FACT SHEET

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 3
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

NPDES Permit No. DC0000019

The United States Environmental Protection Agency (EPA) Proposed the Reissuance of a National Pollutant Discharge Elimination System (NPDES) Permit to Discharge Pollutants Pursuant to the Provisions of the Clean Water Act (CWA) For:

Department of the Army
Baltimore District, Corps of Engineers
Washington Aqueduct Division

FACILITY LOCATION:
5900 MacArthur Boulevard, NW
Washington, D.C. 20016-2514

RECEIVING WATERS:
Potomac River, Rock Creek, Mill Creek

ACTION TO BE TAKEN:

EPA is proposing to reissue the NPDES permit for the Washington Aqueduct subject to certain effluent discharge limitations, monitoring requirements, and other terms and conditions identified in the permit. The permit requirements are based on Section 402 of the Clean Water Act (33 U.S.C. 1342), and NPDES regulations found at 40 CFR Parts 122, 124, 125, 127, and 131.

Persons wishing to comment on, or request a public hearing for, the draft permit for this facility may do so in writing electronically by the expiration date of the public comment period. All public comments and/or requests for a public hearing must state the nature of the issues to be raised as well as the requester's name, address, and telephone number. All public comments and requests for a public hearing must be in writing and submitted electronically to the following:

Carissa Moncavage
U.S. EPA Region 3
moncavage.carissa@epa.gov

Public Comment Start Date: December 7, 2020
Public Comment Expiration Date: January 7, 2020

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1.0 Current and Previous Public Notice and Comment

EPA published a draft permit for this facility for public notice and comment on August 1, 2019 and accepted comments until September 3, 2019 because August 31, 2019 fell on a weekend and September 1, 2019 was a holiday. EPA has made substantial changes to that draft permit as a result of public comments and other information as discussed below. As a result, EPA is making this revised draft permit and fact sheet available for public notice and comment.

Pursuant to 40 C.F.R. § 124.13, "[a]ll persons, including applicants, who believe any condition of a draft permit is inappropriate or that the [EPA]'s tentative decision to…prepare a draft permit is inappropriate, must raise all reasonably ascertainable issues and submit all reasonably available arguments supporting their position by the close of the public comment period (including any public hearing) under [40 C.F.R.] § 124.10. Any supporting materials which are submitted shall be included in full and may not be incorporated by reference, unless they are already part of the administrative record in the same proceeding, or consist of State or Federal statutes and regulations, EPA documents of general applicability, or other generally available reference materials. Commenters shall make supporting materials not already included in the administrative record available to EPA as directed by the Regional Administrator." 40 C.F.R. § 124.13.

After the public comment period ends, and all comments have been considered, EPA's regional Director for the Water Division will make a final decision regarding permit issuance. If no substantive comments have been received, the tentative conditions in the draft permit will become effective no less than 30 days after the issuance date, unless the permit has been challenged.

The draft permit, fact sheet, and administrative record index are available on the EPA Region 3 public notice website https://www.epa.gov/dc/epa-public-notices-district-columbia and on the EPA Region 3 NPDES Permits website https://www.epa.gov/npdes-permits/district-columbia-npdes-permits. The administrative record contains all the records EPA used for the development of the draft permit, as required in 40 C.F.R. § 124.10(d)(vi). Copies of any document listed in the administrative record index can be obtained by contacting the permit writer below.

For additional information, please email the permit writer, Carissa Moncavage at moncavage.carissa@epa.gov or call 215-814-5798.

2.0 Summary of Changes Made

EPA received comments from three commenters on the previous draft permit during the comment period. EPA is making certain changes to the draft permit and fact sheet as a result of those comments, as well as additional review undertaken. These changes are described in detail throughout this fact sheet but are summarized here. The primary differences between the previous draft permit and this revised draft permit are:

- Changed the name of Outfall 002 to Outfall 002A to minimize confusion with Outfall 002Q, the continuous discharge. The permittee provided documentation that 002 and 002Q are two separate outfalls, not one outfall with both a continuous and intermittent discharge as was previously understood. Therefore, because these are two distinct outfalls, the name for Outfall 002 was changed to 002A which is consistent with how this outfall is identified in EPA's Integrated Compliance Information System for electronic reporting.

- Added aluminum water quality-based effluent limits for discharges from outfalls 003, 004, 007, 008, and 009 because the technology based effluent limits proposed in the previous draft permit were less stringent than the calculated water quality-based effluent limits.

- Removed the mass based average monthly limits for aluminum for all intermittent discharges – i.e., discharges from all outfalls other than 002Q because an average monthly limit is not appropriate for intermittent or non-continuous discharges. The effluent limits for the non-continuous discharges are expressed as maximum daily limits consistent with 40 C.F.R. §122.45(e). Also, recalculated the daily maximum effluent limits for aluminum based on the new concentration-based WQBELs.

- The monitoring frequency for pH and total residual chlorine for Outfalls 003 and 004 have been changed from daily to once per discharge since the discharges from these outfalls are intermittent and to be consistent with the monitoring requirements for these parameters at Outfalls 006, 007, 008, and 009.

- Part III Section A of the draft permit has been revised to add the following language: "the permittee is authorized to discharge in accordance with the terms and conditions set forth in Part I of this permit" to be consistent with similar language specified in Part III Section B.

- The total suspended solids influent monitoring requirements at Outfalls 002A, 003 and 004 have been removed from the draft permit because the permit does not contain a percent removal requirement due to the construction and implementation of the residual processing facility.

- The fact sheet was revised to specify that a hardness value of 100 mg/L was used to calculate the hardness dependent metals water quality criteria[1]. The hardness concentration of 100 mg/L is used as the default value.

- EPA performed a reasonable potential (RP) analysis for barium at Outfalls 006 and 007 and chloride at Outfalls 002A, 003, 004 using the federal water quality criteria for these parameters

[1] Calculations of the metals criteria can be found in Chapter 21-1105, Table 2 of the D.C. Muncipal Regulations for water quality standards.

as an interpretation of the District of Columbia narrative water quality criterion as allowed in 40 C.F.R. § 122.44(d)(1)(vi)(A).

- EPA performed a RP analysis for iron at Outfalls 002A, 003, 004, and 008 using discharge monitoring report (DMR) data for the past 4 years (from 3/1/2015 to 11/20/2019). This time frame is representative of the current and future discharges at these outfalls. Discharge sampling that occurred prior to and including February 2015 was before the residual processing facility was fully functional, therefore not representative of the facility's current and future discharge quality. The RP analysis showed that iron water quality based effluent limits are not required for Outfalls 002A, 003, 004, and 008. Outfalls 006, 007, and 009 reported a "no discharge" for the time period above, therefore, a RP analysis was not conducted at these outfalls for iron.

- EPA performed a RP analysis on Outfall 002Q using data reported on the permittee's DMRs and the effluent characterization data from the 2008 permit. Because the permit application did not include an effluent characterization of Outfall 002Q, a special condition was also added to Part III Section C of the permit requiring an effluent characterization of Outfall 002Q to be submitted to EPA within six months of the permit effective date.

- EPA performed a RP analysis for fluoride at all the outfalls using the National Primary Drinking Water Regulation's maximum contaminant level[2] (MCL) of 4.0 mg/L for this parameter. The District does not have a numeric water quality criterion for fluoride, therefore, the MCL was used as an interpretation of the District Columbia narrative water quality criterion[3] as allowed in 40 C.F.R. § 122.44(d)(1)(vi)(C). On May 18, 2020 the permittee provided updated fluoride data for Outfalls 003, 004, 008, and 009. These updated fluoride data were used in the RP analysis at these outfalls. The RP analysis showed water quality based effluent limits were not necessary.

- The fact sheet has been revised to define the term "instream waste concentration" as the ratio between effluent flow and stream flow as specified in the EPA 1985 Technical Support Document for Water Quality-based Toxics Control.

- The fact sheet has been revised to clarify that the term "instream background concentration" is the same as "background concentration." The background concentration data specified in the fact sheet were based on instream monitoring data provided by the permittee to EPA.

- EPA corrected a typo on the source of StreamStats to indicate it is a U.S. Geological Survey (USGS) website instead of National Oceanic Atmospheric Administration or NOAA. EPA used the 1Q10 flow from the StreamStats website. This information was provided in the form of a footnote in the previous fact sheet (footnote 3). This revised fact sheet removes footnote 3 and incorporates this information into the body of the fact sheet on page 20.

- EPA used the recently promulgated federal aluminum instream water quality criterion (83 Fed. Reg. 65,663 Dec. 21, 2018) as an interpretation of the District of Columbia narrative water quality criterion[3] because the District does not have a numeric water quality criterion for aluminum. The aluminum criterion was calculated using the Aluminum Criteria Calculator v2.0,

[2] The fluoride MCL can be found on EPA's website: https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations

[3] See the District of Columbia's Municipal Regulations, Title 21 Section 21-1104.1 for the narrative water quality criteria.

which can be found in the permit's administrative record. The calculator requires the input of site-specific data for pH, hardness and dissolved organic carbon, data which were provided by the permittee. Since the pH, hardness and dissolved organic carbon can vary for each stream, the aluminum criteria calculated for Outfalls 003 and 004 are different than the aluminum water quality criterion calculated for Outfall 006 because the input values varied at each stream.

- The fact sheet has been revised to correct a typo for the copper instream criterion specified on page 11 of the previous fact sheet; the correct criterion is 0.0134 mg/L instead of 0.134 mg/L.

