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September 20, 2019

Richard Wolff, Executive Director
North Hudson Sewerage Authority
1600 Adams Street
Hoboken, NJ 07030

Re: Review of Development & Evaluation of Alternatives Report
North Hudson Sewerage Authority – Adams Street Wastewater Treatment Plant (WWTP)
NJPDES Permit No. NJ0026085

Dear Mr. Wolff:

Thank you for the submission dated June 25, 2019 entitled: “Alternatives Development and Evaluation: Adams Street Wastewater Treatment Plant” as submitted to the New Jersey Department of Environmental Protection (the Department). The report was submitted in a timely manner and was prepared in accordance with Part IV.D.3.b.v of the above referenced NJPDES permit. The report is part of the development of the Long-Term Control Plan (LTCP) submittal requirements which is due on June 1, 2020.

The overall objective of the Development and Evaluation of Alternatives Report is to develop and evaluate a range of CSO control alternatives that meet the requirements of the Federal CSO Control Policy Section II.C.4, N.J.A.C. 7:14A-11, Appendix C, and the USEPA Combined Sewer Overflows Guidance for Long-Term Control Plan (EPA 832-B-95-002). Such evaluation shall include a range of CSO control alternatives for eliminating, reducing, or treating CSO discharge events. This subject report builds on other previously submitted LTCP reports referenced in Part IV.D.3.b of the NJPDES permit, which includes an approved hydrologic, hydraulic and water quality model and other information in the July 1, 2018 “System Characterization Report” (approved by the Department on July 23, 2019); the July 1, 2018 “Public Participation Process Report for the Adams Street Wastewater Treatment Plant” (approved by the Department on March 29, 2019); the June 30, 2018 “NJCSO Group Compliance Monitoring Program Report” (approved by the Department on March 1, 2019); and the June 2018 “Identification of Sensitive Areas Report” (approved by the Department on April 8, 2019).

As per Part IV.G.4.e.i – vii of the above referenced NJPDES permits, the Development and Evaluation of Alternatives for the LTCP shall include, but not be limited to, an evaluation of the following CSO control alternatives:

- i. Green infrastructure.
- ii. Increased storage capacity in the collection system.
- iii. Sewage Treatment Plant (STP) expansion and/or storage at the plant while maintaining compliance with all permit limits.

- iv. Inflow and Infiltration (I/I) reduction to meet the definition of non-excessive infiltration and non-excessive inflow as defined in N.J.A.C. 7:14A-1.2 in the entire collection system that conveys flows to the treatment works.
- v. Sewer separation.
- vi. Treatment of the CSO discharge.
- vii. CSO related bypass of the secondary treatment portion of the STP in accordance with N.J.A.C. 7:14A-11.12 Appendix C, II C.7.

A range of CSO Control Alternatives are covered within the report. A general overview of the information provided for the CSO control alternatives, as provided in response to Part IV.G.4.e, can be summarized below where the Department's comments follow:

