A. INTRODUCTION

This chapter assesses the potential for the Proposed Project to result in significant adverse operational noise impacts. The analysis determines whether the Proposed Project would result in increases in noise levels that could have a significant adverse impact on existing sensitive receptors and also considers the effect of existing and future noise levels on the noise-sensitive developments introduced by the Proposed Project. Refer to **Chapter 01.0, "Purpose and Need for the Proposed Project," Chapter 02.0, "Project Alternatives," Chapter 03.0, "Process, Coordination, and Public Participation**," and **Chapter 04.0, "Analysis Framework,"** for more details about the Proposed Project.

As discussed in **Chapter 05.13, "Transportation,"** the Proposed Project is expected to change traffic patterns and volumes in the general vicinity of the Project Sites. Therefore, a mobile source analysis was conducted to determine whether there are any significant adverse noise impacts. Additionally, as the Proposed Project would include several accessory on-site play areas, a play area and cumulative noise analysis was conducted to determine whether there are any noise sensitive locations where the Proposed Project would have the potential to result in significant adverse noise impacts. Furthermore, because the Proposed Project would introduce new noise-sensitive receptors, an analysis of cumulative noise exposure including vehicular traffic and playground noise was conducted to determine the necessary level of window/wall attenuation at each proposed Project Sites building. Refer to **Chapter 05.19, "Construction,"** for an assessment of potential noise impacts during construction.

As discussed in **Chapter 02.0, "Project Alternatives,"** there are three feasible alternatives under consideration for implementation of the Proposed Project. These include: Alternative 2 – the Rezoning Alternative; Alternative 3 – the Non-Rezoning Alternative; and Alternative 4 – the Midblock Bulk Alternative. A discussion of Alternative 5 – the Rehabilitation and Infill Alternative, which has been determined to be infeasible, is presented in **Chapter 05.22, "Rehabilitation and Infill Alternative Analysis."** Refer to **Chapter 04.0, "Analysis Framework," Table 04.0-4,** for information on the analysis approach for the three feasible alternatives for each technical area.

B. PRINCIPAL CONCLUSIONS

Technical terms used below are defined below in **"Acoustical Fundamentals".**

The Proposed Project would not result in significant adverse noise impacts. A noise assessment was undertaken to determine the levels of noise attenuation that may be needed to achieve acceptable interior noise levels in accordance with 2021 *CEQR Technical Manual (CTM)* guidance as well as US Department of Housing and Urban Development (HUD) guidelines. The With Action Condition $L_{10(1)}$ and L_{dn} noise levels were determined by adjusting the existing

noise measurements to account for future increases in traffic with the Proposed Project based on the Noise Passenger Car Equivalent (PCE) proportional analysis results, including the noise contribution from vehicular traffic on adjacent roadways, and by calculating the cumulative noise level in the future condition based on the playground noise and future vehicular traffic noise on adjacent roadways.

Based on the projected noise levels, up to 33 dBA window/wall attenuation along with an alternate means of ventilation allowing for the maintenance of a closed-window condition would be required to achieve acceptable interior noise levels at the Proposed Project's residential and community facility uses in each of the three alternatives under consideration for the Proposed Project. These requirements will be memorialized in a legally binding document between the New York City Housing Authority (NYCHA) and the PACT Partner. With implementation of the prescribed noise attenuation and alternate means of ventilation outlined below, the Proposed Project would provide sufficient attenuation to achieve *CTM* interior noise level guidelines of 45 dBA or lower for residential and/or community facility uses and *HUD Noise Guidebook* interior noise level guidelines of 45 dBA or lower for residential uses. Therefore, the Rezoning Alternative, Non-Rezoning Alternative, and Midblock Bulk Alternative would not result in any significant adverse noise impacts related to building noise attenuation requirements.

C. ACOUSTICAL FUNDAMENTALS

Sound is a fluctuation in air pressure. Sound pressure levels (SPLs) are measured in units called "decibels" ("dB"). The particular character of the sound that we hear is determined by the speed, or "frequency," at which the air pressure fluctuates, or "oscillates." Frequency defines the oscillation of sound pressure in terms of cycles per second. One cycle per second is known as 1 Hertz ("Hz"). People can hear over a relatively limited range of sound frequencies, generally between 20 Hz and 20,000 Hz, and the human ear does not perceive all frequencies equally well. High frequencies (e.g., a whistle) are more easily discernible and, therefore, more intrusive than many of the lower frequencies (e.g., diesel truck engine).

"A"-Weighted Sound Level (dBA)

In order to establish a uniform noise measurement that simulates people's perception of loudness and annoyance, the decibel measurement is weighted to account for those frequencies most audible to the human ear. This is known as the A-weighted sound level, or "dBA," and it is the descriptor of noise levels most often used for community noise. As shown in **Table 05.16-1**, the threshold of human hearing is defined as 0 dBA; very quiet conditions (as in a library, for example) are approximately 40 dBA; levels between 50 dBA and 70 dBA define the range of noise levels generated by normal daily activity; levels above 70 dBA would be considered noisy, and then loud, intrusive, and deafening, as the scale approaches 120 dBA.

Table 05.16-1: Noise Levels of Common Sources

Sound Source	SPL (dBA)
Air raid siren at 50 feet	120
Maximum Levels at Rock Concerts (Rear Seats)	110
On Platform by Passing Subway Train	100
On Sidewalk by Passing Heavy Truck or Bus	90
On Sidewalk by Typical Highway	80
On Sidewalk by Passing Automobiles with Mufflers	70
Typical Urban Area	60-70
Typical Suburban Area	50-60
Quiet Suburban Area at Night	40-50
Typical Rural Area at Night	30-40
Isolated Broadcast Studio	20
Audiometric (Hearing Testing) Booth	10
Threshold of hearing	0

Source: *CTM*

Community Response to Changes in Noise Levels

Table 05.16-2 shows the average ability of an individual to perceive changes in noise. It is important to note that the dBA scale is logarithmic, meaning that each increase of 10 dBA describes a doubling of perceived loudness. Thus, the noise on a platform with a passing subway train, at 100 dBA, is perceived as twice as loud as passing heavy trucks at 90 dBA. For most people to perceive an increase in noise, it must be at least 3 dBA. At 5 dBA, the change will be readily noticeable. These guidelines permit direct estimation of an individual's probable perception of changes in noise levels.

Table 05.16-2: Average Ability to Perceive Changes in Noise Levels

Change (dBA)	Human Perception of Sound
2-3	Barely perceptible
5	Readily noticeable
10	A doubling or halving of the loudness of sound
20	A dramatic change
40	Difference between a faintly audible sound and a very loud sound

Source: Bolt Beranek and Neuman, Inc., Fundamentals and Abatement of Highway Traffic Noise, Report No. PB-222-703. Prepared for Federal Highway Administration, June 1973.

Noise Descriptors Used in Impact Assessment

As the SPL unit of dBA describes a noise level at just one moment and very few noises are constant, other ways of describing noise over extended periods have been developed. One way of describing fluctuating sound is to describe the fluctuating noise heard over a specific time period as if it had been a steady, unchanging sound. For this condition, a descriptor called the "equivalent sound level," L_{eq}, can be computed. L_{eq} is the constant sound level that, in a given situation and time period (e.g., 1 hour, denoted by $L_{eq(1)}$, or 24 hours, denoted as $L_{eq(24)}$), conveys the same sound energy as the actual time-varying sound. The Day-Night Sound Level (L_{dn}) refers to a 24-hour average noise level with a ten dB penalty applied to the noise levels during the hours between 10 PM and 7 AM, due to increased sensitivity to noise levels during these hours. Statistical sound level descriptors such as L_1, L_{10}, L_{50}, L_{90}, and L_x, are used to indicate noise levels that are exceeded one, ten, 50, 90, and "x" percent of the time, respectively. Discrete event

peak levels are given as L_1 levels. L_{eq} is used in the prediction of future noise levels, by adding the contributions from new sources of noise (i.e., increases in traffic volumes) to the existing levels and in relating annoyance to increases in noise levels.

The relationship between L_{eq} and levels of exceedance is worth noting. Because L_{eq} is defined in energy rather than straight numerical terms, it is not simply related to the levels of exceedance. If the noise fluctuates very little, L_{eq} will approximate L_{50} or the median level. If the noise fluctuates broadly, the L_{eq} will be approximately equal to the L_{10} value. If extreme fluctuations are present, the L_{eq} will exceed L_{90} or the background level by 10 or more decibels. Thus, the relationship between L_{eq} and the levels of exceedance will depend on the character of the noise. In community noise measurements, it has been observed that the L_{eq} is generally between L_{10} and L_{50}.

For purposes of the Proposed Project, the maximum one-hour equivalent sound level ($L_{eq(1)}$) has been selected as the noise descriptor to be used in this noise impact evaluation. $L_{eq(1)}$ is the noise descriptor recommended for use in the *CTM* for vehicular traffic and is used to provide an indication of highest expected sound levels. The one-hour L_{10} is the noise descriptor used in the *CTM* noise exposure guidelines for city environmental impact review classification. The L_{dn} is the noise descriptor used in the *HUD Noise Guidebook* and sets exterior noise standards for housing construction projects receiving federal funds.

D. REGULATORY CONTEXT

US Department of Housing and Urban Development (HUD) Noise Regulations

HUD regulations establishing standards for HUD-assisted projects appear in Title 24, Code of Federal Regulations, part 51, subpart B (24 CFR 51.B). HUD categorized noise levels for proposed residential development as acceptable, normally unacceptable, and unacceptable, as shown in **Table 05.16-3**. HUD assistance for construction of new noise sensitive uses is generally prohibited for projects with unacceptable noise exposures and is discouraged for projects with normally unacceptable noise exposure. The assumption is that standard building construction provides an average of 20 dBA of attenuation from exterior noise levels (this is in contrast to NYC guidance for non-HUD-assisted projects for which it is assumed that standard construction provides 25 dBA of attenuation). For an exterior L_{dn} of 65 dBA or below, this amount of attenuation would be sufficient to meet an interior L_{dn} level of 45 dBA. HUD-financed buildings constructed in Normally Unacceptable or Unacceptable areas must provide sufficient sound attenuation, as specified by HUD, to reduce interior noise levels to an L_{dn} of 45 dBA. According to the *HUD Noise Guidebook*, if the exterior L_{dn} noise level is between 65 dBA and 70 dBA, a minimum of 25 dBA of noise attenuation must be provided, and if the exterior noise L_{dn} noise level is between 70 dBA and 75 dBA, a minimum of 30 dBA of noise attenuation would be required. Likewise, in the event that L_{dn} noise levels exceed 75 dBA, sufficient attenuation must be provided to bring interior noise levels down to 45 L_{dn} or below.

Table 05.16-3: HUD Acceptability Standards for Noise

Category	Noise Level (L_{dn})
Acceptable	≤ 65 dBA
Normally Unacceptable	>65 dBA ≤ 75 dBA
Unacceptable	> 75 dBA

Source: HUD, March 1985.

For this analysis, L_{dn} levels were estimated using the following equation:

$$L_{dn} = L_{10} - 3$$

The method used to determine L_{dn} values is to measure the loudest hourly L_{10} for a typical day and then to estimate the L_{dn} from this loudest hourly L_{10}, which is consistent with the *HUD Noise Guidebook*.

New York State Department of Environmental Conservation (NYSDEC)

NYSDEC has published a policy and guidance document, *Assessing and Mitigating Noise Impacts* (DEP-00-1, February 2, 2001), which presents noise impact assessment methods, identifies thresholds for significant impacts, and discusses potential avoidance and mitigative measures to reduce or eliminate noise impacts.[1]

NYSDEC's guidance document sets forth thresholds that can be used in determining whether a noise increase due to a project may constitute a significant adverse impact, noting that these thresholds should be viewed as guidelines subject to adjustment as appropriate for the specific circumstances. According to DEP-00-1, increases in noise ranging from 0 to 3 dBA should have no appreciable effect on receptors, increases of 3 to 6 dBA may have the potential for adverse impacts only in cases where the most sensitive of receptors (e.g., hospital or school) are present, increases of more than 6 dBA may require a closer analysis of impact potential depending on existing noise levels and the character of surrounding land use and receptors; and increases of 10 dBA or greater deserve consideration of avoidance and mitigation measures in most cases.

New York City Noise Code

The New York City Noise Control Code, which became effective July 2007, defines "unreasonable and prohibited noise standards and decibel levels" for the City of New York. The Noise Code generally seeks to reduce ambient noise, prohibiting all unreasonable and unnecessary noise and addressing construction hours and activities. It also: (1) establishes sound level standards for specific noise sources, such as motor vehicles, building heating/hot water, ventilation, and air conditioning (HVAC) equipment, and construction activities; (2) requires that all exhausts be muffled; and (3) prohibits all unnecessary noise adjacent to schools, hospitals, or courts. It specifies maximum allowable SPLs for designated octave bands emanating from a commercial or business enterprise as measured within a receiving property (such as a mixed-use and residential property). The Noise Code's enforcement is driven by complaints of violations.

[1] http://www.dec.ny.gov/docs/permits_ej_operations_pdf/noise2000.pdf.

New York *CTM* Noise Standards and Appendix

Impact Significance Criteria

According to *CTM*, for the purposes of determining a significant impact during daytime hours, it is reasonable to consider a L_{eq} noise level of 65 dBA as an absolute noise level that should not be significantly exceeded. Therefore, a significant noise impact would occur at a sensitive noise receptor (i.e., residences, play areas, parks, schools, libraries, and houses of worship) during daytime hours under the following circumstances:

- A noise increase of 3 dBA or greater is predicted in the future as a result of the proposed project (the With-Action condition), when the future noise levels without the proposed project (the No-Action condition) is at 62 dBA or greater; or
- When the No-Action noise level is below 62 dBA, a predicted noise increase with the proposed project exceeds the difference between 65 dBA and the No-Action noise level. For example, if the No-Action noise level is 61 dBA, then the maximum noise increment with the proposed project would be 4 dBA, since an increase higher than 4 dBA would result in a noise level that exceeds the 65 dBA L_{eq} significant impact threshold.
- Additionally, an increase of With-Action noise levels by 5 dBA over a No-Action noise level that is at or below 60 dBA would be considered significant.

Noise Exposure Criteria

The *CTM* sets external noise exposure standards, which are shown in **Table 05.16-4** below. Noise exposure is classified into four categories based on the L_{10}: Acceptable, Marginally Acceptable, Marginally Unacceptable, and Clearly Unacceptable. The *CTM* Noise Exposure Guidelines shown in **Table 05.16-4** are guidelines, not a law. However, City reviewing agencies use the guidelines in determining potential impacts when a project comes under their review.

The *CTM* also defines attenuation requirements for buildings based on exterior noise levels (see **Table 05.16-5**). Recommended noise attenuation values for buildings are designed to maintain interior noise levels of 45 dBA or lower for residential, hotel, or community facility uses and interior noise levels of 50 dBA or lower for commercial office uses and are determined based on exterior $L_{10(1)}$ noise levels.

Table 05.16-4: Noise Exposure Guidelines Set Forth in the *CTM*[1]

Receptor Type	Time Period	Acceptable General External Exposure	Airport[3] Exposure	Marginally Acceptable General External Exposure	Airport[3] Exposure	Marginally Unacceptable General External Exposure	Airport[3] Exposure	Clearly Unacceptable General External Exposure	Airport[3] Exposure
1. Outdoor area requiring serenity and quiet[2]		$L_{10} \leq 55$ dBA	---------- DNL $\leq$ 60 dBA ----------						
2. Hospital, Nursing Home		$L_{10} \leq 55$ dBA		$55 < L_{10} \leq 65$ dBA	---------- 60 < DNL $\leq$ 65 dBA ----------	$65 < L_{10} \leq 80$ dBA	(i) 65 < DNL $\leq$ 75 dBA,	$L_{10} > 80$ dBA	---------- 75 dBA < DNL ----------
3. Residence, residential hotel or motel	7 AM to 10 PM	$L_{10} \leq 65$ dBA		$65 < L_{10} \leq 70$ dBA		$70 < L_{10} \leq 80$ dBA		$L_{10} > 80$ dBA	
	10 PM to 7 AM	$L_{10} \leq 55$ dBA		$55 < L_{10} \leq 70$ dBA		$70 < L_{10} \leq 80$ dBA		$L_{10} > 80$ dBA	
4. School, museum, library, court, house of worship, transient hotel or motel, public meeting room, auditorium, out-patient public health facility		Same as Residential Day (7 AM-10 PM)		Same as Residential Day (7 AM-10 PM)		Same as Residential Day (7 AM-10 PM)		Same as Residential Day (7 AM-10 PM)	
5. Commercial or office		Same as Residential Day (7 AM-10 PM)		Same as Residential Day (7 AM-10 PM)		Same as Residential Day (7 AM-10 PM)		Same as Residential Day (7 AM-10PM)	
6. Industrial, public areas only[4]	Note 4	Note 4		Note 4		Note 4		Note 4	

Notes:

(i) In addition, any new activity shall comply with the Impact Thresholds detailed in Section 410 of Chapter 19, "Noise," of the *CTM*.

[1] Measurements and projections of noise exposures are to be made at appropriate heights above site boundaries as given by American National Standards Institute (ANSI) Standards; all values are for the worst hour in the time period.

[2] Tracts of land where serenity and quiet are extraordinarily important and serve an important public need and where the preservation of these qualities is essential for the area to serve its intended purpose. Such areas could include amphitheaters, particular parks or portions of parks or open spaces dedicated or recognized by appropriate local officials for activities requiring special qualities of serenity and quiet. Examples are grounds for ambulatory hospital patients and patients and residents of sanitariums and old-age homes.

[3] One may use the FAA-approved L_{dn} contours supplied by the Port Authority, or the noise contours may be computed from the federally approved INM Computer Model using flight data supplied by the Port Authority of New York and New Jersey.

[4] External Noise Exposure standards for industrial areas of sounds produced by industrial operations other than operating motor vehicles or other transportation facilities are spelled out in the New York City Zoning Resolution, Sections 42-20 and 42-21. The referenced standards apply to M1, M2, and M3 manufacturing districts and to adjoining residence districts (performance standards are octave band standards).

Source: New York City Department of Environmental Protection (DEP); adopted policy 1983.

Table 05.16-5: Required Attenuation Values to Achieve Acceptable Interior Noise Level

	Marginally Unacceptable				Clearly Unacceptable
Vehicular Traffic	$70<L_{10}\leq73$	$73<L_{10}\leq76$	$76<L_{10}\leq78$	$78<L_{10}\leq80$	$80<L_{10}$
Aircraft[A]	$65<DNL\leq68$	$68<DNL\leq71$	$71<DNL\leq73$	$73<DNL\leq75$	$75<DNL$
Train	$65<L_{dn}\leq68$	$68<L_{dn}\leq71$	$71<L_{dn}\leq73$	$73<L_{dn}\leq75$	$75<L_{dn}$
Attenuation[B]	(I) 28 dB(A)	(II) 31 dB(A)	(III) 33 dB(A)	(IV) 35 dB(A)	See note [C]

Notes:

[A] DNL descriptor based on average values of Ldn over a year period.

[B] The above composite window-wall attenuation values are for residential dwellings and community facility development. Commercial office spaces and meeting rooms would be 5.0 dB(A) less in each category. All the above categories require a closed window situation and, hence, an alternate means of ventilation.