- The fact sheet has been revised to identify Total Suspended Solids (TSS) as parameter of concern for the Chesapeake Bay Total Maximum Daily Load (TMDL). The TSS effluent limits in the permit and the permittee's use of the solid management facility will ensure compliance with the Chesapeake Bay TMDL for this pollutant.

- Added Chesapeake Bay TMDL requirements into the permit at all the outfalls.

- The Endangered Species Act (ESA) section of the fact sheet has been revised to include references to both the Shortnose Sturgeon and the Atlantic Sturgeon; the ESA analysis included both species of sturgeon but the previous fact sheet inadvertently omitted reference to the Atlantic Sturgeon.

- Added regulatory requirements for using sufficiently sensitive test methods for compliance testing to Part I Section H of the permit.

- Added more detailed electronic reporting requirements to Part I Section J.2 and Section J.3 of the permit.

3.0 Facility Summary

3.1 General

The United States Army Corps of Engineers ("the Corps") owns and operates the Dalecarlia and McMillan Water Treatment Plants, which supply potable (i.e., drinking) water to approximately one million residents in the District of Columbia via the District of Columbia Water and Sewer Authority (DC Water); Arlington County, Virginia; and Fairfax, Virginia via the Fairfax County Water Authority (Fairfax Water). The plants provide water at cost to the Wholesale Customers, which are the District of Columbia; Arlington County, Virginia; and the City of Falls Church, Virginia. The Wholesale Customers approve the capital construction budget and are responsible for depositing sufficient funds with the Corps to cover their respective proportional share of the total cost of running and funding improvements at the plants. Together, the Dalecarlia and McMillan Water Treatment Plants are referred to as the Washington Aqueduct.

An act of Congress created the Washington Aqueduct Division water supply system in the mid-1800's with the construction of the Great Falls Dam and intake, which is located in Maryland on the Potomac River. There is a second intake at Little Falls, also located in Maryland, which the Corps uses intermittently. Water flows by gravity from the Great Falls intake to the Dalecarlia Reservoir. From the

forebay, a low-lift booster pump station pumps water into the Dalecarlia Reservoir. The Little Falls pumping station can also deliver water directly to the Dalecarlia Reservoir.

The Dalecarlia Reservoir is a 46-acre earthen basin that serves as a pretreatment reservoir for the two water treatment plants. Approximately 51% of the untreated sediments, which are naturally occurring solids in the raw water taken from the Potomac River, are separated from the aqueous portion of the untreated water in the Dalecarlia Reservoir. The untreated sediments from the Dalecarlia Reservoir are periodically removed. (Depending on situation-specific market conditions, the sediments may be land applied, beneficially reused, or disposed of by other land-based means.)

Water from the Dalecarlia Reservoir is delivered by gravity to both the Dalecarlia Water Treatment Plant (Dalecarlia Sedimentation Basins) and the Georgetown Sedimentation Basins, which are locally known as the Georgetown Reservoir. Water from the Georgetown Sedimentation Basins is delivered to the McMillan Water Treatment Plant.

Water from the Dalecarlia Sedimentation Basins is treated at the Dalecarlia Water Treatment Plant. Regardless of which plant processes the water, treatment is a three-step process that includes sedimentation, filtration, and disinfection. The average total production of the Dalecarlia and McMillan Water Treatment Plants is 150 million gallons per day; however, during the summer, the peak may approach 265 million gallons per day.

Water delivered to the sedimentation basins at Dalecarlia and the Georgetown Sedimentation Basins contains solids that did not physically settle out at the Dalecarlia Reservoir. To make the water drinkable, these solids must be chemically treated. The Corps does this by adding aluminum sulfate (alum), which is considered a drinking water coagulant.

The Dalecarlia facility uses 36 rapid dual media filters and the McMillan facility uses 12 rapid dual media filters. Except for the filter backwash water at the McMillan Water Treatment Plant, which is recycled to the McMillan Reservoir, and the filter backwash water at the Dalecarlia Water Treatment Plant, which is recycled to the Dalecarlia Reservoir, all sedimentation residuals are collected in the Residual Processing Facility.

3.2 Discharge Description

The Washington Aqueduct Water Treatment Plant consists of eight Outfalls: 002A, 002Q, 003, 004, 006, 007, 008, and 009. Discharges from all of these outfalls other than 002Q are intermittent. Based on information provided in the permit application, the intermittent discharges are assumed to occur at the following frequencies:

- Outfalls 002A, 003, 004, 007, and 009: 1 discharge event lasting 2 days every 5 years
- Outfall 006: 1 discharge event lasting 1 day every 3 years

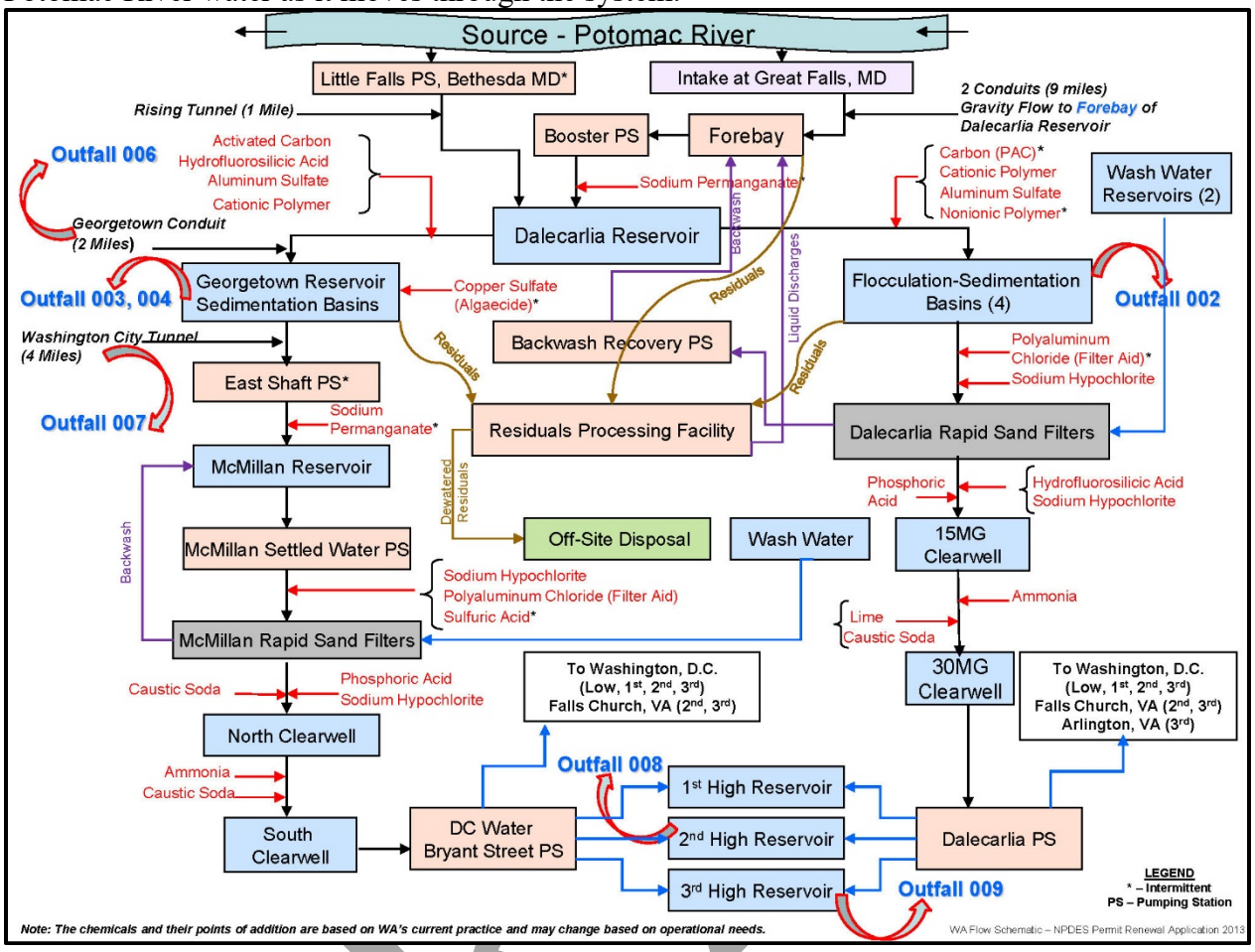
Table 1 below lists the receiving streams for each outfall along with other relevant information. Figure 1 below is a process flow diagram depicting the various processes at the Washington Aqueduct.

Table 1. Washington Aqueduct Outfalls, receiving streams, and other information

Discharge Streams and Expected Contaminants						
	Outfall 002A	**Outfall 002Q[4]**	**Outfalls 003 and 004**	**Outfall 006**	**Outfall 007**	**Outfalls 008 and 009**
Waste Streams	Dalecarlia Flocculation – Sedimentation Basins	Leakage or Discharge from Spring at Hydro Building	Georgetown Basins	Georgetown Conduit	City Tunnel	Potable Water 2nd/3rd High Reservoir
Receiving Waters	Potomac River	Potomac River	Potomac River	Unnamed Tributary to the Potomac River	Rock Creek	Mill Creek
Coagulated Water	Yes	No	Yes	Yes	No	No
Settled Water	No	No	No	No	Yes	No
Finished Drinking Water	No	No	No	No	No	Yes
Groundwater	No	Yes	No	No	No	No
Basin Leakage	No	Yes	No	No	No	No
Expected Contaminants Based on Treatment Chemicals and Effluent Characterization	TSS pH Total Al Sulfate Chloride Total Copper Manganese	Total Al Perchlorate Iron TSS Chloroform pH	TSS pH Total Al Sulfate Fluoride Total Copper Chloride Manganese Zinc	TSS pH Total Al Sulfate Fluoride Barium Chloride Total Copper Iron Manganese Zinc	TSS pH Fluoride Total Al Barium Chloride Total Copper Manganese Sulfate Zinc	TSS Chlorine pH Fluoride Ammonia Phosphate Total Al
Approximate Controlled Max Daily Flow, MGD	7	0.05	40/40	5	5	7/10

[4] The yearly flow for Outfall 002Q is 19.3 MGD.