- The Adams Street Wastewater Treatment Plant (WWTP) is operated by North Hudson Sewerage Authority and currently has a permitted flow of 20.8 million gallons per day (MGD) and a wet weather maximum hydraulic capacity of 40 MGD. Section 12 (Adams Street Wastewater Treatment Plant) of the report outlines different approaches that can be undertaken at the treatment plant including **STP Expansion** and **Bypass**. One alternative is to increase primary capacity to 52 MGD with a wet weather bypass where disinfected bypassed flows are combined back in after secondary treatment. The second and third alternatives involve a portion of the flow being directed to a secondary treatment train (30 MGD capacity), of either cloth media or compressible media filtration, then being recombined before UV disinfection.
- Regulator adjustments which can serve to **increase in-line storage capacity** are described for the H3/H4/HSI Basin and the H5 Basin in Sections 5.3.1.2 and 6.3.3.2 (Network Adjustments), respectively. **Storage** alternatives are also described for each of the individual drainage basins (except H6/H7 and W2) including above and below ground tanks, storage tanks in the river, and a tunnel for Basin W1234. **Storage at the wastewater treatment plant** is discussed in Section 12.5.5 (Install Storage Tank at Trickling Filter) where it is stated that inclusion of either a 5 or 10 MG storage tank would allow for better control of influent flow through the plant during and after a rainfall event.
- **Treatment of CSO Discharge** is evaluated and described within the sections for certain individual drainage basins although the report states that disinfection as its own alternative (i.e. chlorination only) is not feasible due to inadequate contact time within the outfall pipe. High rate treatment with cloth media and compressible media filtration is also evaluated for certain basins although these alternatives are not assigned a weighted percent for comparison with other CSO control alternatives.
- **Sewer separation** is the conversion of a Combined Sewer System into a system of separate sewers and sanitary sewers. Discussion of sewer separation within the report is limited to Section 7 (H6/H7 Basin) as part of the Northwest Resiliency Park Project; Section 9 (W1234 Basin); as well as on page 4 of Appendix C (Analysis Workshop Memorandum).
- **Inflow and Infiltration (I/I)** is described as having an impact on CSO performance particularly with respect to increasing issues with dry weather flows at the Adams Street WWTP. As described in Section 11 (Inflow and Infiltration), NHSA describes that I/I was evaluated in the W1234 and W5 basins by using CCTV data which assisted in indicating the severity of aging infrastructure within the service area.

- **Green Infrastructure** (GI) technologies are generally referenced in Section 11.2 (Green Infrastructure) with a detailed analysis regarding the feasibility of green (vegetated) roofs and bioretention practices including right of way (ROW) placement.

Specific Comments

Comment 1

In the Executive Summary, the report describes the procedure used for the alternatives analysis which includes identification of alternatives, preliminary screening, development of conceptual layouts, modeling, cost analysis then a weighting method to rank the alternatives as summarized in Table ES-1 (Adams Street WWTP Service Area – CSO Control Alternatives Comparison) with additional detail in Appendix A (Evaluation Criteria) and B (Evaluation Scores). However, the total amount of points differs between Table ES-1 and Appendix A and B. Please clarify.

Appendix D contains alternatives that were deemed feasible in Table 1 (Preliminary Screening Alternatives Summary) with a column indicating yes to proceed to full evaluation. However, some of these alternatives were not included in the body of the report. Conversely, some of the alternatives that are identified in Table 1 as “Not for this contract” are included in the body of the report. Please clarify how alternatives were selected for further evaluation.

Comment 2

In Section 1 (Introduction), Figure 1-1 (Adams Street WWTP Service Area) depicts the system block diagram of the Adams Street WWTP. This figure serves to provide an understanding of the location and configuration of the pump stations, regulators, and outfalls along the Hudson River as well as the modeled volume of the fifth-largest overflow that is used within the report as a target for storage and capacity evaluations. Please note that outfall 008A is missing the value for the 5th largest storm in this figure. Please revise.

Comment 3

The NJPDES permit requires that the permittee select either the Presumption or Demonstration Approach as defined in the Federal CSO Control Policy as well as in the NJPDES permit. However, as stated on page 2-1 in Section 2.1 (Alternatives Analysis Concept Workshop), “The fifth-largest overflow from the Baseline Characterization was used to estimate the facilities required to minimize overflows to an average of four per year.” The attainment of four or less overflows is an alternative defined under the Presumption Approach as is the target of 85% capture. In addition, in Section 8.3 (Runoff Distribution in the Adams Street Service Area) of the revised April 1, 2019 “System Characterization Report” a value of 57% capture is indicated. While this information is included, neither the Presumption or Demonstration Approach have been specifically selected within the report. While this comment does not necessitate a response at this time, a final selection is required to be made in the ‘Selection and Implementation of Alternatives’ report as part of the LTCP submission due on June 1, 2020.

