Appendix M: Infrastructure

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Appendix M1:

Technical Memorandum Impact of the Proposed Western Rail Yard Development on Combined-Sewer Discharges

<u>**TECHNICAL MEMORANDUM**</u>

IMPACT OF THE PROPOSED WESTERN RAIL YARD DEVELOPMENT ON COMBINED-SEWER DISCHARGES

INTRODUCTION

This Technical Memorandum summarizes analyses requested by the New York City Department of Environmental Protection (DEP) to assess the potential impact of the proposed Western Rail Yard (WRY) development project on wastewater flows to the North River Water Pollution Control Plant (WPCP) collection system, and on representative annual combined-sewer overflows (CSOs) from each outfall in the system that may discharge to the Hudson and Harlem Rivers during wet weather. Figure 1 presents a map of the North River WPCP collection system and indicates the location of the WRY project site.

The analyses described herein supplement studies performed as part of the Draft Environmental Impact Statement (DEIS) of this proposed development ("Proposed Actions") of the western section of the Long Island Rail Road's (LIRR) John D. Caemmerer Yard, and two additional housing sites. As described in the DEIS Chapter 14, "Infrastructure," the proposed development at the additional housing sites would result in a minimal increase in wastewater flow that was considered part of the population growth associated with the future No-Build condition described herein.

Previous analyses performed for the *No. 7 Subway Extension – Hudson Yards Rezoning and Development Program Final Generic Environmental Impact Statement ("Hudson Yards FGEIS")* demonstrated that pollutant loads associated with that project would not be expected to significantly affect water quality in the Hudson River. The assessment of water quality performed for the *Hudson Yards FGEIS* project involved a sewer-system modeling approach that regionalized projected flow contributions associated with the area-wide Hudson Yards rezoning. To determine the potential impact of the Proposed Actions at the WRY project site on CSO discharges from individual outfalls throughout the collection system, a new analysis was necessary to (1) determine the wastewater flows that would be generated from the WRY project site under both No Build and Build scenarios for both dry- and wet-weather conditions, and (2) route the WRY wastewater flows to the parts of the collection system that would actually receive those flows.

In the analyses presented herein, hourly wet-weather discharges were developed using the latest available InfoWorks CS models of the North River WPCP collection system. The models were further modified to explicitly contain the WRY project site as a distinct subcatchment. As described in greater detail below, the model inputs were adjusted to represent conditions in the proposed project build-completion year (2019) for three different scenarios. The "2019 No-Build" scenario represents conditions in year 2019 without the Proposed Actions. This scenario includes increased sewage flows associated with general population growth throughout the North

River collection system (as per DEP projections[1]), as well as sewage-flow changes associated with other projects expected to be completed by 2019 (such as implementation of DEP's amended drainage plan, the Manhattanville development project, and other projects as described herein.) The "2019 Build-CEQR" scenario is identical to the first scenario, except that it reflects completion of the proposed WRY project. This scenario utilizes the CEQR guidelines concerning per-capita water use and associated generation of sanitary sewage. A third scenario, the "2019 Build-LEED" scenario, is identical to the second scenario, except that the per-capita sanitary sewage generation is reduced to 80 percent of the CEQR guideline level to reflect water-conservation measures required by the project's commitment to "Leadership in Energy and Environmental Design" (LEED) Silver certification. All scenarios employed the same annual precipitation period, the 1988 hourly record at JFK Airport, which produces a representative annual CSO response across the City. This rainfall record has been adopted for CSO-planning studies being performed not only by New York City, but also by the State of New Jersey and other regional regulatory agencies.

PRINCIPAL CONCLUSIONS

The results of the analyses indicate that, relative to the 2019 No-Build scenario, the 2019 Build-CEQR scenario has one additional CSO event and an additional CSO volume of about 2.2 million gallons (MG) per year. Similarly, the 2019 Build-LEED scenario has one additional CSO event and an increase of about 1.6 MG per year relative to the No-Build scenario. In either Build scenario, the resulting incremental mass loadings of pollutants to the receiving water would be minor and, based on the prior *Hudson Yards FGEIS* analysis, would not result in significant adverse water-quality impacts in the receiving water.

Using CEQR guidelines for per-capita sanitary sewage flow, the increased flow of sewage to the North River WPCP in 2019 would be about 1.2 million gallons per day (MGD). With the project's commitment to LEED Silver certification, the increased flow would be about 1.0 MGD. Under either Build scenario, the incremental flow is minor and would not cause the WPCP to exceed its permitted discharge limits, affect its ability to properly treat sewage, or to cause any significant adverse impacts to Hudson River water quality.

METHODOLOGY AND ASSUMPTIONS

Modeling Framework

InfoWorks CS ("InfoWorks") is a commercially available modeling package developed by Wallingford Software. It is a detailed, state-of-the-art hydrologic/hydraulic model used to determine runoff flows, water-surface elevations, flows within sewers, and overflow discharges from sewers. InfoWorks can be readily applied to evaluate sewer-system performance and hydraulic characteristics during various conditions, to calculate flows within the system as well as discharges from the system, and to develop pollutant loadings.

[1] "Population Projections for NYC Neighborhoods: 2010 and 2030," prepared by the NYC Department of City Planning for the Mayor's Strategic Planning Initiative, presented 11/16/2005 and distributed by Angela Sung, Office of the Deputy Mayor for Economic Development and Rebuilding, on November 18, 2005.