Figure 1. Process flow diagram for the Washington Aqueduct showing the various treatments of Potomac River water as it moves through the system.



4.0 Receiving Water Characterization

The table below lists the seven discharge points, their associated receiving waters and designated uses. The designated uses are based on the District's 2018 Integrated Report. The applicable TMDLs are discussed below in Section 5.0.

Outfall No.	Latitude	Longitude	Receiving Water	Designated Uses*
002A	N 38º 55' 57"	W 77º 07' 03"	Potomac River	A, B, C, D, E
002Q	N 38º 56' 04.38"	W 77º 06' 56.13"	Potomac River	A, B, C, D, E
003	N 38º 54' 41.5"	W 77º 05' 57"	Potomac River	A, B, C, D, E
004	N 38º 54' 27.5"	W 77º 05' 36"	Potomac River	A, B, C, D, E
006	N 38º 55' 14"	W 77º 06' 00"	Unnamed Tributary of the Potomac River	A, B, C, D, E
007	N 38º 54' 58"	W 77º 03' 32"	Rock Creek	A, B, C, D, E
008	N 38º 56' 35"	W 77º 05' 20"	Mill Creek, tributary of the Middle Potomac River	A, B, C, D, E
009	N 38º 57' 08"	W 77º 04' 40"	Mill Creek	A, B, C, D, E

***Classifications of the District's Waters, Defined:**

Class A – Primary Contact Recreation
Class B – Secondary Contact Recreation
Class C – Protection and propagation fish, shellfish and wildlife
Class D – Protection of human health related to consumption of fish and shellfish
Class E – Navigation

5.0 Total Maximum Daily Loads (TMDLs)

According to 40 C.F.R. § 122.44 (d)(1)(vii)(B), the effluent limits developed to protect a narrative water quality criterion, a numeric water quality criterion, or both, must be consistent with the assumptions and requirements of any available wasteload allocation for the discharge in a TMDL established or approved by EPA pursuant to 40 C.F.R. § 130.7. The table below lists the established or approved TMDLs for the receiving streams to which the permittee discharges.

TMDLs applicable to this permit:

	Pollutants	Applicable Outfall
Potomac Watershed TMDLs	E.coli (revised 2014) PCB (approved 2007)	002A, 002Q 003, 004, 006, 008, 009
Chesapeake Bay TMDL (established 2010)	Total Nitrogen (TN), Total Phosphorus (TP), and TSS that address Dissolved Oxygen (DO), pH, Chlorophyll *a* impairments	All outfalls
Rock Creek Watershed TMDLs	E.coli (revised 2014) Arsenic (approved 2004) Copper (approved 2004) Lead (approved 2004) Zinc (approved 2004)	007

5.1 The Potomac River TMDLs

5.1.1 E.coli

The Potomac River TMDL for E.coli does not assign a wasteload allocation to the Washington Aqueduct. The TMDL for E.coli identifies the potential sources of E.coli in the Potomac River as coming from the combined sewer overflows, separate sanitary sewer overflows which can result from leaky or undersized sewer pipes, stormwater runoff, and direct deposits of feces into the water from wildlife sources. EPA does not believe E.coli is a pollutant of concern for this facility because discharges from the basins are comprised of drinking water and drinking water does not contain E.coli[5]. As such, the permit does not contain requirements for E.coli at this time.

5.1.2 PCBs

[5] In February 13, 2013 EPA published the Revised Total Coliform Rule that set the maximum contaminant level goal for E.coli to zero. More information can be found on EPA's website: https://www.epa.gov/dwreginfo/revised-total-coliform-rule-and-total-coliform-rule#:~:text=Contaminant%20Level,-Addresses%20the%20presence&text=coli%20in%20drinking%20water.,includes%20routine%20and%20repeat%20samples.

The Potomac River TMDL for PCBs identifies the point sources of PCB loadings to the Potomac River to be wastewater treatment plants, regulated stormwater, and CSOs. Because PCBs are man-made compounds used for a variety of industrial applications, including coolants and lubricants in electrical equipment, it is not expected to be a pollutant of concern for the Washington Aqueduct. As such, the permit does not contain requirements for PCBs at this time.

5.2 The Rock Creek TMDLs

5.2.1 Copper, lead, mercury, and zinc

The Rock Creek TMDLs for copper, lead, mercury, and zinc do not identify the Washington Aqueduct as a source of those pollutants to Rock Creek. The TMDL identifies the potential sources of these metals as stormwater discharges, combined sewer overflow discharges, and non-point source discharges. Outfall 007 discharges to Rock Creek and data submitted by the permittee show non-detect levels for lead and mercury for this outfall. As described in Section 7 below, the data for zinc show there is no reasonable potential to cause or contribute to an excursion above water quality criteria at Outfall 007. However, the data for copper show there is reasonable potential to cause or contribute to an excursion above water quality criteria at Outfall 007, therefore, EPA established a WQBEL for copper at this outfall and included it in the permit. Since the TMDL does not require reductions for copper, the WQBEL will ensure this discharge is not contributing to excursions above water quality criteria in Rock Creek.

5.2.2 E.coli

The Rock Creek TMDL for E.coli does not identify the Washington Aqueduct as a source of E.coli impairment to Rock Creek. The Rock Creek TMDL for E.coli identifies the potential sources of E.coli as coming from the combined sewer overflows, separate sanitary sewer overflows which can result from leaky or undersized sewer pipes, stormwater runoff, and direct deposits of feces into the water from wildlife sources. EPA does not believe E.coli is a pollutant of concern for this facility because discharges from the basins are comprised of drinking water and drinking water does not contain E.coli. As such, the permit does not contain requirements for E.coli at this time.

5.3 The 2010 Chesapeake Bay TMDL

EPA established the Chesapeake Bay TMDL for nitrogen, phosphorus, and sediment (Bay TMDL) in 2010 as a result of significant involvement and investment by the Chesapeake Bay Program (CBP) partnership. See EPA's website for more information on the development of the Bay TMDL: https://www.epa.gov/chesapeake-bay-tmdl/chesapeake-bay-tmdl-document. The Bay TMDL identified 478 individual wasteload allocations (WLAs) for significant facilities across the 92 river segments and identified aggregate WLAs for non-significant facilities. The CBP partners, including the District, have been implementing the Bay TMDL since 2010; most recently, the Bay states developed Phase III Watershed Implementation Plans (WIPs) to provide further information on how they intend to continue implementing the Bay TMDL.[6]

5.3.1 Nonsignificant Dischargers and the Bay TMDL

[6] As described on EPA's website https://www.epa.gov/chesapeake-bay-tmdl/chesapeake-bay-watershed-implementation-plans-wips, the Watershed Implementation Plans are the roadmap for how the Bay jurisdictions, in partnership with federal and local governments, will achieve the Bay TMDL allocations.

The Bay TMDL categorizes the Washington Aqueduct as a non-significant discharger and includes it in the aggregate wasteload allocations (WLAs) for TN, TP, and TSS for the DC portion of the Potomac Tidal Fresh (POTTF_MD) segment. For facilities included within an aggregate WLA, the TMDL assumes permitting authorities will explain in the permit fact sheet that the limits assigned to the individual facility are included as part of the aggregate TMDL WLA (Section 8.3.3 of the Bay TMDL). Appendix Q of the Bay TMDL lists annual aggregate WLAs for the nonsignificant Chesapeake Bay dischargers. The Aqueduct permit is the only nonsignificant permit listed under the aggregate for its associated stream segment. The table below contains the relevant information extracted from the Appendix Q spreadsheet of the Bay TMDL:

Row number	Facility	NPDES	EOS[7] TN WLA (lbs/yr)	DEL[8] TN WLA (lbs/yr)	EOS TP WLA (lbs/yr)	DEL TP WLA (lbs/yr)	EOS TSS WLA (lbs/yr)	DEL TSS WLA (lbs/yr)
3286	Aggregate	See Permit Numbers Below	952.96	934.85	204.20	106.71	136,136.53	90,563.68
3288	WASH AQUEDUCT-DALECARLIA	DC0000019						

The Bay TMDL used Discharge Monitoring Report data from industrial facilities where available to derive loadings in Appendix Q. If DMR data were not available, then default values were used to estimate loads (Section 4.5.2 of the Bay TMDL). EPA initially included the entire aggregate edge of stream wasteload allocations for TN, TP, and TSS as maximum cumulative annual loads at all the outfalls in the draft permit. However, the Aqueduct had concerns with applying maximum cumulative loads at all the outfalls asserting that there is a high likelihood that the mass limits for TN and TP would be exceeded solely due to concentrations of these pollutants present in the Potomac River. As a result, the Aqueduct recommended the application of net limits in the permit as well as conducting a sampling study of the Potomac River. EPA evaluated the Aqueduct's request to replace the annual cumulative limits with net limits and has determined that there is insufficient data to make the recommended changes to the permit. Instead EPA determined that monitoring for TN and TP over the next permit term is appropriate at this time and is discussed in more detail below.