Comment 4

In accordance with the Federal CSO Control Policy, the assessment of system-wide CSO control alternatives is required to be based on an “average” or “typical” rainfall year. As stated within the May 2018 report entitled “Typical Hydrological Year Report”, 2004 was selected as the typical hydrological year. While a long-term precipitation data set (i.e. greater than 30 years) was considered as part of this analysis, a more recent period was used in the ultimate selection of 2004 in order to consider local climate

change. While use of the year 2004 does consider climate change, please be sure to consider resiliency requirements in the design of any infrastructure (e.g., storage and satellite treatment). Specifically, in accordance with the provisions of Executive Order 11988, the USEPA and the New Jersey Water Bank require that funded infrastructure be located outside of floodplains or elevated above the 500-year flood elevation. Where such avoidance is not possible, the following hierarchy of protective measures has been established:

1. Elevation of critical infrastructure above the 500-year floodplain;
2. Flood-proofing of structures and critical infrastructure;
3. Flood-proofing of system components.

While this comment does not necessitate a response at this time, these protective measures should be a consideration in the LTCP.

Comment 5

A discussion of public participation and the CSO supplemental team was not provided in the report specific to the Development and Evaluation of Alternatives. As per Part IV.G.2 of the NJPDES CSO permit, public participation shall actively involve the affected public throughout each of the three steps of the LTCP process including the Development and Evaluation of Alternatives phase. The Department acknowledges that a listing of meetings and agendas for the CSO Supplemental Team, as well as a discussion of other public outreach, is included in your Public Participation Process Report dated July 1, 2018. Please supplement Section 2 (Development and Evaluation of Alternatives Approach) of this subject report with a brief summary of subsequent public participation activities as well as meeting dates specific to the development and evaluation of alternatives including a general overview of feedback on any alternatives presented that are specific to the communities served by the Adams Street Wastewater Treatment Plant.

Moving forward, public participation is a required element of the ‘Selection and Implementation of Alternatives’ for the LTCP. Continued public participation must be provided to garner public input regarding CSO control alternatives where a description of such activities must be included in the LTCP. The discussion should include a description of the public participation activities that occurred during the development of these reports, the feedback opportunities provided, and how feedback was considered. It is also recommended that members of the CSO Supplemental Team be provided a copy of the LTCP in advance of the June 1, 2020 due date to the Department.

Comment 6

Sections 3 (H1 Basin), 4 (H2 Basin), 5 (H2/H4/HSI Basin), 6 (H5 Basin), 7 (H6/H7 Basin), 8 (18th Street Pump Station Basin), 9 (W1234 Basin), and 10 (W5 Basin) outline the evaluation of alternatives which were narrowed down from the Preliminary Screening phase where a more detailed discussion is included in the Preliminary Screening Memorandum in Appendix D. Comments that pertain to multiple sections are as follows:

- Cloth media filtration and Compressible Media Filtration are discussed in Sections 3, 5, 6, 8, and 9. While each of these sections include an overall table as a basin alternatives comparison, Cloth Media Filtration and Compressible Media Filtration are not identified within these tables and are not assigned a weighted point total or a weighted percent. In addition, there is limited information regarding siting or placement for these pretreatment alternatives at each basin location. Please provide. Additional information regarding disinfection contact times and dosage in alternatives that were evaluated.