[C] The required attenuation value is the difference between L_{huild} and $L_{interior}$, using the appropriate noise descriptor
Where:
L_{build} is the projected noise level under the build condition rounded up to the whole number
$L_{interior}$ is the designed interior noise level (45 dBA for vehicular noise, 40 dBA for aircraft and train noise)

Source: DEP; *CTM*, Table 19-3.

Noise Evaluation Criteria

This analysis evaluates whether each project alternative would result in increases in noise levels that could have a significant adverse impact on existing sensitive receptors and also evaluates noise exposure at the noise-sensitive receptors introduced by the project alternatives.

Since the HUD noise guidance does not include criteria for noise level increments resulting from a proposed project and the NYSDEC incremental noise level increase criteria are less conservative than the *CTM* criteria, the *CTM* criteria have been used to evaluate noise level increases resulting from the project alternatives (i.e., new residential or community facility uses).

Since HUD and CEQR noise exposure criteria use different noise descriptors and thresholds, either one could be more conservative depending on the source of noise exposure at a given location. Consequently, noise exposure and associated requirements for building attenuation at noise receptors newly introduced by the project alternatives have been evaluated using both HUD and CEQR criteria, with the higher attenuation requirement between the two criteria being proposed for each alternative.

E. METHODOLOGY

General Noise Analysis Methodology

Representative noise receptor locations were selected based on the location of existing receptors and future noise-sensitive uses included in each project alternative. Existing noise levels were established at each receptor location by field measurements. Future noise levels for each project alternative were calculated using a proportional modeling technique for vehicular traffic noise and a projection based on previous noise level measurements for playground noise. The noise analysis examined the weekday AM, midday (MD), and PM peak hours at all receptor locations and a school dismissal/bus departure period for receptors proximate to schools. The selected time periods are when the Proposed Project would be expected to produce the maximum traffic generation (based on the traffic studies presented in **Chapter 05.13**) and therefore result in the maximum

potential for significant adverse noise impacts. For each receptor location representing existing receptor(s), the predicted future With-Action noise level increment was compared to CEQR noise impact criteria. For each receptor representing noise-sensitive uses introduced by the project alternatives, the predicted future With-Action total noise levels were compared to both CEQR and HUD noise exposure guidelines, and the appropriate amount of building attenuation was determined in order to satisfy both CEQR and HUD criteria.

The noise prediction techniques used for the noise analysis are described below.

Vehicular Traffic Noise Prediction Methodology

Future noise levels for each alternative were calculated using a proportional modeling technique, which was used as a screening tool to estimate changes in noise levels. The proportional modeling technique is an analysis methodology recommended for analysis purposes in the *CTM.*

Using this technique, the prediction of future noise levels where traffic is the dominant noise source is based on a calculation using measured existing noise levels and predicted changes in traffic volumes to determine noise levels for each alternative. Vehicular traffic volumes (counted during the noise measurements) are converted into noise passenger car equivalent (Noise PCE) values. At locations where traffic on the adjacent street is a significant noise source, a traffic counting and classification program should be conducted that records the following: total vehicles; total number of buses (i.e., vehicles having two or three axles and designed to carry more than nine passengers); total number of heavy trucks (i.e., cargo vehicles with three or more axles); total number of medium trucks (i.e., vehicles with two axles and six tires); and total number of passenger vehicles or light trucks (i.e., vehicles having two axles and four tires). In order to convert vehicular traffic volumes into Noise PCEs, it is assumed that one medium-duty truck generates the noise equivalent of 13 passenger vehicle/light trucks; one heavy-duty truck generates the noise equivalent of 47 passenger vehicles/light trucks; and one bus generates the noise equivalent of 18 passenger vehicle/light trucks.

Future noise levels were calculated using the following equation:

$$F\ NL = 10 * \log_{10} (F\ PCE / E\ PCE) + E\ NL$$

where:

F NL = Future Noise Level (applicable to Future No-Action or development Scenarios)
E NL = Existing Noise Level
F PCE = Future PCEs (applicable to Future No-Action or development Scenarios)
E PCE = Existing PCEs

Sound levels are measured in decibels and, therefore, increase logarithmically with sound source strength. In this case, the sound source is traffic volumes measured in Noise PCEs. For example, assume that traffic is the dominant noise source at a particular location. If the existing traffic volume on a street is 100 Noise PCEs and if the future traffic volume were increased by 50 Noise PCEs (to a total of 150 Noise PCEs), the noise level would increase by 1.8 dBA. Similarly, if the

future traffic were increased by 100 Noise PCEs, or doubled to a total of 200 Noise PCEs, the noise level would increase by 3.0 dBA.

The 2041 No-Action Alternative Noise PCE values were determined based on the results of the traffic analysis for that alternative (see **Chapter 05.13**).

Play Area Noise Prediction Methodology

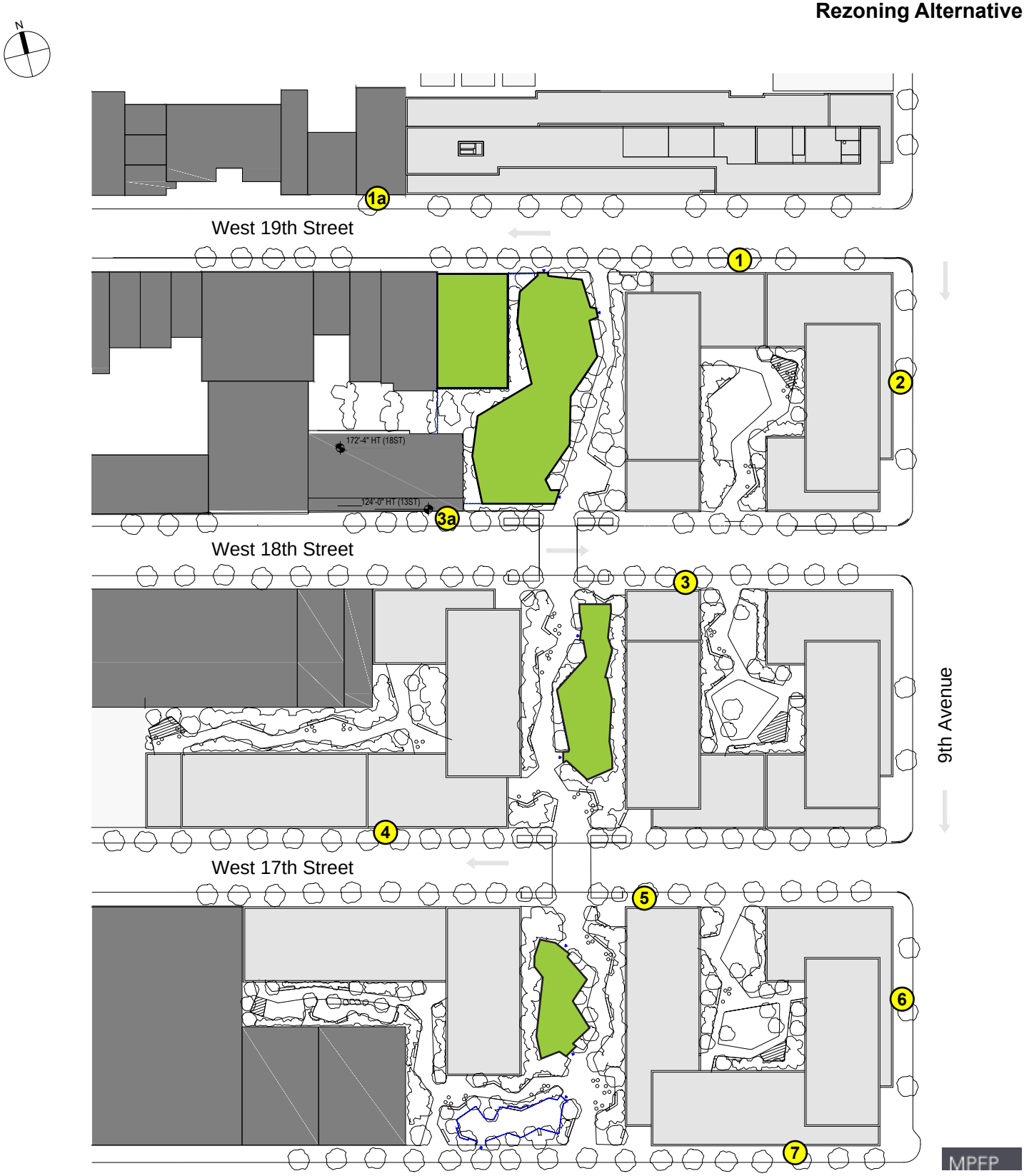
While people are not usually thought of as stationary noise, children in playgrounds or spectators at outdoor sporting events or concerts can introduce additional sources of noise within communities. According to the *CTM*, noise generated by children in playgrounds or people using parks is considered a stationary source of noise. As noted above, several existing publicly accessible and/or NYCHA-owned play areas are located adjacent to or within the Project Sites. Additionally, the NYCHA-owned play areas and basketball court would be replaced and relocated within the Project Sites, which will result in new play areas and a new basketball court adjacent to existing and future sensitive receptors. As such, a preliminary play area noise assessment was conducted to determine the need for additional attenuation requirements for the building façades with frontage on the existing and future play areas.

At each of the noise receptor locations (including existing receptors and receptors introduced by the project alternatives) that has a direct line of sight to a play area, noise associated with that play area was estimated. Elementary school children and High School children are the primary age groups that use the existing Chelsea Park Soccer Field and the currently existing NYCHA-owned basketball court, respectively. Consequently, the Elementary School and High School playground boundary noise levels were used in the play area analysis at these respective locations, along with applicable noise level reductions due to distance from the play areas to the receptors. At the remaining play areas, to conservatively represent children of any age using the play areas, early childhood playground boundary noise levels were assumed, along with applicable noise level reductions due to distance from the play areas to the receptors. In addition, all play area outer perimeters (i.e., fence lines) were assumed to be a minimum of 10 feet away from any sensitive receptor. Play areas under the Rezoning Alternative, Non-Rezoning Alternative, and Midblock Bulk Alternative at each Project Site are shown in **Figures 05.16-1a, 05.16-1b, 05.16-1c, 05.16-1d, 05.16-1e,** and **05.16-1f**.

Table 05.16-6 shows measured maximum hourly playground boundary noise levels. These values are based upon measurements made at a series of New York City school playgrounds for the New York City School Construction Authority (SCA).[2] At receptors with line of sight to existing or future playgrounds, these noise levels were projected from to the playground boundary to the receptors, based on reductions with distance as specified in the SCA playground noise study. Further, cumulative L_{eq} noise levels including contribution from traffic on adjacent roadways and playground noise was calculated. Playground L_{10} noise levels are assumed to be 3 dBA greater than projected L_{eq} values.

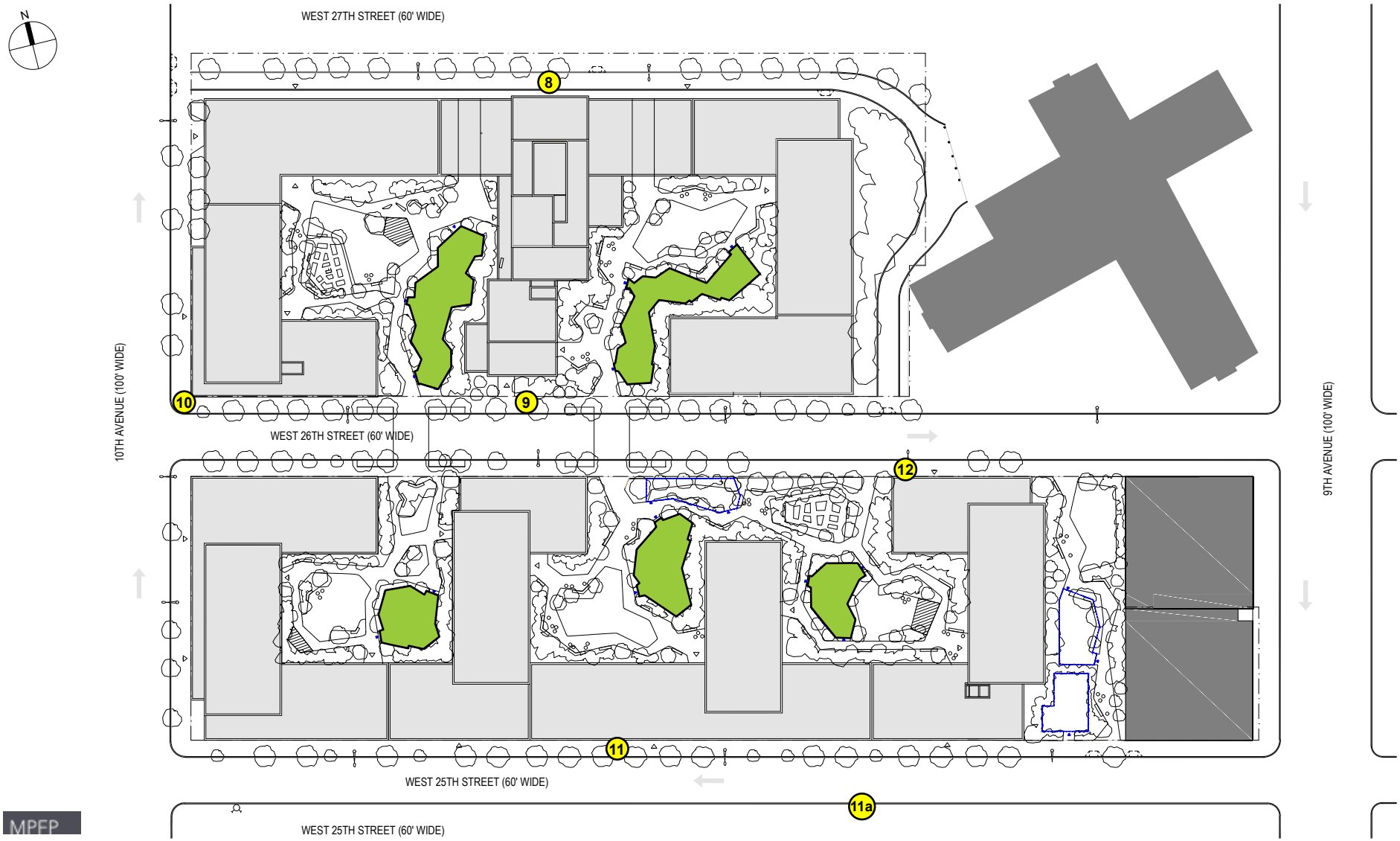
[2] SCA Playground Noise Study, AKRF, Inc., October 23, 1992.

Figure 05.16-1a
Proposed Playground - Fulton Houses
Rezoning Alternative



Legend

- Existing Non-NYCHA Buildings
- Proposed New NYCHA Playgrounds
- Proposed New NYCHA Buildings
- (1) Noise Receptor Location



Legend

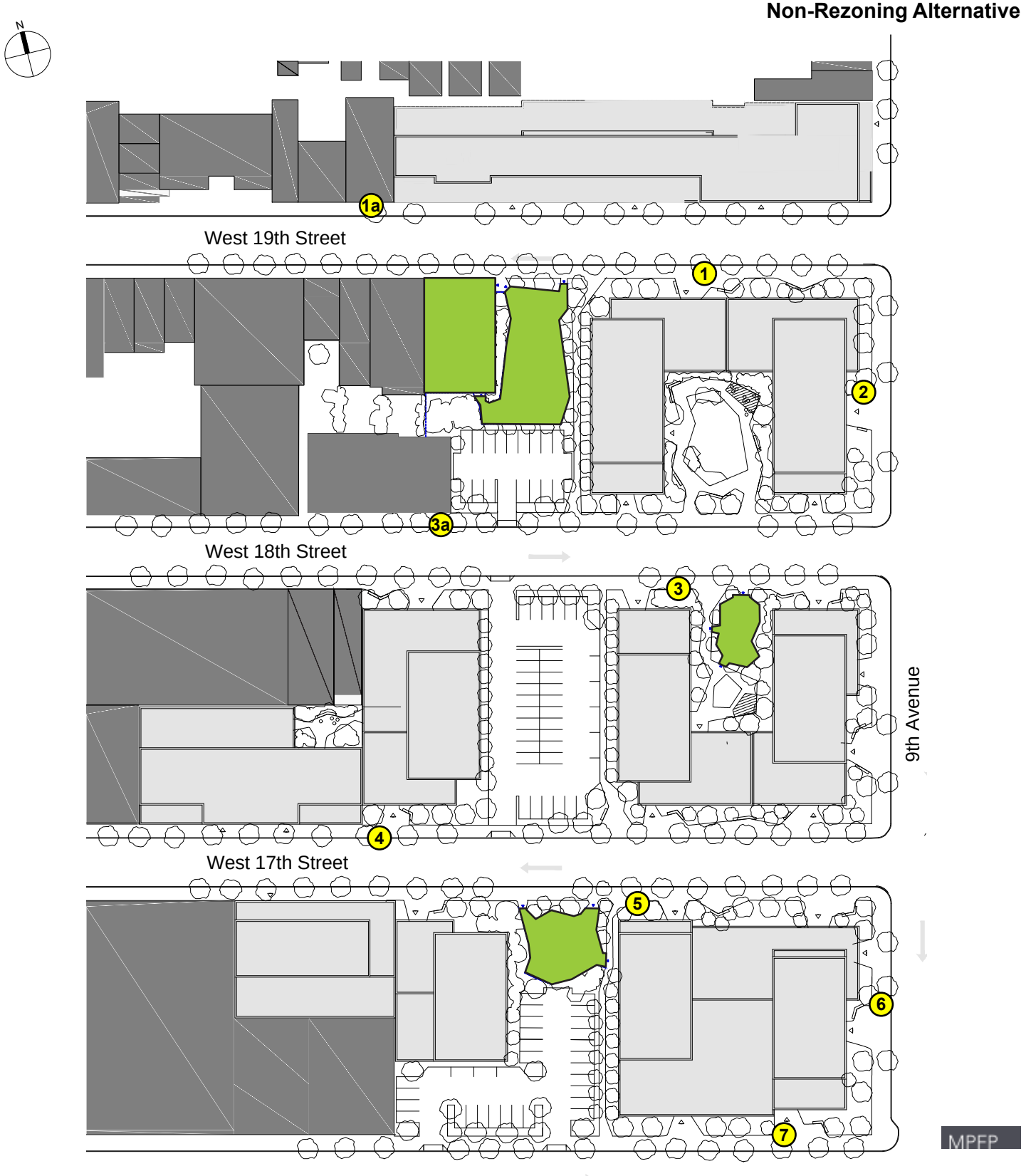
- Existing Non-NYCHA Buildings
- Proposed New NYCHA Playgrounds
- Proposed New NYCHA Buildings
- 8 Noise Receptor Location

Fulton and Elliott-Chelsea Houses Redevelopment Project **Figure 05.16-1b**

Proposed Playground - Elliott-Chelsea Houses - Rezoning Alternative

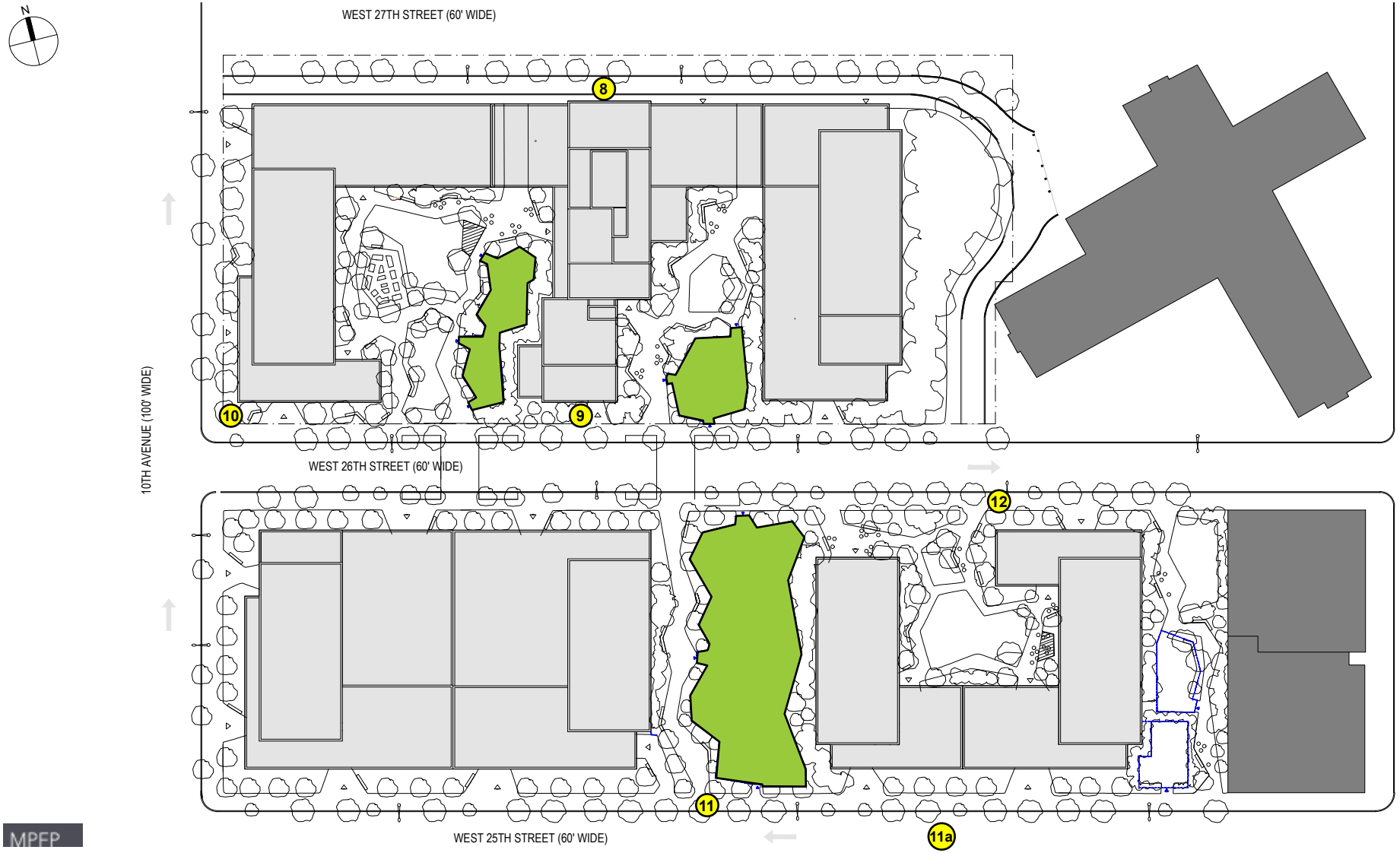
Fulton and Elliott-Chelsea Houses Redevelopment Project **Figure 05.16-1c**

Proposed Playground - Fulton Houses
Non-Rezoning Alternative



Legend

- Existing Non-NYCHA Buildings
- Proposed New NYCHA Playgrounds
- Proposed New NYCHA Buildings
- (1) Noise Receptor Location



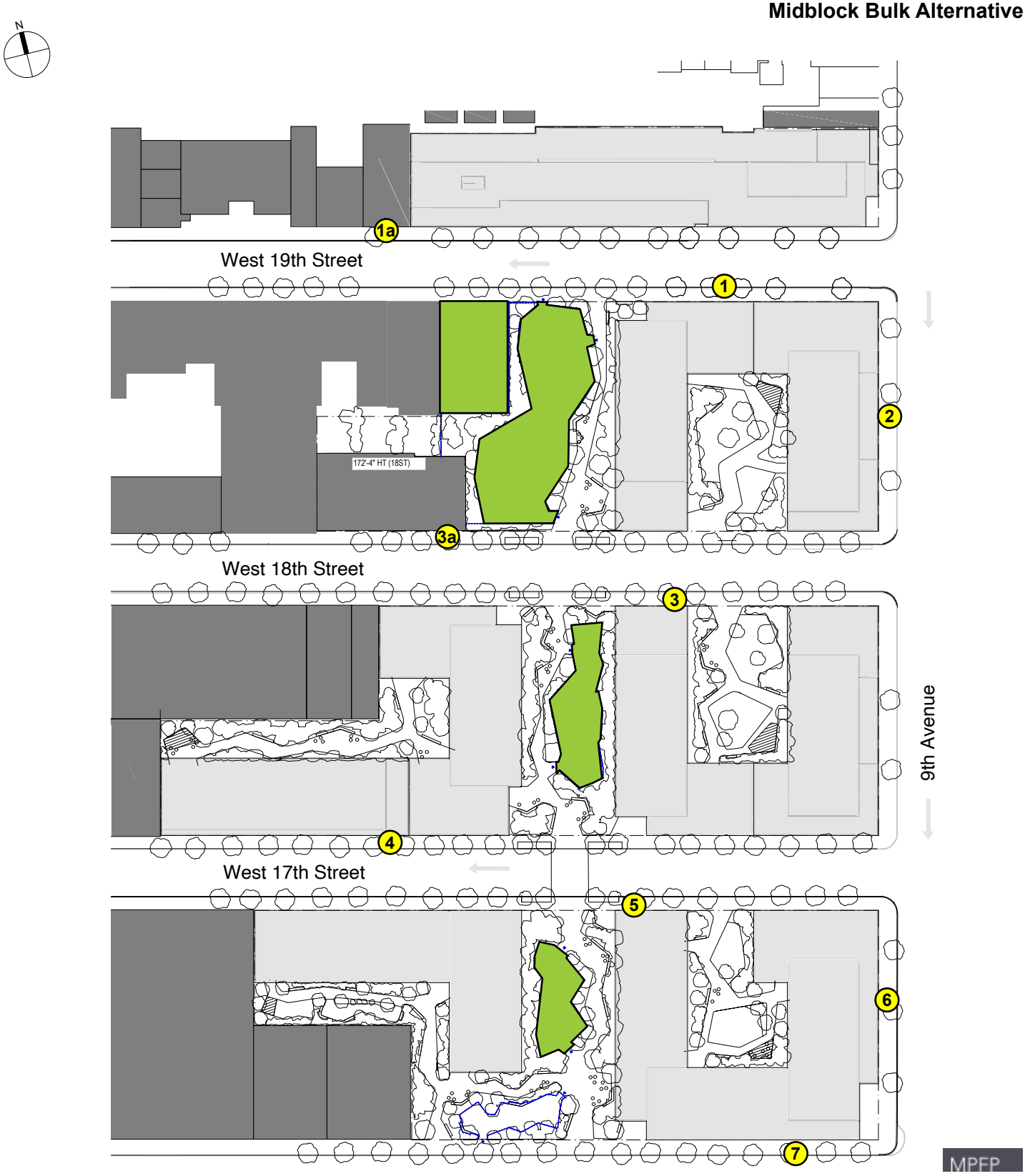
Legend

- Existing Non-NYCHA Buildings
- Proposed New NYCHA Playgrounds
- Proposed New NYCHA Buildings
- (8) Noise Receptor Location

Fulton and Elliott-Chelsea Houses Redevelopment Project **Figure 05.16-1d**

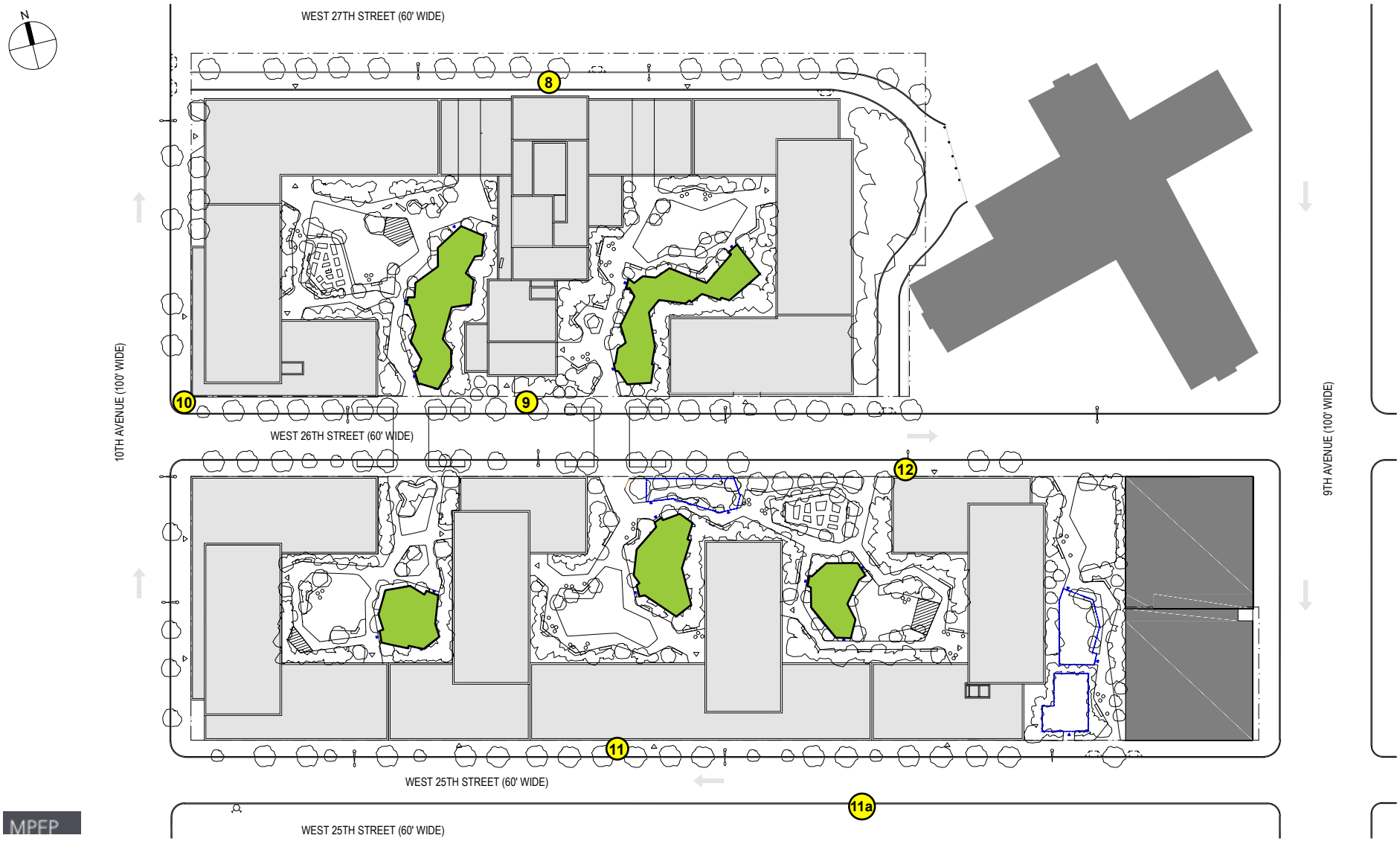
Proposed Playground - Elliott-Chelsea Houses - Non-Rezoning Alternative

Proposed Playground - Fulton Houses
Midblock Bulk Alternative



Legend

- Existing Non-NYCHA Buildings
- Proposed New NYCHA Playgrounds
- Proposed New NYCHA Buildings
- (1) Noise Receptor Location



Legend

- Existing Non-NYCHA Buildings
- Proposed New NYCHA Buildings
- Proposed New NYCHA Playgrounds
- 8 Noise Receptor Location

Fulton and Elliott-Chelsea Houses Redevelopment Project **Figure 05.16-1f**

Proposed Playground - Elliott-Chelsea Houses - Midblock Bulk Alternative

Table 05.16-6: Playground Boundary Noise $L_{eq(1)}$ Noise Levels (in dBA)

Early Childhood	Elementary Schools	Intermediate Schools	High Schools
71.5	71.4	71.0	68.2

Source: 2021 *CTM*, Noise Appendix Table 5.

Other Potential Sources of Noise

Mechanical Equipment

The Proposed Project would not include any unenclosed mechanical equipment for building ventilation that could result in stationary source noise impacts to the surrounding area. All mechanical equipment would be located either inside the building or would be enclosed on the roof of the structures and would be designed to meet all applicable noise regulations and requirements (i.e., Subchapter 5, §24-227 of the New York City Noise Control Code, the New York City Department of Buildings Code). Therefore, the Proposed Project would not result in any significant increase in ambient noise levels in the vicinity of the Project Sites or the surrounding study area due to mechanical equipment noise.

Train Noise

An initial train noise impact screening analysis could be warranted if a new receptor would be located within 1,500 feet of existing rail activity and have a direct line of sight to that activity. As the Project Sites are not within 1,500 feet of an existing rail line nor does the site have a direct line of sight to a rail activity, no initial train noise impact screening analysis is warranted.

Aircraft Noise

An initial aircraft noise impact screening analysis would be warranted if the new receptor would either generate or reroute aircraft or introduce a new receptor that is within a 65 dBA DNL contour. Since the Proposed Project would not generate or reroute aircraft, and as the Project Sites are not within a 65 dBA DNL contour, no initial aircraft noise impact screening analysis is warranted.

F. AFFECTED ENVIRONMENT

As shown in **Figures 04.0-1** and **04.0-2** in **Chapter 04.0**, the Project Sites consists of Fulton, Elliott, Chelsea, and Chelsea Addition Houses located across two separate public housing campuses owned and maintained by NYCHA, located in the Chelsea neighborhood of Manhattan Community District 4. The Fulton Houses Project Site includes portions of four adjacent blocks bound by W. 20th Street to the north, 9th Avenue to the east, W. 16th Street to the south, and 10th Avenue to the west; and the Elliott-Chelsea Houses Project Site includes portions of two blocks bound by W. 27th Drive/Chelsea Park to the north, 9th Avenue to the east, W. 25th Street to the south, and 10th Avenue to the south.

Selection of Noise Receptor Locations

As discussed above, local traffic is the dominant source of noise in the vicinity of the Project Sites. A total of 12 noise measurement locations were selected within and around the Project Sites for impact identification and evaluation of noise attenuation requirements. Three additional noise receptors (i.e., receptors 1a, 3a, and 11a) were selected to facilitate evaluation of potential noise impacts from the play areas included in the project alternatives. These sites represent the closest existing noise-sensitive receptors with direct line of sight to the proposed play areas. Existing noise levels were not measured at Sites 1a, 3a, and 11a; rather, they are represented by measured levels at Sites 1, 3, and 11, respectively. The 15 selected receptor locations surrounding the Project Sites are presented in **Table 05.16-7** and shown in **Figures 05.16-2a and 05.16-2b**.

Table 05.16-7: Noise Receptor Locations

Location	Receptor Location/ Map ID[1]	Monitoring Location
Fulton Houses Project Site	1	North Side of W. 19th Street; approximately 100 feet west of Ninth Avenue
Fulton Houses Project Site	1a	435 W. 19th Street; North Side of W. 19th Street; approximately 400 feet west of Ninth Avenue
Fulton Houses Project Site	2	Midpoint of West Side of Ninth Avenue; approximately 90 feet north of W. 18th Street
Fulton Houses Project Site	3	South Side of W. 18th Street; approximately 140 feet west of Ninth Avenue
Fulton Houses Project Site	3a	425 W. 18th Street; North Side of W. 18th Street; approximately 350 feet west of Ninth Avenue
Fulton Houses Project Site	4	North Side of W. 17th Street; approximately 400 feet west of Ninth Avenue
Fulton Houses Project Site	5	South Side of W. 17th Street; approximately 160 feet west of Ninth Avenue
Fulton Houses Project Site	6	Midpoint of West Side of Ninth Avenue; approximately 90 feet north of W. 16th Street
Fulton Houses Project Site	7	North Side of W. 16th Street; approximately 80 feet west of Ninth Avenue
Elliott-Chelsea Houses Project Site	8	South Side of W. 27th Drive; approximately 230 feet east of Tenth Avenue
Elliott-Chelsea Houses Project Site	9	North Side of W. 26th Street; approximately 250 feet east of Tenth Avenue
Elliott-Chelsea Houses Project Site	10	Northeast corner of the intersection at W. 26th Street and Tenth Avenue
Elliott-Chelsea Houses Project Site	11	North Side of W. 25th Street; approximately 350 feet east of Tenth Avenue
Elliott-Chelsea Houses Project Site	11a	420 W. 25th Street; South Side of W. 25th Street; approximately 260 feet west of Ninth Avenue
Elliott-Chelsea Houses Project Site	12	South Side of W. 26th Street; approximately 200 feet west of Ninth Avenue

Note:
[1] Refer to **Figures 05.16-2a/b** for noise monitoring receptor location.

Noise Monitoring

Monitoring was conducted during the typical midweek conditions. At all 12 measurement locations, 20-minute spot measurements of existing noise levels were performed for the weekday AM peak hour (8:00 AM to 9:00 AM), weekday midday (MD) peak hour (12:00 PM to 1:00 PM), and weekday PM peak hour (5:00 PM to 6:00 PM). Additional noise measurements were performed at Receptor Locations 8, 9, and 12 during the school dismissal/bus departure (SC PM)

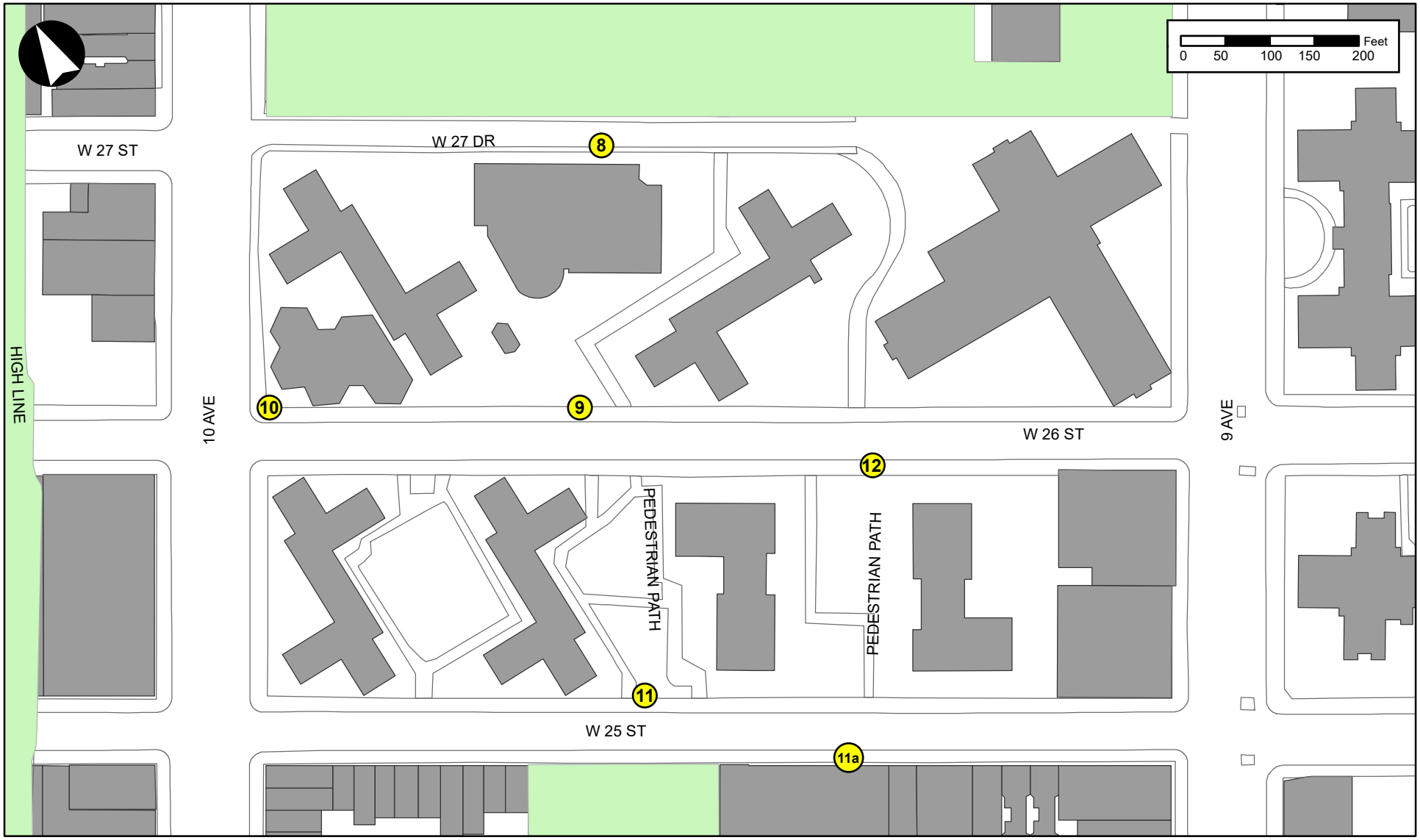
Noise Receptor Locations: Fulton Houses

Legend

Existing NYCHA and non-NYCHA Buildings

Open Space

1a Noise Receptor Location



Legend

Existing NYCHA and non-NYCHA Buildings

Open Space

11 Noise Receptor Location

Fulton and Elliott-Chelsea Houses Redevelopment Project

Figure 05.16-2b

Noise Receptor Locations: Elliott-Chelsea Houses

peak period (2:30 PM to 3:30 PM), due to the proximity of the nearby PS 138 and PS 033 – Chelsea Prep at 281 9th Avenue (Block 724, Lot 23). Noise measurements were performed on Tuesday, October 25, 2022, Thursday, October 27, 2022, Thursday, November 3, 2022, and Thursday, November 10, 2022. On October 25th, the weather was mostly cloudy with high temperatures in the mid-60s ºF and average wind speeds of six miles-per-hour; on October 27th, the weather was fair with high temperatures in the mid-60s ºF and average wind speeds of 10 miles-per-hour; on November 3rd, the weather was fair with high temperatures in the high-60s ºF and average wind speeds of five miles-per-hour; and on November 10th, the weather was fair with high temperatures in the mid-60s ºF and average wind speeds of eight miles-per-hour. Traffic volumes and vehicle classifications were documented during the noise monitoring.

Equipment Used During Noise Monitoring

The instrumentation used for the measurements at the receptor locations was a Brüel & Kjær Type 4189 ½-inch microphone connected to a Brüel & Kjær Model 2250 Type 1 (as defined by the ANSI) sound level meter. This assembly was mounted at a height of 5 feet above the ground surface on a tripod and at least 6 feet away from any sound-reflecting surfaces to avoid major interference with source sound level that is being measured. The meter was calibrated before and after readings with a Brüel & Kjær Type 4231 sound-level calibrator using the appropriate adaptor. Measurements at the receptor locations were made on the A-scale (dBA). The data were digitally recorded by the sound level meter and displayed at the end of the measurement period in units of dBA. Measured quantities included L_{eq}, L_1, L_{10}, L_{50}, and L_{90}. A windscreen was used during all sound measurements except for calibration. Only traffic-related noise was measured; noise from other sources (e.g., emergency sirens, irregular aircraft flyovers, etc.) was excluded from the measured noise levels. Weather conditions were noted to ensure a true reading as follows: wind speed under 12 mph; relative humidity under 90 percent; and temperature above 14ºF and below 122ºF (pursuant to ANSI Standard S1.13-2005).

Existing Noise Levels at Noise Measurement Locations

The noise monitoring results for existing conditions are shown in **Table 05.16-8**. Noise from vehicular traffic was the dominant sources at each receptor location, with exception to Receptor Location 8 where users of the adjacent Chelsea Park (especially during operating school hours) were the dominant noise source. The existing noise levels reflect the level of vehicular activity on the roadways bounding the Project Sites. In terms of *CTM* criteria, existing L_{10} noise levels measured at Site 11 are in the "acceptable" category, existing L_{10} noise levels measured at Sites 1, 3, 4, 5, 7, 8, and 9 are in the "marginally acceptable" category, and existing L_{10} noise levels measured at Sites 2, 6, 10, and 12 are in the "marginally unacceptable" category.

L_{dn} noise levels were calculated for the corresponding receptor locations, as described above in Section D - Regulatory Context section under "HUD Development Guidelines". According to HUD criteria, the calculated existing L_{dn} noise levels at Sites 1, 3, 4, 5, 7, and 11 are in the "acceptable" noise exposure category, whereas the calculated existing L_{dn} noise levels at Sites 2, 6, 8, 9, 10, and 12 are in the "normally unacceptable" noise exposure category.

Table 05.16-8: Existing Noise Levels (dBA)

Site[1]	Time	L_{max}	L_{min}	L_{eq}	L_1	L_{10}[2]	L_{50}	L_{90}	L_{dn}[2,3]	CEQR Noise Exposure Category	HUD Noise Exposure Category
1	AM	76.8	57.7	61.7	71.2	63.9	59.1	57.8	60.9	Marginally Acceptable	Acceptable
	MD	82.4	62.3	66.2	75.6	**67.0**	64.4	62.8	**64.0**		
	PM	79.1	57.4	62.1	72.0	63.4	59.7	57.6	60.4		
2	AM	88.4	59.5	69.1	77.7	70.9	66.1	61.6	67.9	Marginally Unacceptable	Normally Unacceptable
	MD	83.5	58.2	66.4	74.2	69.5	64.3	60.3	66.5		
	PM	84.0	58.2	68.4	77.0	**71.5**	65.6	60.7	**68.5**		
3	AM	77.8	58.0	65.1	73.1	**67.2**	63.5	60.9	**64.2**	Marginally Acceptable	Acceptable
	MD	79.6	57.4	64.2	73.5	66.5	61.8	59.0	62.5		
	PM	75.6	57.3	61.4	69.0	64.0	59.4	58.0	61.0		
4	AM	79.9	60.7	64.7	73.5	**66.4**	62.5	61.4	**63.4**	Marginally Acceptable	Acceptable
	MD	81.4	60.5	64.9	74.7	65.7	62.5	61.6	62.7		
	PM	77.7	61.6	63.9	72.1	64.8	62.6	62.0	61.8		
5	AM	77.6	59.6	64.5	71.4	**67.1**	62.8	60.5	**64.1**	Marginally Acceptable	Acceptable
	MD	84.1	58.8	63.4	70.7	64.8	60.8	59.5	61.8		
	PM	91.5	58.6	66.3	78.3	62.5	60.4	59.4	59.5		
6	AM	84.1	61.2	67.5	76.2	69.8	65.2	62.9	66.8	Marginally Unacceptable	Normally Unacceptable
	MD	81.8	61.9	68.6	77.6	**71.0**	66.1	63.8	**68.0**		
	PM	73.7	60.2	63.2	68.8	64.8	62.4	61.0	61.8		
7	AM	77.2	61.4	65.3	71.9	**67.7**	63.8	62.5	**64.7**	Marginally Acceptable	Acceptable
	MD	86.1	62.0	66.2	72.7	67.6	64.5	63.1	64.6		
	PM	77.6	58.7	63.9	68.9	66.0	63.1	60.4	63.0		
8	AM	81.6	56.5	62.8	72.1	63.4	59.9	56.8	60.4	Marginally Unacceptable	Normally Unacceptable
	MD	92.0	58.9	69.3	77.6	**69.8**	64.5	60.0	**66.8**		
	SC PM	80.2	57.6	64.2	74.8	65.7	61.6	58.3	62.7		
	PM	75.0	56.7	61.1	67.9	62.9	59.9	57.1	59.9		
9	AM	72.6	54.2	59.9	67.3	62.1	58.4	55.7	59.1	Marginally Acceptable	Normally Unacceptable[4]
	MD	97.6	54.5	69.1	77.2	66.5	59.3	56.6	63.5		
	SC PM	78.5	55.2	63.0	72.0	65.4	61.0	57.9	62.4		
	PM	84.3	57.6	65.7	75.6	**68.2**	62.5	59.2	**65.2**		
10	AM	86.9	57.9	70.6	81.0	**73.8**	65.9	60.4	**70.8**	Marginally Unacceptable	Normally Unacceptable[5]
	MD	84.2	57.9	69.3	80.1	72.3	65.7	61.0	69.3		
	PM	100.8	56.8	74.7	83.5	71.7	65.2	59.8	68.7		
11	AM	74.2	56.0	61.5	68.3	**64.5**	60.0	57.6	**61.5**	Acceptable	Acceptable
	MD	84.6	54.4	63.4	75.4	63.5	58.9	55.9	60.5		
	PM	81.1	55.9	62.6	73.3	64.0	59.6	57.3	61.0		
12	AM	87.0	58.3	71.9	82.4	**74.2**	68.3	63.7	**71.2**	Marginally Unacceptable	Normally Unacceptable
	MD	82.5	61.9	69.3	76.6	71.8	67.9	65.1	68.8		
	SC PM	77.5	55.4	62.1	71.1	64.5	60.4	57.6	61.5		
	PM	77.2	55.3	62.0	72.1	63.9	59.9	57.3	60.9		

Notes:

[1] Refer to **Figures 05.16-2a/b** for noise monitoring receptor location.

[2] The highest L_{10} and L_{dn} noise levels at each monitoring location are shown in **bold**.

[3] L_{dn} noise values calculated using the methodology presented above, as is consistent with the *HUD Noise Guidebook*.

[4] As the highest existing L_{eq} noise levels at Receptor Location 9 (69.1 dBA) during the weekday midday peak period exceeds that of the corresponding highest existing L_{10} noise level (66.5 dBA), the higher L_{eq} noise levels were used in place of the highest L_{10} noise levels to determine the appropriate HUD Noise Exposure category, and thus, any relevant noise attenuation requirements.

[5] As the highest existing L_{eq} noise levels at Receptor Location 10 (74.7 dBA) during the weekday PM peak period exceeds that of the corresponding highest existing L_{10} noise level (71.7 dBA), the higher L_{eq} noise levels were used in place of the highest L_{10} noise levels to determine the appropriate HUD Noise Exposure category, and thus, any relevant noise attenuation requirements.

G. ENVIRONMENTAL EFFECTS

A detailed description of the alternatives analyzed in this chapter is presented in **Chapter 2.0.**

Alternative 1 – No-Action Alternative

Mobile Source Noise Screening Analysis

Using the methodology previously described, future noise levels in the No-Action Alternative have been projected for the 2041 analysis year and are presented in **Table 05.16-9** below. It is assumed that the Project Sites would continue to be occupied by the existing buildings and uses at the Fulton and Elliott-Chelsea Houses (see **Table 04.0-1 and 04.0-2 in Chapter 04.0**). As such, play area noise in the No-Action Alternative is not expected to differ from existing condition noise, and traffic volumes under the No-Action Alternative are expected to differ from existing conditions solely due to background growth and future planned off-Site developments (see **Chapter 05.13,** for description of changes in vehicular traffic between existing condition and the No-Action Alternative).

Table 05.16-9: 2041 No-Action Alternative Noise Levels (dBA)

Noise Receptor Location[1]	Time[2]	Existing L_{eq}	No-Action L_{eq}	Change	No-Action L_{10}[2]	No-Action L_{dn}[2,3]
1	AM	61.7	61.8	0.1	64.0	61.0
	MD	66.2	66.3	0.1	**67.1**	**64.1**
	PM	62.1	62.2	0.1	63.5	60.5
1a	AM	61.7	61.8	0.1	64.0	61.0
	MD	66.2	66.3	0.1	**67.1**	**64.1**
	PM	62.1	62.2	0.1	63.5	60.5
2	AM	69.1	69.9	0.8	71.7	68.7
	MD	66.4	67.6	1.2	70.7	67.7
	PM	68.4	69.5	1.1	**72.6**	**69.6**
3	AM	65.1	65.8	0.7	**67.9**	**64.9**
	MD	64.2	65.0	0.8	67.3	64.3
	PM	61.4	62.1	0.8	64.7	61.7
3a	AM	65.1	65.8	0.7	**67.9**	**64.9**
	MD	64.2	65.0	0.8	67.3	64.3
	PM	61.4	62.1	0.8	64.7	61.7
4	AM	64.7	65.6	0.9	**67.3**	**64.3**
	MD	64.9	65.8	0.9	66.6	63.6
	PM	63.9	64.8	0.9	65.6	62.6
5	AM	64.5	65.4	0.9	**68.0**	**65.0**
	MD	63.4	64.3	0.9	65.7	62.7
	PM	66.3	67.2	0.9	63.4	60.4
6	AM	67.5	68.3	0.8	70.7	67.7
	MD	68.6	69.7	1.1	**72.1**	**69.1**
	PM	63.2	64.3	1.1	65.9	62.9
7	AM	65.3	65.6	0.3	**68.0**	**65.0**
	MD	66.2	66.5	0.3	67.9	64.9
	PM	63.9	64.1	0.2	66.2	63.2
8	AM	62.8	62.8	0.0	63.4	60.4
	MD	69.3	69.3	0.0	**69.8**	**66.8**
	SC PM	64.2	64.2	0.0	65.7	62.7
	PM	61.1	61.1	0.0	62.9	59.9
9	AM	59.9	60.2	0.3	62.4	59.4
	MD	69.1	69.5	0.4	66.9	63.9
	SC PM	63.0	63.5	0.5	65.9	62.9
	PM	65.7	66.2	0.5	**68.7**	**65.7**
10	AM	70.6	71.0	0.4	**74.2**	**71.2**
	MD	69.3	69.8	0.5	72.8	69.8
	PM	74.7	75.4	0.7	72.4	69.4
11	AM	61.5	63.5	2.0	**66.5**	**63.5**
	MD	63.4	64.8	1.4	64.9	61.9
	PM	62.6	64.5	1.9	65.9	62.9
11a	AM	61.5	63.5	2.0	**66.5**	**63.5**
	MD	63.4	64.8	1.4	64.9	61.9
	PM	62.6	64.5	1.9	65.9	62.9
12	AM	71.9	72.2	0.3	**74.6**	**71.6**
	MD	69.3	69.6	0.3	72.1	69.1
	SC PM	62.1	62.6	0.5	65.0	62.0
	PM	62.0	62.5	0.5	64.4	61.4

Notes:

[1] Refer to **Figures 05.16-2a/b** for noise receptor location.

[2] The highest L_{10} and L_{dn} noise levels at each monitoring location are shown in **bold**.

[3] L_{dn} noise values were estimated using the methodology presented above, as is consistent with the *HUD Noise Guidebook*.

Comparing future No-Action Alternative noise levels with existing noise levels, the maximum increase in L_{eq} noise levels would be less than 3 dBA. Increases of this magnitude would be considered barely perceptible according to *CTM* guidelines.

In terms of *CTM* criteria, No-Action Alternative L_{10} noise levels at Receptor Locations 1, 1a, 3, 3a, 4, 5, 7, 8, and 9 would remain in the "marginally acceptable" category, No-Action Alternative L_{10} noise levels at Receptor Locations 2, 6, 10, and 12 would remain in the "marginally unacceptable" category, and No-Action Alternative L_{10} noise levels at Receptor Locations 11 and 11a would change from the "acceptable" to "marginally acceptable" category.

In terms of HUD criteria, No-Action L_{dn} noise levels at Receptor Locations 1, 1a, 3, 3a, 4, 5, 7, 11, and 11a would remain in the "acceptable" category, and No-Action L_{dn} noise levels at Receptor Locations 2, 6, 8, 9, 10, and 12 would remain in the "normally unacceptable" category.

However, as described in **Chapter 02.0**, there would be no new receptors introduced through the No-Action Alternative. In addition, any work that would occur by the Build Year anticipates only typical NYCHA capital repairs, there is no plan to replace the windows in the existing buildings to account for background noise increases.

Alternative 2 – Rezoning Alternative

Mobile Source Noise Screening Analysis

Using the methodology previously described, future mobile source noise levels in the Rezoning Alternative were calculated for each of the 15 noise receptor locations during each of the analysis periods for the 2041 analysis year, which are presented in **Table 05.16-10** below.

Table 05.16-10: 2041 No-Action Alternative and Rezoning Alternative Mobile Source Noise Levels (dBA)

Noise Receptor Location[1]	Time	No-Action Alternative L_{eq}	Rezoning Alternative L_{eq}	Change	Rezoning Alternative L_{10}[2]	Rezoning Alternative L_{dn}[2,3]
1	AM	61.8	62.0	0.2	64.2	61.2
	MD	66.3	66.4	0.1	**67.2**	**64.2**
	PM	62.2	62.4	0.2	63.7	60.7
1a	AM	61.8	62.0	0.2	64.2	61.2
	MD	66.3	66.4	0.1	**67.2**	**64.2**
	PM	62.2	62.4	0.2	63.7	60.7
2	AM	69.9	70.0	0.1	71.8	68.8
	MD	67.6	67.8	0.2	70.9	67.9
	PM	69.5	69.6	0.1	**72.7**	**69.7**
3	AM	65.8	66.5	0.7	**68.6**	**65.6**
	MD	65.0	65.3	0.3	67.6	64.6
	PM	62.1	62.3	0.2	64.9	61.9
3a	AM	65.8	66.5	0.7	**68.6**	**65.6**
	MD	65.0	65.3	0.3	67.6	64.6
	PM	62.1	62.3	0.2	64.9	61.9
4	AM	65.6	66.7	1.1	**68.4**	**65.4**
	MD	65.8	66.4	0.6	67.2	64.2
	PM	64.8	65.3	0.5	66.1	63.1
5	AM	65.4	66.2	0.8	**68.8**	**65.8**
	MD	64.3	64.8	0.5	66.2	63.2
	PM	67.2	67.7	0.5	63.9	60.9
6	AM	68.3	68.3	0.0	70.7	67.7
	MD	69.7	69.7	0.0	**72.1**	**69.1**
	PM	64.3	64.3	0.0	65.9	62.9
7	AM	65.6	65.8	0.2	**68.2**	**65.2**
	MD	66.5	66.6	0.1	68.0	65.0
	PM	64.1	64.2	0.1	66.3	63.3
8	AM	62.8	62.8	0.0	63.4	60.4
	MD	69.3	69.3	0.0	**69.8**	**66.8**
	SC PM	64.2	64.2	0.0	65.7	62.7
	PM	61.1	61.1	0.0	62.9	59.9
9	AM	60.2	60.8	0.6	63.0	60.0
	MD	69.5	70.1	0.6	67.5	64.5
	SC PM	63.5	63.9	0.4	66.3	63.3
	PM	66.2	66.7	0.5	**69.2**	**66.2**
10	AM	71.0	71.2	0.2	**74.4**	**71.4**
	MD	69.8	69.9	0.1	72.9	69.9
	PM	75.4	75.5	0.1	72.5	69.5
11	AM	63.5	64.0	0.5	**67.0**	**64.0**
	MD	64.8	65.1	0.3	65.2	62.2
	PM	64.5	64.7	0.2	66.1	63.1
11a	AM	63.5	64.0	0.5	**67.0**	**64.0**
	MD	64.8	65.1	0.3	65.2	62.2
	PM	64.5	64.7	0.2	66.1	63.1
12	AM	72.2	72.7	0.5	**75.1**	**72.1**
	MD	69.6	70.1	0.5	72.6	69.6
	SC PM	62.6	63.1	0.5	65.5	62.5
	PM	62.5	63.0	0.5	64.9	61.9

Notes:

[1] Refer to **Figures 05.16-2a/b** for noise receptor location.

[2] The highest L_{10} and L_{dn} noise levels at each monitoring location are shown in **bold**.

[3] L_{dn} noise values calculated using the methodology presented above, as is consistent with the *HUD Noise Guidebook*.

Comparing future Rezoning Alternative mobile source noise levels with No-Action Alternative noise levels, the maximum increase in L_{eq} noise levels would be less than 3 dBA. Increases of this magnitude would be considered barely perceptible and not significant according to *CTM* guidance.

In terms of *CTM* criteria, Rezoning Alternative L_{10} noise levels at Receptor Locations 1, 1a, 3, 3a, 4, 5, 7, 8, 9, 11, and 11a would remain in the "marginally acceptable" category as compared to the No-Action Alternative, and Rezoning Alternative noise levels at Receptor Locations 2, 6, 10, and 12 would remain in the "marginally unacceptable" category.

In terms of HUD criteria, the Rezoning Alternative L_{dn} noise levels at Receptor Locations 1, 1a, 11, and 11a would remain in the "acceptable" category as compared to the No-Action Alternative, the Rezoning Alternative L_{dn} noise levels at Receptor Locations 2, 6, 8, 9, 10, and 12 would remain in the "normally unacceptable" category, and the Rezoning Alternative L_{dn} noise levels at Receptor Locations 3, 3a, 4, 5, and 7 would change from the "acceptable" to the "normally unacceptable" category.

Cumulative Mobile Source and Play Area Noise Impact Evaluation

Existing Receptors

Using the methodology previously described, future play area noise levels in the Rezoning Alternative were calculated at each façade of Receptor Locations 1a and 3a, which represent existing noise-sensitive receptors not located on the Proposed Project Sites. Receptor 11a is not included in the play area noise analysis in this Alternative because it would not have direct line of sight to a newly introduced play area. The future play area noise levels and cumulative total noise levels (including noise from mobile sources as presented previously in **Table 05.16-10**) at these locations are presented in **Table 05.16-11** below.

Table 05.16-11: Cumulative Noise Under the Rezoning Alternative at Closest Existing Receptor Façades (dBA)

Noise Receptor Location[1]	Address	Façade	Time	No-Action Alternative L_{eq}	Traffic-Only Rezoning Alternative L_{eq}	Rezoning Alternative Play Area L_{eq} at Boundary	Cumulative Rezoning Alternative L_{eq} at Receptor	Change	Cumulative Rezoning Alternative L_{10}[2] at Receptor
1a	435 W. 19th Street	South	AM	61.8	62.0	55.7	62.9	1.1	65.1
			MD	66.3	66.4		66.8	0.5	**67.6**
			PM	62.2	62.4		63.2	1.0	64.5
3a	425 W. 18th Street	North	AM	65.8	66.5	60.2	67.4	1.6	**69.5**
			MD	65.0	65.3		66.5	1.5	68.8
			PM	62.1	62.3		64.4	2.3	67.0
		East	AM	65.8	66.5	68.6	70.7	4.9	**72.8**
			MD	65.0	65.3		70.3	5.3	72.6
			PM	62.1	62.3		69.5	7.4	72.1

Notes:
[1] Refer to **Figures 05.16-2a/b** for noise receptor location.
[2] Highest L_{10} noise value indicated in **bold**.

Comparing the future cumulative Rezoning Alternative L_{eq} noise levels with the No-Action Alternative noise levels, the maximum increase in noise levels at Receptor Location 1a, i.e., 435

W. 19th Street would be less than 3 dBA. Increases of this magnitude would be considered barely perceptible according to *CTM* guidelines. Consequently, noise levels at Receptor Location 1a under the Rezoning Alternative would not rise to the level of a significant adverse noise impact.

At Receptor Location 3a (425 W. 18th Street), maximum cumulative noise levels in the Rezoning Alternative would be 7.4 dBA greater than the No-Action Alternative. Based on field observations and date of construction (2017), the building façade is expected to have incorporated double-glazed windows which provide approximately 28 dBA window/wall attenuation, as well as an alternate means of ventilation (AMV), resulting in interior noise levels of less than 45 dBA (i.e., the threshold considered acceptable for residential use according to both *CTM* and HUD noise exposure criteria). Therefore, while the change in noise levels at this receptor would be noticeable, interior noise levels would remain below the acceptable 45 dBA threshold, and consequently the project-generated noise at Receptor Location 3a (425 W. 18th Street) would not rise to the level of a significant adverse noise impact.

Future Project Buildings

Using the methodology previously described, future play area noise levels in the Rezoning Alternative were calculated at each façade of each of the buildings to be built under the Rezoning Alternative based on the distance between the façade and the nearest edge of the associated future play area, including a proposed basketball court. Additionally, each façade was associated with one of the 12 Noise Receptor Locations to determine the noise levels from vehicular traffic. In addition to the future play areas and basketball court, the existing Chelsea Park Soccer Field was also considered in the play area noise analysis. The maximum cumulative future noise levels (i.e., mobile source and play area) at these façades are presented in **Table 05.16-12**. The proposed buildings are shown in **Figures 05.16-3a and 05.16-3b**.

Fulton Houses Project Site - Rezoning Alternative

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Fulton and Elliott-Chelsea Houses Redevelopment Project

Figure 05.16-3b

Elliott-Chelsea Houses Project Site - Rezoning Alternative

Table 05.16-12: Maximum Cumulative Noise Under the Rezoning Alternative at Project Building Façades (dBA)

Sensitive Receptor			Traffic-Only Rezoning Alternative L_{eq}	Rezoning Alternative L_{eq} Including Play Area Noise	Cumulative Rezoning Alternative L_{10}	Cumulative Rezoning Alternative L_{dn}
Building	Façade	Representative Noise Receptor				
Fulton 1	North	1	66.4	66.4	67.2	64.2
	South	1	66.4	67.3	68.1	65.1
	East	2	69.6	69.6	72.7	69.7
Fulton 2	North	1	66.4	66.4	67.2	64.2
	South and West	3	66.5	66.5	68.6	65.6
	East	2	69.6	69.6	72.7	69.7
Fulton 3	North and West	3	66.5	66.5	68.6	65.6
	South	5	66.2	66.2	68.8	65.8
	East	2	69.6	69.6	72.7	69.7
Fulton 4	North	3	66.5	67.2	69.3	66.3
	South and West	4	66.7	66.7	68.4	65.4
	East	4	66.7	68.8	70.5	67.5
Fulton 5	North	5	66.2	66.6	69.2	66.2
	Courtyard	5	66.2	66.2	68.8	65.8
	South	7	65.8	65.8	68.2	65.2
	East	6	69.7	69.7	72.1	69.1
	West	5	66.2	68.5	71.1	68.1
Fulton 6	North	4	66.7	67.0	68.7	65.7
	South	7	65.8	65.8	68.2	65.2
	East	5	66.2	70.9	73.5	70.5
	West	4	66.7	66.7	68.4	65.4
Fulton 7	North	3	66.5	67.0	69.1	66.1
	South	5	66.2	66.2	68.8	65.8
	East	3	66.5	66.5	68.6	65.6
	West	4	66.7	71.1	72.8	69.8
Fulton 8	North	1	66.4	66.4	67.2	64.2
	South	3	66.5	67.2	69.3	66.3
	East	3	66.5	66.5	68.6	65.6
	West	1	66.4	69.4	70.2	67.2
Elliott-Chelsea 1	North	8	69.3	71.3	71.8	68.8
	South	9	66.7	66.7	69.2	66.2
	South (Eastern Courtyard)	9	66.7	67.7	70.2	67.2
	South (Western Courtyard)	9	66.7	68.1	70.6	67.6
	East	9	66.7	68.7	71.2	68.2
	West	9	66.7	71.1	73.6	70.6
Elliott-Chelsea 2	North	8	69.3	71.2	71.7	68.7
	South	9	66.7	66.7	69.2	66.2
	South (Courtyard)	9	66.7	68.1	70.6	67.6
	East	9	66.7	69.1	71.6	68.6
	West	10	71.2	71.2	74.4	71.4

Sensitive Receptor			Traffic-Only Rezoning Alternative L_{eq}	Rezoning Alternative L_{eq} Including Play Area Noise	Cumulative Rezoning Alternative L_{10}	Cumulative Rezoning Alternative L_{dn}
Building	Façade	Representative Noise Receptor				
Elliott-Chelsea 3	North (Courtyard)	12	72.7	73.7	76.0	73.0
	South	11	64.0	64.0	67.0	64.0
	West	12	72.7	73.4	75.7	72.7
Elliott-Chelsea 4	North	9	66.7	67.3	69.8	66.8
	North (Courtyard)	9	66.7	71.1	73.6	70.6
	South	11	64.0	64.0	67.0	64.0
	East	9	66.7	68.7	71.2	68.2
	West	10	71.2	71.2	74.4	71.4
Elliott-Chelsea 5	North	9	66.7	67.4	69.9	66.9
	North (Courtyard)	9	66.7	71.1	73.6	70.6
	South	11	64.0	64.0	67.0	64.0
	East	9	66.7	68.2	70.7	67.7
	West	9	66.7	71.1	73.6	70.6
Elliott-Chelsea 6	North	9	66.7	66.7	69.2	66.2
	North (Eastern Courtyard)	9	66.7	69.8	72.3	69.3
	North (Western Courtyard)	9	66.7	68.3	70.8	67.8
	South	11	64.0	64.0	67.0	64.0
	East	12	72.7	73.7	76.0	73.0
	West	9	66.7	71.1	73.6	70.6
Elliott-Chelsea 7	North	8	69.3	71.2	71.7	68.7
	North (Courtyard)	9	66.7	71.1	73.6	70.6
	South	9	66.7	67.5	70.0	67.0
	South (Courtyard)	9	66.7	67.7	70.2	67.2
	East	8	69.3	69.3	69.8	66.8
	West	9	66.7	71.1	73.6	70.6

In terms of *CTM* criteria, the Rezoning Alternative L_{10} noise levels at the façades shown in **Table 05.16-12** would range from the "marginally acceptable" to "marginally unacceptable" category.

In terms of HUD criteria, the Rezoning Alternative L_{dn} noise levels at the façades shown in **Table 05.16-12** would range from the "acceptable" to "normally unacceptable" category.

Façades of buildings introduced by the Rezoning Alternative at which noise levels would be "marginally unacceptable" or "normally unacceptable" would be subject to window/wall attenuation requirements to ensure acceptable interior noise levels (see "Noise Attenuation Requirements" section below).

Noise Attenuation Requirements

As shown in **Table 05.16-3**, the *HUD Noise Guidebook* evaluates noise exposure based on exterior L_{dn} noise levels. For buildings whose façades would experience noise exposure in the "normally unacceptable" or "unacceptable" categories, window/wall attenuation and an AMV would be

necessary to ensure acceptable interior noise levels, i.e., an interior L_{dn} no greater than 45 dBA. In addition, as shown in **Table 05.16-5**, the *CTM* provides noise attenuation guidance for buildings based on exterior noise levels. Recommended noise attenuation values for buildings are designed to maintain a maximum interior noise level of 45 dBA or lower for residential or community facility uses and 50 dBA or lower for commercial office uses and are determined based on exterior L_{10} noise levels where traffic is the dominant source of noise. The results of the building attenuation analysis, including attenuation required by CEQR and HUD guidance, are summarized in **Table 05.16-13** below.

Table 05.16-13: Required Attenuation Values for the Rezoning Alternative (dBA)

Site	Façade	Representative Noise Receptor[1]	Maximum With-Action L_{10}	CEQR Minimum Required Attenuation[2,4]	Maximum With-Action L_{dn}	HUD Minimum Required Attenuation[3,4]
Fulton 1 (Block 717, Lot 19)	North (greater than 50 feet from 9th Avenue)	1	67.2	N/A	64.2	N/A
Fulton 1 (Block 717, Lot 19)	South (greater than 50 feet from 9th Avenue)	1[5]	68.1	N/A	65.1	25
Fulton 1 (Block 717, Lot 19)	East; North and South (within 50 feet of 9th Avenue)	2	72.7	28	69.7	25
Fulton 2 (Block 716, Lot 17)	North (greater than 50 feet from 9th Avenue)	1	67.2	N/A	64.2	N/A
Fulton 2 (Block 716, Lot 17)	West; South (greater than 50 feet from 9th Avenue)	3	68.6	N/A	65.6	25
Fulton 2 (Block 716, Lot 17)	East; North and South (within 50 feet of 9th Avenue)	2	72.7	28	69.7	25
Fulton 3 (Block 715, Lot 10)	West; North (greater than 50 feet from 9th Avenue)	3	68.6	N/A	65.6	25
Fulton 3 (Block 715, Lot 10)	South (greater than 50 feet from 9th Avenue)	5	68.8	N/A	65.8	25
Fulton 3 (Block 715, Lot 10)	East; North and South (within 50 feet of 9th Avenue)	2	72.7	28	69.7	25
Fulton 4 (Block 715, Lot 10)	North	3[5]	69.3	N/A	66.3	25
Fulton 4 (Block 715, Lot 10)	South and West	4	68.4	N/A	65.4	25
Fulton 4 (Block 715, Lot 10)	East	4[5]	70.5	28	67.5	25
Fulton 5 (Block 714, Lot 31)	North (greater than 50 feet from 9th Avenue)	5[5]	69.2	N/A	66.2	25
Fulton 5 (Block 714, Lot 31)	Courtyard	5	68.8	N/A	65.8	25
Fulton 5 (Block 714, Lot 31)	South (greater than 50 feet from 9th Avenue)	7	68.2	N/A	65.2	25
Fulton 5 (Block 714, Lot 31)	East; North and South (within 50 feet of 9th Avenue)	6	72.1	28	69.1	25
Fulton 5 (Block 714, Lot 31)	West	5[5]	71.1	28	68.1	25
Fulton 6 (Block 714, Lot 31)	North	4[5]	68.7	N/A	65.7	25
Fulton 6 (Block 714, Lot 31)	South	7	68.2	N/A	65.2	25
Fulton 6 (Block 714, Lot 31)	East	5[5]	73.5	31	70.5	30
Fulton 6 (Block 714, Lot 31)	West	4	68.4	N/A	65.4	25
Fulton 7 (Block 715, Lot 10)	North	3[5]	69.1	N/A	66.1	25
Fulton 7 (Block 715, Lot 10)	South	5	68.8	N/A	65.8	25
Fulton 7 (Block 715, Lot 10)	East	3	68.6	N/A	65.6	25
Fulton 7 (Block 715, Lot 10)	West	4[5]	72.8	28	69.8	25

Site	Façade	Representative Noise Receptor[1]	Maximum With-Action L_{10}	CEQR Minimum Required Attenuation[2,4]	Maximum With-Action L_{dn}	HUD Minimum Required Attenuation[3,4]
Fulton 8 (Block 716, Lot 17)	North	1	67.2	N/A	64.2	N/A
Fulton 8 (Block 716, Lot 17)	South	3[5]	69.3	N/A	66.3	25
Fulton 8 (Block 716, Lot 17)	East	3	68.6	N/A	65.6	25
Fulton 8 (Block 716, Lot 17)	West	1[5]	70.2	28	67.2	25
Elliott-Chelsea 1 (Block 724, Lot 10)	North	8[5]	71.8	28	68.8	25
Elliott-Chelsea 1 (Block 724, Lot 10)	South	9	69.2	N/A	66.2	25
Elliott-Chelsea 1 (Block 724, Lot 10)	South (Eastern Courtyard)	9[5]	70.2	28	67.2	25
Elliott-Chelsea 1 (Block 724, Lot 10)	South (Western Courtyard)	9[5]	70.6	28	67.6	25
Elliott-Chelsea 1 (Block 724, Lot 10)	East	9[5]	71.2	28	68.2	25
Elliott-Chelsea 1 (Block 724, Lot 10)	West	9[5]	73.6	31	70.6	30
Elliott-Chelsea 2 (Block 724, Lots 1 & 10)	North (greater than 50 feet from Tenth Avenue)	8[5]	71.7	28	68.7	25
Elliott-Chelsea 2 (Block 724, Lots 1 & 10)	South (greater than 50 feet from Tenth Avenue)	9	69.2	N/A	66.2	25
Elliott-Chelsea 2 (Block 724, Lots 1 & 10)	South (Courtyard)	9[5]	70.6	28	67.6	25
Elliott-Chelsea 2 (Block 724, Lots 1 & 10)	East	9[5]	71.6	28	68.6	25
Elliott-Chelsea 2 (Block 724, Lots 1 & 10)	West; North and South (within 50 feet of Tenth Avenue)	10	74.4	31	71.4	30
Elliott-Chelsea 3 (Block 723, Lot 15)	North and East	12	75.0	31	72.0	30
Elliott-Chelsea 3 (Block 723, Lot 15)	North (Courtyard)	12[5]	76.0	31	73.0	30
Elliott-Chelsea 3 (Block 723, Lot 15)	South	11	67.0	N/A	64.0	N/A
Elliott-Chelsea 3 (Block 723, Lot 15)	West	12[5]	75.7	31	72.7	30
Elliott-Chelsea 4 (Block 723, Lot 1)	North (greater than 50 feet from Tenth Avenue)	9[5]	69.8	N/A	66.8	25
Elliott-Chelsea 4 (Block 723, Lot 1)	North (Courtyard)	9[5]	73.6	31	70.6	30
Elliott-Chelsea 4 (Block 723, Lot 1)	South (greater than 50 feet from Tenth Avenue)	11	67.0	N/A	64.0	N/A
Elliott-Chelsea 4 (Block 723, Lot 1)	East	9[5]	71.2	28	68.2	25
Elliott-Chelsea 4 (Block 723, Lot 1)	West; North and South (within 50 feet of Tenth Avenue)	10	74.4	31	71.4	30
Elliott-Chelsea 5 (Block 723, Lot 1)	North	9[5]	69.9	N/A	66.9	25

Site	Façade	Representative Noise Receptor[1]	Maximum With-Action L_{10}	CEQR Minimum Required Attenuation[2,4]	Maximum With-Action L_{dn}	HUD Minimum Required Attenuation[3,4]
Elliott-Chelsea 5 (Block 723, Lot 1)	North (Courtyard)	9[5]	73.6	31	70.6	30
Elliott-Chelsea 5 (Block 723, Lot 1)	South	11	67.0	N/A	64.0	N/A
Elliott-Chelsea 5 (Block 723, Lot 1)	East	9[5]	70.7	28	67.7	25
Elliott-Chelsea 5 (Block 723, Lot 1)	West	9[5]	73.6	31	70.6	30
Elliott-Chelsea 6 (Block 723, Lot 15)	North	9	69.2	N/A	66.2	25
Elliott-Chelsea 6 (Block 723, Lot 15)	North (Eastern Courtyard)	9[5]	72.3	28	69.3	25
Elliott-Chelsea 6 (Block 723, Lot 15)	North (Western Courtyard)	9[5]	70.8	28	67.8	25
Elliott-Chelsea 6 (Block 723, Lot 15)	South	11	67.0	N/A	64.0	N/A
Elliott-Chelsea 6 (Block 723, Lot 15)	East	12[5]	76.0	31	73.0	30
Elliott-Chelsea 6 (Block 723, Lot 15)	West	9[5]	73.6	31	70.6	30
Elliott-Chelsea 7 (Block 724, Lot 15)	North	8[5]	71.7	28	68.7	25
Elliott-Chelsea 7 (Block 724, Lot 15)	North (Courtyard)	9[5]	73.6	31	70.6	30
Elliott-Chelsea 7 (Block 724, Lot 15)	South	9[5]	70.0	N/A	67.0	25
Elliott-Chelsea 7 (Block 724, Lot 15)	South (Courtyard)	9[5]	70.2	28	67.2	25
Elliott-Chelsea 7 (Block 724, Lot 15)	East	8	69.8	N/A	66.8	25
Elliott-Chelsea 7 (Block 724, Lot 15)	West	9[5]	73.6	31	70.6	30

Notes:

[1] Receptor locations shown in **Figures 05.16-2a/b**; necessary attenuation levels shown in **Figures 05.16-4a and 05.16-4b**.

[2] The above composite window-wall attenuation requirements are for residential and community facility uses. Commercial Office or residential amenity uses would require 5 dBA less attenuation. All the above categories require a closed window situation and an alternate means of ventilation.

[3] The above composite window-wall attenuation requirements are for residential uses only. All above categories require a closed window situation and an alternate means of ventilation.

[4] "N/A" indicates that the highest calculated L_{10} or L_{dn} is below 70 dBA or 65 dBA, respectively. The *CTM* and HUD Noise Regulations do not specify minimum attenuation guidance for exterior values below these levels.

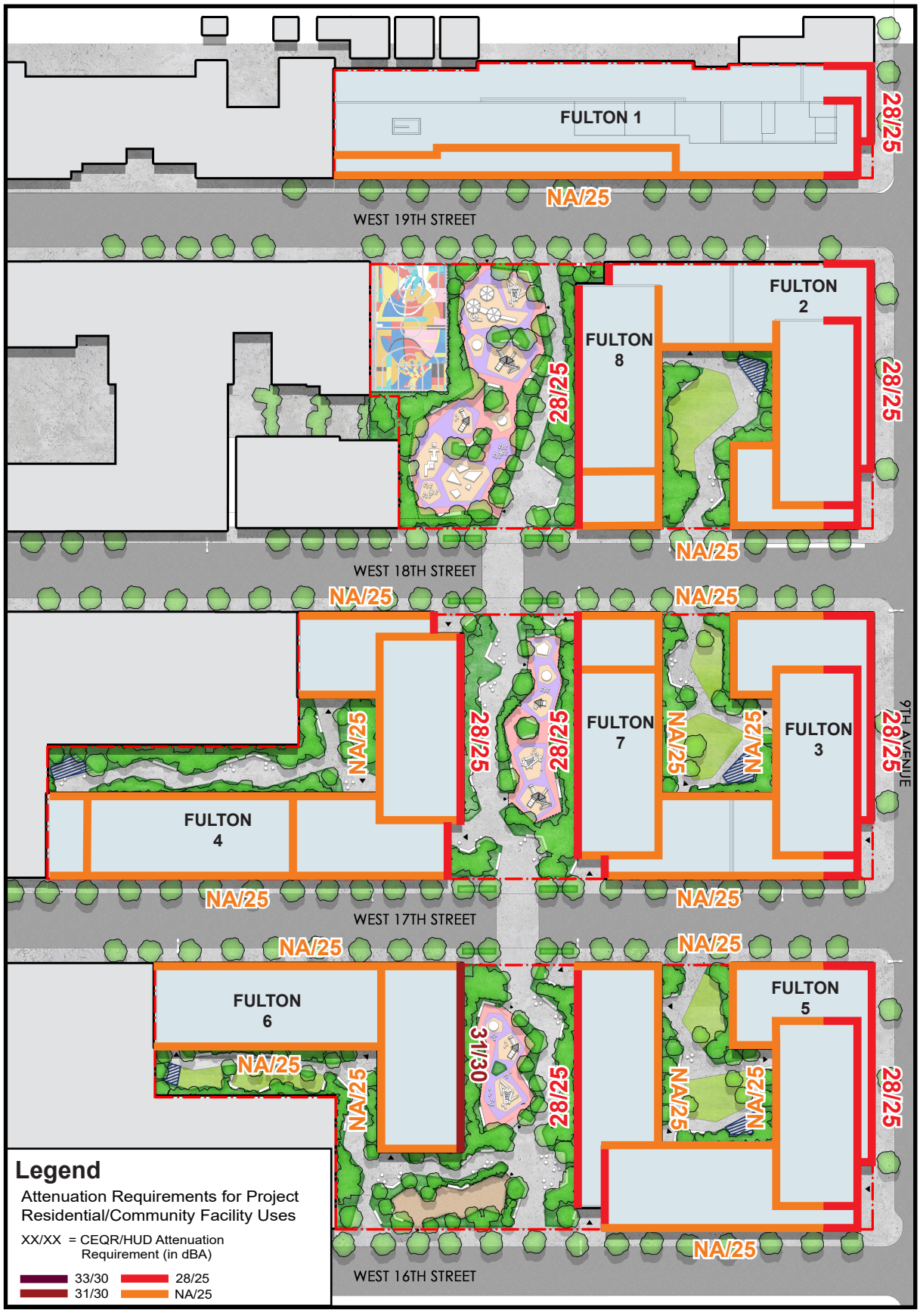
[5] Attenuation requirements at these locations are based on cumulative noise level prediction including contribution from traffic on adjacent roadways and projected play area noise.

As shown in **Table 05.16-13** and **Figures 05.16-4a and 05.16-4b**, up to 31 dBA of window/wall attenuation would be required to provide acceptable interior noise levels per *CTM* and HUD guidelines along with an AMV to allow for maintenance of a closed-window condition. These noise levels account for noise from projected vehicular traffic in the future as well as contribution from existing and newly introduced playgrounds at locations with a direct line of sight.

The attenuation of a composite structure is a function of the attenuation provided by each of its component parts and how much of the area is made up of each part. Typically, a building façade is composed of the wall, windows, and any vents or louvers for HVAC systems in various ratios

Figure 05.16-4a

Fulton Houses Project Site Noise Attenuation - Rezoning Alternative



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Fulton and Elliott-Chelsea Houses Redevelopment Project

Figure 05.16-4b

Elliott-Chelsea Houses Project Site Noise Attenuation - Rezoning Alternative

of area. Buildings included in the Rezoning Alternative would be designed to provide composite window/wall attenuation greater than or equal to the attenuation requirements listed in **Table 05.16-13** and **Figures 05.16-4a and 05.16-4b**.

The noise attenuation specifications for the Rezoning Alternative will be memorialized in a legally binding document between NYCHA and the PACT Partner. With implementation of the noise attenuation levels outlined above, the Rezoning Alternative would provide sufficient attenuation to achieve *CTM* and HUD interior noise level guidelines of 45 dBA or lower for residential/community facility uses. Therefore, the Rezoning Alternative would not result in any significant adverse noise impacts related to building noise attenuation requirements.

Alternative 3 – Non-Rezoning Alternative

Mobile Source Noise Screening Analysis

Using the methodology previously described, future mobile source noise levels in the Non-Rezoning Alternative were calculated for each of the 15 noise receptor locations during each of the analysis periods for the 2041 analysis year, which are presented in **Table 05.16-14** below.

Table 05.16-14: 2041 No-Action Alternative and Non-Rezoning Alternative Mobile Source Noise Levels (dBA)

Noise Receptor Location[1]	Time	No-Action Alternative L_{eq}	Non-Rezoning Alternative L_{eq}	Change	Non-Rezoning Alternative L_{10}[2]	Non-Rezoning Alternative L_{dn}[2,3]
1	AM	61.8	61.8	0.0	64.0	61.0
	MD	66.3	66.4	0.1	**67.2**	**64.2**
	PM	62.2	62.3	0.1	63.6	60.6
1a	AM	61.8	61.8	0.0	64.0	61.0
	MD	66.3	66.4	0.1	**67.2**	**64.2**
	PM	62.2	62.3	0.1	63.6	60.6
2	AM	69.9	70.0	0.1	71.8	68.8
	MD	67.6	67.7	0.1	70.8	67.8
	PM	69.5	69.6	0.1	**72.7**	**69.7**
3	AM	65.8	66.0	0.2	**68.1**	**65.1**
	MD	65.0	65.1	0.1	67.4	64.4
	PM	62.1	62.3	0.2	64.9	61.9
3a	AM	65.8	66.0	0.2	**68.1**	**65.1**
	MD	65.0	65.1	0.1	67.4	64.4
	PM	62.1	62.3	0.2	64.9	61.9
4	AM	65.6	66.3	0.7	**68.0**	**65.0**
	MD	65.8	66.1	0.3	66.9	63.9
	PM	64.8	65.1	0.3	65.9	62.9
5	AM	65.4	65.8	0.4	**68.4**	**65.4**
	MD	64.3	64.6	0.3	66.0	63.0
	PM	67.2	67.5	0.3	63.7	60.7
6	AM	68.3	68.3	0.0	70.7	67.7
	MD	69.7	69.7	0.0	**72.1**	**69.1**
	PM	64.3	64.3	0.0	65.9	62.9
7	AM	65.6	65.9	0.3	**68.3**	**65.3**
	MD	66.5	66.8	0.3	68.2	65.2
	PM	64.1	64.3	0.2	66.4	63.4
8	AM	62.8	62.8	0.0	63.4	60.4
	MD	69.3	69.3	0.0	**69.8**	**66.8**
	SC PM	64.2	64.2	0.0	65.7	62.7
	PM	61.1	61.1	0.0	62.9	59.9
9	AM	60.2	60.5	0.3	62.7	59.7
	MD	69.5	69.9	0.4	67.3	64.3
	SC PM	63.5	63.8	0.3	66.2	63.2
	PM	66.2	66.5	0.3	**69.0**	**66.0**
10	AM	71.0	71.1	0.1	**74.3**	**71.3**
	MD	69.8	69.9	0.1	72.9	69.9
	PM	75.4	75.4	0.0	72.4	69.4
11	AM	63.5	63.8	0.3	**66.8**	**63.8**
	MD	64.8	65.0	0.2	65.1	62.1
	PM	64.5	64.6	0.1	66.0	63.0
11a	AM	63.5	63.8	0.3	**66.8**	**63.8**
	MD	64.8	65.0	0.2	65.1	62.1
	PM	64.5	64.6	0.1	66.0	63.0
12	AM	72.2	72.4	0.2	**74.8**	**71.8**
	MD	69.6	69.9	0.3	72.4	69.4
	SC PM	62.6	63.0	0.4	65.4	62.4
	PM	62.5	62.8	0.3	64.7	61.7

Notes:

[1] Refer to **Figures 05.16-2a/b** for noise receptor location.

[2] The highest L_{10} and L_{dn} noise levels at each monitoring location are shown in **bold**.

[3] L_{dn} noise values calculated using the methodology presented above, as is consistent with the *HUD Noise Guidebook*.

Comparing future Non-Rezoning Alternative mobile source noise levels with No-Action Alternative noise levels, the maximum increase in L_{eq} noise levels would be less than 3 dBA. Increases of this magnitude would be considered barely perceptible and not significant according to *CTM* guidance.

In terms of *CTM* criteria, Non-Rezoning Alternative L_{10} noise levels at Receptor Locations 1, 1a, 3, 3a, 4, 5, 7, 8, 9, 11, and 11a would remain in the "marginally acceptable" category as compared to the No-Action Alternative, and Non-Rezoning Alternative L_{10} noise levels at Receptor Locations 2, 6, 10, and 12 would remain in the "marginally unacceptable" category.

In terms of HUD criteria, the Non-Rezoning Alternative L_{dn} noise levels at Receptor Locations 1, 1a, 4, 11, and 11a would remain in the "acceptable" category as compared to the No-Action Alternative, Non-Rezoning Alternative L_{dn} noise levels at Receptor Locations 2, 6, 8, 9, 10, and 12 would remain in the "normally unacceptable" category, and Non-Rezoning Alternative L_{dn} noise levels at Receptor Locations 3, 3a, 5, and 7 would change from the "acceptable" to "normally unacceptable" category.

Cumulative Mobile Source and Play Area Noise Impact Evaluation

Existing Receptors

Using the methodology previously described, future play area noise levels in the Non-Rezoning Alternative were calculated during each of the analysis periods for the 2041 analysis year at each façade of Receptor Locations 1a, 3a, and 11a, which represent existing noise-sensitive receptors not located on the Project Sites. The future play area noise levels and cumulative total noise levels (including noise from mobile sources as presented previously in **Table 05.16-14**) at these locations are presented in **Table 05.16-15** below.

Table 05.16-15: Cumulative Noise Under the Non-Rezoning Alternative at Closest Existing Receptor Façades (dBA)

Noise Receptor Location[1]	Address	Façade	Time	No-Action Alternative L_{eq}	Traffic-Only Non-Rezoning Alternative L_{eq}	Non-Rezoning Alternative Play Area L_{eq} at Boundary	Cumulative Non-Rezoning Alternative L_{eq} at Receptor	Change	Cumulative Non-Rezoning Alternative L_{10}[2] at Receptor
1a	435 W. 19th Street	South	AM	61.8	61.8	56.0	62.8	1.0	65.0
			MD	66.3	66.4		66.8	0.5	**67.6**
			PM	62.2	62.3		63.2	1.0	64.5
3a	425 W. 18th Street	North	AM	65.8	66.0	59.9	67.0	1.2	**69.1**
			MD	65.0	65.1		66.2	1.2	68.5
			PM	62.1	62.3		64.3	2.2	66.9
		East	AM	65.8	66.0	64.4	68.3	2.5	**70.4**
			MD	65.0	65.1		67.8	2.8	70.1
			PM	62.1	62.3		66.5	4.4	69.1
11a	420 W. 25th Street	North	AM	63.5	63.8	60.7	65.5	2.0	**68.5**
			MD	64.8	65.0		66.4	1.6	66.5
			PM	64.5	64.6		66.1	1.6	67.5

Notes:
[1] Refer to **Figures 05.16-2a/b** for noise receptor location.
[2] Highest L_{10} noise value indicated in **bold**.

Comparing the future cumulative Non-Rezoning Alternative L_{eq} noise levels with the No-Action Alternative noise levels, excepting Receptor Location 3a, the maximum increase in noise levels at Receptor Location 1a and 11a, i.e., 435 W. 19th Street and 420 W. 25th Street, respectively would be less than 3 dBA. Increases of this magnitude would be considered barely perceptible according to *CTM* guidelines. Consequently, noise levels at Receptor Locations 1a and 11a under the Non-Rezoning Alternative would not rise to the level of a significant adverse noise impact.

At Receptor Location 3a (425 W. 18th Street), cumulative noise levels in the Non-Rezoning Alternative would be 4.4 dBA greater than the No-Action Alternative. Based on field observations and date of construction (2017), the building façade is expected to have incorporated double-glazed windows which provide approximately 28 dBA window/wall attenuation, as well as an AMV, resulting in interior noise levels of less than 45 dBA (i.e., the threshold considered acceptable for residential use according to *CTM* noise exposure criteria). Therefore, while the change in noise levels at this receptor would be noticeable, interior noise levels would remain below the acceptable 45 dBA threshold, and consequently the project-generated noise at Receptor Location 3a (425 W. 18th Street) would not rise to the level of a significant adverse noise impact.

Future Project Buildings

Using the methodology previously described, future play area noise levels in the Non-Rezoning Alternative were calculated at each façade of each of the buildings to be built under the Non-Rezoning Alternative based on the distance between the façade and the nearest edge of the associated play area. Additionally, each façade was associated with one of the 12 Noise Receptor Locations to determine the noise levels from vehicular traffic. In addition to the future play areas and basketball court, the existing Chelsea Park Soccer Field was also considered in the play area noise analysis. The maximum cumulative future noise levels (i.e., mobile source and play area) at these facades are presented in **Table 05.16-16.** The proposed buildings are shown in **Figures 05.16-5a and 05.16-5b**.

Fulton Houses Project Site - Non-Rezoning Alternative

Fulton and Elliott-Chelsea Houses Redevelopment Project

Figure 05.16-5b

Elliott-Chelsea Houses Project Site - Non-Rezoning Alternative

Table 05.16-16: Maximum Cumulative Noise Under the Non-Rezoning Alternative at Project Building Façades (dBA)

Sensitive Receptor			Traffic-Only Non-Rezoning Alternative L_{eq}	Non-Rezoning Alternative L_{eq} Including Play Area Noise	Cumulative Non-Rezoning Alternative L_{10} Building	Cumulative Non-Rezoning Alternative L_{10} Façade
Building	Façade	Representative Noise Receptor				
Fulton 1	North	1	66.4	66.4	67.2	64.2
	South	1	66.4	67.2	68.0	65.0
	East	2	69.6	69.6	72.7	69.7
Fulton 2	North and West	1	66.4	66.4	67.2	64.2
	South	3	66.0	66.6	68.7	65.7
	East	2	69.6	69.6	72.7	69.7
Fulton 3	North	3	66.0	66.0	68.1	65.1
	North (Courtyard)	3	66.0	67.2	69.3	66.3
	South	5	65.8	65.8	68.4	65.4
	East	2	69.6	69.6	72.7	69.7
	West	3	66.0	70.8	72.9	69.9
Fulton 4	North and East	1	66.4	66.4	67.2	64.2
	South	3	66.0	66.5	68.6	65.6
	West	1	61.8	68.7	70.9	67.9
Fulton 5	North and West	3	66.0	66.0	68.1	65.1
	North (Courtyard)	3	66.0	67.2	69.3	66.3
	South	5	65.8	66.4	69.0	66.0
	East	3	66.0	69.9	72.0	69.0
Fulton 6	All	4	66.3	66.3	68.0	65.0
Fulton 7	North	5	65.8	65.8	68.4	65.4
	South and Courtyard	7	65.9	65.9	68.3	65.3
	East	6	69.7	69.7	72.1	69.1
	West	5	65.8	70.8	73.4	70.4
Fulton 8	North	3	66.0	66.0	68.1	65.1
	South	4	66.3	66.8	68.5	65.5
	East and West	4	66.3	66.3	68.0	65.0
Fulton 9	North	4	66.3	70.2	71.9	68.9
	South	7	65.9	65.9	68.3	65.3
	East	5	65.8	70.1	72.7	69.7
	West	4	66.3	66.3	68.0	65.0
Fulton 10	All	4	66.3	66.3	68.0	65.0
Elliott-Chelsea 1	North	8	69.3	71.3	71.8	68.8
	South	9	66.5	66.5	69.0	66.0
	South (Eastern Courtyard)	9	66.5	67.2	69.7	66.7
	South (Western Courtyard)	9	66.5	67.8	70.3	67.3
	East	9	66.5	68.3	70.8	67.8
	West	9	66.5	71.0	73.5	70.5
Elliott-Chelsea 2	North	8	69.3	71.2	71.7	68.7
	South	9	66.5	66.5	69.0	66.0
	South (Courtyard)	9	66.5	67.8	70.3	67.3
	East	9	66.5	67.4	69.9	66.9
	West	10	71.1	71.1	74.3	71.3

Sensitive Receptor			Traffic-Only Non-Rezoning Alternative L_{eq}	Non-Rezoning Alternative L_{eq} Including Play Area Noise	Cumulative Non-Rezoning Alternative L_{10} Building	Cumulative Non-Rezoning Alternative L_{dn} Façade
Building	Façade	Representative Noise Receptor				
Elliott-Chelsea 3	North, Courtyard, East, and West	12	72.4	72.4	74.7	71.7
	South	11	63.8	63.8	66.8	63.8
Elliott-Chelsea 4	North and East	12	72.4	72.4	74.7	71.7
	South	11	63.8	63.8	66.8	63.8
	West	12	72.4	74.1	76.4	73.4
Elliott-Chelsea 5	North	9	66.5	67.0	69.5	66.5
	South	11	63.8	63.8	66.8	63.8
	East	9	66.5	66.5	69.0	66.0
	West	10	71.1	71.1	74.3	71.3
Elliott-Chelsea 6	North	9	66.5	67.0	69.5	66.5
	South	11	63.8	63.8	66.8	63.8
	East	9	66.5	68.7	71.2	68.2
	West	9	66.5	66.5	69.0	66.0
Elliott-Chelsea 7	North	8	69.3	71.2	71.7	68.7
	South	9	66.5	67.0	69.5	66.5
	South (Courtyard)	9	66.5	67.2	69.7	66.7
	East	8	69.3	69.3	69.8	66.8
	West	9	66.5	71.0	73.5	70.5

In terms of *CTM* criteria, the Non-Rezoning Alternative L_{10} noise levels at the façades shown in **Table 05.16-16** would range from the "marginally acceptable" to "marginally unacceptable" category.

In terms of HUD criteria, the Non-Rezoning Alternative L_{dn} noise levels at the façades shown in **Table 05.16-16** would range from the "acceptable" to "normally unacceptable" category.

Façades of buildings introduced by the Non-Rezoning Alternative at which noise levels would be "marginally unacceptable" or "normally unacceptable" would be subject to window/wall attenuation requirements to ensure acceptable interior noise levels (see "Noise Attenuation Requirements" section below).

Noise Attenuation Requirements

As shown in **Table 05.16-3**, the *HUD Noise Guidebook* evaluates noise exposure based on exterior L_{dn} noise levels. For buildings whose façades would experience noise exposure in the "normally unacceptable" or "unacceptable" categories, window/wall attenuation and an alternate means of ventilation would be necessary to ensure acceptable interior noise levels, i.e., an interior L_{dn} no greater than 45 dBA. In addition, as shown in **Table 05.16-5**, the *CTM* provides noise attenuation guidance for buildings based on exterior noise levels. Recommended noise attenuation values for buildings are designed to maintain a maximum interior noise level of 45 dBA or lower for residential or community facility uses and 50 dBA or lower for commercial office uses and are determined based on exterior L_{10} noise levels where traffic is the dominant source of noise. The results of the building attenuation analysis, including attenuation required by CEQR and HUD guidance, are summarized in **Table 05.16-17** below.

Table 05.16-17: Required Attenuation Values for the Non-Rezoning Alternative

Building	Façade	Representative Noise Receptor[1]	Maximum With-Action L_{10}	CEQR Minimum Required Attenuation[2,4]	Maximum With-Action L_{dn}	HUD Minimum Required Attenuation[3,4]
Fulton 1 (Block 717, Lot 19)	North (greater than 50 feet from 9th Avenue)	1	67.2	N/A	64.2	N/A
Fulton 1 (Block 717, Lot 19)	South (greater than 50 feet from 9th Avenue)	1[5]	68.0	N/A	65.0	N/A
Fulton 1 (Block 717, Lot 19)	East; North and South (within 50 feet of 9th Avenue)	2	72.7	28	69.7	25
Fulton 2 (Block 716, Lot 17)	West; North (greater than 50 feet from 9th Avenue)	1	67.2	N/A	64.2	N/A
Fulton 2 (Block 716, Lot 17)	South (greater than 50 feet from 9th Avenue)	3[5]	68.7	N/A	65.7	25
Fulton 2 (Block 716, Lot 17)	East; North and South (within 50 feet of 9th Avenue)	2	72.7	28	69.7	25
Fulton 3 (Block 715, Lot 10)	North (greater than 50 feet from 9th Avenue)	3	68.1	N/A	65.1	25
Fulton 2 (Block 716, Lot 17)	North (Courtyard)	3[5]	69.3	N/A	66.3	25
Fulton 2 (Block 716, Lot 17)	South (greater than 50 feet from 9th Avenue)	5	68.4	N/A	65.4	25
Fulton 2 (Block 716, Lot 17)	East; North and South (within 50 feet of 9th Avenue)	2	72.7	28	69.7	25
Fulton 2 (Block 716, Lot 17)	West	3[5]	72.9	28	69.9	25
Fulton 4 (Block 716, Lot 17)	North and East	1	67.2	N/A	64.2	N/A
Fulton 4 (Block 716, Lot 17)	South	3[5]	68.6	N/A	65.6	25
Fulton 4 (Block 716, Lot 17)	West	1[5]	70.9	28	67.9	25
Fulton 5 (Block 715, Lot 10)	North and West	3	68.1	N/A	65.1	25
Fulton 5 (Block 715, Lot 10)	North (Courtyard)	3[5]	69.3	N/A	66.3	25
Fulton 5 (Block 715, Lot 10)	South	5[5]	69.0	N/A	66.0	25
Fulton 5 (Block 715, Lot 10)	East	3[5]	72.0	28	69.0	25
Fulton 6 (Block 715, Lot 10)	All	4	68.0	N/A	65.0	N/A
Fulton 7 (Block 714, Lot 31)	North (greater than 50 feet from 9th Avenue)	5	68.4	N/A	65.4	25
Fulton 7 (Block 714, Lot 31)	Courtyard; South (greater than 50 feet from 9th Avenue)	7	68.3	N/A	65.3	25
Fulton 7 (Block 714, Lot 31)	East; North and South (within 50 feet of 9th Avenue)	6	72.1	28	69.1	25
Fulton 7 (Block 714, Lot 31)	West	5[5]	73.4	31	70.4	30
Fulton 8 (Block 715, Lot 10)	North	3	68.1	N/A	65.1	25
Fulton 8 (Block 715, Lot 10)	South	4[5]	68.5	N/A	65.5	25
Fulton 8 (Block 715, Lot 10)	East and West	4	68.0	N/A	65.0	N/A

Building	Façade	Representative Noise Receptor[1]	Maximum With-Action L_{10}	CEQR Minimum Required Attenuation[2,4]	Maximum With-Action L_{dn}	HUD Minimum Required Attenuation[3,4]
Fulton 9 (Block 714, Lot 31)	North	4[5]	71.9	28	68.9	25
Fulton 9 (Block 714, Lot 31)	South	7	68.3	N/A	65.3	25
Fulton 9 (Block 714, Lot 31)	East	5[5]	72.7	28	69.7	25
Fulton 9 (Block 714, Lot 31)	West	4	68.0	N/A	65.0	N/A
Fulton 10 (Block 714, Lot 31)	All	4	68.0	N/A	65.0	N/A
Elliott-Chelsea 1 (Block 724, Lot 10)	North	8[5]	71.8	28	68.8	25
Elliott-Chelsea 1 (Block 724, Lot 10)	South	9	69.0	N/A	66.0	25
Elliott-Chelsea 1 (Block 724, Lot 10)	South (Eastern Courtyard)	9[5]	69.7	N/A	66.7	25
Elliott-Chelsea 1 (Block 724, Lot 10)	South (Western Courtyard)	9[5]	70.3	28	67.3	25
Elliott-Chelsea 1 (Block 724, Lot 10)	East	9[5]	70.8	28	67.8	25
Elliott-Chelsea 1 (Block 724, Lot 10)	West	9[5]	73.5	31	70.5	30
Elliott-Chelsea 2 (Block 724, Lots 1 & 10)	North (greater than 50 feet from Tenth Avenue)	8[5]	71.7	28	68.7	25
Elliott-Chelsea 2 (Block 724, Lots 1 & 10)	South (greater than 50 feet from Tenth Avenue)	9	69.0	N/A	66.0	25
Elliott-Chelsea 2 (Block 724, Lots 1 & 10)	South (Courtyard)	9[5]	70.3	28	67.3	25
Elliott-Chelsea 2 (Block 724, Lots 1 & 10)	East	9[5]	69.9	N/A	66.9	25
Elliott-Chelsea 2 (Block 724, Lots 1 & 10)	West; North and South (within 50 feet of Tenth Avenue)	10	74.3	31	71.3	30
Elliott-Chelsea 3 (Block 723, Lot 15)	North, Courtyard, East, and West	12	74.7	31	71.7	30
Elliott-Chelsea 3 (Block 723, Lot 15)	South	11	66.8	N/A	63.8	N/A
Elliott-Chelsea 4 (Block 723, Lot 15)	North and East	12	74.7	31	71.7	30
Elliott-Chelsea 4 (Block 723, Lot 15)	South	11	66.8	N/A	63.8	N/A
Elliott-Chelsea 4 (Block 723, Lot 15)	West	12[5]	76.4	33	73.4	30

Building	Façade	Representative Noise Receptor[1]	Maximum With-Action L_{10}	CEQR Minimum Required Attenuation[2,4]	Maximum With-Action L_{dn}	HUD Minimum Required Attenuation[3,4]
Elliott-Chelsea 5 (Block 723, Lot 1)	North (greater than 50 feet from Tenth Avenue)	9[5]	69.5	N/A	66.5	25
Elliott-Chelsea 5 (Block 723, Lot 1)	South (greater than 50 feet from Tenth Avenue)	11	66.8	N/A	63.8	N/A
Elliott-Chelsea 5 (Block 723, Lot 1)	East	9	69.0	N/A	66.0	25
Elliott-Chelsea 5 (Block 723, Lot 1)	West; North and South (within 50 feet of Tenth Avenue)	10	74.3	31	71.3	30
Elliott-Chelsea 6 (Block 723, Lot 1)	North	9[5]	69.5	N/A	66.5	25
Elliott-Chelsea 6 (Block 723, Lot 1)	South	11	66.8	N/A	63.8	N/A
Elliott-Chelsea 6 (Block 723, Lot 1)	East	9[5]	71.2	28	68.2	25
Elliott-Chelsea 6 (Block 723, Lot 1)	West	9	69.0	N/A	66.0	25
Elliott-Chelsea 7 (Block 724, Lot 15)	North	8[5]	71.7	28	68.7	25
Elliott-Chelsea 7 (Block 724, Lot 15)	South	9[5]	69.5	N/A	66.5	25
Elliott-Chelsea 7 (Block 724, Lot 15)	South (Courtyard)	9[5]	69.7	N/A	66.7	25
Elliott-Chelsea 7 (Block 724, Lot 15)	East	8	69.8	N/A	66.8	25
Elliott-Chelsea 7 (Block 724, Lot 15)	West	9[5]	73.5	31	70.5	30

Notes:

[1] Receptor locations shown in **Figures 05.16-2a/b**; necessary attenuation levels shown in **Figures 05.16-6a and 05.16-6b**.

[2] The above composite window-wall attenuation requirements are for residential and community facility uses. Commercial Office or residential amenity uses would require 5 dBA less attenuation. All the above categories require a closed window situation and an alternate means of ventilation.

[3] The above composite window-wall attenuation requirements are for residential uses only. All above categories require a closed window situation and an alternate means of ventilation.

[4] "N/A" indicates that the highest calculated L_{10} or L_{dn} is below 70 dBA or 65 dBA, respectively. The *CTM* and HUD Noise Regulations do not specify minimum attenuation guidance for exterior values below these levels.

[5] Attenuation requirements at these locations are based on cumulative noise level prediction including contribution from traffic on adjacent roadways and projected play area noise.

As shown in **Table 05.16-17** and **Figures 05.16-6a and 05.16-6b**, up to 33 dBA of window/wall attenuation would be required to provide acceptable interior noise levels per *CTM* and HUD guidelines along with an AMV to allow for maintenance of a closed-window condition. These noise levels account for noise from projected vehicular traffic in the future as well as contribution from existing and newly introduced playgrounds at locations with a direct line of sight.

The attenuation of a composite structure is a function of the attenuation provided by each of its component parts and how much of the area is made up of each part. Typically, a building façade is composed of the wall, windows, and any vents or louvers for HVAC systems in various ratios of area. Buildings included in the Rezoning Alternative would be designed to provide composite window/wall attenuation greater than or equal to the attenuation requirements listed in **Table 05.16-17** and **Figures 05.16-6a and 05.16-6b**.

Figure 05.16-6a

Fulton Houses Project Site Noise Attenuation - Non-Rezoning Alternative

MPFP

Fulton and Elliott-Chelsea Houses Redevelopment Project

Figure 05.16-6b

Elliott-Chelsea Houses Project Site Noise Attenuation - Non-Rezoning Alternative

The noise attenuation specifications for the Non-Rezoning Alternative will be memorialized in a legally binding document between NYCHA and the PACT Partner. With implementation of the noise attenuation levels outlined above, the Non-Rezoning Alternative would provide sufficient attenuation to achieve *CTM* and HUD interior noise level guidelines of 45 dBA or lower for residential/community facility uses. Therefore, the Non-Rezoning Alternative would not result in any significant adverse noise impacts related to building noise attenuation requirements.

Alternative 4 – Midblock Bulk Alternative

Mobile Source Noise Screening Analysis

Using the methodology previously described, future mobile source noise levels in the Midblock Bulk Alternative were calculated for each of the 15 noise receptor locations during each of the analysis periods for the 2041 analysis year, which are presented in **Table 05.16-18** below.

Table 05.16-18: 2041 No-Action Alternative and Midblock Bulk Alternative Mobile Source Noise Levels (dBA)

Noise Receptor Location[1]	Time	No-Action Alternative L_{eq}	Midblock Bulk Alternative L_{eq}	Change	Midblock Bulk Alternative L_{10}[2]	Midblock Bulk Alternative L_{dn}[2,3]
1	AM	61.8	62.0	0.2	64.2	61.2
	MD	66.3	66.4	0.1	**67.2**	**64.2**
	PM	62.2	62.4	0.2	63.7	60.7
1a	AM	61.8	62.0	0.2	64.2	61.2
	MD	66.3	66.4	0.1	**67.2**	**64.2**
	PM	62.2	62.4	0.2	63.7	60.7
2	AM	69.9	70.0	0.1	71.8	68.8
	MD	67.6	67.8	0.2	70.9	67.9
	PM	69.5	69.6	0.1	**72.7**	**69.7**
3	AM	65.8	66.5	0.7	**68.6**	**65.6**
	MD	65.0	65.3	0.3	67.6	64.6
	PM	62.1	62.3	0.2	64.9	61.9
3a	AM	65.8	66.5	0.7	**68.6**	**65.6**
	MD	65.0	65.3	0.3	67.6	64.6
	PM	62.1	62.3	0.2	64.9	61.9
4	AM	65.6	66.9	1.3	**68.6**	**65.6**
	MD	65.8	66.4	0.6	67.2	64.2
	PM	64.8	65.3	0.5	66.1	63.1
5	AM	65.4	66.3	0.9	**68.9**	**65.9**
	MD	64.3	64.8	0.5	66.2	63.2
	PM	67.2	67.7	0.5	63.9	60.9
6	AM	68.3	68.3	0.0	70.7	67.7
	MD	69.7	69.7	0.0	**72.1**	**69.1**
	PM	64.3	64.3	0.0	65.9	62.9
7	AM	65.6	65.6	0.0	**68.0**	**65.0**
	MD	66.5	66.6	0.1	68.0	65.0
	PM	64.1	64.2	0.1	66.3	63.3
8	AM	62.8	62.8	0.0	63.4	60.4
	MD	69.3	69.3	0.0	**69.8**	**66.8**
	SC PM	64.2	64.2	0.0	65.7	62.7
	PM	61.1	61.1	0.0	62.9	59.9
9	AM	60.2	60.8	0.6	63.0	60.0
	MD	69.5	70.1	0.6	67.5	64.5
	SC PM	63.5	63.9	0.4	66.3	63.3
	PM	66.2	66.7	0.5	**69.2**	**66.2**
10	AM	71.0	71.2	0.2	**74.4**	**71.4**
	MD	69.8	69.9	0.1	72.9	69.9
	PM	75.4	75.5	0.1	72.5	69.5
11	AM	63.5	64.0	0.5	**67.0**	**64.0**
	MD	64.8	65.1	0.3	65.2	62.2
	PM	64.5	64.7	0.2	66.1	63.1
11a	AM	63.5	64.0	0.5	**67.0**	**64.0**
	MD	64.8	65.1	0.3	65.2	62.2
	PM	64.5	64.7	0.2	66.1	63.1
12	AM	72.2	72.7	0.5	**75.1**	**72.1**
	MD	69.6	70.1	0.5	72.6	69.6
	SC PM	62.6	63.1	0.5	65.5	62.5
	PM	62.5	63.0	0.5	64.9	61.9

Notes:

[1] Refer to **Figures 05.16-2a/b** for noise receptor location.

[2] The highest L_{10} and L_{dn} noise levels at each monitoring location are shown in **bold**.

[3] L_{dn} noise values calculated using the methodology presented above, as is consistent with the *HUD Noise Guidebook*.

Comparing future Midblock Bulk Alternative mobile source noise levels with No-Action Alternative noise levels, the maximum increase in L_{eq} noise levels would be less than 3 dBA. Increases of this magnitude would be considered barely perceptible and not significant according to *CTM* guidance.

In terms of *CTM* criteria, Midblock Bulk Alternative L_{10} noise levels at Receptor Locations 1, 1a, 3, 3a, 4, 5, 7, 8, 9, 11, and 11a would remain in the "marginally acceptable" category as compared to the No-Action Alternative, and Midblock Bulk Alternative noise levels at Receptor Locations 2, 6, 8, 10, and 12 would remain in the "marginally unacceptable" category.

In terms of HUD criteria, the Midblock Bulk Alternative L_{dn} noise levels at Receptor Locations 1, 1a, 7, 11, and 11a would remain in the "acceptable" category as compared to the No-Action Alternative, the Midblock Bulk Alternative L_{dn} noise levels at Receptor Locations 2, 6, 8, 9, 10, and 12 would remain in the "normally unacceptable" category, and the Midblock Bulk Alternative L_{dn} noise levels at Receptor Locations 3, 3a, 4, and 5 would change from the "acceptable" to the "normally unacceptable" category.

Cumulative Mobile Source and Play Area Noise Impact Evaluation

Existing Receptors

Using the methodology previously described, future play area noise levels in the Midblock Bulk Alternative were calculated during each of the analysis periods for the 2041 analysis year at each façade of Receptor Locations 1a and 3a, which represent existing noise-sensitive receptors not located on the Project Sites. Receptor 11a is not included in the play area noise analysis in this Alternative because it would not have direct line of sight to a newly introduced play area. The future play area noise levels and cumulative total noise levels (including noise from mobile sources as presented previously in **Table 05.16-18**) at these locations are presented in **Table 05.16-19** below.

Table 05.16-19: Cumulative Noise Under the Midblock Bulk Alternative at Closest Existing Receptor Façades (dBA)

Noise Receptor Location[1]	Address	Façade	Time	No-Action Alternative L_{eq}	Traffic-Only Midblock Bulk Alternative L_{eq}	Midblock Bulk Alternative Play Area L_{eq} at Boundary	Cumulative Midblock Bulk Alternative L_{eq} at Receptor	Change	Cumulative Midblock Bulk Alternative L_{10}[2] at Receptor
1a	435 W. 19th Street	South	AM	61.8	62.0	55.8	62.9	1.1	65.1
			MD	66.3	66.4		66.8	0.5	**67.6**
			PM	62.2	62.4		63.3	1.1	64.6
3a	425 W. 18th Street	North	AM	65.8	66.5	60.2	67.4	1.6	**69.5**
			MD	65.0	65.3		66.5	1.5	68.8
			PM	62.1	62.3		64.4	2.3	67.0
		East	AM	65.8	66.5	68.6	70.7	4.9	**72.8**
			MD	65.0	65.3		70.3	5.3	72.6
			PM	62.1	62.3		69.5	7.4	72.1

Notes:
[1] Refer to **Figures 05.16-2a/b** for noise receptor location.
[2] Highest L_{10} noise value indicated in **bold**.

Comparing the future cumulative Midblock Bulk Alternative L_{eq} noise levels with the No-Action Alternative noise levels, the maximum increase in noise levels at Receptor Location 1a, i.e., 435 W. 19th Street would be less than 3 dBA. Increases of this magnitude would be considered barely perceptible according to *CTM* guidelines. Consequently, noise levels at Receptor Location 1a under the Midblock Bulk Alternative would not rise to the level of a significant adverse noise impact.

At Receptor Location 3a (425 W. 18th Street), maximum cumulative noise levels in the Midblock Bulk Alternative would be 7.4 dBA greater than the No-Action Alternative. Based on field observations and date of construction (2017), the building façade is expected to have incorporated double-glazed windows which provide approximately 28 dBA window/wall attenuation, as well as an AMV, resulting in interior noise levels of less than 45 dBA (i.e., the threshold considered acceptable for residential use according to both *CTM* and HUD noise exposure criteria). Therefore, while the change in noise levels at this receptor would be noticeable, interior noise levels would remain below the acceptable 45 dBA threshold, and consequently the project-generated noise at Receptor Location 3a (425 W. 18th Street) would not rise to the level of a significant adverse noise impact.

Future Project Buildings

Using the methodology previously described, future play area noise levels in the Midblock Bulk Alternative were calculated at each façade of each of the buildings to be built under the Midblock Bulk Alternative based on the distance between the façade and the nearest edge of the associated play area. Additionally, each façade was associated with one of the 12 Noise Receptor Locations to determine the noise levels from vehicular traffic. In addition to the future play areas and basketball court, the existing Chelsea Park Soccer Field was also considered in the play area noise analysis. The maximum cumulative future noise levels (i.e., mobile source and play area) at these façades are presented in **Table 05.16-20**. The proposed buildings are shown in **Figures 05.16-7a and 05.16-7b**.

Figure 05.16-7a

Fulton Houses Project Site - Midblock Bulk Alternative

Fulton and Elliott-Chelsea Houses Redevelopment Project

Figure 05.16-7b

Elliott-Chelsea Houses Project Site - Midblock Bulk Alternative

Table 05.16-20: Maximum Cumulative Noise Under the Midblock Bulk Alternative at Project Building Façades (dBA)

Sensitive Receptor			Traffic-Only Midblock Bulk Alternative L_{eq}	Midblock Bulk Alternative L_{eq} Including Play Area Noise	Cumulative Midblock Bulk Alternative L_{10} Building	Cumulative Midblock Bulk Alternative L_{dn} Façade
Building	Façade	Representative Noise Receptor				
Fulton 1	North	1	66.4	66.4	67.2	64.2
	South	1	66.4	67.3	68.1	65.1
	East	2	69.6	69.6	72.7	69.7
Fulton 2	North	1	66.4	66.4	67.2	64.2
	South and West	3	66.5	66.5	68.6	65.6
	East	2	69.6	69.6	72.7	69.7
Fulton 3	All	4	66.9	66.9	68.6	65.6
Fulton 4	North and West	3	66.5	66.5	68.6	65.6
	South	5	66.3	66.3	68.9	65.9
	East	2	69.6	69.6	72.7	69.7
Fulton 5	North	5	66.3	66.7	69.3	66.3
	Courtyard	5	66.3	66.3	68.9	65.9
	South	7	65.6	65.6	68.0	65.0
	East	6	69.7	69.7	72.1	69.1
	West	5	66.3	69.2	71.8	68.8
Fulton 6	North	4	66.9	66.9	68.6	65.6
	South	7	65.6	65.6	68.0	65.0
	East	5	66.3	70.9	73.5	70.5
	West	4	66.9	66.9	68.6	65.6
Fulton 7	North	3	66.5	67.0	69.1	66.1
	South	5	66.3	66.3	68.9	65.9
	East	3	66.5	66.5	68.6	65.6
	West	3	66.5	71.0	73.1	70.1
Fulton 8	North	1	66.4	66.4	67.2	64.2
	South	3	66.5	67.1	69.2	66.2
	East	3	66.5	66.5	68.6	65.6
	West	1	66.4	68.5	70.7	67.7
Fulton 9	North	3	66.5	67.2	69.3	66.3
	South and West	4	66.9	66.9	68.6	65.6
	East	4	66.9	69.4	71.1	68.1
Elliott-Chelsea 1	North	8	69.3	71.3	71.8	68.8
	South	9	66.7	66.7	69.2	66.2
	South (Eastern Courtyard)	9	66.7	67.7	70.2	67.2
	South (Western Courtyard)	9	66.7	68.1	70.6	67.6
	East	9	66.7	68.7	71.2	68.2
	West	9	66.7	71.1	73.6	70.6
Elliott-Chelsea 2	North	8	69.3	71.2	71.7	68.7
	South	9	66.7	66.7	69.2	66.2
	South (Courtyard)	9	66.7	68.1	70.6	67.6
	East	9	66.7	69.1	71.6	68.6
	West	10	71.2	71.2	74.4	71.4
Elliott-Chelsea 3	North and East	12	72.7	72.7	75.0	72.0
	North (Courtyard)	12	72.7	73.7	76.0	73.0
	South	11	64.0	64.0	67.0	64.0
	West	12	72.7	73.4	75.7	72.7
Elliott-Chelsea 4	North	9	66.7	67.3	69.8	66.8
	North (Courtyard)	9	66.7	71.1	73.6	70.6

Sensitive Receptor			Traffic-Only Midblock Bulk Alternative L_{eq}	Midblock Bulk Alternative L_{eq} Including Play Area Noise	Cumulative Midblock Bulk Alternative L_{10} Building	Cumulative Midblock Bulk Alternative L_{dn} Façade
Building	**Façade**	**Representative Noise Receptor**				
	South	11	64.0	64.0	67.0	64.0
	East	9	66.7	68.7	71.2	68.2
	West	10	71.2	71.2	74.4	71.4
Elliott-Chelsea 5	North	9	66.7	67.4	69.9	66.9
	North (Courtyard)	9	66.7	71.1	73.6	70.6
	South	11	64.0	64.0	67.0	64.0
	East	9	66.7	68.2	70.7	67.7
	West	9	66.7	71.1	73.6	70.6
Elliott-Chelsea 6	North	9	66.7	66.7	69.2	66.2
	North (Eastern Courtyard)	9	66.7	69.8	72.3	69.3
	North (Western Courtyard)	9	66.7	68.3	70.8	67.8
	South	11	64.0	64.0	67.0	64.0
	East	12	72.7	73.7	76.0	73.0
	West	9	66.7	71.1	73.6	70.6
Elliott-Chelsea 7	North	8	69.3	71.2	71.7	68.7
	North (Courtyard)	9	66.7	71.1	73.6	70.6
	South	9	66.7	67.5	70.0	67.0
	South (Courtyard)	9	66.7	67.7	70.2	67.2
	East	8	69.3	69.3	69.8	66.8
	West	9	66.7	71.1	73.6	70.6

In terms of *CTM* criteria, the Midblock Bulk Alternative L_{10} noise levels at the façades shown in **Table 05.16-20** would range from the "marginally acceptable" to "marginally unacceptable" category.

In terms of HUD criteria, the Midblock Bulk Alternative L_{dn} noise levels at the façades shown in **Table 05.16-20** would range from the "acceptable" to "normally unacceptable" category.

Façades of buildings introduced by the Midblock Bulk Alternative at which noise levels would be "marginally unacceptable" or "normally unacceptable" would be subject to window/wall attenuation requirements to ensure acceptable interior noise levels (see "Noise Attenuation Requirements" section below).

Noise Attenuation Requirements

As shown in **Table 05.16-3**, the *HUD Noise Guidebook* evaluates noise exposure based on exterior L_{dn} noise levels. For buildings whose façades would experience noise exposure in the "normally unacceptable" or "unacceptable" categories, window/wall attenuation and an alternate means of ventilation would be necessary to ensure acceptable interior noise levels, i.e., an interior L_{dn} no greater than 45 dBA. In addition, as shown in **Table 05.16-5**, the *CTM* provides noise attenuation guidance for buildings based on exterior noise levels. Recommended noise attenuation values for buildings are designed to maintain a maximum interior noise level of 45 dBA or lower for residential or community facility uses and 50 dBA or lower for commercial office uses and are determined based on exterior L_{10} noise levels where traffic is the dominant source of noise. The, are summarized in **Table 05.16-21** below.

Table 05.16-21: Required Attenuation Values for the Midblock Bulk Alternative (dBA)

Site	Façade	Representative Noise Receptor[1]	Maximum With-Action L_{10}	CEQR Minimum Required Attenuation[2,4]	Maximum With-Action L_{dn}	HUD Minimum Required Attenuation[3,4]
Fulton 1 (Block 717, Lot 19)	North (greater than 50 feet from Ninth Avenue)	1	67.2	N/A	64.2	N/A
	South (greater than 50 feet from Ninth Avenue)	1[5]	68.1	N/A	65.1	25
	East; North and South (within 50 feet of Ninth Avenue)	2	72.7	28	69.7	25
Fulton 2 (Block 716, Lot 17)	North (greater than 50 feet from Ninth Avenue)	1	67.2	N/A	64.2	N/A
	West; South (greater than 50 feet from Ninth Avenue)	3	68.6	N/A	65.6	25
	East; North and South (within 50 feet of Ninth Avenue)	2	72.7	28	69.7	25
Fulton 3 (Block 715, Lot 10)	All	4	68.6	N/A	65.6	25
Fulton 4 (Block 715, Lot 10)	West; North (greater than 50 feet from Ninth Avenue)	3	68.6	N/A	65.6	25
	South (greater than 50 feet from Ninth Avenue)	5	68.9	N/A	65.9	25
	East; North and South (within 50 feet of Ninth Avenue)	2	72.7	28	69.7	25
Fulton 5 (Block 714, Lot 31)	North (greater than 50 feet from Ninth Avenue)	5[5]	69.3	N/A	66.3	25
	Courtyard	5	68.9	N/A	65.9	25
	South (greater than 50 feet from Ninth Avenue)	7	68.0	N/A	65.0	N/A
	East; North and South (within 50 feet of Ninth Avenue)	6	72.1	28	69.1	25
	West	5[5]	71.8	28	68.8	25
Fulton 6 (Block 714, Lot 31)	North	4	68.6	N/A	65.6	25
	South	7	68.0	N/A	65.0	N/A
	East	5[5]	73.5	31	70.5	30
	West	4	68.6	N/A	65.6	25
Fulton 7 (Block 715, Lot 10)	North	3[5]	69.1	N/A	66.1	25
	South	5	68.9	N/A	65.9	25
	East	3	68.6	N/A	65.6	25
	West	3[5]	73.1	31	70.1	30
Fulton 8 (Block 716, Lot 17)	North	1	67.2	N/A	64.2	N/A
	South	3[5]	69.2	N/A	66.2	25
	East	3	68.6	N/A	65.6	25
	West	1[5]	70.7	28	67.7	25
Fulton 9 (Block 715, Lot 10)	North	3[5]	69.3	N/A	66.3	25
	South and West	4	68.6	N/A	65.6	25
	East	4[5]	71.1	28	68.1	25
Elliott-Chelsea 1 (Block 724, Lot 10)	North	8[5]	71.8	28	68.8	25
	South	9	69.2	N/A	66.2	25
	South (Eastern Courtyard)	9[5]	70.2	28	67.2	25
	South (Western Courtyard)	9[5]	70.6	28	67.6	25
	East	9[5]	71.2	28	68.2	25
	West	9[5]	73.6	31	70.6	30

Site	Façade	Representative Noise Receptor[1]	Maximum With-Action L_{10}	CEQR Minimum Required Attenuation[2,4]	Maximum With-Action L_{dn}	HUD Minimum Required Attenuation[3,4]
Elliott-Chelsea 2 (Block 724, Lots 1 & 10)	North (greater than 50 feet from Tenth Avenue)	8[5]	71.7	28	68.7	25
	South (greater than 50 feet from Tenth Avenue)	9	69.2	N/A	66.2	25
	South (Courtyard)	9[5]	70.6	28	67.6	25
	East	9[5]	71.6	28	68.6	25
	West; North and South (within 50 feet of Tenth Avenue)	10	74.4	31	71.4	30
Elliott-Chelsea 3 (Block 723, Lot 15)	North and East	12	75.0	31	72.0	30
	North (Courtyard)	12[5]	76.0	31	73.0	30
	South	11	67.0	N/A	64.0	N/A
	West	12[5]	75.7	31	72.7	30
Elliott-Chelsea 4 (Block 723, Lot 1)	North (greater than 50 feet from Tenth Avenue)	9[5]	69.8	N/A	66.8	25
	North (Courtyard)	9[5]	73.6	31	70.6	30
	South (greater than 50 feet from Tenth Avenue)	11	67.0	N/A	64.0	N/A
	East	9[5]	71.2	28	68.2	25
	West; North and South (within 50 feet of Tenth Avenue)	10	74.4	31	71.4	30
Elliott-Chelsea 5 (Block 723, Lot 1)	North	9[5]	69.9	N/A	66.9	25
	North (Courtyard)	9[5]	73.6	31	70.6	30
	South	11	67.0	N/A	64.0	N/A
	East	9[5]	70.7	28	67.7	25
	West	9[5]	73.6	31	70.6	30
Elliott-Chelsea 6 (Block 723, Lot 15)	North	9	69.2	N/A	66.2	25
	North (Eastern Courtyard)	9[5]	72.3	28	69.3	25
	North (Western Courtyard)	9[5]	70.8	28	67.8	25
	South	11	67.0	N/A	64.0	N/A
	East	12[5]	76.0	31	73.0	30
	West	9[5]	73.6	31	70.6	30
Elliott-Chelsea 7 (Block 724, Lot 15)	North	8[5]	71.7	28	68.7	25
	North (Courtyard)	9[5]	73.6	31	70.6	30
	South	9[5]	70.0	N/A	67.0	25
	South (Courtyard)	9[5]	70.2	28	67.2	25
	East	8	69.8	N/A	66.8	25
	West	9	73.6	31	70.6	30

Notes:

[1] Receptor locations shown in **Figures 05.16-2a/b**; necessary attenuation levels shown in **Figures 05.16-8a and 05.16-8b**.

[2] The above composite window-wall attenuation requirements are for residential and community facility uses. Commercial Office or residential amenity uses would require 5 dBA less attenuation. All the above categories require a closed window situation and an alternate means of ventilation.

[3] The above composite window-wall attenuation requirements are for residential uses only. All above categories require a closed window situation and an alternate means of ventilation.

[4] "N/A" indicates that the highest calculated L_{10} or L_{dn} is below 70 dBA or 65 dBA, respectively. The *CTM* and HUD Noise Regulations do not specify minimum attenuation guidance for exterior values below these levels.

[5] Attenuation requirements at these locations are based on cumulative noise level prediction including contribution from traffic on adjacent roadways and projected play area noise

As shown in **Table 05.16-21** and **Figures 05.16-8a and 05.16-8b**, up to 31 dBA of window/wall attenuation would be required to provide acceptable interior noise levels per *CTM* and HUD guidelines along with an AMV to allow for maintenance of a closed-window condition. These

Figure 05.16-8a

Fulton Houses Project Site Noise Attenuation - Midblock Bulk Alternative

MPFP

Fulton and Elliott-Chelsea Houses Redevelopment Project **Figure 05.16-8b**

Elliott-Chelsea Houses Project Site Noise Attenuation Midblock Bulk Alternative

noise levels account for noise from projected vehicular traffic in the future as well as contribution from existing and newly introduced playgrounds at locations with a direct line of sight.

The attenuation of a composite structure is a function of the attenuation provided by each of its component parts and how much of the area is made up of each part. Typically, a building façade is composed of the wall, windows, and any vents or louvers for HVAC systems in various ratios of area. Buildings included in the Midblock Bulk Alternative would be designed to provide composite window/wall attenuation greater than or equal to the attenuation requirements listed in **Table 05.16-21** and **Figures 05.16-8a and 05.16-8b**.

The noise attenuation specifications for the Midblock Bulk Alternative will be memorialized in a legally binding document between NYCHA and the PACT Partner. With implementation of the noise attenuation levels outlined above, the Midblock Bulk Alternative would provide sufficient attenuation to achieve *CTM* and HUD interior noise level guidelines of 45 dBA or lower for residential/community facility uses. Therefore, the Midblock Bulk Alternative would not result in any significant adverse noise impacts related to building noise attenuation requirements.