In the early 2000s, DEP selected InfoWorks as the modeling software to be used for facility-planning analyses of its WPCP collection systems. These models have since been employed and developed in a number of City projects, including the CSO Long Term Control Plan (LTCP), Water Quality Task Order, and CSO BMP Reporting projects, among others. Beginning with the LTCP project, the InfoWorks models were constructed and calibrated for each of the City's WPCP sewer systems. As ongoing changes to the City's sewer systems are made and new monitoring data becomes available, these models are continuously being updated and upgraded during the course of various ongoing DEP projects. Although DEP owns the models, they are also sometimes applied for purposes of assisting with evaluations of hydraulic and water-quality impacts associated with proposed development projects.

The North River WPCP model was initially calibrated for DEP's LTCP project, as described in the North River WPCP Landside Modeling Report (March 2008). The model is configured with major sewer elements, including regulators, tide gates, outfalls, branch interceptors, and interceptors. The calculated frequency and volume of CSOs are dependent on both regulator and branch-interceptor capacities and on the hydraulic gradient line (HGL) in the interceptors. Changes in wastewater flow or runoff flow, therefore, could result in CSO frequency/volume reductions not only within the regulator drainage area where changes are implemented, but also marginal reductions in the adjacent regulator drainage areas, or areas where regulators are most sensitive to the hydraulic gradient line changes in the interceptor sewers.

Since its application for the LTCP project, the North River collection-system model has been applied and further modified under DEP's Water Quality Task Order and CSO BMP Reporting projects to conduct annual evaluations of the performance of the collection system. The latest available version of the model (developed for the calendar year 2008 reporting period) provided the starting point for modifications for the analyses herein. For the purposes of this study, new modifications included creating a subcatchment to explicitly and accurately represent the WRY project area, creating an accurate representation of the existing drainage characteristics of the LIRR Caemmerer Rail Yard and storm sewer, and updating the model for changes associated with the Amended Drainage Plan (ADP) to more realistically represent the area associated with the Javits Convention Center.

The North River sewer-system model was further adapted to simulate the following scenarios in order to assess the project's impact on the sewer system and the resulting impacts on wet-weather discharges of CSO:

1. **2019 No Build –** Sanitary flow rates account for projected population and development increases for calendar year 2019. Drainage area characteristics reflect the future 2019 condition without the Proposed Actions.

2. **2019 Build-CEQR –** Same as 1) above, except that the project site conditions are updated in the model to reflect completion of the project with respect to site hydrology and sanitary sewage flows (estimated based on CEQR guidelines).

3. **2019 Build-LEED –** Same as 2) above, except that the sanitary sewage flow contributions were reduced to 80 percent of the CEQR values to reflect water-conservation measures consistent with LEED certification.

The following two sections describe the details of the assumptions used in modeling the sanitary sewage and drainage characteristics of the three scenarios.

Representation of Project Site Drainage

The 13-acre Western Rail Yard project site is bounded by W 33rd Street and W 30th Street and 11th Ave and 12th Ave (as shown in Figure 2). Currently, most of the site is covered by railroad tracks, service roads and facility buildings of the LIRR Caemmerer Yard. Stormwater runoff from Caemmerer Yard is conveyed to a LIRR 43" x 68" box culvert that ties into the outfall pipe of CSO NR-027 (the same outfall pipe serving the combined sewer overflow discharges from Regulator N-45) to the Hudson River. Wastewater flow from the Caemmerer Yard is pumped to the combined sewer along W 30th Street. The southern section of the development site (between W 30th Street and the approximate location of W 31st Street) is occupied by a private bus-storage facility, the New York City Department of Sanitation (DSNY), and a New York City Transit (NYCT) storage area. Sewage and stormwater runoff from this part of the site is conveyed in the combined sewers along W 30th Street to Regulator N-45. Table 14-2 in DEIS Chapter 14, "Infrastructure" lists composite runoff coefficients of 0.86 and 0.90 for the northern (Caemmerer Yard) and southern (the W 30th Street frontage) sections of the project site, respectively.

2019 No Build

For conditions in 2019 without the Proposed Actions, it is assumed that the project site surface characteristics would remain as they are in the existing condition, and that the stormwater runoff would continue to be served by the LIRR box sewer and the City's combined sewers along W 30th Street. Therefore, the hydrology of the site for this condition is unchanged from the existing project site.

Independent of the WRY project, other projects are expected to be completed by the 2019 project build year. Hudson Yards rezoning projects that are expected to occur by 2019 are shown on Figure 2. In addition, DEP's Amended Drainage Plan (ADP) will be implemented as necessary to meet the additional sewage increase generated by the developments in the area. Quantification of the additional sewage is discussed in the following section.

According to the ADP for the Hudson Yards area, a new 4′ x 2′ storm sewer along W 33rd Street and a high-level storm sewer on 12th Ave will be installed by 2019 and will divert some stormwater runoff from 12th Ave and W 33rd Street directly to the Hudson River through the outfall now associated with Regulator N-44 (SPDES Outfall No. 052, located at W 34th St.). The overflow structure at Regulator N-44 will be abandoned and combined-sewage flows will be conveyed to Regulator N-43 (located at W 36th St.) through combined sewers with enhanced capacities to accommodate future sanitary flow increases from the Hudson Yard rezoning projects.

In addition, as part of the Columbia University Manhattanville project, which is located within the drainage area of Regulator N-23, sewer-separation work on W 131st and W 130th Streets would be completed by 2019. As a result, stormwater runoff from about 8.14 acres will be diverted away from the combined sewers to instead discharge directly into the Hudson River. The 2019 No Build scenario reflects the conditions described above.