- Within Sections 5.3.1 (Pump Flows through 5th Street Pump Station) and 6.3.3 (Modify the H5 Regulator to convey additional flow to the 11th St PS) there is discussion regarding upsizing of pumps as well as other alternatives and the direct effect of these changes on the outfall that is directly linked to that basin. However, based on Figure 1-1, there are interconnections between some of the regulators. For example, given that H1 and H3 are connected to H4 it is unclear if any pump upgrades to the 5th Street Pump Station would impact these other regulators given these interconnections. Similarly, upgrading of the 11th Street Pump Station would directly impact outfall 006A, but it may also affect outfall 008A since regulators H6 and H7 are interconnected to H5. Please clarify. In addition, this alternative would result in additional flows being diverted to the Adams Street WWTP. Please clarify if this is the case and, if so, please address this scenario in Section 12 (Adams Street Wastewater Treatment Plant) in this subject report.
- Changing the regulator heights is described as part of the alternatives discussed in Section 5.3.1 and 6.3.3. For example, in Sections 5.3.1.2 (Network Adjustments) and 6.3.3.2 (Network Adjustments), it is stated that an increased pump station capacity would require regulator adjustments, namely lowering the H4 weir by 0.5 ft to an elevation of 6-ft. Please explain if these weir heights are feasible and how any projected street flooding as a result of this change could be prevented. In addition, it seems that lowering the weirs would result in additional CSO flow being diverted to the outfall. Please clarify.
- Figure 5-5 (Outfall 005A Overflow Frequency vs. Volume, Proposed Condition), Figure 5-8 (Outfall 005A Overflow Frequency vs. Volume, Proposed Condition) and Figure 5-10 (Outfall 005A Overflow frequency vs. Volume, Proposed Condition) show the change in overflow frequency given the conceptual installation of a storage tank in Stevens Park, Hoboken Little League Field, and in the river near Sinatra Park Amphitheater, respectively. All these proposed alternatives use a target storage volume of 4.57 MG. However, in reviewing these figures, the number of overflows is still at 45 for Figure 5-5 and 5-8 but is 17 for Figure 5-10. While the Department acknowledges that there are siting constraints for these potential storage tank locations, please clarify why a larger tank was not considered to reduce overflows to 4 or less at these locations. In addition, please describe why modeled results are so disparate given that the target storage volume is identical for each location.

Comment 7

Comments on Section 3 (H1 Basin) which affect outfall 002A are as follows:

- Figure 3.2 (Outfall 002A Overflow Frequency vs. Volume, Existing Conditions) shows the maximum overflow volume to be approximately 12.3 MG. However, later in Section 3.3.2 (Disinfection at H1 Wet-Weather Pump Station) the following is stated, “The largest Typical Year CSO event is 7.32 MG, with a corresponding peak flow rate of 58.28 MGD and an annual CSO volume of 44 MG.” Please clarify the discrepancy between 7.32 MG and 12.3 MG.

Comments on Section 5 (H3/H4/HSI Basin) which affect outfall 005A are as follows:

- In Section 5.3.1.1 (Identification and Preliminary Screening) the following statement is included, “...the target CSO volume of 4.57 MG from outfall 005A would be diverted from the H4 Regulator to the 5th Street Pump Station and ultimately to Adams Street WWTP.” Please clarify how this volume will be diverted, whether it be through a new pump or through network adjustments.

Comments on Section 6 (H5 Basin) which affect outfall 006A are as follows:

- In Section 6.3.1.1 (Identification and Preliminary Screening) it is stated that "...the 11th Street Pump Station has a higher rated capacity than the 5th Street Pump Station and may be able to handle the high flows better." Please clarify if the 11th Street Pump Station has a higher capacity compared to 5th Street since this appears to be an error.
- In Section 6.3.1.1 (Identification and Preliminary Screening) it is stated that "This alternative will be affected only if downstream bottlenecks are eliminated." Please identify the location of any bottlenecks.
- Section 6.3.1.1 describes a diversion of flow from the H5 Regulator to the H4 Regulator which would impact the hydraulics of outfall 006A. Please describe if connecting these regulators would result in two hydraulically connected systems becoming one system.
- Section 6.3.1 (Consolidate Flow with H3/H4 through Conveyance Pipe) and Section 6.3.2 (Consolidate Flow with H3/H4 through Storage Tunnel) describe a diversion of flow to the H4 regulator. Please clarify if these changes result in a need to upsize the capacity of the 5th Street Pump station.
- In Section 6.3.3.1 (Identification and Preliminary Screening) it is stated that this alternative will result in modifications to the H3 and H4 regulators; however, these regulators are not connected to the 11th Street Pump Station. Please clarify.
- In Section 6.3.4.1 (Identification and Preliminary Screening) it is stated that "...The river near this discharge point is classified as a Category 1 water due to the kayak launch." Please replace the term "Category 1" with "Primary Contact" given that New Jersey Surface Water Quality Standards (NJSWQS) at N.J.A.C. 7:9B-1.1 et seq. classifies the Hudson River as an SE2 (C2) waterway.