The Bay TMDL contemplated that permittees would submit TN and TP monitoring data with their permit applications, however, EPA has not received this monitoring data from the Aqueduct. This information must be gathered to be consistent with the assumptions and requirements of the Bay TMDL and to evaluate whether net limits are appropriate. Therefore, the permit includes monitoring for TN and TP over the next permit term. EPA will evaluate the data to determine whether the discharges at the outfalls are consistent with the assumptions and requirements for Nonsignificant facilities in the Bay TMDL. Moreover, EPA agrees with the Aqueduct's recommendation to add a special condition to the permit that requires the sampling of both raw Potomac River water at the intakes and the discharges at the outfalls and has included this requirement in Part III.C of the draft permit. This special condition requires the Aqueduct to conduct a background study that includes sampling for TN and TP at each of the intakes and outfalls over the next permit term. Once data are collected and submitted to EPA for review,

[7] Edge of Stream load is the amount of a pollutant reaching a simulated stream segment from a point in that stream's watershed. (Section 11 of the Bay TMDL)

[8] Delivered load is the amount of a pollutant delivered to the tidal waters of the Chesapeake Bay or its tidal tributaries from an upstream point of discharge/runoff after accounting for permanent reductions in pollutant loads due to natural in-stream processes in nontidal rivers.

EPA will evaluate the data and determine appropriate effluent limitations or additional permit conditions as necessary.

5.3.2 The District's 2019 Phase III Watershed Implementation Plan (WIP)

The District's Phase III WIP, which was finalized in 2019, describes the District's strategy for continuing to reduce nitrogen, phosphorus, and sediment in the Chesapeake Bay. The District's Phase III WIP guides the District's continued implementation of the Bay TMDL and outlines the various pollutant reduction strategies the District plans to implement to meet planning targets. These planning targets were calculated by EPA and agreed to by the CBP partnership. As part of its Phase III WIP, the District developed local planning goals for various source sectors, including individually permitted point sources.

Chapter 6 of the District's Phase III WIP includes planning goals for individually permitted municipal and industrial facilities. The planning goals for these facilities are based on existing permit limits at the time of WIP development and DMR data for the specific progress reporting period of July 2017 through June 2018. These data were used as inputs to the Chesapeake Assessment Scenario Tool[9] (CAST), which is a CBP partnership load estimator tool that provides estimates of load reductions for sources such as wastewater. States, federal agencies, and local governments use the results from CAST to identify which pollutant reduction strategies provide the greatest reduction in TN, TP, and TSS loads and to determine if WLAs are being met. DOEE used CAST to estimate load reductions and set planning goals for the nonsignificant permitted facilities in the District. See Table 6-5 of the District's Phase III WIP.

In an effort to better understand how the District's Phase III WIP planning goals for the nonsignificant permitted facilities are intended to implement the Bay TMDL aggregate WLAs, EPA Region 3 consulted with DOEE and the Chesapeake Bay Program Office. After several discussions, EPA Region 3 understands that the planning goals for the facilities listed in Table 6-5 of the District's Phase III WIP are not intended to be incorporated into NPDES permits as effluent limits. The District's Phase III WIP and the WLAs of the Bay TMDL both have the ultimate goal of reducing pollutant loadings into the Bay by 2025.

5.3.3 Concentration Based TSS Limits

As discussed above, the aggregate WLAs in the Bay TMDL were based on the DMR data of facilities, where available. The concentration limits for TSS from the 2008 permit are being retained in the new permit because these were the same limits that were in the permit when the Bay TMDL was developed. EPA believes that maintaining the same concentration limits for TSS is consistent with the assumptions and requirements of the Bay TMDL for nonsignificant facilities. Regarding concentrations of nitrogen and phosphorus, the permittee was not required to monitor for TN and TP at the time the TMDL was developed, therefore, there were no DMR data or effluent limits for these two pollutants. As such, there are no concentration limits for TN and TP in the permit, but the permit requires monitoring for TN, TP, and TSS at all the outfalls.

6.0 Basis for Effluent Limitations

[9] For more information about CAST visit https://cast.chesapeakebay.net/about.

In general, the Clean Water Act (Act) requires compliance with all applicable statutory and regulatory requirements, including effluent limitations based on the capabilities of technologies available to control pollutants (i.e., technology-based effluent limits) and limitations that are protective of the water quality standards of the receiving water (i.e., water quality-based effluent limits). Typically, technology-based effluent limitations (TBELs) are developed for all applicable pollutants of concern and water quality-based effluent limitations (WQBELs) are developed where TBELs are not adequate to meet applicable water quality standards (WQS) in the receiving water, which is determined by considering the instream water quality criterion, the background concentration and the dilution factor. The final effluent limitations will ensure that all applicable District of Columbia WQS are achieved.

7.0 Technology-Based Effluent Limitations (TBELs)

Federal regulations at 40 C.F.R. § 122.44(a) and § 125.3 require that permits include conditions requiring dischargers to meet applicable TBELs. When EPA has not promulgated effluent limitation guidelines (ELG) for an industry, permit limitations may be based on best professional judgment (BPJ). (40 C.F.R. § 125.3(c)).

The proposed effluent limits in this permit for TSS and Oil & Grease are TBELs for existing sources based on Best Conventional Pollutant Control Technology (BCT) available. These effluent limits are set at the same levels as in the 2008 permit to prevent backsliding (40 C.F.R. § 122.44(l)). In addition, the proposed effluent limits for aluminum from Outfall 002A are TBELs based on Best Available Technology (BAT) as determined by EPA in 2002 using BPJ. EPA's BPJ determination can be found in document number 38 of the permit's administrative record.

8.0 Water Quality-Based Effluent Limitations (WQBELs)

40 C.F.R. § 122.44(d)(1)(i) requires limitations to be established in permits to control all pollutants or pollutant parameters that are or may be discharged at a level that *cause*, have the *reasonable potential to cause*, or *contribute* to an excursion above any state WQS, including state narrative water quality criteria. The WQBELs in this permit will be as stringent as necessary to ensure that the designated uses of the Potomac River, Rock Creek, and Mill Creek are protected, maintained, and/or attained. EPA assessed the reasonable potential (RP) for the discharges from this facility to cause, have the RP to cause, or contribute to an exceedance of the District's applicable WQSs. EPA used the *Technical Support Document for Water Quality-based Toxics Control* (TSD) approach to conduct that analysis. The hardness used to calculate the WQBELs for metals was 100 mg/L, which is a default value used by the District of Columbia's Department of Energy and Environment.

9.1 Total Residual Chlorine & pH

The total residual chlorine and pH effluent limits in the permit are WQBELs designed to meet the District's WQS for those parameters. Specifically, this permit adopts the District's WQS for total residual chlorine and pH as the WQBELs for this permit. Therefore, no RP analysis is needed for these parameters. The WQBEL for total residual chlorine is that no chlorine shall be discharged in detectable amounts – i.e., the discharge of total residual chlorine shall not be greater than the non-detect level of less than 0.1 mg/L. The WQBEL for pH is 6.0 to 8.5 as specified in Section 21-1104.8 of the District of Columbia Municipal Regulations, Water Quality Standards.

9.0 Reasonable Potential (RP) Analysis

EPA performed a RP analysis for the parameters of concern other than TSS, oil and grease, total residual chlorine, and pH, using the TSD approach. For pollutants for which the RP analysis shows the potential to exceed in-stream water quality values, WQBELs must be calculated as required at 40 C.F.R. § 122.44(d).

The data that EPA used for the RP analyses were obtained from the 2013 application, the 2017 supplemental information submitted to EPA, and historical DMR data. However, not all of these data were used to evaluate RP at every outfall for the reasons explained below.

Outfalls 002A, 003, and 004: RP for these outfalls was calculated using data from the 2017 supplemental information as requested by EPA pursuant to CWA Section 308, the DMR data reported for the period of March 2015 – November 2019, and recent sampling data submitted by the permittee for iron and flouride. These recent data as well as the data from the selected DMR timeframe were used because it represents discharge conditions with the Residual Processing Facility in operation. Data reported on the 2013 application and DMR data prior to March 2015 represents discharge conditions prior to the completion of the Residual Processing Facility, thus not representative of current and future discharge and therefore not used in the RP analysis for these outfalls.

Outfalls 002Q, 006, 007: RP for these outfalls was calculated using data from the 2013 permit application, the 2017 supplemental information as requested by EPA pursuant to CWA Section 308, and DMR data reported over the last permit term from 2008-2019.

Outfalls 008, and 009: RP for these outfalls was calculated using data from the 2013 permit application, the 2017 supplemental information as requested by EPA pursuant to CWA Section 308, and DMR data reported over the last permit term from 2008-2019. The permittee also collected 3,258 flouride measurements in 2019 as part of a special study and general process monitoring activities. These flouride data were used in the RP analysis because they more accurately represent current conditions at these outfalls.

The Washington Aqueduct Water Treatment Plant consists of eight outfalls: 002A, 002Q, 003, 004, 006, 007, 008, and 009. These outfalls only have intermittent discharges with the exception of Outfall 002Q, which is a continuous discharge. The duration of each of these intermittent discharges is assumed to be 48 hours or less.

The District of Columbia WQS define the Criterion Continuous Concentration (chronic aquatic life criterion) as an extended period of time of 96 hours (4 days). Therefore, since the intermittent discharges are less than 96 hours, EPA made the determination to use the District of Columbia's acute criterion for all outfalls with intermittent discharges (outfalls 002A, 003, 004, 006, 007, 008, 009). Using the acute water quality criteria for the intermittent discharges will be protective of the receiving streams.

Outfall 002Q is a continuous discharge and, therefore, was evaluated using both the acute and the chronic criteria for all parameters of concern.