2019 Build

With the Proposed Actions, stormwater runoff from the northern portion of the Western Rail Yard development site would flow into the new storm sewer along W. 33rd Street that will be installed per the ADP to discharge directly to the Hudson River. stormwater generated from the southern third of the development site with frontage along W 30th Street would no longer drain into the W 30th Street combined sewer, but instead would be diverted to the LIRR 43″ x 68″ box culvert that drains the existing rail yard to discharge into the Hudson River. This drainage configuration for the project site has been reflected in the model for the "2019 Build" scenarios.

The composite runoff coefficients provided in Table 14-8 in Chapter 14, "Infrastructure," (0.92 for the northern portion and 0.9 for the southern portion of the project site) have been applied in the model to calculate stormwater runoff. The project's commitment to LEED certification and associated practices that would further reduce the stormwater runoff from the project site is conservatively excluded for analysis purposes. As mentioned in the DEIS Chapter 14, "Infrastructure," the composite runoff coefficients have been calculated conservatively using a coefficient of 0.85 for softscapes (to reflect a minimum depth of planting soil), although a more typical value for conventional landscaped surfaces would be about 0.20.

Wastewater Flows

The total average dry-weather (sanitary-sewage) flow in the existing North River WPCP service area is calculated within the model through specification of per-capita sewer-generation rates and population values distributed on a regulator-subcatchment basis. In calendar year 2008, the overall average dry-weather flow for the entire WPCP drainage area was about 119 MGD.

2019 No Build

According to DEP projections[1] for the year 2020, the average daily dry-weather flow to the North River WPCP will be approximately 128 MGD, based on population growth and specific development projects expected at the time the projections were prepared. This analysis conservatively assigned this 2020 flow projection for 2019.

To most accurately distribute the projected flow increases throughout the North River WPCP service area, expected contributions from developments known to be included in DEP's 2005 projections were first apportioned to the appropriate locations, and then remaining increases in flow were distributed throughout the collection system by ratio of the increase above the existing flow. Specifically, a total flow increment of 5.56 MGD was attributable to the No-Build development projects shown in Figure 2 (and described in more detail in Chapter 2, "Framework for Analysis," in the EIS), and 0.20 MGD was attributable to the Manhattanville project, so these incremental flows were assigned to the appropriate regulators which would receive those flows. The remaining 122.24 MGD was distributed among individual regulators throughout the collection system by applying the overall ratio of the future flow to the existing flow at each regulator.

[1] "Population Projections for NYC Neighborhoods: 2010 and 2030," prepared by the NYC Department of City Planning for the Mayor's Strategic Planning Initiative, presented 11/16/2005 and distributed by Angela Sung, Office of the Deputy Mayor for Economic Development and Rebuilding, on November 18, 2005.

2019 Build

The Proposed Actions would generate increased sanitary sewage flow compared to the No Build condition. The specific increment by which the sanitary sewage would change is dependent upon the per-capita water usage that is assumed. For purposes of this investigation, two different per-capita water use rates were used: one based on CEQR guidelines, and another set at 80 percent of the CEQR level to reflect water-conservations measures associated with LEED certification.

Using generation rates from the *CEQR Technical Manual*, the WRY development would generate about 1.24 MGD (Table 14-6 of DEIS Chapter 14, "Infrastructure.") This represents an incremental increase of 1.22 MGD from the 2019 No Build condition, with about 0.50 MGD generated from the northern portion of the site and 0.74 MGD from the southern portion. The 2019 Build-CEQR scenario includes these incremental flow rates.

The Developer of the WRY project has committed to incorporating several sustainable-design elements into construction of the development site, including seeking LEED Silver certification, which requires at least a 20 percent reduction in water usage compared to the CEQR flows[1]. In the 2019 Build-LEED scenario, the total incremental sewage flow is 0.98 MGD above the 2019 No-Build scenario.

Table 1 lists the average dry-weather flows (DWF) of the North River WPCP drainage area for the three scenarios.

Table 1. Dry-Weather Flow (DWF) Associated with the Modeled Scenarios

Scenario	Per capita DWF (GPCD)	Population-Based DWF (MGD)	Other Projects DWF (MGD)	WRY Project DWF (MGD)	Total DWF (MGD)
2019 No Build	165.083	122.24	5.76	0	128.00
2019 Build-CEQR	165.083	122.24	5.76	1.22	129.22
2019 Build-LEED	165.083	122.24	5.76	0.98	128.98

[1] LEED currently requires as prerequisite for any certification (not just Silver) at least a 20 percent reduction in water usage compared to the baseline condition)

DISCUSSION OF RESULTS

The results of the sewer-system modeling analyses are presented in Table 2. For each of the three modeled scenarios, this table shows the annual CSO volume and number of events at each of the 49 outfall locations in the North River WPCP sewershed, with totals shown by receiving waterbody and overall for the sewershed. The table is oriented to show the relative location of the CSO outfalls in the collection system and the associated receiving waters. At outfalls where more than one regulator contributes to the CSO, entries have been broken down by the contributing regulator. As noted above, all simulation runs use the same rainfall conditions (the 1988 JFK rainfall record, which the City has adopted for CSO-planning work such as the CSO Long Term Control Planning project and other studies).

Table 3 is similar in layout to Table 2, but presents the incremental differences between the modeled scenarios. The incremental difference from the 2019 No-Build to the 2019 Build-CEQR scenarios shows the impact of the Western Rail Yard project development. The incremental difference from the 2019 No-Build to the 2019 Build-LEED scenario shows the impact of the Western Rail Yard project development when taking into account reduced sanitary sewage flows associated with water-conservation measures required by LEED certification.

Impact of Project on Dry-Weather Flow

In dry weather, the proposed WRY development would increase sanitary flows to the North River WPCP by about 1.22 MGD (or about 440.8 MG/year) if CEQR guidelines are used, or by about 1.0 MGD (352.7 MG/year) if the project's LEED commitment is considered. These increases represent about 0.9 percent and 0.7 percent of treated flow for CEQR and LEED scenarios, respectively. This increase is well within the capacity of the WPCP and would not cause the WPCP to exceed its permitted flow limit or its ability to properly treat sewage.

Impact of Project on CSO Frequency

EPA guidance[1] defines a "CSO event" as a storm event that causes an overflow from the combined sewer system; for example, a single storm that causes 50 outfalls to overflow is considered *one* event (not 50). In accordance with EPA's definition, the results of the analysis indicate that the proposed Western Rail Yard project will not increase the annual number of events that cause CSO discharges from the North River collection system from the 51 CSO events per year in the No Build condition, as shown in Table 2.

Although the frequency of CSO events for the North River WPCP collection system would not increase as a result of the Western Rail Yard project, results of the analysis indicate that CSO frequency would increase slightly (one additional event per year versus the No-Build scenario) at three individual outfalls: NR-028 (associated with Regulator R-N45, which drains the Western Rail Yard project site) and NR-024, both within ½ mile of the site, and NR-036, about 2 miles north of the site.) In the Build condition, these outfalls would be expected to overflow 9, 16, and 20 times annually, respectively. DEP considers all three of these sites lower-volume "Tier 4"

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[1] Combined Sewer Overflows, Guidance for Permit Writers, Office of Wastewater Management, USEPA. EPA 832-B-95-008.

outfalls[1]. With respect to impact on CSO frequency, there is no difference whether sanitary flows are based on the CEQR or LEED generation rates.

Impact of Project on CSO Volumes

The model calculations indicate that, using CEQR guidelines, the proposed Western Rail Yard project would be expected to increase annual CSO volumes by a total of about 2.2 million gallons (MG/yr), an increase of 0.4 percent. Of this total volumetric increase, about 1.9 MG/yr is expected to discharge to the Hudson River (a 0.5 percent increase), while about 0.3 MG/yr is expected to discharge to the Harlem River (a 0.3 percent increase). Using the reduced wastewater flow associated with LEED certification, the projected increases would be about 1.6 MG/yr overall (1.4 MG/yr to the Hudson River and 0.2 MG/yr to the Harlem River).

Out of the 49 outfalls in the North River service area, no single outfall is expected to experience an increased CSO volume of more than 0.5 MG over the course of a representative annual period. The greatest impact is expected to occur at outfalls NR-028 and NR-027 (associated with Regulators R-N43 and R-N45, which drain the WRY project site), where annual total CSO volumes are expected to increase by as much as 0.5 and 0.4 MG, respectively, using the more conservative CEQR approach, or as much as 0.3 MG when incorporating the project's LEED commitment. In either case, the increase in CSO volume from regulators serving the project site is less than 2 percent. These two outfalls discharge to the Hudson River within a half mile of the project area. However, due to the particular hydraulics of the sewer system, other outfalls not directly associated with the project site are also affected. Regardless of the location of the regulators relative to the project site, the elevation of the regulator's weir can act as a relief from the interceptor sewer if water levels in the interceptor are sufficiently high. In addition to the two outfalls noted above, the WRY project would cause an increase in annual CSO volumes at 12 other outfalls (as shown in Table 3). Looking only at these outfalls, the total annual CSO volume would increase by 1.3 MG (0.5 percent) in the Build-CEQR scenario and by 1.0 MG (0.4 percent) in the Build-LEED scenario.

Additional sewer flow from the project site can influence water levels throughout the interceptor network by adding to the total volume of flow within the system. As a result, water levels will be slightly higher in the interceptor (particularly between the project site and the WPCP.) The difference in water level at the WPCP will slightly affect the timing of the plant "throttling" (that is, closing of the influent gates to limit wet-weather inflows that would otherwise disrupt treatment processes and even flood the plant). Because the threshold water level for throttling is attained slightly sooner at the onset of storms, and maintained slightly longer at the end of storms, there will be a slightly higher volume of overflow. This volume accrues over the course of a year and results in a slightly higher annual CSO discharge volume.

[1] DEP groups all outfalls into "Tiers" according to their ranked CSO volumes among all CSOs in the City. The "Tier 1" outfalls have the largest volumes and together comprise 50% of the annual Citywide CSO volume; the "Tier 2" outfalls are the next largest and together comprise the next 25% of the annual Citywide CSO volume; the "Tier 3" outfalls are the next largest and together comprise the next 15% of the annual Citywide CSO volume; the "Tier 4" outfalls are the next largest and together comprise the next 10% of the annual Citywide CSO volume; and "Tier 5" outfalls are smallest as they do not overflow in response to the JFK 1988 rainfall record.

Impact of CSO Volumes on Water Quality

The water-quality impact of the additional CSO projected to discharge as a result of the WRY project was determined based upon comparison to the results of another, similar project. A comprehensive environmental review process for the No. 7 Subway Extension—Hudson Yards Rezoning and Development Program project was completed in late 2004 with the publication of the Final Generic Environmental Impact Statement (*Hudson Yards FGEIS*). The associated Hudson Yards rezoning was approved in January 2005. The Hudson Yards area is generally bounded by W 30th Street to the south, Seventh and Eighth Avenues to the east, W 43rd Street to the north, and Twelfth Avenue to the west. The *Hudson Yards FGEIS* estimated that the total development resulting from the rezoning would include approximately 28 million square feet of office space, 12.6 million square feet of residential space, 1.5 million square feet of hotel space, and 700,000 square feet of retail space. The *Hudson Yards FGEIS* also included the extension of the No. 7 Subway Line by approximately one mile, which is currently under construction. In addition, the *Hudson Yards FGEIS* included an approximately 1 million square-foot expansion of the Jacob K. Javits Convention Center and the development of a multi-use facility on a platform to be constructed over the Western Rail Yard. The multi-use facility and the Convention Center expansion did not move forward. However, that analysis showed that the projected year 2025 increase in CSOs from the entire Hudson Yards project could be as much as 43 MG per year.