Comments on Section 7 (H6/H7 Basin) which affect outfall 008A are as follows:

- In Section 7.3.1.3 (Infoworks Modeling Results) please adjust the scale for the y-axis in Figure 7-4 (Outfall 008A Overflow Frequency vs. Volume, Proposed Conditions) to indicate a range of values.

Comments on Section 8 (18th Street Pump Station Basin) which affect outfall 012A are as follows:

- Section 8.3.1.2 (Network Updates) "These changes increase the street flooding for the Typical Year from 0.09 MG to 0.24 MG in H3 and 0.75 MG to 1.25 MG in H4." Please clarify why changes in this basin affect street flooding in the H3 and H4 Basins. Can street flooding be prevented by further increasing the pump capacity beyond 18 MGD?

Comments on Section 9 (W1234 Basin) which affect outfall 013A are as follows:

- On page 9-10 in Section 9.3.4.1 (Identification and Preliminary Screening) it states that "Because this alternative is not expected to reach the target 5 overflows at Outfall 013A, the overflows at the W4 regulator weir will be measured to remove this flow during wet weather." The permit requires the target frequency of 4 or less be attained at the outfall, please include an analysis on the affects of changes to W1, W2, W3, and W4 at the outfall.
- Section 9.3.2 (Relocate W1, W2, and W3 Regulators) describes relocation of the regulators to the top of the hill on Park Ave where this alternative gives a weighted percent of 68% in Table 9-5

(W1234 Basin Alternatives Score Comparison). Please clarify how this alternative would affect CSO volume and frequency.

Comments on Section 10 (W5 Basin) which affect outfall 015A are as follows:

- Section 10.3.1.3 (Infoworks Integrated Catchment Modelling Modeling Results) includes figure 10-4 () which shows that there is still a CSO overflow frequency for the proposed high level storm sewer alternative. If this outfall is converted to stormwater only it is unclear why there are still CSOs.

Comment 8

The concept of storage tanks and disinfection contact basins constructed in the Hudson River is described in several sections which could include a public/private partnership with a residential development. As described in the report, these alternatives are technologically challenging, there are also significant regulatory requirements, and feasibility is unclear. Please provide additional information as to whether or not available land options have been fully exhausted and any such properties could sustain the needed tank sizes referenced. In addition, please describe whether or not any potential storage tanks would be surface or subsurface and, if subsurface, whether or not consideration has been given to any amenities such as parks, parking or GI. In addition, please confirm if the flows from these storage alternatives would be sent to the Adams Street WWTP.

Comment 9

Section 11.1 (Inflow/Infiltration) discusses I/I where the amount of I/I removal for each of the Weehawken meter sheds was calculated and utilized to prepare Table 11-1 (Adams Street Service Area Estimated I/I Per Drainage Basin) for Basins W1, W2, W3, W4 and W5. It is unclear why there are two rows for W2 in Table 11-1. Also, please confirm if the term metershed as included in the narrative text is intended to mean the same thing as basin in Table 11-1. Finally, since I/I discussion focuses on Weehawken, please describe if any I/I evaluation was conducted for the Hoboken basins.

Comment 10

There is limited discussion within the report for the Adams Street sewer service area as it relates to sewer separation with the exception of separating sewers in the W4 drainage area along with a Combined Sewer Overflow Storage Tank as described in Section 7 (H6/H7 Basin) and partial sewer separation in Section 9 (W1234 Basin). Please provide additional site-specific discussion in Section 11 (Systemwide Alternatives) as to why sewer separation was not considered on a larger scale to provide a more complete evaluation of the sewer separation alternative for the Adams Street sewer service area.

Comment 11

In Section 11.2 (Green Infrastructure) different types of GI are described where an analysis is included regarding the feasibility of bioretention practices and green (vegetated) roofs. It is stated in Section 11.2.1.2 (Functionality and Feasibility) that a number of right of way (ROW) GI implementation assumptions are considered such as drainage area, GI storage volume and GI siting. Regarding assumptions for the drainage area, the 2013 Hoboken Green Infrastructure Strategic Plan is cited even though there are two other communities (i.e., Union City and Weehawken) within the Adams Street sewer service area. Please justify why use of this plan is appropriate for this analysis.

Table 11-4 (Estimated Maximum ROW GI Storage Volume by Drainage Basin in NHSA Service Area) depicts the estimated GI storage volume by drainage area where a total of 6.36 million gallons is identified. The Department acknowledges the inclusion of this quantitative metric for GI which is needed in order to establish that any volumetric credit is given towards overall CSO reduction goals and changes from the baseline. Please describe how you derived the gallon values referenced in order to quantify any volumetric decrease in CSO flow from GI measures. In addition, on page 11-3 it states that “The average loading ratio used was 20:1 (ratio of impervious area to GI area).” Please clarify the source of this 20:1 ratio.

Additional feasibility analysis is described in Section 11.2.1.2 (Functionality and Feasibility) where a value of 4.6% is identified for feasible road area in Table 11-5 (GI Area and Feasible Roadway Area in the NHSA Service Area). A value of 5% as an implementation percentage of rooftops is assumed to be available for green roofs as indicated in Table 11-6 (Private Rooftop Storage in the NHSA Service Area). It is then concluded on page 11-5 that “This indicates that green infrastructure can reach 27% of the goal for volume reduction in the Adams Street WWTP service area...”

While the Department acknowledges that a robust analysis is provided in the report on the possibilities for volume reduction through GI, there is limited information regarding the siting of potential GI projects. Please supplement the report with additional information regarding potential sites for GI locations to demonstrate whether or not the goal of 27% is viable. For example, this could include a map of sites for potential ROW GI storage sites. In addition, please describe how operation and maintenance can be assured for publicly and privately-owned GI ROW sites and/or green (vegetated) roofs.

Comment 12

In Section 12.4 (Existing Conditions), Figure 12-2 (Adams Street WWTP – Simplified Process Flow Diagram) does not match the narrative in that the trickling filter should indicate a capacity of 32 MGD. Regarding Section 12.5.1.2 (Conceptual Process Flow), please explain the change in size of the grit chamber in Figure 12-3 (Adams Street WWTP – Proposed Process Flow Diagram). In addition, peak flows are split around a portion of the PURAC system in this alternative. Please revise the flow diagram.

In Section 12.5.2 (Provide up to 52 mgd Total WWTP Capacity by Blending 20 mgd of Disinfected Primary Effluent from Primary Clarifier 1 with 32 mgd Receiving Primary Treatment in Primary Clarifiers 2 and 3, Secondary Treatment, and UV Disinfection) there is discussion about the conceptual installation of a 5 MG storage tank on page 12-5. Please describe if this the same storage tank as described in Section 12.5.5 (Install Storage Tank at Trickling Filter).

On page 12-9 there is discussion about the replacement of one of the trickling filters with either a 5 or 10 MG storage tank where a portion will be 140 ft subsurface. Since the trickling filter capacity is 40 MGD it is difficult to make a comparison given the units of these tanks. Please clarify.

Comment 13

While cost analyses are provided within the report within Section 3 (H1 Basin), Section 4 (H2 Basin) Section 5 (H3/H4/HSI Basin), Section 6 (H5 Basin), Section 7 (H6/H7 Basin), Section 8 (18th Street Pump Station Basin), Section 9 (W1234 Basin), Section 10 (W5 Basin), Section 11 (Systemwide Alternatives), and Section 12 (Adams Street Wastewater Treatment Plant) for each analyzed alternative, please note that the Department is not commenting on any cost analysis at this time and will defer its comments until the LTCP submission. This includes any conclusions regarding the selection of any preliminary CSO control alternatives, present value calculations, and the cost range of any CSO control alternatives.

Please incorporate these changes to the report and submit a revised version to the Department no later than 60 days from the date of this letter. Thank you for your continued cooperation.

Sincerely,



Joseph Mannick
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