The permit application did not contain an effluent characterization for Outfall 002Q so EPA used the effluent characterization from the prior permit in the RP analysis. The special condition in Part III.C.3 of the permit requires the permittee to submit an effluent characterization for Outfall 002Q within six months of the reissuance of this permit.

The permit includes special conditions that apply if the duration of the intermittent discharge is equal or greater than 96 hours. Should the duration of the intermittent discharges be equal or greater than 96 hours, EPA will assess compliance with the chronic quality criteria and modify the permit as necessary.

Using a more detailed version of the TSD approach, the following is a description of the steps used to conduct the RP analysis:

1. Determine the total number of effluent data values for the pollutant of interest (n) and identify the Highest Effluent Concentration (HEC), which is the highest value of the dataset for that parameter.[10]
2. Determine the coefficient of variation (CV) of the dataset. The CV is equal to the standard of deviation divided by the long-term average, rounded to one decimal place.[11] The default CV for fewer than 10 data values is 0.6, as specified in Box 3-2 of the TSD.
3. Determine the appropriate confidence level for the RP analysis (for this permit, EPA used the 99th confidence level, recommended by the TSD in section 5.5.4) and determine the Reasonable Potential Multiplier (RPM), using Table 3-1 of the TSD. If n is greater than 20, the TSD states to use the multiplier assigned to 20 samples as identified on Table 3-1 of the TSD.
4. Calculate the Adjusted Effluent Concentration (AEC): AEC = HEC x RPM.
5. Determine if the AEC is greater than the Water Quality Criterion (WQC). For those parameters where the AEC > WQC, continue with the RP analysis.[12]
6. Calculate the Dilution Factor.
7. Calculate the Maximum Receiving Water Concentration (MRWC), using the AEC, the Instream Background Concentration, and the Dilution Factor.
8. Compare the MRWC to the WQC. If MRWC > WQC, then RP is found.

9.1 Steps 1-4 of the RP Analysis:
Step 1. Determine the HEC and (n)
Step 2. Determine CV
Step 3. Determine RP Multiplier
Step 4. Calculate the AEC

Outfall 002A					
Parameters of concern	Number of samples (n)	HEC (mg/L)	CV	RP Multiplier	AEC (mg/L)
Aluminum	2	0.121	0.6	7.4	0.891
Chloride	1	0.036	0.6	13.2	0.475

[10] These values are provided in the RP analysis spreadsheet which can be found in the Administrative Record for this permit.
[11] For values other than the default value, see the calculations provided in the RP analysis spreadsheet.
[12] This step is not part of the TSD approach. However, if the AEC is less than the WQC, then there is no way, after adjusting for dilution and calculating the MRWC, that the MRWC will be greater than the WQC, so there is no need to continue the RP analysis for those parameters.

Copper	2	0.003	0.6	7.4	0.0194
Manganese	2	0.0591	0.6	7.4	0.437
Sulfate	1	0.0477	0.6	13.2	0.629
Iron	26	8.00	0.002	1.00	8.02
Barium	2	0.0419	0.6	7.4	0.310
Flouride	1	0.0001	0.6	13.2	0.00167
Zinc	2	0.0077	0.6	7.4	0.0572

Outfall 002Q					
Parameters of concern	Number of samples (n)	HEC (mg/L)	CV	RP Multiplier	AEC (mg/L)
Aluminum	119	3.04	0.77	1.49	4.53
Iron	6	0.024	0.6	3.8	0.091
Chloroform	118	4.10	2.45	2.27	9.32
Perchlorate	26	0.00130	0.46	1.86	0.00242

Outfall 003					
Parameters of concern	Number of samples (n)	HEC (mg/L)	CV	RP Multiplier	AEC (mg/L)
Aluminum	11	0.573	0.5	2.5	1.43
Chloride	11	62.0	0.3	1.8	112
Copper	11	0.005	0.6	2.9	0.0154
Manganese	11	0.0507	0.2	1.5	0.0760
Sulfate	11	49.0	0.1	1.2	58.8
Zinc	11	0.006	0.4	2.1	0.0126
Fluoride	3,258	0.89	0.09	1.2	1.0680
Iron	11	0.038	0.6	2.9	0.110

Outfall 004					
Parameters of concern	Number of samples (n)	HEC (mg/L)	CV	RP Multiplier	AEC (mg/L)
Aluminum	11	0.573	0.5	2.5	1.43
Chloride	11	62.0	0.3	1.8	112
Copper	11	0.005	0.6	2.9	0.0154
Manganese	11	0.0507	0.2	1.5	0.0760
Sulfate	11	49.0	0.1	1.2	58.8
Zinc	11	0.006	0.4	2.1	0.0126
Fluoride	3,258	0.89	0.09	1.2	1.0680
Iron	11	0.038	0.6	2.9	0.110
Outfall 006					
Parameters of concern	Number of samples (n)	HEC (mg/L)	CV	RP Multiplier	AEC (mg/L)
Aluminum	10	1.3136	0.3	1.8	2.36
Barium	2	0.0416	0.6	7.4	0.308
Chloride	11	0.0590	0.3	1.8	0.104

Copper	305	0.0042	0.3	1	0.00415
Fluoride	1	0.0008	0.6	13.2	0.0102
Iron	19	0.3349	0.7	2.6	0.844
Manganese	11	0.0668	0.2	1.5	0.0982
Sulfate	11	49.60	0.2	1.3	66.7
Zinc	11	0.00368	0.3	1.8	0.00643

Outfall 007					
Parameters of concern	Number of samples (n)	HEC (mg/L)	CV	RP Multiplier	AEC (mg/L)
Aluminum	10	0.4155	0.3	1.8	0.748
Barium	2	0.0388	0.6	7.4	0.287
Chloride	11	52.50	0.3	1.7	89.0
Copper	2	0.0186	0.6	7.4	0.137
Fluoride	1	0.001	0.6	13.2	0.0107
Manganese	11	0.0447	0.3	1.5	0.0655
Sulfate	11	48.70	0.1	1.3	63.6
Zinc	11	0.0037	0.4	0	0.00761

Outfall 008					
Parameters of concern	Number of samples (n)	HEC (mg/L)	CV	RP Multiplier	AEC(mg/L)
Aluminum	345	0.320	0.6	2.3	0.736
Fluoride	52	0.860	0.09	1.2	1.032
Iron	4	0.043	0.6	4.7	0.202

Outfall 009					
Parameters of concern	Number of samples (n)	HEC (mg/L)	CV	RP Multiplier	AEC(mg/L)
Aluminum	345	0.320	0.6	2.3	0.736
Fluoride	51	0.790	0.08	1.2	0.948
Iron	4	0.043	0.6	4.7	0.202

9.2 Steps 5-8 of the RP Analysis

Step 5. Determine if the AEC is greater than the Water Quality Criterion (WQC). If yes, continue with the RP analysis. If no, there is no reason to continue with the RP analysis.

Where possible, EPA used DC's WQS to determine the acute numeric WQC. The DC water quality standards do not contain a numeric WQC for aluminum. Therefore, the permittee developed and calculated the WQBELs for aluminum based on its interpretation of DC's narrative WQC using EPA's aluminum criterion calculator[13] as allowed in 40 C.F.R. § 122.44(d)(1)(vi)(A). EPA reviewed the calculations submitted by the permittee and found that

[13] EPA's Final Aquatic Life Criteria for Aluminum in Freshwater was used. See https://www.epa.gov/wqc/2018-final-aquatic-life-criteria-aluminum-freshwater or 83 FR 65663.

they were consistent with the EPA final Aquatic Life Ambient WQC for Aluminum 2017. These aluminum calculations conducted by the permittee were in accordance with TSD and included in the RP discussion in this section. The aluminum calculations conducted by the permittee are included in the permit's administrative record.

For barium and chloride, DC has no numeric WQC, so EPA used its National Recommended Water Quality Criteria for Human Health to interpret the narrative WQC for these parameters.

For sulfate, neither DC nor EPA has numeric WQC for sulfate, so EPA used its National Secondary Drinking Water Standard of 250 mg/L for sulfate to interpret the DC narrative WQC.

Finally, for flouride, neither DC nor EPA has a numeric WQC for fluoride, so EPA used the federal maximum contaminant level (MCL) of 4.0 mg/L for the protection of drinking water as an interpretation of the DC narrative WQC.

Outfall 002A – Chronic Conditions				
Parameter of concern	AEC (mg/L)	WQC (mg/L)	DC WQC or Federal WQC or MCL	Is AEC > WQC?
Aluminum	0.891	1.90	Federal WQC	No
Chloride	0.4752	860.0	Federal WQC	No
Copper	0.0194	0.0134	DC WQC	Yes
Manganese	0.437	0.100	DC WQC	Yes
Sulfate	629	250.0	Federal WQC	Yes
Iron	8.02	1.00	DC WQC	Yes
Barium	0.310	1.00	Federal WQC	No
Flouride	0.00167	4.00	Federal MCL	No
Zinc	0.0572	0.1172	DC WQC	No

Outfall 002Q – Acute Conditions				
Parameter of concern	AEC (mg/L)	WQC (mg/L)	DC WQC or Federal WQC or MCL	Is AEC > WQC?
Aluminum	4.53	1.90	Federal	Yes
Iron	0.091	1.00	DC	No
Chloroform	9.32	0.470	DC	Yes
Perchlorate	0.00242	0.015	Federal	No

Outfall 002Q – Chronic Conditions				
Parameter of concern	AEC (mg/L)	WQC (mg/L)	DC WQC or Federal WQC or MCL	Is AEC > WQC?
Aluminum	4.53	1.1	Federal	Yes
Iron	0.091	1.00	DC	No
Chloroform	9.32	3.00	DC	Yes
Perchlorate	0.00242	0.015	Federal	No

Outfall 003 – Acute Conditions				
Parameter of concern	AEC (mg/L)	WQC (mg/L)	DC WQC or Federal WQC or MCL	Is AEC > WQC?