Based on the water-quality analyses performed previously for the *Hudson Yards FGEIS*, the incremental CSO volumes that could result from the proposed WRY project would not adversely impact ambient water quality in the receiving water. In the *Hudson Yards FGEIS*, the year 2025 projected increase in annual CSO discharge beyond the baseline condition was 43 MG—about 20 times the 2.2 MG annual increase associated with the WRY project. Those increases were shown to cause undetectable or insignificant impacts on dissolved oxygen (-0.004 mg/L), total nitrogen (+.006 mg/L), total phosphorus (+0.001 mg/L), total suspended solids (+0.046 mg/L), total coliform (+9 MPN/100mL), copper (+0.068 ug/L), lead (+0.033 ug/L), and zinc (+0.193 ug/L). When added to the existing ambient concentrations of each of these parameters, these projected changes would not have caused excursions for any of the applicable water-quality standards. Because the CSO discharges that would be associated with the WRY project are much smaller, it is clear that the water-quality impacts associated with the Proposed Actions would impact water quality to an even lesser degree.

Short-term impacts of increased CSO discharges in the immediate vicinity of the outfalls are also expected to be minor. As shown in Table 3, outfall NR-027 is projected to have the largest increase in CSO volume—0.5 MG per year for the 2019 Build-CEQR scenario. That increment in annual volume consists of 30 wet-weather hours during which the Build scenario discharge exceeds the No-Build scenario discharge. The maximum single-hour difference is 52,000 gallons. However, the Hudson River flow averages approximately 400,000,000 to 500,000,000 gallons in an hour, roughly 8,000 to 10,000 times that increment.

In summary, the incremental annual CSO volume projected to result from the proposed Western Rail Yard development is far smaller (roughly 5 percent) of the maximum annual volume that had been analyzed as part of the *Hudson Yards FGEIS* study. Water-quality modeling performed as part of that study demonstrated that the flow, flushing and assimilative capacity of the receiving waters would result in no significant impact even for the larger CSO volume, so it is clear that the much smaller CSO volumes associated with the Western Rail Yard development would result in no impact on water quality.

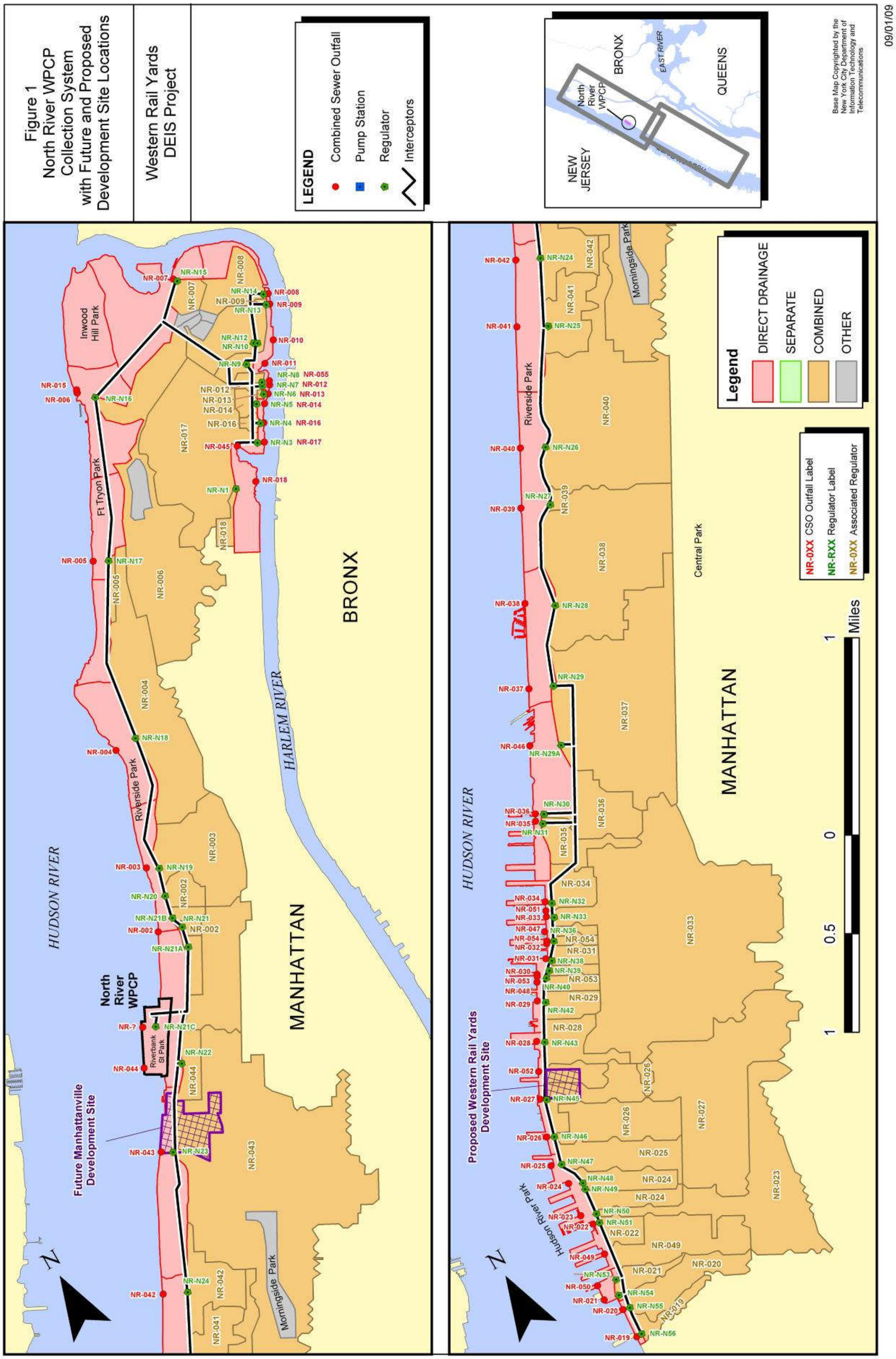

Figure 1
North River WPCP
Collection System
with Future and Proposed
Development Site Locations
Western Rail Yards
DEIS Project
LEGEND
Combined Sewer Outfall
Pump Station
Regulator
Interceptors
NEW JERSEY
BRONX
QUEENS
EAST RIVER
North River WPCP
Base Map Copyrighted by the New York City Department of Information Technology and Telecommunications
09/01/09
HUDSON RIVER
HARLEM RIVER
MANHATTAN
BRONX
Inwood Hill Park
Ft Tryon Park
Riverside Park
Riverbank St Park
Morningside Park
Central Park
Hudson River Park
Future Manhattanville Development Site
Proposed Western Rail Yards Development Site
Legend
DIRECT DRAINAGE
SEPARATE
COMBINED
OTHER
NR-0XX CSO Outfall Label
NR-RXX Regulator Label
NR-0XX Associated Regulator
0
0.5
1
Miles

Figure 2. Western Rail Yard Project Site and Surrounding Projects

Table 2. Hydraulic Modeling Results

Receiving Waterbody	Distance from WRY Project Area	Flow Direction: Hudson River	Flow Direction: Inter-ceptor	Outfall (Tier)	Regulator	Discharged CSO Volume (MG/year) Scenario 1: 2019 No Build	Scenario 2: 2019 Build (CEQR)	Scenario 3: 2019 Build (LEED)	CSO Events (Number/year) Scenario 1: 2019 No Build	Scenario 2: 2019 Build (CEQR)	Scenario 3: 2019 Build (LEED)
Harlem River	Within 10 mi North			NR-008 (4)	R-N14	23.5	23.5	23.5	42	42	42
				NR-009 (4)	R-N13	2.3	2.3	2.3	23	23	23
				NR-010 (4)	R-N12	2.9	2.9	2.9	15	15	15
				NR-010 (4)	R-N10	6.1	6.2	6.2	15	15	15
				NR-011 (4)	R-N09	1.2	1.2	1.2	9	9	9
				NR-055 (4)	R-N08	0.9	1.0	1.0	9	9	9
				NR-012 (4)	R-N07	0.7	0.7	0.7	8	8	8
				NR-013 (4)	R-N06	0.6	0.6	0.6	7	7	7
				NR-014 (4)	R-N05	1.8	1.8	1.8	10	10	10
				NR-016 (4)	R-N04	1.3	1.3	1.3	10	10	10
				NR-017 (3)	R-N03	42.6	42.7	42.6	30	30	30
				NR-045 (4)	R-N02	10.1	10.1	10.1	14	14	14
				NR-018 (4)	R-N01	0.1	0.1	0.1	3	3	3
				NR-007 (4)	R-N15	0.9	0.9	0.9	8	8	8
				Total CSO to Harlem R.		*95.0*	*95.3*	*95.2*	*42*	*42*	*42*
Hudson River	Within 10 mi North			NR-006 (3)	R-N16	47.8	48.0	47.9	26	26	26
				NR-006 (3)	R-N16A	0.0	0.0	0.0	0	0	0
	Within 8 mi North			NR-005 (4)	R-N17	0.0	0.0	0.0	0	0	0
				NR-004 (4)	R-N18	5.9	5.9	5.9	8	8	8
				NR-003 (4)	R-N19	4.3	4.3	4.3	8	8	8
				NR-002 (3)	R-N20	0.4	0.4	0.4	5	5	5
				NR-002 (3)	R-N21B	0.5	0.5	0.5	3	3	3
				NR-002 (3)	R-N21A	0.6	0.6	0.6	7	7	7
				NR-002 (3)	R-N21	37.6	37.6	37.6	51	51	51
	Within 6.0 mi North		WPCP	***See last row for volume treated at WPCP***							
				NR-044 (4)	R-N22	1.3	1.3	1.3	11	11	11
				NR-043 (3)	R-N23	70.8	70.9	70.9	19	19	19
				NR-042 (4)	R-N24	3.6	3.6	3.6	16	16	16
	Within 4.0 mi North			NR-041 (4)	R-N25	2.6	2.6	2.6	11	11	11
				NR-040 (4)	R-N26A	16.8	16.8	16.8	8	8	8
				NR-039 (5)	R-N27	0.0	0.0	0.0	0	0	0
				NR-038 (4)	R-N28	4.8	4.8	4.8	5	5	5
				NR-037 (4)	R-N29	0.5	0.5	0.5	3	3	3
	Within 2.0 mi North			NR-046 (4)	R-N29A	6.6	6.6	6.6	11	11	11
				NR-036 (4)	R-N30	11.8	11.9	11.9	19	20	20
				NR-035 (4)	R-N31	6.7	6.7	6.7	19	19	19
				NR-034 (4)	R-N32	5.3	5.3	5.3	18	18	18
	Within 1.0 mi North			NR-033 (4)	R-N33	11.1	11.1	11.1	7	7	7
				NR-033 (4)	R-N34	0.0	0.0	0.0	0	0	0
				NR-047 (4)	R-N35	0.0	0.0	0.0	0	0	0
				NR-032 (4)	R-N36	0.8	0.8	0.8	6	6	6
				NR-032 (4)	R-N37	0.0	0.0	0.0	0	0	0
				NR-031 (4)	R-N38	2.6	2.6	2.6	8	8	8
				NR-030 (4)	R-N39	1.5	1.5	1.5	7	7	7
				NR-048 (4)	R-N40	2.8	2.9	2.9	10	10	10
				NR-048 (4)	R-N41	0.1	0.1	0.1	2	2	2
				NR-029 (4)	R-N42	4.6	4.6	4.6	12	12	12
	Project Site			NR-028 (4)	R-N43	4.2	4.6	4.5	8	9	9
				NR-027 (3)	R-N45	44.5	45.0	44.8	11	11	11
	Within 0.5 mi of WRY Project Area			NR-026 (4)	R-N46	19.1	19.2	19.2	27	27	27
				NR-025 (4)	R-N47	12.1	12.2	12.2	15	15	15
				NR-024 (4)	R-N49	8.0	8.0	8.0	15	16	16
				NR-024 (4)	R-N48	4.0	4.0	4.0	11	11	11
	Within 1.0 mi South			NR-023 (4)	R-N50	24.7	24.8	24.8	11	11	11
				NR-022 (4)	R-N51	10.0	10.1	10.0	17	17	17
				NR-049 (4)	R-N52	8.3	8.4	8.4	27	27	27
				NR-050 (4)	R-N53	0.0	0.0	0.0	1	1	1
	Within 1.5 mi South			NR-021 (4)	R-N54	4.2	4.2	4.2	15	15	15
				NR-020 (4)	R-N55	12.2	12.2	12.2	23	23	23
				NR-019 (4)	R-N56	3.3	3.3	3.3	17	17	17
				Total CSO to Hudson R.		*406.0*	*407.9*	*407.4*	*51*	*51*	*51*
North River WPCP Collection System - Total CSO						***501.0***	***503.2***	***502.6***	***51***	***51***	***51***
North River WPCP (Treated Flow)						49,953	50,394	50,306			

