyanide, Chronic	mg/L	5.2	ND	ND					5.2						5.2	ND	ND								5.2	ND	ND							
Dissolved Oxygen	mg/L	3.5	2.5	2.5	6.56	8.59	10.39	6.84	3.5	7.17	8.14	10.32	7.20	13.04	3.5	4.3	1.5	5.65	8.36	8.50	5.42	7.33	7.20		3.5	5.4	4.4	6.85	7.49	7.6		7.09	8.4	
Halogen, Total Organic (TOX)	ug/L	No Standard	26.0	36.1					No Standard						No Standard	26.8	41.2								No Standard	ND	ND							
Hexavalent Chromium, Acute	mg/L	16	ND	ND					16						16	ND	ND								16	ND	ND							
Hexavalent Chromium, Chronic	mg/L	10	ND	ND					10						10	ND	ND								10	ND	ND							
Nitrate-N	mg/L	No Standard	ND	0.90					No Standard						No Standard	0.85	2.0								No Standard	ND	ND							
Nitrite-N	mg/L	No Standard	ND	ND					No Standard						No Standard	ND	ND								No Standard	ND	ND							
Odor	T.O.N.	24	30	5					24						24	20	10								24	2	2							
Oil/Grease Hexane Extractable	mg/L	No Standard	14.8	12.4					No Standard						No Standard	7.2	8.4								No Standard	ND	2.6							
Oil/Grease Silica Gel Treated	mg/L	No Standard	ND	ND					No Standard						No Standard	2.3	ND								No Standard	ND	ND							
Phenolics	mg/L	0.020	0.068	0.028	ND	ND			0.020	ND	ND				0.020	0.016	0.016								0.020	0.012	0.009							
Phosphorus, Total	mg/L	No Standard	2.1	2.5					No Standard						No Standard	1.4	2.3								No Standard	0.56	1.4							
Sulfide, Total	mg/L	No Standard	1.3	ND					No Standard						No Standard	ND	ND								No Standard	ND	ND							
Surfactants (MBAS)	mg/L	1.000	0.557	0.505					1.000						1.000	0.485	0.383								1.000	0.123	0.067							
Total Dissolved Solids	mg/L	No Standard	186	277					No Standard						No Standard	150	230								No Standard	39	26							
Total Kjeldahl Nitrogen	mg/L	No Standard	21.2	23.5					No Standard						No Standard	14.1	21.0								No Standard	5.3	8.3							
Total Nitrogen	mg/L	No Standard	21.2	24.4					No Standard						No Standard	15.0	23.0								No Standard	5.30	8.30							
Total Suspended Solids	mg/L	No Standard	108	186	30	36	21	30	No Standard	27	35	22	19	124	No Standard	140	112	7	158	4	12	56	4	10	No Standard	76	200	<4	58	<4	8	44	<4	
Turbidity	NTU	150.0	126	81.9	26	29	16	16	150.0	26	33	17	14		150.0	37.2	57.4								150.0	26.2	80.6							
Hardness	mg/L	No Standard	85.2	127					No Standard						No Standard	58.1	102								No Standard	18.9	31.5							
Trivalent Chromium, Acute	mg/L	0.4994	ND	ND					0.4994						0.4994	ND	ND								0.4994	ND	ND							
Trivalent Chromium, Chronic	mg/L	0.0239	ND	ND					0.0239						0.0239	ND	ND								0.0239	ND	ND							
Aluminum, Acute	mg/L	0.75	1.2	0.40					0.75					2.875	0.75	0.64	0.25								0.75	0.47	0.44							
Aluminum, Chronic	mg/L	0.09	1.2	0.40					0.09					2.875	0.09	0.64	0.25								0.09	0.47	0.44							
Antimony, Total	mg/L	0.0056	ND	ND					0.0056						0.0056	0.0013	ND	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		0.0056	0.0023	0.0018	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	
Arsenic, Acute	mg/L	0.34	ND	ND					0.01						0.34	ND	ND	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		0.34	ND	ND	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	
Arsenic, Chronic	mg/L	0.15	ND	ND					0.01						0.15	ND	ND	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		0.15	ND	ND	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	
Cadmium, Acute	mg/L	0.0010[b]	ND	ND					0.0010[b]						0.0010[b]	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		0.0010[b]	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Cadmium, Chronic	mg/L	0.0001[b]	ND	ND					0.0001[b]						0.0001[b]	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		0.0001[b]	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Chromium, Total	mg/L	No Standard	0.011	0.0014					No Standard	ND					No Standard	0.0094	ND	<0.002	0.016	<0.002	<0.002	0.005	<0.002		No Standard	0.0032	0.0031	<0.002	0.005	<0.002	<0.002	0.003	<0.002	
Copper, Acute	mg/L	0.011[b]	0.042	0.041			0.0028	0.0032	0.011[b]	0.005	0.0068			0.0103	0.010[c]	0.033	0.029	0.007	0.017	0.007	0.006	0.008	0.007	<0.010	0.010[c]	0.025	0.032	<0.005	0.015	0.006	<0.005	0.009	0.006	<0.010
Copper, Chronic	mg/L	0.007[b]	0.042	0.041			0.0028	0.0032	0.007[b]					0.0103	0.007[c]	0.033	0.029	0.007	0.017	0.007	0.006	0.008	0.007	<0.010	0.007[c]	0.025	0.032	<0.005	0.015	0.006	<0.005	0.009	0.006	<0.010
Iron, Total	mg/L	0.3	2.9	1.3					0.3					4.2	0.30	0.76	0.47							0.37	0.3	0.72	1.5							0.561
Lead, Acute	mg/L	0.0380	0.028	0.0096			0.0016	0.0023	0.0380	ND	ND			0.0069	0.0380	0.016	0.0060	0.002	0.013	0.002	0.002	0.006	0.002		0.0380	0.0081	0.020	<0.002	0.008	<0.002	<0.002	0.004	<0.002	
Lead, Chronic	mg/L	0.0054	0.028	0.0096			0.0016	0.0023	0.0054					0.0069	0.0054	0.016	0.0060	0.002	0.013	0.002	0.002	0.006	0.002		0.0054	0.0081	0.020	<0.002	0.008	<0.002	<0.002	0.004	<0.002	
Mercury, Total	mg/L	0.000051	0.00020	ND			ND	0.000022	0.00005	ND	ND				0.000051	ND	ND								0.000051	ND	0.0011							
Molybdenum, Total	mg/L	No Standard	0.0013	0.0012					No Standard						No Standard	0.0027	ND								No Standard	0.0031	ND							
Selenium, Acute	mg/L	0.02	ND	ND					0.02						0.02	ND	ND	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		0.02	ND	ND	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	
Selenium, Chronic	mg/L	0.0046	ND	ND					0.0046						0.0046	ND	ND	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		0.0046	ND	ND	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	
Silver, Total	mg/L	0.0019[b]	ND	ND					0.0019[b]						0.0019[b]	ND	ND	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		0.0019[b]	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Thallium, Total	mg/L	0.00047	ND	ND					0.00024						0.00047	ND	ND	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		0.00047	ND	ND	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	
Zinc, Total	mg/L	0.098[b]	0.22	0.13	0.0042	0.0138	0.0033	0.0112	0.098[b]	0.0020	0.0087	0.0032	0.0102	0.025	0.088[b]	0.11	0.067	0.019	0.051	0.020	0.018	0.027	0.025	0.012	0.088[b]	0.14	0.20	0.012	0.034	0.013	0.01	0.029	0.013	0.011
Enterococcus	CFU/100ml	88	241960	199000					33						88	77000	173000								88	8160	34500							
Fecal Coliform	CFU/100ml	770	2600000	3700000	160	170	160	93	200	83	120		110		770	470000	1030000	9700	10000	240	830	10000	350		770	1260000	2100000	720	>10000	240	880	>10000	1600	

	LEGEND:
	Value Exceeds WQS
ND	Non Detection
~~ND~~	Screening of POIs
	303(d) list Impairement
I	Value Greater than or Equal to Method Detection Limit but Below Reportable Detection Limit (RDL)
	No Standard but Present in Combined Sewer Discharge

	Footnotes
a	Value for pH = 7.1 found in DRBC Water Quality Regulations, Section 4.20.5 Paragraph A.3
b	Value for Average Ca, Mg Hardness = 84 mg/l. Average value is based on EPA STORET station data from 2010-2015 in Delaware River
c	Value for Average Ca, Mg Hardness = 74 mg/l found in DRBC Water Quality Regulations, Section 4.20.5 Paragraph A.2 in Chester and Ridley Creeks

ATTACHMENT J

Summary of STORET Data Exceedances

DELCORA LTCPU
Summary of STORET Data Showing Exceedance in All Receiving Bodies
2010-2015

Parameter	Number of Storet Observations (2010-2015)				Number of Exceedances (2010-2015)				Number of Non Detects (2010-2015)				Note
Location	Delaware		Chester	Ridley	Delaware		Chester	Ridley	Delaware		Chester	Ridley	
Station ID (Upstream or Downstream of Outfall)	892062 (Upstream of Outfall 14)	WQN0182, 332049 (Downstream of Outfall 2)	422094 (Downstream of Outfall 12)	422120 (Downstream of Outfall 15)	892062 (Upstream of Outfall 14)	WQN0182, 332049 (Downstream of Outfall 2)	422094 (Downstream of Outfall 12)	422120 (Downstream of Outfall 15)	892062 (Upstream of Outfall 14)	WQN0182, 332049 (Downstream of Outfall 2)	422094 (Downstream of Outfall 12)	422120 (Downstream of Outfall 15)	
bis(2-Ethylhexyl)phthalate	0	0	0	0	0	0	0	0	0	0	0	0	
Dieldrin	0	0	0	0	0	0	0	0	0	0	0	0	
Total Polychlorinated Biphenyl	0	0	0	0	0	0	0	0	0	0	0	0	
Ammonia-N	0	25	0	0	0	0	0	0	0	0	0	0	
Biochemical Oxygen Demand	0	0	0	0	0	0	0	0	0	0	0	0	No Standard
Carbonaceous BOD	0	0	0	0	0	0	0	0	0	0	0	0	No Standard
Carbonaceous BOD 20 Day	0	0	0	0	0	0	0	0	0	0	0	0	No Standard
Dissolved Oxygen	34	61	0	0	0	0	0	0	0	0	0	0	
Nitrate-N	0	0	0	0	0	0	0	0	0	0	0	0	No Standard
Nitrite-N	0	0	0	0	0	0	0	0	0	0	0	0	
Odor	0	0	0	0	0	0	0	0	0	0	0	0	
Phenolics	7	10	0	0	0	0	0	0	7	8	0	0	
Phosphorus, Total	0	10	1	1	0	0	0	0	0	0	0	0	No Standard
Surfactants (MBAS)	0	0	0	0	0	0	0	0	0	0	0	0	
Total Dissolved Solids	34	64	1	1	0	0	0	0	0	0	0	0	No Standard
Total Kjeldahl Nitrogen	0	0	1	1	0	0	0	0	0	0	0	0	No Standard
Total Nitrogen	0	0	0	0	0	0	0	0	0	0	0	0	No Standard
Total Suspended Solids	34	64	1	1	0	0	0	0	0	0	0	0	No Standard
Turbidity	34	35	0	0	0	0	0	0	0	0	0	0	
Hardness	36	66	0	0	0	0	0	0	0	0	0	0	No Standard
Aluminum, Acute	0	29	0	0	0	**14**	0	0	0	0	0	0	
Aluminum, Chronic	0	29	0	0	0	**29**	0	0	0	0	0	0	
Antimony, Total	4	0	0	0	0	0	0	0	4	0	0	0	
Arsenic, Acute	0	0	0	0	0	0	0	0	0	0	0	0	
Arsenic, Chronic	0	0	0	0	0	0	0	0	0	0	0	0	
Copper, Acute	36	67	1	1	0	**3**	0	0	10	6	1	1	
Copper, Chronic	36	67	1	1	0	**6**	**1**	**1**	10	6	0	0	
Iron, Total	0	29	1	1	0	**29**	**1**	**1**	0	0	0	0	
Lead, Acute	36	67	0	0	0	0	0	0	31	37	0	0	
Lead, Chronic	36	67	0	0	0	**4**	0	0	31	37	0	0	
Mercury, Total	10	16	0	0	**1**	0	0	0	6	10	0	0	
Zinc, Total	36	67	1	1	0	0	0	0	5	5	0	0	
Enterococcus*	0	0	0	0	**0**	**0**	**0**	**0**	0	0	0	0	
Fecal Coliform*	34	35	0	0	**0**	**0**	**0**	**0**	0	0	0	0	

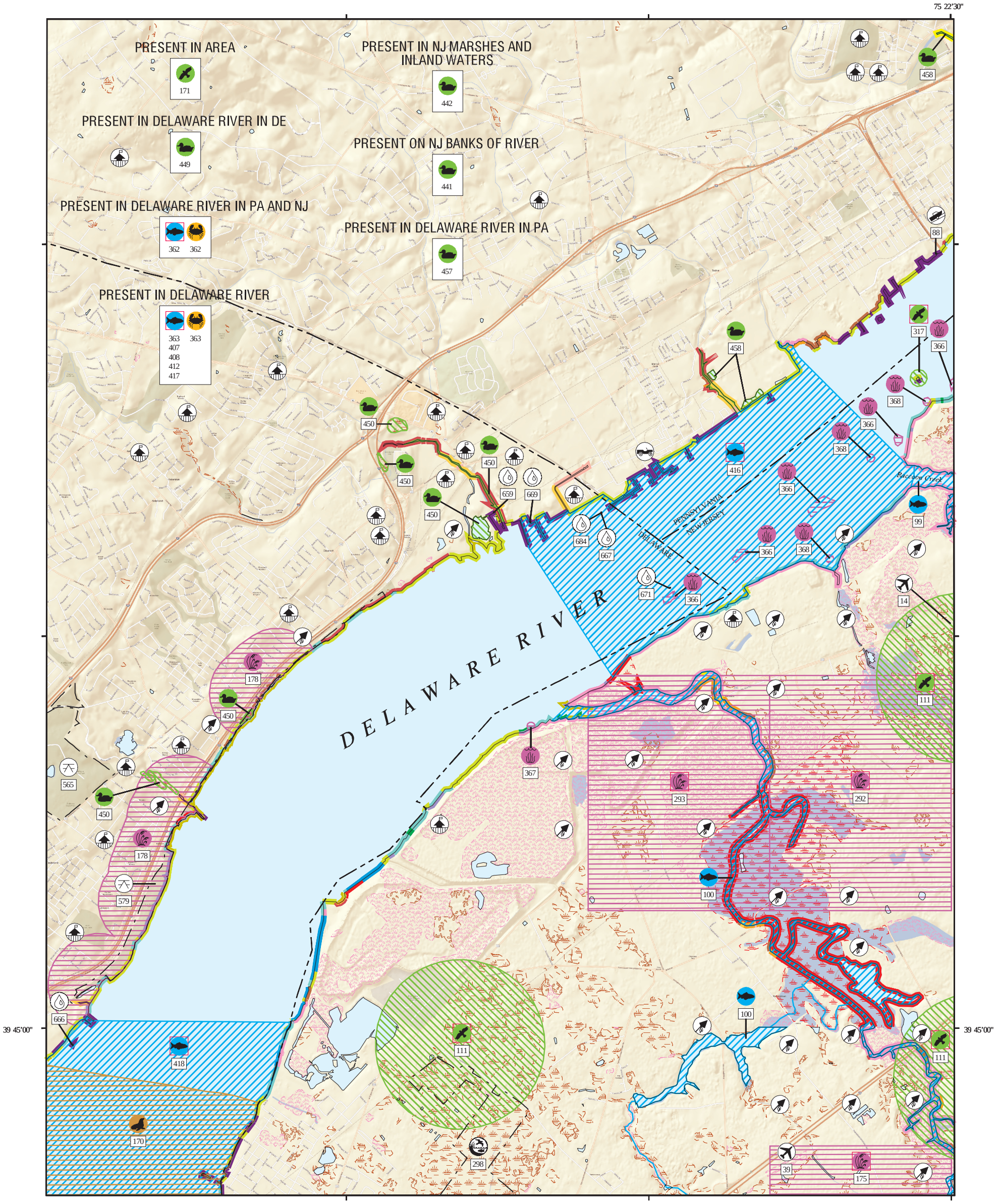
*Fecal Coliform was identified as a parameter exceeding water quality standards (WQS) for Chester and Ridley Creeks based on historical data from 2010 (see Attachment J). Sufficient historical data indicating WQS exceedance for all receiving waterbodies was unavailable, however Enterococcus and Fecal Coliform are considered typical parameters associated with CSOs and for this reason are included as POCs.

	LEGEND
	Pollutant Of Concern (POC)
	Parameter of Potential Concern (POPC)

ATTACHMENT K

NOAA Environmental Sensitivity Index Maps

ENVIRONMENTAL SENSITIVITY INDEX MAP



SHORELINE HABITATS (ESI)

- 1B EXPOSED, SOLID MAN- MADE STRUCTURES
- 2A EXPOSED WAVE- CUT PLATFORMS IN CLAY, MUD, OR BEDROCK
  2B EXPOSED SCARPS AND STEEP SLOPES IN CLAY OR MUD
- 3A FINE- TO MEDIUM- GRAINED SAND BEACHES
  3B SCARPS AND STEEP SLOPES IN SAND
- 4 COARSE- GRAINED SAND BEACHES
- 5 MIXED SAND AND GRAVEL (SHELL) BEACHES
- 6A GRAVEL BEACHES
- 6B RIPRAP
- 7 EXPOSED TIDAL FLATS
- 8A SHELTERED SCARPS IN CLAY OR MUD
- 8B SHELTERED, SOLID MAN- MADE STRUCTURES
- 8C SHELTERED RIPRAP
  8E PEAT SHORELINES
- 9A SHELTERED TIDAL FLATS
  9B VEGETATED LOW BANKS
- 10A SALT- AND BRACKISH- WATER MARSHES
- 10B FRESHWATER MARSHES
- 10C SWAMPS
- 10D SCRUB- SHRUB WETLANDS

N W E S

SCALE 1:45000

1 .5 0 1 KILOMETER

1 .5 0 1 MILE

1 .5 0 1 NAUTICAL MILE

Not For Navigation

Published: March 2014

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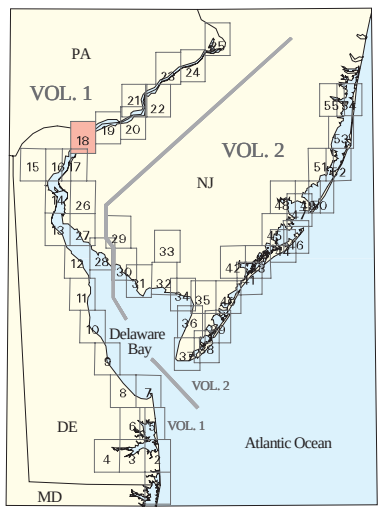
National Ocean Service
Office of Response and Restoration
Emergency Response Division



Delaware Bay ESI - Volume 1 **ESI-18**

Delaware/New Jersey/Pennsylvania: ESIMAP 18

BIOLOGICAL RESOURCES:

BIRD:

RAR#	Species	S	F	ST	Conc.	J	F	M	A	M	J	J	A	S	O	N	D	Nesting	Migrating	Molting
111	Endangered raptor 2	E		NJ		X	X	X	X	X	X	X	X	X	X	X	X	JAN-JUL	-	-
171	Osprey							X	X	X	X	X	X	X	X			MAR-AUG	MAR-MAR SEP-OCT	-
317	Threatened raptor	T		NJ				X	X	X	X	X	X	X	X			APR-AUG	SEP-OCT	-
441	Bufflehead				10S	X	X	X	X	X					X	X	X	-	MAR-APR OCT-DEC	-
	Canada goose				1000S	X	X	X	X	X	X	X	X	X	X	X	X	-	MAR-APR SEP-NOV	-
	Canvasback				100S	X	X	X	X	X						X	X	-	MAR-APR NOV-DEC	-
	Common goldeneye				10S	X	X	X	X	X						X	X	-	MAR-APR NOV-DEC	-
	Hooded merganser				10S	X	X	X							X	X	X	-	FEB-MAR OCT-DEC	-
	Red-breasted merganser				10S	X	X	X	X						X	X	X	-	MAR-APR OCT-DEC	-
	Ring-necked duck				100S	X	X	X	X						X	X	X	-	MAR-APR OCT-DEC	-
	Ruddy duck				100S	X	X	X	X						X	X	X	-	MAR-APR OCT-NOV	-
	Scaup				100S	X	X	X	X						X	X	X	-	MAR-APR OCT-DEC	-
	Snow goose				1000S	X	X	X	X	X				X	X	X	X	-	FEB-MAY SEP-OCT	-
442	American black duck				1000S	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUN	APR-APR SEP-DEC	-
	American coot				100S	X	X	X	X	X		X	X	X	X	X	X	-	FEB-MAR SEP-NOV	-
	American wigeon				100S	X	X	X	X	X		X	X	X	X	X	X	-	MAR-APR AUG-NOV	-
	Bufflehead				10S	X	X	X	X	X					X	X	X	-	MAR-APR OCT-DEC	-
	Canada goose				1000S	X	X	X	X	X	X	X	X	X	X	X	X	-	MAR-APR SEP-NOV	-
	Canvasback				100S	X	X	X	X	X						X	X	-	MAR-APR NOV-DEC	-
	Common goldeneye				10S	X	X	X	X	X						X	X	-	MAR-APR NOV-DEC	-
	Common merganser				100S	X	X	X	X							X	X	-	FEB-MAR NOV-DEC	-
	Gadwall				100S	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	MAR-APR OCT-NOV	-
	Green-winged teal				100S	X	X	X	X	X		X	X	X	X	X	X	-	FEB-MAR SEP-NOV	-
	Hooded merganser				10S	X	X	X							X	X	X	-	FEB-MAR OCT-DEC	-
	Mallard				1000S	X	X	X	X	X	X	X	X	X	X	X	X	MAR-JUN	-	-
	Mute swan				10S	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-
	Northern pintail				100S	X	X	X	X			X	X	X	X	X	X	-	FEB-APR AUG-SEP	-
	Northern shoveler				10S	X	X	X	X	X			X	X	X	X	X	-	MAR-APR SEP-OCT	-
	Red-breasted merganser				10S	X	X	X	X						X	X	X	-	MAR-APR OCT-DEC	-
	Ring-necked duck				100S	X	X	X	X						X	X	X	-	MAR-APR OCT-DEC	-
	Ruddy duck				100S	X	X	X	X						X	X	X	-	MAR-APR OCT-NOV	-
	Scaup				100S	X	X	X	X						X	X	X	-	MAR-APR OCT-DEC	-
	Snow goose				1000S	X	X	X	X	X				X	X	X	X	-	FEB-MAY SEP-OCT	-
	Tundra swan				100S	X	X	X	X						X	X	X	-	FEB-APR OCT-NOV	-
449	Bufflehead				10S	X	X	X	X	X					X	X	X	-	MAR-MAR OCT-NOV	-
	Canada goose				10000S	X	X	X	X	X	X	X	X	X	X	X	X	MAR-JUN	MAR-APR SEP-NOV	-
	Ring-necked duck				100S	X	X	X	X						X	X	X	-	MAR-APR OCT-NOV	-
	Ruddy duck				1000S	X	X	X	X	X	X	X	X	X	X	X	X	-	FEB-MAR OCT-NOV	-
	Scaup				1000S	X	X	X	X						X	X	X	-	MAR-APR OCT-DEC	-
	Snow goose				100S	X	X	X	X						X	X	X	-	FEB-APR OCT-NOV	-
450	American black duck				100S	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUN	OCT-APR	-
	American coot				1000S	X	X	X	X	X			X	X	X	X	X	-	FEB-APR OCT-NOV	-
	American wigeon				10S	X	X	X	X	X			X	X	X	X	X	-	MAR-APR SEP-OCT	-
	Bufflehead				10S	X	X	X	X	X					X	X	X	-	MAR-MAR OCT-NOV	-
	Canada goose				10000S	X	X	X	X	X	X	X	X	X	X	X	X	MAR-JUN	MAR-APR SEP-NOV	-
	Common merganser				10S	X	X	X	X							X	X	-	FEB-MAR NOV-DEC	-
	Gadwall				100S	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	MAR-APR OCT-NOV	-
	Green-winged teal				100S	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	MAR-APR AUG-SEP	-
	Mallard				100S	X	X	X	X	X	X	X	X	X	X	X	X	MAR-JUL	FEB-MAY OCT-DEC	-
	Mute swan				10S	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-
	Northern pintail				100S	X	X	X	X	X			X	X	X	X	X	-	FEB-MAY SEP-DEC	-
	Northern shoveler				100S	X	X	X	X	X			X	X	X	X	X	-	MAR-APR OCT-NOV	-
	Ring-necked duck				100S	X	X	X	X						X	X	X	-	MAR-APR OCT-NOV	-
	Ruddy duck				1000S	X	X	X	X	X	X	X	X	X	X	X	X	-	FEB-MAR OCT-NOV	-
	Scaup				1000S	X	X	X	X						X	X	X	-	MAR-APR OCT-DEC	-
	Snow goose				100S	X	X	X	X						X	X	X	-	FEB-APR OCT-NOV	-
	Wood duck				10S	X	X	X	X	X	X	X	X	X	X	X	X	MAR-JUN	FEB-MAR OCT-DEC	-
457	Bufflehead				100S	X	X	X	X	X	X				X	X	X	-	MAR-MAY OCT-DEC	-
	Canada goose				100S	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	FEB-APR SEP-NOV	-
	Canvasback				100S	X	X	X	X	X			X	X	X	X	X	-	FEB-APR SEP-NOV	-
	Common goldeneye				10S	X	X	X	X	X					X	X	X	-	FEB-APR NOV-DEC	-
	Long-tailed duck				10S	X	X	X	X						X	X	X	-	FEB-APR OCT-NOV	-
	Mergansers				100S	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUN	FEB-APR OCT-DEC	-
	Northern shoveler				10S	X	X	X	X	X			X	X	X	X	X	-	MAR-APR AUG-NOV	-
	Ruddy duck				1000S	X	X	X	X	X	X			X	X	X	X	-	MAR-APR OCT-NOV	-
	Scaup				100S	X	X	X	X						X	X	X	-	MAR-APR OCT-DEC	-
458	American black duck				1000S	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUN	FEB-APR OCT-DEC	-
	Bufflehead				100S	X	X	X	X	X	X				X	X	X	-	MAR-MAY OCT-DEC	-
	Canada goose				100S	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	FEB-APR SEP-NOV	-
	Canvasback				100S	X	X	X	X	X	X			X	X	X	X	-	FEB-APR SEP-NOV	-
	Common goldeneye				10S	X	X	X	X	X	X				X	X	X	-	FEB-APR NOV-DEC	-
	Green-winged teal				100S	X	X	X	X	X		X	X	X	X	X	X	-	MAR-MAY AUG-NOV	-
	Long-tailed duck				10S	X	X	X	X						X	X	X	-	FEB-APR OCT-NOV	-
	Mallard				1000S	X	X	X	X	X	X	X	X	X	X	X	X	APR-AUG	FEB-MAY SEP-DEC	-
	Mergansers				100S	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUN	FEB-APR OCT-DEC	-
	Northern pintail				100S	X	X	X	X	X			X	X	X	X	X	-	FEB-APR SEP-DEC	-
	Northern shoveler				10S	X	X	X	X	X		X	X	X	X	X	X	-	MAR-APR AUG-NOV	-
	Ruddy duck				1000S	X	X	X	X	X	X			X	X	X	X	-	MAR-APR OCT-NOV	-
	Scaup				100S	X	X	X	X						X	X	X	-	MAR-APR OCT-DEC	-
	Tundra swan				100S	X	X	X	X						X	X	X	-	FEB-APR OCT-DEC	-

FISH:

RAR#	Species	S	F	ST	Conc.	J	F	M	A	M	J	J	A	S	O	N	D	Spawning	Eggs	Larvae	Juveniles	Adults
99	Alewife				HIGH SPAWNING	X	X	X	X	X	X	X	X	X	X	X	X	MAR-MAY	MAR-MAY	APR-JUN	JAN-DEC	MAR-JUN
	American eel				PRESENT	X	X	X	X	X	X	X	X	X	X	X	X	-	-	DEC-APR	JAN-DEC	JAN-DEC
	American shad				HIGH SPAWNING			X	X	X	X	X	X	X	X			MAR-JUN	APR-JUN	MAY-JUL	JUN-NOV	MAR-JUN OCT-NOV
	Blueback herring				HIGH SPAWNING	X	X	X	X	X	X	X	X	X	X	X	X	MAR-JUN	MAR-JUN	MAY-JUL	JAN-DEC	MAR-JUN OCT-NOV
100	Alewife				HIGH SPAWNING	X	X	X	X	X	X	X	X	X	X	X	X	MAR-MAY	MAR-MAY	APR-JUN	JAN-DEC	MAR-JUN
	American eel				PRESENT	X	X	X	X	X	X	X	X	X	X	X	X	-	-	DEC-APR	JAN-DEC	JAN-DEC
	Blueback herring				HIGH SPAWNING	X	X	X	X	X	X	X	X	X	X	X	X	MAR-JUN	MAR-JUN	MAY-JUL	JAN-DEC	MAR-JUN OCT-NOV
362	Alewife				HIGH SPAWNING			X	X	X	X	X	X	X				MAR-MAY	MAR-MAY	APR-JUN	JUN-AUG	MAR-OCT
	American eel				LOW	X	X	X	X	X	X	X	X	X	X	X	X	-	-	DEC-APR	JAN-DEC	JAN-DEC
	American shad				HIGH SPAWNING			X	X	X	X	X	X	X	X			MAR-JUN	APR-JUN	MAY-JUL	JUN-NOV	MAR-NOV
	Atlantic croaker				MED					X	X	X	X	X				-	-	-	JUL-OCT	JUN-NOV
	Atlantic menhaden				HIGH					X	X	X						-	-	-	JUN-JUL	JUN-AUG
	Bay anchovy				MED							X	X	X	X			-	-	-	AUG-OCT	AUG-NOV
	Blueback herring				HIGH			X	X	X	X	X	X	X	X			MAR-JUN	MAR-JUN	MAR-JUN	JUN-NOV	MAR-NOV
	Channel catfish				PRESENT					X	X	X	X	X	X			-	-	-	JUL-SEP	JUN-NOV
	Gizzard shad				LOW					X	X	X	X	X	X			-	-	-	JUN-OCT	JUL-NOV
	Hickory shad				LOW			X	X	X								MAR-JUN	MAR-JUN	MAR-JUN	-	MAR-JUN
	Hickory shad	E		PA	LOW			X	X	X								MAR-JUN	MAR-JUN	MAR-JUN	-	MAR-JUN
	Spot				HIGH SPRING							X	X	X				-	-	-	JUL-SEP	JUL-SEP

Biological information shown on the maps represents known concentration areas or occurrences, but does not necessarily represent the full distribution or range of each species. DNREC, NJDEP ENSP, and PGC provided information for some of the federally and state listed species and species of conservation concern for display in the ESI atlas and accompanying digital data in 2013-2014. These data represent existing information known to these agencies at the time of the request and should never be substituted for consultation with these agencies. This atlas was developed using NJDEP GIS digital data for archaeological and historic sites, but this secondary product has not been verified by NJDEP and is not state-authorized. Archaeological and historical site information for Delaware was provided by DE Division of Historical and Cultural Affairs.

Delaware/New Jersey/Pennsylvania: ESIMAP 18 (cont.)

BIOLOGICAL RESOURCES: (cont.)

FISH: (cont.)

RAR#	Species	S	F	ST	Conc.	J	F	M	A	M	J	J	A	S	O	N	D	Spawning	Eggs	Larvae	Juveniles	Adults
362	Striped bass				HIGH SPAWNING	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUN	APR-JUN	APR-JUL	JAN-DEC	APR-NOV
	White perch				HIGH	X	X	X	X	X	X	X	X	X	X	X	X	MAR-JUN	MAR-JUN	APR-JUL	JAN-DEC	JAN-DEC
	Yellow perch				LOW					X	X	X	X	X				-	-	-	JUN-AUG	JUN-OCT
363	Alewife				HIGH SPAWNING	X	X	X	X	X	X	X	X	X	X	X	X	MAR-MAY	MAR-MAY	APR-JUN	JAN-DEC	MAR-OCT
	American eel				MED	X	X	X	X	X	X	X	X	X	X	X	X	-	-	DEC-APR	JAN-DEC	JAN-DEC
	American shad				HIGH SPAWNING	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	JAN-DEC	MAR-OCT
	Atlantic croaker				HIGH			X	X	X	X	X	X	X	X	X		-	-	-	JUL-OCT	APR-NOV
	Atlantic menhaden				HIGH				X	X	X	X	X	X				-	-	-	JUN-OCT	MAY-OCT
	Bay anchovy				MED			X	X	X	X	X	X	X	X			-	-	-	APR-NOV	APR-NOV
	Blueback herring				HIGH	X	X	X	X	X	X	X	X	X	X	X	X	MAR-JUN	MAR-JUN	APR-JUN	JAN-DEC	APR-NOV
	Bluefish				LOW					X	X	X	X	X				-	-	-	JUN-OCT	-
	Channel catfish				PRESENT	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	JUN-OCT	JAN-DEC
	Gizzard shad				LOW					X	X	X	X	X	X			-	-	-	JUN-OCT	JUL-NOV
	Hickory shad				MED			X	X	X	X	X	X	X	X			-	-	-	MAY-OCT	MAR-JUN OCT-NOV
	Hickory shad	E		PA	MED			X	X	X	X	X	X	X	X			-	-	-	MAY-OCT	MAR-JUN OCT-NOV
	Spot				MED				X	X	X	X	X	X				-	-	-	JUN-OCT	MAY-OCT
	Striped bass				HIGH SPAWNING	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUN	APR-JUN	APR-JUL	JAN-DEC	APR-NOV
	Weakfish				PRESENT					X	X	X	X	X				-	-	-	JUN-OCT	-
	White perch				HIGH	X	X	X	X	X	X	X	X	X	X	X	X	MAR-JUN	MAR-JUN	APR-JUL	JAN-DEC	JAN-DEC
	Yellow perch				LOW					X	X	X	X	X	X			-	-	-	JUN-NOV	JUN-NOV
407	Shortnose sturgeon	E	E	DE	MED				X	X	X	X	X	X	X			-	-	-	APR-OCT	APR-OCT
	Shortnose sturgeon	E	E	NJ	MED				X	X	X	X	X	X	X			-	-	-	APR-OCT	APR-OCT
	Shortnose sturgeon	E	E	PA	MED				X	X	X	X	X	X	X			-	-	-	APR-OCT	APR-OCT
408	Shortnose sturgeon	E	E	DE	HIGH	X	X	X								X	X	-	-	-	NOV-MAR	-
	Shortnose sturgeon	E	E	NJ	HIGH	X	X	X								X	X	-	-	-	NOV-MAR	-
	Shortnose sturgeon	E	E	PA	HIGH	X	X	X								X	X	-	-	-	NOV-MAR	-
412	Atlantic sturgeon	E	E	DE	HIGH				X	X	X							APR-JUN	APR-JUN	MAY-JUN	APR-JUN	APR-JUN
	Atlantic sturgeon	E	E	NJ	HIGH				X	X	X							APR-JUN	APR-JUN	MAY-JUN	APR-JUN	APR-JUN
	Atlantic sturgeon	E	E	PA	HIGH				X	X	X							APR-JUN	APR-JUN	MAY-JUN	APR-JUN	APR-JUN
416	Atlantic sturgeon	E	E	DE	HIGH YOY	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUN	APR-JUN	MAY-JUN	JAN-DEC	MAR-NOV
	Atlantic sturgeon	E	E	NJ	HIGH YOY	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUN	APR-JUN	MAY-JUN	JAN-DEC	MAR-NOV
	Atlantic sturgeon	E	E	PA	HIGH YOY	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUN	APR-JUN	MAY-JUN	JAN-DEC	MAR-NOV
417	Atlantic sturgeon	E	E	DE	PRESENT	X	X	X			X	X	X	X	X	X	X	-	-	-	JUL-MAR	MAR-MAR JUL-NOV
	Atlantic sturgeon	E	E	NJ	PRESENT	X	X	X			X	X	X	X	X	X	X	-	-	-	JUL-MAR	MAR-MAR JUL-NOV
	Atlantic sturgeon	E	E	PA	PRESENT	X	X	X			X	X	X	X	X	X	X	-	-	-	JUL-MAR	MAR-MAR JUL-NOV
418	Atlantic sturgeon	E	E	DE	PRESENT	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	JAN-DEC	MAR-NOV
	Atlantic sturgeon	E	E	NJ	PRESENT	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	JAN-DEC	MAR-NOV

HABITAT:

RAR#	Species	S	F	ST	Conc.	J	F	M	A	M	J	J	A	S	O	N	D
175	Endangered plant	E		NJ		X	X	X	X	X	X	X	X	X	X	X	X
178	Rare plant					X	X	X	X	X	X	X	X	X	X	X	X
292	Endangered plant	E		NJ		X	X	X	X	X	X	X	X	X	X	X	X
	Sensitive Joint-vetch	E	T	NJ		X	X	X	X	X	X	X	X	X	X	X	X
293	Sensitive Joint-vetch	E	T	NJ		X	X	X	X	X	X	X	X	X	X	X	X
366	Eelgrass (water celery)					X	X	X	X	X	X	X	X	X	X	X	X
367	Eelgrass (water celery)					X	X	X	X	X	X	X	X	X	X	X	X
368	Submerged aquatic vegetation					X	X	X	X	X	X	X	X	X	X	X	X

INVERTEBRATE:

RAR#	Species	S	F	ST	Conc.	J	F	M	A	M	J	J	A	S	O	N	D	Spawning	Eggs	Larvae	Juveniles	Adults
362	Blue crab				LOW						X	X	X	X	X	X		-	-	-	JUN-OCT	JUN-NOV
363	Blue crab				LOW	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	JAN-DEC	JAN-DEC

MARINE MAMMAL:

RAR#	Species	S	F	ST	Conc.	J	F	M	A	M	J	J	A	S	O	N	D	Mating	Calving	Pupping	Molting
170	Gray seal				OCCASIONAL	X	X	X	X							X	X	-	-	-	-
	Harbor seal				COMMON	X	X	X	X							X	X	-	-	-	-
	Harp seal				OCCASIONAL	X	X	X	X	X						X	X	-	-	-	-
	Hooded seal				VERY RARE	X	X	X	X	X						X	X	-	-	-	-

HUMAN USE RESOURCES:

AIRPORT:

HUN#	Name	Contact	Phone
14	BRIDGEPORT-CAHILL FIELD		
39	SPITFIRE AERODROME		

BOAT RAMP:

HUN#	Name	Contact	Phone
88	FLOWER STREET- CHESTER CITY BOAT RAMP	CITY OF CHESTER	

MANAGEMENT AREA:

HUN#	Name	Contact	Phone
298	GAME BRANCH	NJ DEPT OF NATURAL LANDS TRUST	

PARK:

HUN#	Name	Contact	Phone
565	BELLEVUE STATE PARK	DELAWARE STATE PARKS	
579	FOX POINT STATE PARK	DELAWARE STATE PARKS	

WATER INTAKE:

HUN#	Name	Contact	Phone
659	CLAYMONT STEEL, INC.		
666	DUPONT EDGEMOOR PLANT		
667	FPL ENERGY		
669	GENERAL CHEMICAL		
671	LOGAN GENERATING CORP.		
684	SUNOCO INC (R&M)		

Biological information shown on the maps represents known concentration areas or occurrences, but does not necessarily represent the full distribution or range of each species. DNREC, NJDEP ENSP, and PGC provided information for some of the federally and state listed species and species of conservation concern for display in the ESI atlas and accompanying digital data in 2013-2014. These data represent existing information known to these agencies at the time of the request and should never be substituted for consultation with these agencies. This atlas was developed using NJDEP GIS digital data for archaeological and historic sites, but this secondary product has not been verified by NJDEP and is not state-authorized. Archaeological and historical site information for Delaware was provided by DE Division of Historical and Cultural Affairs.

ENVIRONMENTAL SENSITIVITY INDEX MAP

75 15'00"

39 52'30"

PRESENT IN PA MARSHES AND INLAND WATERS
458

PRESENT IN HEINZ NWR
248

PRESENT IN AREA
111 175

PRESENT IN NJ MARSHES AND INLAND WATERS
442

PRESENT IN DELAWARE RIVER
362 362
407
408
412
417

PRESENT IN DELAWARE RIVER IN PA
457

PRESENT ON NJ BANKS OF RIVER
441

DELAWARE RIVER

PENNSYLVANIA
NEW JERSEY

LITTLE TINICUM ISLAND

CRAB POINT

BRAMELL POINT

Raccoon Creek

123 691 247 207 371 442 168 330 181 283 368 371 416 443 317 366 339 100 316 395 368 294 99 492 298

SHORELINE HABITATS (ESI)

- 1B EXPOSED, SOLID MAN- MADE STRUCTURES
- 2A EXPOSED WAVE- CUT PLATFORMS IN CLAY, MUD, OR BEDROCK
  2B EXPOSED SCARPS AND STEEP SLOPES IN CLAY OR MUD
- 3A FINE- TO MEDIUM- GRAINED SAND BEACHES
  3B SCARPS AND STEEP SLOPES IN SAND
- 4 COARSE- GRAINED SAND BEACHES
- 5 MIXED SAND AND GRAVEL (SHELL) BEACHES
- 6A GRAVEL BEACHES
- 6B RIPRAP
- 7 EXPOSED TIDAL FLATS
- 8A SHELTERED SCARPS IN CLAY OR MUD
- 8B SHELTERED, SOLID MAN- MADE STRUCTURES
- 8C SHELTERED RIPRAP
  8E PEAT SHORELINES
- 9A SHELTERED TIDAL FLATS
  9B VEGETATED LOW BANKS
- 10A SALT- AND BRACKISH- WATER MARSHES
- 10B FRESHWATER MARSHES
- 10C SWAMPS
- 10D SCRUB- SHRUB WETLANDS

N
W E
S

SCALE 1:45000

1 .5 0 1 KILOMETER

1 .5 0 1 MILE

1 .5 0 1 NAUTICAL MILE

Not For Navigation

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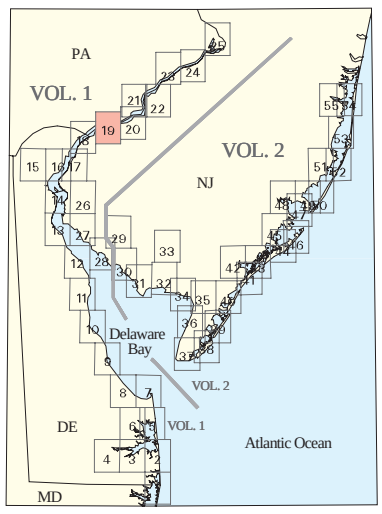
National Oceanic and Atmospheric Administration
National Ocean Service
Office of Response and Restoration
Emergency Response Division



Delaware Bay ESI - Volume 1 ESI-19

Delaware/New Jersey/Pennsylvania: ESIMAP 19

BIOLOGICAL RESOURCES:

BIRD:

RAR#	Species	S	F	ST	Conc.	J	F	M	A	M	J	J	A	S	O	N	D	Nesting	Migrating	Molting
111	Endangered raptor 2	E		NJ		X	X	X	X	X	X	X	X	X	X	X	X	JAN-JUL	-	-
	Endangered raptor 2	T		PA		X	X	X	X	X	X	X	X	X	X	X	X	JAN-JUL	-	-
247	American bittern	E		PA	COMMON	X	X	X	X	X	X	X	X	X	X	X	X	MAY-AUG	-	-
	American black duck				ABUNDANT	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUN	FEB-APR OCT-DEC	-
	American coot				COMMON	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUN	-	-
	American woodcock				COMMON	X	X	X	X	X	X	X	X	X	X	X	X	MAR-JUN	-	-
	Bald eagle	T		PA	UNCOMMON	X	X	X	X	X	X	X	X	X	X	X	X	FEB-APR	-	-
	Barn owl				COMMON	X	X	X	X	X	X	X	X	X	X	X	X	JAN-DEC	-	-
	Black tern	E		PA	OCCASIONAL				X	X	X	X	X					-	-	-
	Black-bellied plover				COMMON			X	X	X	X	X	X	X				-	MAY-OCT	-
	Black-crowned night-heron	E		PA	ABUNDANT	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	MAR-APR JUL-DEC	-
	Blackpoll warbler	E		PA	COMMON					X	X		X	X	X			-	MAY-JUN AUG-OCT	-
	Blue-winged teal				COMMON			X	X	X	X	X	X	X	X	X	X	MAY-JUN	MAR-MAY AUG-OCT	-
	Canada goose				ABUNDANT	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	FEB-APR SEP-NOV	-
	Common moorhen				UNCOMMON			X	X	X	X	X	X	X	X			MAY-SEP	-	-
	Common snipe				COMMON	X	X	X	X	X		X	X	X	X	X	X	-	MAR-MAY JUL-NOV	-
	Common tern	E		PA	RARE				X	X	X	X	X	X	X			-	APR-MAY AUG-SEP	-
	Double-crested cormorant				COMMON	X		X	X	X	X	X	X	X	X	X	X	-	MAR-MAY AUG-DEC	-
	Forster's tern				COMMON				X	X	X	X	X	X	X	X		-	APR-MAY JUL-OCT	-
	Great blue heron				COMMON	X	X	X	X	X	X	X	X	X	X	X	X	-	MAR-MAY	-
	Great egret	E		PA	ABUNDANT			X	X	X	X	X	X	X	X	X	X	APR-JUL	MAR-MAY JUL-DEC	-
	Greater scaup				COMMON	X	X	X	X			X	X	X	X	X	X	-	NOV-APR	-
	Greater yellowlegs				COMMON			X	X	X		X	X	X	X	X		-	MAR-MAY JUL-NOV	-
	Green heron							X	X	X	X	X	X	X	X			-	-	-
	Green-winged teal				ABUNDANT	X	X	X	X	X	X	X	X	X	X	X	X	JUL-AUG	MAR-MAY AUG-NOV	-
	Herring gull				COMMON	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-
	Hooded merganser				OCCASIONAL	X	X	X	X	X	X	X	X	X	X	X	X	MAY-AUG	MAR-APR OCT-JAN	-
	Killdeer				ABUNDANT	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUN	FEB-MAR AUG-NOV	-
	King rail	E		PA	OCCASIONAL			X	X	X	X	X	X	X	X			MAY-AUG	-	-
	Laughing gull				COMMON			X	X	X	X	X	X	X	X	X	X	-	APR-MAY AUG-OCT	-
	Least bittern	E		PA	COMMON				X	X	X	X	X	X	X			MAY-AUG	-	-
	Little blue heron				COMMON				X	X	X	X	X	X				-	-	-
	Loggerhead shrike	E		PA	RARE				X	X			X	X	X	X	X	-	MAR-APR AUG-SEP	-
	Mallard				ABUNDANT	X	X	X	X	X	X	X	X	X	X	X	X	APR-AUG	FEB-MAY SEP-DEC	-
	Marsh wren				COMMON	X	X	X	X	X	X	X	X	X	X	X	X	MAY-AUG	-	-
	Northern harrier	T		PA	COMMON	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUN	OCT-FEB	-
	Northern pintail				COMMON	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUN	FEB-APR SEP-DEC	-
	Northern shoveler				COMMON	X	X	X	X	X	X			X	X	X	X	MAY-JUN	MAR-APR SEP-NOV	-
	Osprey	T		PA	OCCASIONAL			X	X	X	X	X	X	X	X			-	MAR-MAY AUG-OCT	-
	Peregrine falcon	E		PA	RARE	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-
	Pied-billed grebe				COMMON	X	X	X	X	X	X	X	X	X	X	X	X	MAY-AUG	MAR-MAY AUG-AUG	-
	Piping plover	E	E	PA	RARE				X	X	X	X	X	X				-	-	-
	Ring-billed gull				COMMON	X	X	X	X	X	X	X	X	X	X	X	X	-	OCT-MAR	-
	Ruddy duck				COMMON	X	X	X	X				X	X	X			-	MAR-APR OCT-NOV	-
	Sedge wren	E		PA	RARE				X	X	X	X	X	X				JUN-AUG	-	-
	Semipalmated plover				COMMON				X	X	X	X	X	X	X			-	APR-OCT	-
	Semipalmated sandpiper				COMMON				X	X	X	X	X	X	X			-	APR-OCT	-
	Short-eared owl	E		PA	OCCASIONAL	X	X	X	X					X	X	X		-	MAR-APR OCT-NOV	-
	Snowy egret				ABUNDANT			X	X	X	X	X	X	X	X			APR-AUG	MAR-MAY JUL-SEP	-
	Solitary sandpiper				COMMON				X	X		X	X	X	X			-	APR-MAY JUL-OCT	-
	Sora				OCCASIONAL			X	X	X	X	X	X	X	X			MAY-JUL	-	-
	Spotted sandpiper				COMMON				X	X	X	X	X	X	X			MAY-JUN	APR-MAY JUL-OCT	-
	Swamp sparrow					X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-
	Upland sandpiper	E		PA	RARE				X	X	X	X	X	X				-	APR-MAY JUL-SEP	-
	Virginia rail				OCCASIONAL			X	X	X	X	X	X	X	X			MAY-AUG	-	-
	Wood duck				ABUNDANT	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUN	MAR-APR SEP-NOV	-
	Yellow-bellied flycatcher	E		PA	UNCOMMON					X	X		X	X	X			-	MAY-JUN AUG-OCT	-
	Yellow-crowned night-heron	E		PA	RARE				X	X	X	X	X	X				-	-	-
317	Threatened raptor	T		NJ					X	X	X	X	X	X	X			APR-AUG	SEP-OCT	-
330	Peregrine falcon	E		PA	1 NEST	X	X	X	X	X	X	X	X	X	X	X	X	FEB-JUL	MAR-MAY	-
441	Bufflehead				10S	X	X	X	X	X				X	X	X		-	MAR-APR OCT-DEC	-
	Canada goose				1000S	X	X	X	X	X	X	X	X	X	X	X	X	-	MAR-APR SEP-NOV	-
	Canvasback				100S	X	X	X	X	X					X	X		-	MAR-APR NOV-DEC	-
	Common goldeneye				10S	X	X	X	X	X					X	X		-	MAR-APR NOV-DEC	-
	Hooded merganser				10S	X	X	X						X	X	X		-	FEB-MAR OCT-DEC	-
	Red-breasted merganser				10S	X	X	X	X						X	X	X	-	MAR-APR OCT-DEC	-
	Ring-necked duck				100S	X	X	X	X						X	X	X	-	MAR-APR OCT-DEC	-
	Ruddy duck				100S	X	X	X	X						X	X	X	-	MAR-APR OCT-NOV	-
	Scaup				100S	X	X	X	X						X	X	X	-	MAR-APR OCT-DEC	-
	Snow goose				1000S	X	X	X	X	X				X	X	X	X	-	FEB-MAY SEP-OCT	-
442	American black duck				1000S	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUN	APR-APR SEP-DEC	-
	American coot				100S	X	X	X	X	X			X	X	X	X	X	-	FEB-MAR SEP-NOV	-
	American wigeon				100S	X	X	X	X	X			X	X	X	X	X	-	MAR-APR AUG-NOV	-
	Bufflehead				10S	X	X	X	X	X				X	X	X		-	MAR-APR OCT-DEC	-
	Canada goose				1000S	X	X	X	X	X	X	X	X	X	X	X	X	-	MAR-APR SEP-NOV	-
	Canvasback				100S	X	X	X	X	X					X	X		-	MAR-APR NOV-DEC	-
	Common goldeneye				10S	X	X	X	X	X					X	X		-	MAR-APR NOV-DEC	-
	Common merganser				100S	X	X	X	X						X	X		-	FEB-MAR NOV-DEC	-
	Gadwall				100S	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	MAR-APR OCT-NOV	-
	Green-winged teal				100S	X	X	X	X	X		X	X	X	X	X		-	FEB-MAR SEP-NOV	-
	Hooded merganser				10S	X	X	X						X	X	X		-	FEB-MAR OCT-DEC	-
	Mallard				1000S	X	X	X	X	X	X	X	X	X	X	X	X	MAR-JUN	-	-
	Mute swan				10S	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-
	Northern pintail				100S	X	X	X	X			X	X	X	X	X		-	FEB-APR AUG-SEP	-
	Northern shoveler				10S	X	X	X	X	X			X	X	X	X		-	MAR-APR SEP-OCT	-
	Red-breasted merganser				10S	X	X	X	X					X	X	X		-	MAR-APR OCT-DEC	-
	Ring-necked duck				100S	X	X	X	X					X	X	X		-	MAR-APR OCT-DEC	-
	Ruddy duck				100S	X	X	X	X					X	X	X		-	MAR-APR OCT-NOV	-
	Scaup				100S	X	X	X	X					X	X	X		-	MAR-APR OCT-DEC	-
	Snow goose				1000S	X	X	X	X	X			X	X	X	X		-	FEB-MAY SEP-OCT	-
	Tundra swan				100S	X	X	X	X					X	X	X		-	FEB-APR OCT-NOV	-
443	Bufflehead				10S	X	X	X	X	X				X	X	X		-	MAR-APR OCT-DEC	-
	Canada goose				10000S	X	X	X	X	X	X	X	X	X	X	X	X	-	MAR-APR SEP-NOV	-
	Canvasback				100S	X	X	X	X	X					X	X		-	MAR-APR NOV-DEC	-
	Common goldeneye				10S	X	X	X	X	X					X	X		-	MAR-APR NOV-DEC	-
	Red-breasted merganser				10S	X	X	X	X					X	X	X		-	MAR-APR OCT-DEC	-
	Ring-necked duck				10S	X	X	X	X					X	X	X		-	MAR-APR OCT-DEC	-
	Ruddy duck				10S	X	X	X	X					X	X	X		-	MAR-APR OCT-NOV	-
	Scaup				100S	X	X	X	X					X	X	X		-	MAR-APR OCT-DEC	-
457	Bufflehead				100S	X	X	X	X	X	X			X	X	X		-	MAR-MAY OCT-DEC	-
	Canada goose				100S	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	FEB-APR SEP-NOV	-
	Canvasback				100S	X	X	X	X	X	X			X	X	X	X	-	FEB-APR SEP-NOV	-
	Common goldeneye				10S	X	X	X	X	X	X				X	X	X	-	FEB-APR NOV-DEC	-
	Long-tailed duck				10S	X	X	X	X					X	X	X		-	FEB-APR OCT-NOV	-

Biological information shown on the maps represents known concentration areas or occurrences, but does not necessarily represent the full distribution or range of each species. DNREC, NJDEP ENSP, and PGC provided information for some of the federally and state listed species and species of conservation concern for display in the ESI atlas and accompanying digital data in 2013-2014. These data represent existing information known to these agencies at the time of the request and should never be substituted for consultation with these agencies. This atlas was developed using NJDEP GIS digital data for archaeological and historic sites, but this secondary product has not been verified by NJDEP and is not state-authorized. Archaeological and historical site information for Delaware was provided by DE Division of Historical and Cultural Affairs.

Delaware/New Jersey/Pennsylvania: ESIMAP 19 (cont.)

BIOLOGICAL RESOURCES: (cont.)

BIRD: (cont.)

RAR#	Species	S	F	ST	Conc.	J	F	M	A	M	J	J	A	S	O	N	D	Nesting	Migrating	Molting
457	Mergansers				100S	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUN	FEB-APR OCT-DEC	-
	Northern shoveler				10S	X	X	X	X	X		X	X	X	X	X		-	MAR-APR AUG-NOV	-
	Ruddy duck				1000S	X	X	X	X	X	X		X	X	X	X		-	MAR-APR OCT-NOV	-
	Scaup				100S	X	X	X	X					X	X	X		-	MAR-APR OCT-DEC	-
458	American black duck				1000S	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUN	FEB-APR OCT-DEC	-
	Bufflehead				100S	X	X	X	X	X	X			X	X	X		-	MAR-MAY OCT-DEC	-
	Canada goose				100S	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	FEB-APR SEP-NOV	-
	Canvasback				100S	X	X	X	X	X			X	X	X	X		-	FEB-APR SEP-NOV	-
	Common goldeneye				10S	X	X	X	X	X				X	X	X		-	FEB-APR NOV-DEC	-
	Green-winged teal				100S	X	X	X	X	X		X	X	X	X	X		-	MAR-MAY AUG-NOV	-
	Long-tailed duck				10S	X	X	X	X					X	X	X		-	FEB-APR OCT-NOV	-
	Mallard				1000S	X	X	X	X	X	X	X	X	X	X	X	X	APR-AUG	FEB-MAY SEP-DEC	-
	Mergansers				100S	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUN	FEB-APR OCT-DEC	-
	Northern pintail				100S	X	X	X	X	X				X	X	X	X	-	FEB-APR SEP-DEC	-
	Northern shoveler				10S	X	X	X	X	X		X	X	X	X	X		-	MAR-APR AUG-NOV	-
	Ruddy duck				1000S	X	X	X	X	X	X		X	X	X	X		-	MAR-APR OCT-NOV	-
	Scaup				100S	X	X	X	X					X	X	X		-	MAR-APR OCT-DEC	-
	Tundra swan				100S	X	X	X	X					X	X	X		-	FEB-APR OCT-DEC	-

FISH:

RAR#	Species	S	F	ST	Conc.	J	F	M	A	M	J	J	A	S	O	N	D	Spawning	Eggs	Larvae	Juveniles	Adults
99	Alewife				HIGH SPAWNING	X	X	X	X	X	X	X	X	X	X	X	X	MAR-MAY	MAR-MAY	APR-JUN	JAN-DEC	MAR-JUN
	American eel				PRESENT	X	X	X	X	X	X	X	X	X	X	X	X	-	-	DEC-APR	JAN-DEC	JAN-DEC
	American shad				HIGH SPAWNING			X	X	X	X	X	X	X	X			MAR-JUN	APR-JUN	MAY-JUL	JUN-NOV	MAR-JUN OCT-NOV
	Blueback herring				HIGH SPAWNING	X	X	X	X	X	X	X	X	X	X	X	X	MAR-JUN	MAR-JUN	MAY-JUL	JAN-DEC	MAR-JUN OCT-NOV
100	Alewife				HIGH SPAWNING	X	X	X	X	X	X	X	X	X	X	X	X	MAR-MAY	MAR-MAY	APR-JUN	JAN-DEC	MAR-JUN
	American eel				PRESENT	X	X	X	X	X	X	X	X	X	X	X	X	-	-	DEC-APR	JAN-DEC	JAN-DEC
	Blueback herring				HIGH SPAWNING	X	X	X	X	X	X	X	X	X	X	X	X	MAR-JUN	MAR-JUN	MAY-JUL	JAN-DEC	MAR-JUN OCT-NOV
248	Alewife				PRESENT	X	X	X	X	X	X	X	X	X	X	X	X	MAR-MAY	MAR-MAY	APR-JUN	JAN-DEC	MAR-JUN
	American eel				PRESENT	X	X	X	X	X	X	X	X	X	X	X	X	-	-	DEC-APR	JAN-DEC	JAN-DEC
	Atlantic croaker				PRESENT					X	X	X	X	X	X			-	-	-	JUL-OCT	JUN-NOV
	Atlantic menhaden				PRESENT					X	X	X						-	-	-	JUN-JUL	JUN-AUG
	Blueback herring				PRESENT	X	X	X	X	X	X	X	X	X	X	X	X	MAR-JUN	MAR-JUN	MAY-JUL	JAN-DEC	MAR-JUN OCT-NOV
	Channel catfish				PRESENT	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	JUN-OCT	JAN-DEC
	Gizzard shad				PRESENT					X	X	X	X	X	X			-	-	-	JUN-OCT	JUL-NOV
	Hickory shad				PRESENT	X	X	X	X	X	X	X	X	X	X	X	X	MAR-JUN	MAR-JUN	MAR-JUN	JAN-DEC	MAR-JUN OCT-NOV
	Hickory shad	E		PA	PRESENT	X	X	X	X	X	X	X	X	X	X	X	X	MAR-JUN	MAR-JUN	MAR-JUN	JAN-DEC	MAR-JUN OCT-NOV
	Largemouth bass				PRESENT				X	X	X	X	X	X	X	X		APR-MAY	APR-MAY	APR-MAY	MAY-JUL	APR-NOV
	Smallmouth bass				PRESENT	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	-
	Spot				PRESENT						X	X	X					-	-	-	JUL-SEP	JUL-SEP
	Striped bass				PRESENT	X	X	X	X	X	X	X	X	X	X	X	X	-	APR-JUN	APR-JUL	JAN-DEC	MAR-DEC
	White perch				PRESENT	X	X	X	X	X	X	X	X	X	X	X	X	MAR-JUN	MAR-JUN	APR-JUL	JAN-DEC	JAN-DEC
	Yellow perch				PRESENT					X	X	X	X	X				-	-	-	JUN-AUG	JUN-OCT
362	Alewife				HIGH SPAWNING			X	X	X	X	X	X	X				MAR-MAY	MAR-MAY	APR-JUN	JUN-AUG	MAR-OCT
	American eel				LOW	X	X	X	X	X	X	X	X	X	X	X	X	-	-	DEC-APR	JAN-DEC	JAN-DEC
	American shad				HIGH SPAWNING			X	X	X	X	X	X	X	X			MAR-JUN	APR-JUN	MAY-JUL	JUN-NOV	MAR-NOV
	Atlantic croaker				MED					X	X	X	X	X	X			-	-	-	JUL-OCT	JUN-NOV
	Atlantic menhaden				HIGH					X	X	X						-	-	-	JUN-JUL	JUN-AUG
	Bay anchovy				MED							X	X	X	X			-	-	-	AUG-OCT	AUG-NOV
	Blueback herring				HIGH			X	X	X	X	X	X	X	X			MAR-JUN	MAR-JUN	MAR-JUN	JUN-NOV	MAR-NOV
	Channel catfish				PRESENT					X	X	X	X	X	X			-	-	-	JUL-SEP	JUN-NOV
	Gizzard shad				LOW					X	X	X	X	X	X			-	-	-	JUN-OCT	JUL-NOV
	Hickory shad				LOW			X	X	X	X							MAR-JUN	MAR-JUN	MAR-JUN	-	MAR-JUN
	Hickory shad	E		PA	LOW			X	X	X	X							MAR-JUN	MAR-JUN	MAR-JUN	-	MAR-JUN
	Spot				HIGH SPRING							X	X	X				-	-	-	JUL-SEP	JUL-SEP
	Striped bass				HIGH SPAWNING	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUN	APR-JUN	APR-JUL	JAN-DEC	APR-NOV
	White perch				HIGH	X	X	X	X	X	X	X	X	X	X	X	X	MAR-JUN	MAR-JUN	APR-JUL	JAN-DEC	JAN-DEC
	Yellow perch				LOW					X	X	X	X	X				-	-	-	JUN-AUG	JUN-OCT
407	Shortnose sturgeon	E	E	NJ	MED				X	X	X	X	X	X	X			-	-	-	APR-OCT	APR-OCT
	Shortnose sturgeon	E	E	PA	MED				X	X	X	X	X	X	X			-	-	-	APR-OCT	APR-OCT
408	Shortnose sturgeon	E	E	NJ	HIGH	X	X	X								X	X	-	-	-	NOV-MAR	-
	Shortnose sturgeon	E	E	PA	HIGH	X	X	X								X	X	-	-	-	NOV-MAR	-
412	Atlantic sturgeon	E	E	NJ	HIGH				X	X	X							APR-JUN	APR-JUN	MAY-JUN	APR-JUN	APR-JUN
	Atlantic sturgeon	E	E	PA	HIGH				X	X	X							APR-JUN	APR-JUN	MAY-JUN	APR-JUN	APR-JUN
416	Atlantic sturgeon	E	E	NJ	HIGH YOY	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUN	APR-JUN	MAY-JUN	JAN-DEC	MAR-NOV
	Atlantic sturgeon	E	E	PA	HIGH YOY	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUN	APR-JUN	MAY-JUN	JAN-DEC	MAR-NOV
417	Atlantic sturgeon	E	E	NJ	PRESENT	X	X	X			X	X	X	X	X	X	X	-	-	-	JUL-MAR	MAR-MAR JUL-NOV
	Atlantic sturgeon	E	E	PA	PRESENT	X	X	X			X	X	X	X	X	X	X	-	-	-	JUL-MAR	MAR-MAR JUL-NOV

HABITAT:

RAR#	Species	S	F	ST	Conc.	J	F	M	A	M	J	J	A	S	O	N	D
175	Endangered plant	E		NJ		X	X	X	X	X	X	X	X	X	X	X	X
247	Field dodder	T		PA		X	X	X	X	X	X	X	X	X	X	X	X
	Forked rush	E		PA		X	X	X	X	X	X	X	X	X	X	X	X
	Walter's barnyard grass	E		PA		X	X	X	X	X	X	X	X	X	X	X	X
294	Endangered plant	E		NJ		X	X	X	X	X	X	X	X	X	X	X	X
	Swamp-pink	E	T	NJ		X	X	X	X	X	X	X	X	X	X	X	X
298	Swamp-pink	E	T	NJ		X	X	X	X	X	X	X	X	X	X	X	X
366	Eelgrass (water celery)					X	X	X	X	X	X	X	X	X	X	X	X
368	Submerged aquatic vegetation					X	X	X	X	X	X	X	X	X	X	X	X
371	Submerged aquatic vegetation					X	X	X	X	X	X	X	X	X	X	X	X

INVERTEBRATE:

RAR#	Species	S	F	ST	Conc.	J	F	M	A	M	J	J	A	S	O	N	D	Spawning	Eggs	Larvae	Juveniles	Adults
283	Eastern elliptio				COMMON	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	JAN-DEC	JAN-DEC
	Eastern floater				COMMON	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	JAN-DEC	JAN-DEC
362	Blue crab				LOW						X	X	X	X	X			-	-	-	JUN-OCT	JUN-NOV

REPTILE:

RAR#	Species	S	F	ST	Conc.	J	F	M	A	M	J	J	A	S	O	N	D	Nesting	Hatching	Internesting	Juveniles	Adults
247	Eastern redbelly turtle	T		PA	UNCOMMON	X	X	X	X	X	X	X	X	X	X	X	X	JUN-JUL	-	-	-	-
	Southern leopard frog	E		PA	COMMON	X	X	X	X	X	X	X	X	X	X	X	X	MAR-JUN	-	-	-	-

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Delaware/New Jersey/Pennsylvania: ESIMAP 19 (cont.)

HUMAN USE RESOURCES:

BOAT RAMP:

HUN#	Name	Contact	Phone
123	RIDLEY TOWNSHIP MARINA	RIDLEY TOWNSHIP MARINA	

HELIPORT:

HUN#	Name	Contact	Phone
168	BOEING HELICOPTERS CENTER 3 SOUTH		
181	CROZER-CHESTER		
207	PIAC		

MANAGEMENT AREA:

HUN#	Name	Contact	Phone
316	LOGAN POND WMA	NJ DIV OF FISH AND WILDLIFE	
339	NEHONSEY BROOK PRESERVE	NJ DEPT OF NATURAL LANDS TRUST	

MARINA:

HUN#	Name	Contact	Phone
395	BRIDGEPORT BOAT YARD(ON RACCOON CREEK)	ALLEN	856/467-0943
442	ISLAND MARINA	ISLAND MARINA	
492	RICHARD'S BUTTONWOOD MARINA	JAMES RICHARDS 215-397-7583	856/467-9173

WILDLIFE REFUGE:

HUN#	Name	Contact	Phone
691	JOHN HEINZ NTL WILDLIFE REFUGE TINICUM	USFWS	

Biological information shown on the maps represents known concentration areas or occurrences, but does not necessarily represent the full distribution or range of each species. DNREC, NJDEP ENSP, and PGC provided information for some of the federally and state listed species and species of conservation concern for display in the ESI atlas and accompanying digital data in 2013-2014. These data represent existing information known to these agencies at the time of the request and should never be substituted for consultation with these agencies. This atlas was developed using NJDEP GIS digital data for archaeological and historic sites, but this secondary product has not been verified by NJDEP and is not state-authorized. Archaeological and historical site information for Delaware was provided by DE Division of Historical and Cultural Affairs.

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