Aluminum	1.43	1.10	Federal WQC	Yes
Chloride	112	860.0	Federal WQC	No
Copper	0.0154	0.0134	DC WQC	Yes
Manganese	0.0760	0.100	DC WQC	No
Sulfate	58.8	250.0	Federal WQC	No
Zinc	0.0126	0.117	DC WQC	No
Fluoride	1.068	4.00	Federal MCL	No
Iron	0.110	1.00	DC WQC	No

Outfall 004 – Acute Conditions				
Parameter of concern	AEC (mg/L)	WQC (mg/L)	DC WQC or Federal WQC or MCL	Is AEC > WQC?
Aluminum	1.43	1.10	Federal WQC	Yes
Chloride	112	860.0	Federal WQC	No
Copper	0.0154	0.0134	DC WQC	Yes
Manganese	0.0760	0.100	DC WQC	No
Sulfate	58.8	250.0	Federal WQC	No
Zinc	0.0126	0.117	DC WQC	No
Fluoride	1.068	4.00	Federal MCL	No
Iron	0.110	1.00	DC WQC	No

Outfall 006 – Acute Conditions				
Parameter of concern	AEC (mg/L)	WQC (mg/L)	DC WQC or Federal WQC or MCL	Is AEC > WQC?
Aluminum	2.36	1.20	Federal WQC	Yes
Barium	0.307	1.00	Federal WQC	No
Chloride	0.104	860.0	Federal WQC	No
Copper	0.00415	0.0134	DC WQC	No
Fluoride	0.0102	4.00	Federal MCL	No
Iron	0.844	1.00	DC WQC	No
Manganese	0.0982	0.100	DC WQC	No
Sulfate	66.7	250.0	Federal WQC	No
Zinc	0.00643	0.117	DC WQC	No

Outfall 007 – Acute Conditions				
Parameter of concern	AEC (mg/L)	WQC (mg/L)	DC WQC or Federal WQC or MCL	Is AEC > WQC?
Aluminum	0.748	1.30	Federal WQC	No
Barium	0.287	1.00	Federal WQC	No
Chloride	89.0	860.0	Federal WQC	No
Copper	0.137	0.0134	DC WQC	Yes
Fluoride	0.0107	4.00	Federal MCL	No
Manganese	0.0655	0.100	DC WQC	No
Sulfate	63.6	250.0	Federal WQC	No
Zinc	0.00761	0.117	DC WQC	No

Outfall 008 – Acute Conditions				
Parameter of concern	AEC (mg/L)	WQC (mg/L)	DC WQC or Federal WQC or MCL	Is AEC > WQC?
Aluminum	0.320	1.70	Federal	No
Iron	0.202	1.00	DC	No

Outfall 009 – Acute Conditions				
Parameter of concern	AEC (mg/L)	WQC (mg/L)	DC WQC or Federal WQC or MCL	Is AEC > WQC?
Aluminum	0.320	1.70	Federal	No
Iron	0.202	1.00	DC	No

Step 6. Calculate the Dilution Factor (DF):

The DF is a determination of how much the receiving water will dilute the discharge. The DF can be calculated using different mixing zone approaches, as specified in the TSD.

For Outfalls 002A, 002Q, 003, and 004, for which the receiving water is the Potomac River, EPA used the mixing zone dilution factors found in the water quality study submitted by the permittee to EPA in 2001. This study, titled "Water Quality Studies in the Vicinity of Washington Aqueduct," used CORMIX modeling to determine acute and chronic dilution factors for Outfalls 002A, 002Q, 003, and 004. The use of CORMIX in the mixing zone study is consistent with the District's WQS mixing zone regulations. Therefore, EPA used the dilution factors determined by the 2001 study for Outfalls 002, 003, and 004. The 2008 permit also used the acute mixing zone dilution factors from the 2001 study for Outfalls 002A, 002Q, 003, and 004, however, since Outfall 002Q is a continuous discharge EPA also evaluated chronic conditions using the chronic mixing zone dilution factor at this outfall.

	Dilution Factor	Mixing Zone
Outfall 002A	169	Acute Mixing
Outfall 002Q	169	Acute Mixing
Outfall 002Q	51	Chronic Mixing
Outfall 003	2.3	Acute Mixing
Outfall 004	2.3	Acute Mixing

For Outfalls 006, 007, 008, and 009, for which the receiving waters are an unnamed tributary to the Potomac River (Outfall 006), Rock Creek (Outfall 007), and Mill Creek (Outfalls 008 and 009), EPA first calculated Instream Waste Concentration (IWC). The IWC is defined in the TSD as IWC = Effluent Flow/(Stream Flow + Effluent Flow). To calculate the IWC, EPA used information such as physical characteristics and streamflow statistics from the U.S. Geological Survey (USGS) website Stream Stats, available at https://streamstats.usgs.gov/ss/. Because the calculated IWCs for these outfalls are greater than 50%, the stream is effluent dominated, so EPA assumed that there is rapid and complete mixing from these outfalls. EPA then determined the dilution factor (DF) using the equation: DF = (1/Instream Waste Concentration) x 100.

Outfall No.	Stream Flow (MGD)	Effluent Flow (MGD)	IWC (%)	Is IWC > 50%?	Dilution Factor	Mixing Zone
006	3.56	5	58	Yes	1.72	Rapid Mixing
007	3.56	5	58	Yes	1.72	Rapid Mixing
008	0.00162 (1.62 x 10^{-3})	7	100	Yes	1.0	Rapid Mixing
009	0.00000060 (66.06 x 10^{-7})	10	100	Yes	1.0	Rapid Mixing

Step 7. Calculate the Maximum Receiving Water Concentration (MRWC) for the parameters where the AEC > WQC:
MRWC = ((AEC – IBC)/DF) + IBC, where:

AEC is the Adjusted Effluent Concentration
IBC is the Instream Background Concentration –the concentration of a given parameter in the receiving stream. Background data was obtained from "Historical Potomac River Water Characterization Data" submitted by the permittee with its permit application.

DF is the Dilution Factor

Outfall 002A – Acute Conditions				
Parameter of concern	AEC (mg/L)	IBC (mg/L)	DF	MRWC (mg/L)
Copper	0.0194	0.00179	169	0.00189
Manganese	0.437	0.0438	169	0.0461
Sulfate	629	31.1	169	34.7
Iron	8.02	0.193	169	0.239

Outfall 002Q – Acute Conditions				
Parameter of concern	AEC (mg/L)	IBC (mg/L)	DF	MRWC (mg/L)
Aluminum	4.53	0.298	169	0.323
Chloroform	9.32	0.00118	169	0.0563
Outfall 002Q – Chronic Conditions				
Parameter of concern	AEC (mg/L)	IBC (mg/L)	DF	MRWC (mg/L)
Aluminum	4.53	0.298	51	0.381
Chloroform	9.32	0.00118	51	0.184

Outfall 003 – Acute Conditions				
Parameter of concern	AEC (mg/L)	IBC (mg/L)	DF	MRWC (mg/L)
Aluminum	1.43	0.298	2.3	0.791
Copper	0.0154	0.00179	2.3	0.00769

Outfall 004 – Acute Conditions				
Parameter of concern	AEC (mg/L)	IBC (mg/L)	DF	MRWC (mg/L)
Aluminum	1.43	0.298	2.3	0.791
Copper	0.0154	0.00179	2.3	0.00769

Outfall 006 – Acute Conditions				
Parameter of concern	AEC (mg/L)	IBC (mg/L)	DF	MRWC (mg/L)
Aluminum	2.36	No data	1.72	1.37

Outfall 007 – Acute Conditions				
Parameter of concern	AEC (mg/L)	IBC (mg/L)	DF	MRWC (mg/L)
Copper	0.138	No data	1.72	0.0800

Step 8. Determine if the Maximum Receiving Water Concentration (MRWC) is greater than the WQC. If so, EPA concludes that there is a reasonable potential (RP) for the pollutant to cause or contribute to an exceedance of the WQC and a WQBEL must be developed for this parameter. If not, there is no RP to cause or contribute to an instream excursion above the applicable WQC based on the TSD RP procedures (40 C.F.R 122.44(d)(1)(ii)).

Outfall 002A – Acute Conditions			
Parameter of concern	MRWC (mg/L)	WQC (mg/L)	MRWC > WQC?
Copper	0.00189	0.0134	No
Manganese	0.0461	0.100	No
Sulfate	34.66	250	No
Iron	0.197	1.00	No

Outfall 002Q Acute Conditions			
Parameter of concern	MRWC (mg/L)	WQC (mg/L)	MRWC > WQC?
Aluminum	0.323	1.90	No
Chloroform	0.0563	0.470	No
Outfall 002Q Chronic Conditions			
Parameter of concern	MRWC (mg/L)	WQC (mg/L)	MRWC > WQC?
Aluminum	0.381	1.10	No
Chloroform	0.184	3.00	No

Outfall 003 – Acute Conditions			
Parameter of concern	MRWC (mg/L)	WQC (mg/L)	MRWC > WQC?
Aluminum	0.791	1.10	No
Copper	0.00769	0.0134	No
Outfall 004 – Acute Conditions			
Parameter of concern	MRWC (mg/L)	WQC (mg/L)	MRWC > WQC?
Aluminum	0.791	1.10	No
Copper	0.00769	0.0134	No

Outfall 006 – Acute Conditions			
Parameter of concern	MRWC (mg/L)	WQC (mg/L)	MRWC > WQC?
Aluminum	1.37	1.20	Yes

Outfall 007 – Acute Conditions			
Parameter of concern	MRWC (mg/L)	WQC (mg/L)	MRWC > WQC?
Copper	0.0800	0.0134	Yes

10.0 Developing Water-Quality Based Effluent Limits

The next step is the development of a WQBEL, which is required for each pollutant where there is a reasonable potential to cause or contribute to an exceedance of applicable WQSs. If the 2008 permit contained a TBEL, EPA calculated a WQBEL to compare the calculated WQBEL with the TBEL to determine which one is more protective. The procedure for calculating a WQBEL is described at Section 5.4 of the TSD and shown below.