**Note: values rounded to nearest 0.1 MG. Differences between scenarios are highlighted in yellow.*

Table 3. Hydraulic Modeling Results – Incremental Differences

Receiving Waterbody	Distance from WRY Project Area	Flow Direction: Hudson River	Flow Direction: Inter-ceptor	Outfall (Tier)	Regulator	Differences* in Discharge Volume (MG/year) – Scenarios 2-1: 2019 No Build to 2019 Build (CEQR)	Differences* in Discharge Volume (MG/year) – Scenarios 3-1: 2019 No Build to 2019 Build (LEED)	Difference* in CSO Events (Number/year) – Scenarios 2-1: 2019 No Build to 2019 Build (CEQR)	Difference* in CSO Events (Number/year) – Scenarios 3-1: 2019 No Build to 2019 Build (LEED)
Harlem River	Within 10 mi North			NR-008 (4)	R-N14	0.0	0.0	0	0
				NR-009 (4)	R-N13	0.0	0.0	0	0
				NR-010 (4)	R-N12	0.0	0.0	0	0
				NR-010 (4)	R-N10	0.1	0.1	0	0
				NR-011 (4)	R-N09	0.0	0.0	0	0
				NR-055 (4)	R-N08	0.1	0.1	0	0
				NR-012 (4)	R-N07	0.0	0.0	0	0
				NR-013 (4)	R-N06	0.0	0.0	0	0
				NR-014 (4)	R-N05	0.0	0.0	0	0
				NR-016 (4)	R-N04	0.0	0.0	0	0
				NR-017 (3)	R-N03	0.1	0.0	0	0
				NR-045 (4)	R-N02	0.0	0.0	0	0
				NR-018 (4)	R-N01	0.0	0.0	0	0
				NR-007 (4)	R-N15	0.0	0.0	0	0
				Total CSO to Harlem R.		*0.3*	*0.2*	*0*	*0*
Hudson River	Within 10 mi North			NR-006 (3)	R-N16	0.2	0.1	0	0
				NR-006 (3)	R-N16A	0.0	0.0	0	0
	Within 8 mi North			NR-005 (4)	R-N17	0.0	0.0	0	0
				NR-004 (4)	R-N18	0.0	0.0	0	0
				NR-003 (4)	R-N19	0.0	0.0	0	0
				NR-002 (3)	R-N20	0.0	0.0	0	0
				NR-002 (3)	R-N21B	0.0	0.0	0	0
				NR-002 (3)	R-N21A	0.0	0.0	0	0
				NR-002 (3)	R-N21	0.0	0.0	0	0
			WPCP	***See last row for volume treated at WPCP***					
	Within 6 mi North			NR-044 (4)	R-N22	0.0	0.0	0	0
				NR-043 (3)	R-N23	0.1	0.1	0	0
				NR-042 (4)	R-N24	0.0	0.0	0	0
	Within 4 mi North			NR-041 (4)	R-N25	0.0	0.0	0	0
				NR-040 (4)	R-N26A	0.0	0.0	0	0
				NR-039 (5)	R-N27	0.0	0.0	0	0
				NR-038 (4)	R-N28	0.0	0.0	0	0
				NR-037 (4)	R-N29	0.0	0.0	0	0
	Within 2 mi North			NR-046 (4)	R-N29A	0.0	0.0	0	0
				NR-036 (4)	R-N30	0.1	0.1	1	1
				NR-035 (4)	R-N31	0.0	0.0	0	0
				NR-034 (4)	R-N32	0.0	0.0	0	0
	Within 1 mi North			NR-033 (4)	R-N33	0.0	0.0	0	0
				NR-033 (4)	R-N34	0.0	0.0	0	0
				NR-047 (4)	R-N35	0.0	0.0	0	0
				NR-032 (4)	R-N36	0.0	0.0	0	0
				NR-032 (4)	R-N37	0.0	0.0	0	0
				NR-031 (4)	R-N38	0.0	0.0	0	0
				NR-030 (4)	R-N39	0.0	0.0	0	0
				NR-048 (4)	R-N40	0.1	0.1	0	0
				NR-048 (4)	R-N41	0.0	0.0	0	0
				NR-029 (4)	R-N42	0.0	0.0	0	0
	Project Site			NR-028 (4)	R-N43	0.4	0.3	1	1
				NR-027 (3)	R-N45	0.5	0.3	0	0
	Within 0.5 mi of WRY Project Area			NR-026 (4)	R-N46	0.1	0.1	0	0
				NR-025 (4)	R-N47	0.1	0.1	0	0
				NR-024 (4)	R-N49	0.0	0.0	1	1
				NR-024 (4)	R-N48	0.0	0.0	0	0
	Within 1 mi South			NR-023 (4)	R-N50	0.1	0.1	0	0
				NR-022 (4)	R-N51	0.1	0.0	0	0
				NR-049 (4)	R-N52	0.1	0.1	0	0
				NR-050 (4)	R-N53	0.0	0.0	0	0
	Within 1.5 mi South			NR-021 (4)	R-N54	0.0	0.0	0	0
				NR-020 (4)	R-N55	0.0	0.0	0	0
				NR-019 (4)	R-N56	0.0	0.0	0	0
				Total CSO to Hudson R.		*1.9*	*1.4*	*0*	*0*
North River WPCP Collection System - Total CSO						***2.2***	***1.6***		
North River WPCP (Treated Flow)						440.8	352.7		

**Note: differences taken from rounded values shown in Table 2. Differences between scenarios are highlighted in yellow.*

Appendix M2:

DEP Correspondence Regarding Hudson Yards Infrastructure Upgrade

The City of New York

DEPARTMENT OF ENVIRONMENTAL PROTECTION

Steven W. Lawitts
Acting Commissioner

Tel: 718-595-6576
Fax: 718-595-3557

May 26, 2009

Amanda M. Burden, AICP
Chair, City Planning Commissioner
22 Reade Street, 2 W
New York, NY 10007

Ann Weisbrod
President, Hudson Yards Development Corporation
225 West 34th Street, Suite 1402
New York, NY 10122

Reference: Infrastructure Upgrade with Hudson Yards Rezoning and Redevelopment Program

Dear Chairwoman Burden and President Weisbrod:

This is a follow-up to former First Deputy Commissioner David Tweedy's letter of September 16, 2005, regarding preparation of the Infrastructure Chapter of the No. 7 Subway Extension Hudson Yards Rezoning & Redevelopment Program Final Generic Environmental Impact Statement (FGEIS) (CEQR No. 03DCP031M).

Since that time, the Amended Drainage Plan has been completed and approved on April 21, 2009. DEP has revised the scheduling for the various phases based on the latest information provided by the Hudson Yards Development Corporation as stipulated below.

We estimate that these infrastructure improvements will have a total cost of approximately $ 96 million and will be implemented according to the following phased construction scheduled through 2022:

- Phase 1:
  1. FY 2010 – approximately $1.5 million in conjunction with capital project SEN002165/HWM1163 for West 33rd Street between 10th Avenue and 11th Avenue.
  2. FY 2016 - approximately $42 million, for the remaining area bounded by between W. 30th Street, W. 43rd Street, Tenth Avenue and Twelfth Avenue.

- Phase 2:
  1. FY -2018- approximately $12 million, for the general area bounded by W. 34th Street, W. 43rd Street, Eighth Avenue and Tenth Avenue.

- Phase 3:
  1. FY 2010 – approximately $15 million in conjunction with capital project MED-598 for 9th and 10th Avenues between W. 29th and W. 31st Streets and for W. 29th to W. 31st Streets between 9th and 10th Avenues.
  2. FY- 2020 - approximately $10.5 million, for the remaining area bounded by W. 27th Street, W. 30th Street, Seventh Avenue and Twelfth Avenue.

- Phase 4:
  1. FY 2013 – approximately $1 million in conjunction with capital project SEN002164/HWM1163 for 7th Avenue between W. 31st Street and and W. 34th Street
  2. FY 2022 - approximately $13 million, for the remaining area bounded by W. 30th Street, W. 34th Street, Seventh Avenue and Tenth Avenue.

DEP will implement this new scheduling and will revise the budget allocations accordingly by July 1, 2009.

The DEP is committed to implementing these improvements in conjunction with the Hudson Yards Plan. Please contact me directly if you need any additional information.

Sincerely,

Steven W. Lawitts
Acting Commissioner

NB/PG/nf

Cc: Mark Page, OMB Director
John Murray, OMB
Aron Kirsch, HYDC
Steve Levine, OMB
James J. Roberts
Angela Licata
Kathryn Garcia
Magdi Farag
David Karnovsky, DCP
Joe Murin
Jim Garin
Nicholas Barbaro, Jr.