10.1 Compute the Wasteload Allocation (WLA): WLA = ((WQC – IBC) * DF) + IBC, where:

WQC – Water Quality Criterion
IBC – Instream Background Concentration
DF – Dilution Factor

Outfall 002A – Acute Conditions				
Parameter	WQC (mg/L)	IBC (mg/L)	DF	WLA (mg/L)
Aluminum	1.90	0.371	169	259

Outfall 002Q – Acute and Chronic Conditions				
Parameter	WQC (mg/L)	IBC (mg/L)	DF	WLA (mg/L)
Aluminum – acute	1.90	0.298	169	271
Aluminum – chronic	1.1	0.298	51	41.2

Outfall 003 – Acute Conditions				
Parameter	WQC (mg/L)	IBC (mg/L)	DF	WLA (mg/L)
Aluminum	1.1	0.298	2.3	2.14

Outfall 004 – Acute Conditions				
Parameter	WQC (mg/L)	IBC (mg/L)	DF	WLA (mg/L)
Aluminum	1.1	0.298	2.3	2.14

Outfall 006 – Acute Conditions				
Parameter	WQC (mg/L)	IBC (mg/L)	DF	WLA (mg/L)
Aluminum	1.2	No data	1.72	2.06

Outfall 007 – Acute Conditions				
Parameter	WQC (mg/L)	IBC (mg/L)	DF	WLA (mg/L)
Aluminum	1.30	No data	1.72	2.24
Copper	0.0134	No data	1.72	0.0231

Outfall 008 – Acute Conditions				
Parameter	WQC (mg/L)	IBC (mg/L)	DF	WLA (mg/L)
Aluminum	1.70	No data	1	1.70

Outfall 009 – Acute Conditions				
Parameter	WQC (mg/L)	IBC (mg/L)	DF	WLA (mg/L)
Aluminum	1.70	No data	1	1.70

10.2 Calculate the Long-Term Average (LTA), Maximum Daily Limit (MDL) and the Average Monthly Limit (AML). The LTA calculation is based on the 99th confidence level as reflected with the z score of 2.326.

i. LTA = WLA * e $^{(0.5*\text{sigma square} - 2.326*\text{sigma})}$
Sigma square = ln (CV^2 +1)
Sigma = square root of Sigma Squared

ii. MDL = LTA * e $^{(2.326*\text{sigma} - 0.5*\text{sigma square})}$
Sigma square = ln (CV^2 +1)
Sigma = square root of Sigma Squared

iii. AML = LTA * e $^{(1.645*\text{sigma} - 0.5*\text{sigma square})}$
Sigma square = ln (CV^2 +1)
Sigma = square root of Sigma Squared

Outfall 002A						
Parameters of concern	z	CV	Sigma Square	Sigma	LTA (mg/L)	MDL (mg/L)
Aluminum	2.326	0.6	0.307	0.555	83.09	259

Outfall 002Q							
Parameters of concern	z	CV	Sigma Square	Sigma	LTA (mg/L)	MDL (mg/L)	AML (mg/L)
Aluminum	2.326	0.8	0.495	0.703	67.60	271	168

Outfall 003						
Parameters of concern	z	CV	Sigma Square	Sigma	LTA (mg/L)	MDL (mg/L)
Aluminum	2.326	0.5	0.223	0.472	0.800	2.14

Outfall 004						
Parameters of concern	z	CV	Sigma Square	Sigma	LTA (mg/L)	MDL (mg/L)

Aluminum	2.326	0.5	0.223	0.472	0.800	2.14

Outfall 006						
Parameters of concern	z	CV	Sigma Square	Sigma	LTA (mg/L)	MDL (mg/L)
Aluminum	2.326	0.3	0.086	0.294	1.09	2.07

Outfall 007						
Parameters of concern	z	CV	Sigma Square	Sigma	LTA (mg/L)	MDL (mg/L)
Aluminum	2.326	0.3	0.0862	0.294	1.18	2.24
Copper	2.326	0.6	0.307	0.555	0.00742	0.0231

Outfall 008						
Parameters of concern	z	CV	Sigma Square	Sigma	LTA (mg/L)	MDL (mg/L)
Aluminum	2.326	0.6	0.307	0.555	0.546	1.70

Outfall 009						
Parameters of concern	z	CV	Sigma Square	Sigma	LTA (mg/L)	MDL (mg/L)
Aluminum	2.326	0.6	0.307	0.555	0.546	1.70

10.3 Compare the Water Quality Based Effluent Limits (WQBELs) with the Technology Based Effluent Limits (TBELs)

EPA compared the WQBELs with the TBELs as indicated below; whichever is more stringent is included in the permit. The limits are consistent with the anti-backsliding requirements in the Clean Water Act and federal regulations. CWA Section 402(o), 33 U.S.C. § 1342(o); 40 C.F.R. § 122.44(l).

The August 2019 draft permit retained the aluminum TBELs from the prior permit in order to be consistent with the anti-backsliding regulation specified in 40 C.F.R. § 122.44(l). However, when the Maryland Department of Environment provided its 401 Certification after the public comment period closed, it pointed out that while the effluent did not exhibit RP for aluminum at some of the outfalls, the TBELs that were retained in the permit may not be as protective as the WQBEL. As a result, EPA evaluated the aluminum TBELs against a calculated WQBEL for all the outfalls to determine whether they were protective of the receiving streams. The more protective limit was included in the permit. This approach was used even when there was no RP for aluminum because the flocculent the facility uses in its treatment system contains aluminum.

	Parameter	**2019 TBELs (mg/L)**	**Calculated WQBEL MDL (mg/L)**	**Rationale**
Outfall 002	Aluminum	8.0	259	There is no RP for aluminum, and the calculated WQBEL is less stringent than

	Parameter	2019 TBELs (mg/L)	Calculated WQBEL MDL (mg/L)	Rationale
				the TBEL, therefore the permit uses the TBEL.
Outfall 002Q	Aluminum	8.0	271	There is no RP for aluminum, and the calculated WQBEL is less stringent than the TBEL, therefore the permit uses the TBEL.
Outfalls 003 & 004	Aluminum	8.0	2.14	There is no RP for aluminum, but the calculated WQBEL is more stringent than the TBEL, therefore the permit uses the WQBEL.
Outfall 006	Aluminum	8.0	2.07	There is RP for aluminum, and the WQBEL is more stringent than the TBEL, so the permit uses the WQBEL.
Outfall 007	Aluminum	8.0	2.24	There is no RP for aluminum, but the calculated WQBEL is more stringent than the TBEL, therefore the permit uses the WQBEL
Outfall 008	Aluminum	8.0	1.70	There is no RP for aluminum, but the calculated WQBEL is more stringent than the TBEL, therefore the permit uses the WQBEL.
Outfall 009	Aluminum	8.0	1.70	There is no RP for aluminum, but the calculated WQBEL is more stringent than the TBEL, therefore the permit uses the WQBEL.

11.0 Discussion

The 2008 Washington Aqueduct NPDES permit included a TBEL for iron at all the outfalls. However, neither the 2003 permit nor the 2004 modifications to the 2003 permit contained TBELs for iron. EPA determined that technical mistakes were made in issuing the 2008 permit, and therefore is not including the technology based effluent limitation for iron at the outfalls; removal of the TBEL for iron does not constitute backsliding per 40 C.F.R. § 122.44(l)(2)(i)(B)(2).

The District of Columbia water quality criterion for copper is expressed as dissolved. EPA is assuming a 1:1 translator using a conservative approach to convert the total dissolved metals criterion to total effluent limits, consistent with EPA Metal Translator Guidance. The permittee could submit a request for a site-specific metal translator in the next permit.

The permittee requested a change in the average monthly limit for total aluminum from 4.0 mg/L to 6.0 mg/L and retention of the daily maximum limit at 8.0 mg/L for the Outfalls where the TBEL is used. Since these are non-continuous discharge outfalls, the permit requires daily maximum limits for consistent with 40 C.F.R. § 122.45(e) but does not require an average monthly limit. All the outfalls are considered intermittent or non-continuous (intermittent) discharges except Outfall 002Q, which is a continuous discharge. The effluent limits for the non-continuous discharges are expressed as maximum

daily limits consistent with 40 C.F.R. §122.45(e). The effluent limits for the continuous discharge (Outfall 002Q) are expressed as both maximum daily and average monthly limits per 40 C.F.R. § 122.45(d). Therefore, EPA removed the average monthly limit for the intermittent outfalls.

Since D.C.'s water quality criteria are expressed as concentrations, mass-based limits were not included in the permit as permissible by § 40 C.F.R 122.45(f)(ii). This does not apply to pollutants with a wasteload allocation associated with a TMDL.

12.0 Effluent Limits Summary

Discharge Limitations for **Outfall 002A**			
Parameter	Mass Units (lbs/day)	Concentration Units (mg/L)	Basis
	Maximum Daily	Maximum Daily	
Flow (MGD)	Report Only		Same as 2008 permit
Total Suspended Solids	N/A	60	TBEL*
Total Aluminum	N/A	8.0	TBEL
Total Nitrogen	Report	Report	TMDL
Total Phosphorus	Report	Report	TMDL
pH (Std units)	6.0 - 8.5		WQS*
Total Residual Chlorine	No detectable amounts		WQS*

*Same as 2008 permit

Discharge Limitations for **Outfall 002Q**					
Parameter	Mass Units (lbs/day)		Concentration Units (mg/L)		Basis
	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	
Flow (MGD)	Report Only				Same as 2008 permit
Total Suspended Solids	Report		30	60	TMDL
Total Aluminum	N/A		4.0	8.0	TBEL
Total Nitrogen	Report		Report		TMDL
Total Phosphorus	Report		Report		TMDL
Perchlorate	Report	Report	Report	Report	Report Only*
pH (Std units)	6.0 - 8.5				WQS*
Total Residual Chlorine	No detectable amounts				Report Only*

*Same as 2008 permit

Discharge Limitations for **Outfall 003**			
Parameter	Mass Units (lbs/day)	Concentration Units (mg/L)	Basis
	Maximum Daily	Maximum Daily	
Flow (MGD)	Report Only		Same as 2008 permit
Total Suspended Solids	N/A	60	TBEL*
Total Aluminum	N/A	2.14	WQBEL
Total Nitrogen	Report	Report	TMDL
Total Phosphorus	Report	Report	TMDL

pH (Std units)	6.0 - 8.5	WQS*
Total Residual Chlorine	No detectable amounts	Report Only*

*Same as 2008 permit

Discharge Limitations for **Outfall 004**			
Parameter	Mass Units (lbs/day)	Concentration Units (mg/L)	Basis
	Maximum Daily	Maximum Daily	
Flow (MGD)	Report Only		Same as 2008 permit
Total Suspended Solids	N/A	60	TBEL*
Total Aluminum	N/A	2.14	WQBEL
Total Nitrogen	Report	Report	TMDL
Total Phosphorus	Report	Report	TMDL
pH (Std units)	6.0 - 8.5		WQS*
Total Residual Chlorine	No detectable amounts		Report Only*

*Same as 2008 permit

Discharge Limitations for **Outfall 006**			
Parameter	Mass Units (lbs/day)	Concentration Units (mg/L)	Basis
	Maximum Daily	Maximum Daily	
Flow (MGD)	Report Only		Same as 2008 permit
Total Suspended Solids	N/A	60	TBEL*
Total Aluminum	N/A	2.07	WQBEL
Total Nitrogen	Report	Report	TMDL
Total Phosphorus	Report	Report	TMDL
pH (Std units)	6.0 - 8.5		WQS*
Total Residual Chlorine	No detectable amounts		Report Only*

*Same as 2008 permit

Discharge Limitations for **Outfall 007**			
Parameter	Mass Units (lbs/day)	Concentration Units (mg/L)	Basis
	Maximum Daily	Maximum Daily	
Flow (MGD)	Report Only		Same as 2008 permit
Total Suspended Solids	N/A	60	TBEL*
Total Aluminum	N/A	2.24	WQBEL
Total Copper	N/A	0.0231	WQBEL
Total Nitrogen	Report	Report	TMDL
Total Phosphorus	Report	Report	TMDL
pH (Std units)	6.0 - 8.5		WQS*
Total Residual Chlorine	No detectable amounts		Report Only*

*Same as 2008 permit

Discharge Limitations for **Outfall 008**			
Parameter	Mass Units (lbs/day)	Concentration Units (mg/L)	Basis
	Maximum Daily	Maximum Daily	
Flow (MGD)	Report Only		Same as 2008 permit
Total suspended Solid	N/A	60	TBEL*
Total Aluminum	N/A	1.7	WQBEL
Total Nitrogen	Report	Report	TMDL
Total Phosphorus	Report	Report	TMDL
pH (Std units)	6.0 - 8.5		WQS*
Total Residual Chlorine	No detectable amounts		Report only*

*Same as 2008 permit

Discharge Limitation for **Outfall 009**			
Parameter	Mass Units (lbs/day)	Concentration Units (mg/L)	Basis
	Maximum Daily	Maximum Daily	
Flow (MGD)	Report Only		Same as 2008 permit
Total Suspended Solids	N/A	60	TBEL*
Total Aluminum	N/A	1.7	WQBEL
pH (Std units)	6.0 - 8.5		WQS*
Total Residual Chlorine [2]	No detectable amounts		Report Only*

*Same as 2008 permit

13.0 Solid Management Facility

The 2008 permit required TSS effluent limits, average monthly limits equal to 30 mg/L and daily maximum effluent equal to 60 mg/L. This permit carries forward the maximum daily effluent limits, consistent with the anti-backsliding regulation specified in 40 C.F.R. § 122.44(l). The permittee shall ensure proper operation and maintenance of the Residual Processing Facility to comply with the effluent limits consistent with 40 C.F.R. § 122.41(e).

14.0 Endangered species protection

EPA requested an official species list from the U.S. Fish and Wildlife Service (U.S. FWS) using their *Information for Planning and Consultation* tool found on their website at: https://ecos.fws.gov/ipac to determine if there are any federally listed threatened or endangered species or their designated critical habit(s) that will be affected by Washington Aqueduct discharge. The National Oceanic and Atmospheric Administration National Marine Fisheries Service (NOAA Fisheries) has indicated that the endangered Shortnose Sturgeon and the Atlantic Sturgeon have been known to exist in the Potomac River drainage basin and may occur within the waters of the District of Columbia.

The permittee submitted a letter to EPA requesting the removal of Special Conditions for Sedimentation Discharges during the Sturgeon Spring Spawning Season, explaining that the permittee's past practice was to allow residuals/sediments to accumulate within the sedimentation basins over several months and

then to release the accumulated concentrated sediments back to the Potomac River by flushing the sedimentation basins over a few days but, since the construction of the Residual Processing Facility, the permittee does not discharge sediments to the Potomac River. Consequently, the permittee believes that the prohibition of discharging sediment during the Sturgeon Spring Spawning Season is no longer necessary. However, as a precaution, EPA is retaining the prohibition on discharging sediment during the Sturgeon Spring Spawning Season in the permit.

During the Sturgeon Spring Spawning Season, the permittee shall not discharge residuals from the sedimentation basins through Outfalls 002A, 003 or 004 and shall not allow any bypass from these outfalls.

The permittee will not be allowed any discharge or bypass that would exceed the effluent limitation at any Outfalls.

Per the requirements under Section 7 of the Endangered Species Act (50 C.F.R. Part 402; 16 U.S.C. § 1536(c)), EPA submitted a Biological Evaluation to the U.S. National Marine Fisheries Service (NMFS) on August 26, 2019. On September 4, 2019, NMFS concurred that issuance of the permit was not likely to adversely affect any ESA-listed species or critical habitat under its jurisdiction. EPA notified NMFS of the revisions to the draft permit and that these changes are not likely to adversely affect listed species or critical habitats under its jurisdiction. Since the proposed revisions will not adversely affect the listed species or critical habitat considered in the biological opinion submitted by EPA on August 26, 2019 or written concurrence submitted by NMFS on September 4, 2019, a re-initiation of consultation is not required per 50 C.F.R. § 402.16.

15.0 National Historic Preservation Act

The National Historic Preservation Act of 1966. and implementing regulations (36 C.F.R. Part 800) requires federal agencies to take into account the effects of their undertakings on historic properties and afford the Advisory Council on Historic Preservation, or designee, the opportunity to comment on such undertakings. See Section 106, 54 U.S.C. § 306108. On August 21, 2019, EPA notified the DC State Historic Preservation Officer (DC SHPO) of its proposed reissuance of the permit and that it had determined that the permit does not have the potential to affect historic properties in D.C. See 36 C.F.R § 800.3(1). The revisions to the draft permit will not change EPA's historic preservation determination made on August 21, 2019, therefore, re-notifying the DC SHPO is not necessary.

16.0 Anti-Backsliding Provision

Section 402(o) of the CWA and 40 C.F.R. § 122.44(l) prohibit the renewal, reissuance or modification of an existing NPDES permit that contains effluent limits, permit conditions, or standards that are less stringent than those established in the existing permit, unless certain exceptions are met.
Effluent limits in the permit are either identical to or more stringent than those in the 2008 permit with the exception of iron. The 2008 permit included TBELs for iron at all the outfalls, however, EPA determined that mistakes were made in issuing the 2008 permit. As such, removing the TBELs for iron does not constitute backsliding per 40 C.F.R. § 122.44(l)(2)(i)(B)(2).

17.0 Antidegradation Statement

The revised draft permit contains WQBELs and TBELs that will ensure compliance with the DC water quality standards and the antidegradation policy.

18.0 401 Certification

In accordance with CWA 401(a)(1), EPA requested a water quality certification from the District of Columbia, via DOEE, to ensure compliance with the District's WQS. EPA also notified Maryland and Virginia of EPA's proposed issuance of the permit.

401 certification request mailed to DOEE: 8/1/2019
401 certification request received from DOEE: 8/28/2019
Revised 401 certification request emailed to DOEE:
Revised 401 certification received from DOEE:

401 notification letter mailed to MDE: 08/01/2019
401 notification letter received from MDE: 09/06/2019
Revised 401 notification letter emailed to MDE:

401 notification letter mailed to VA DEQ: 08/01/2019
401 notification letter received from VA DEQ: N/A
Revised 401 notification letter emailed to VA DEQ: