study area. As discussed above, the proposed modifications would result in a net loss of 557 planned parking spaces in the future conditions as compared to the 2010 FSEIS.

With a reduction in future parking supply due to the proposed modifications, there would still be sufficient parking spaces available in the ½-mile study area to accommodate the project's parking demand. Therefore, the loss of parking spaces with the proposed modifications would not result in a potential significant parking shortfall in the study area.

TRAFFIC MONITORING PLAN

Prior to the opening of the relocated Collegiate School, the co-applicant, The Collegiate School will perform and submit the following: Detailed plans will be submitted including site plans showing all entrances, sidewalk widths, proposed signs, adjacent street geometry (as per AASHTO, MUTCD and NYCDOT specifications), and walking routes to/from school etc. A survey of the existing Collegiate School will also be performed prior to opening of the new location to determine the origin/destination and modal split of students and staff separately (classified by grades K-2, 3-5, 6-8 and 9-12 separately), as well as arrival and departure patterns in 15-minute increments, and how many students are accompanied by parents. Based on the detailed plans to be provided and the findings of the survey, the locations to be analyzed will be selected. New ATRs, turning movement and pedestrian counts will be performed, as well as traffic and pedestrian analyses, and assess whether the traffic control devices require modification. An updated safety assessment will also be performed based on the new data. Once the school is built and occupied, The Collegiate School should perform follow-up counts and analyses to determine whether any traffic and pedestrian mitigation measures are needed. The Collegiate School is responsible for all costs associated with the monitoring plan, development of mitigation measures, and the design and construction of mitigation measures requiring capital funding. Before commencing any monitoring plan, The Collegiate School must submit a scope of work for NYCDOT review and approval.

NOISE

Based on proportional modeling, the change in traffic volumes due to the proposed modifications would result in a maximum increase in noise levels of less than 2.2 dBA. A change of this magnitude would be barely perceptible and insignificant. However, the proposed school's rooftop playground and at-grade courtyard would have the potential to result in increased noise levels at adjacent buildings and would have the potential for changing the building attenuation requirements for Parcel K2 and K1. Consequently, the noise analysis presented examines the effects of noise from these sources and presents an analysis of the level of building attenuation necessary to ensure that interior noise levels satisfy applicable CEQR interior noise criteria.

ACOUSTICAL FUNDAMENTALS

Quantitative information on the effects of airborne noise on people is well documented. If sufficiently loud, noise may adversely affect people in several ways. For example, noise may interfere with human activities, such as sleep, speech communication, and tasks requiring concentration or coordination. It may also cause annoyance, hearing damage, and other physiological problems. Although it is possible to study these effects on people on an average or statistical basis, it must be remembered that all the stated effects of noise on people vary greatly with the individual. Several noise scales and rating methods are used to quantify the effects of noise on people. These scales and methods consider such factors as loudness, duration, time of occurrence, and changes in noise level with time.

"A"-Weighted Sound Level (dBA)

Noise is typically measured in units called decibels (dB), which are ten times the logarithm of the ratio of the sound pressure squared to a standard reference pressure squared. Because loudness is important in the assessment of the effects of noise on people, the dependence of loudness on frequency must be taken into account in the noise scale used in environmental assessments. Frequency is the rate at which sound pressures fluctuate in a cycle over a given quantity of time, and is measured in Hertz (Hz), where 1 Hz equals 1 cycle per second. Frequency defines sound in terms of pitch components. One of the simplified

scales that accounts for the dependence of perceived loudness on frequency is the use of a weighting network known as A-weighting in the measurement system, to simulate response of the human ear. For most noise assessments the A-weighted sound pressure level in units of dBA is used in view of its widespread recognition and its close correlation with perception. In this analysis, all measured noise levels are reported in dBA or A-weighted decibels. Common noise levels in dBA are shown in **Table 18**.

Ability to Perceive Changes in Noise Levels

The average ability of an individual to perceive changes in noise levels is well documented (see **Table 19**). Generally, changes in noise levels less than 3 dBA are barely perceptible to most listeners, whereas 10 dBA changes are normally perceived as doublings (or halvings) of noise levels. These guidelines permit direct estimation of an individual's probable perception of changes in noise levels.

Table 18
Common Noise Levels

Sound Source	(dBA)
Military jet, air raid siren	130
Amplified rock music	110
Jet takeoff at 500 meters	100
Freight train at 30 meters	95
Train horn at 30 meters	90
Heavy truck at 15 meters	80–90
Busy city street, loud shout	80
Busy traffic intersection	70–80
Highway traffic at 15 meters, train	70
Predominantly industrial area	60
Light car traffic at 15 meters, city or commercial areas, or residential areas close to industry	50–60
Background noise in an office	50
Suburban areas with medium-density transportation	40–50
Public library	40
Soft whisper at 5 meters	30
Threshold of hearing	0

Note: A 10 dBA increase in level appears to double the loudness, and a 10 dBA decrease halves the apparent loudness.
Sources: Cowan, James P. *Handbook of Environmental Acoustics*, Van Nostrand Reinhold, New York, 1994. Egan, M. David, Architectural Acoustics. McGraw-Hill Book Company, 1988.

Table 19
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 Newman, 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

Because the sound pressure level 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. 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 1, 10, 50, 90, and x percent of the time, respectively. Discrete event peak levels are given as L_1 levels.

For the purposes of this project, the maximum 1-hour equivalent sound level ($L_{eq(1)}$) has been selected as the noise descriptor to be used in the noise impact evaluation. $L_{eq(1)}$ is the noise descriptor recommended for use in the *City Environmental Quality Review (CEQR) Technical Manual* and is used to provide an indication of highest expected sound levels. The 1-hour L_{10} is the noise descriptor used in the *CEQR Technical Manual* noise exposure guidelines for City environmental impact review classification. Statistical noise levels (particularly L_{10} and L_{eq} levels) were used to characterize the relevant noise sources and their relative importance at each receptor location.

NOISE STANDARDS AND CRITERIA

New York CEQR Noise Standards

The *CEQR Technical Manual* contains guidelines for required attenuation values to achieve acceptable interior noise levels. These values are shown in **Table 20**. The *CEQR Technical Manual* criteria are based on maintaining an interior noise level for the worst-case hour $L_{10(1)}$ less than or equal to 45 dBA for classroom uses.

Table 20
Required Attenuation Values to Achieve Acceptable Interior Noise Levels

	Marginally Unacceptable				Clearly Unacceptable
Noise level with proposed project	$70<L_{10}\leq73$	$73<L_{10}\leq76$	$76<L_{10}\leq78$	$78<L_{10}\leq80$	$80<L_{10}$
Attenuation[A]	(I) 28 dB(A)	(II) 31 dB(A)	(III) 33 dB(A)	(IV) 35 dB(A)	$36 + (L_{10} - 80)$[B] dB(A)

Notes:
[A]The above composite window-wall attenuation values are for residential dwellings. Commercial office spaces and meeting rooms would be 5 dB(A) less in each category. All the above categories require a closed window situation and hence an alternate means of ventilation.
[B]Required attenuation values increase by 1 dB(A) increments for L_{10} values greater than 80 dBA.
Sources: New York City Department of Environmental Protection

In addition, the *CEQR Technical Manual* uses the following criteria to determine whether a proposed project would result in a significant adverse noise impact. The impact assessments compare the proposed project's Build condition $L_{eq(1)}$ noise levels to those calculated for the No Build condition, for receptors potentially affected by the project.

If the No Build levels are less than 60 dBA $L_{eq(1)}$ and the analysis period is not a nighttime period, the threshold for a significant impact would be an increase of at least 5 dBA $L_{eq(1)}$. For the 5 dBA threshold to be valid, the resultant Build condition noise level would have to be equal to or less than 65 dBA. If the No Build noise level is equal to or greater than 62 dBA $L_{eq(1)}$, or if the analysis period is a nighttime period (defined in the CEQR standards as being between 10 PM and 7 AM), the incremental significant impact threshold would be 3 dBA $L_{eq(1)}$. (If the No Build noise level is 61 dBA $L_{eq(1)}$, the maximum incremental increase would be 4 dBA, since an increase higher than this would result in a noise level higher than the 65 dBA $L_{eq(1)}$ threshold.)

NOISE PREDICTION METHODOLOGY

Noise from the School Playgrounds

The proposed project includes one elevated playground on the 9th floor roof of the north portion of the proposed K2 building, and one at-grade courtyard for use by the school's K-12 students. While use of the rooftop playground has not yet been programmed, for analysis purposes it was conservatively assumed

that it would have active (noisy) recreational activities with 60 students per hour based on discussions with representatives of The Collegiate School. Field observations at the existing school courtyard of The Collegiate School at 260 West 78th Street, yielded a maximum of less than 15 students per hour engaged in active noisy recreation. For analysis purposes it was conservatively assumed that it would have active (noisy) recreational activities with 20 students per hour.

The CadnaA model was used to determine sound effects of the proposed playground at nearby receptor locations. The CadnaA model is a computerized model developed by DataKustik for sound prediction and assessment. The model can be used for the analysis of a wide variety of sound sources, including stationary sources (e.g., construction equipment, industrial equipment, power generation equipment, etc.), transportation sources (e.g., roads, highways, railroad lines, busways, airports, etc.), and other specialized sources (e.g., sporting facilities, etc.) The model takes into account the sound power levels of the sound sources, attenuation with distance, ground contours, reflections from barriers and structures, attenuation due to shielding, etc. The CadnaA model has been used in several SCA projects with rooftop and adjacent playgrounds; predicted noise levels are proportional to the number of students. The CadnaA model is based on the acoustic propagation standards promulgated in International Standard ISO 9613-2. The CadnaA model is a state-of-the-art tool for acoustical analysis.

The analysis of the proposed playgrounds consisted of the following five step procedure:

- The project site geometry and surrounding building geometry were coded into the CadnaA model;
- Using the latest drawings of the proposed buildings on Parcels K1 and K2 and the location of the proposed playgrounds at the site, the building geometry in the CadnaA model was updated to reflect future conditions with the proposed modifications;
- An area source was created in the CadnaA model for each proposed playground. The acoustical parameters of the area sources were defined based on noise measurements that were performed at an existing rooftop playground at P.S./I.S. 210 in Manhattan, NY. The sound power level of the area source created in the CadnaA model was based on measured octave band noise levels (in dBA) from the comparable playground and the number of children assumed to be utilizing the corresponding proposed playground at any given time; and
- Using the area source to represent the proposed playgrounds, the CadnaA model was used to predict noise levels with the proposed modifications at nearby buildings.

FUTURE NOISE LEVELS

School Playground Noise

Using the methodology previously described, noise levels due to the noise generated by the at-grade courtyard and playground on the 9th floor roof were calculated at receptor locations adjacent to the project site (i.e., at nearby Riverside South and Riverside Center buildings, including the K1 parcel at all elevations) and at receptor locations on the proposed Collegiate School building.

At receptor locations adjacent to the project site, noise generated by playground activities at the at-grade courtyard and playground on the 9th floor roof would not be expected to change ambient noise levels appreciably. As part of the 1992 Riverside South approvals, adjacent residential buildings were required to have "exterior double-glazed windows and air conditioning such that window/wall noise attenuation would be at least 30 dBA." As part of the 2010 Riverside Center approvals, adjacent buildings were required to have a minimum of 31 dBA of building attenuation. With the proposed school's courtyard and rooftop playground, no additional building attenuation would be required at any adjacent building, including Parcel K1. (A wall varying in height from approximately 6 to 12 feet—which would function as a noise barrier—would be in place on the western boundary of the at-grade school courtyard. To be conservative, the CadnaA analysis assumed a 5 foot wall.) Therefore, there would be no significant adverse noise impact due to the proposed playground and courtyard (see Attachment B).

As shown in **Table 20**, the *CEQR Technical Manual* has set noise attenuation quantities for buildings, based on exterior $L_{10(1)}$ noise levels, and in order to maintain interior noise levels of 45 dBA $L_{10(1)}$ or lower for classroom uses. The results of the building attenuation analysis for the Collegiate School building on Parcel K2 are summarized in **Table 21**. The design of the proposed Collegiate School building on Parcel K2 will provide attenuation values as shown in Table 21.

Table 21
CEQR Attenuation Requirements

Proposed Building Façade Location	Governing Receptor	Floor Location	Maximum L_{10} (in dBA)[1]	CEQR Category	Attenuation Required (in dBA)
West Façade (facing courtyard)	V	1st Floor	80.8	Clearly Unacceptable	37
		2nd Floor	77.8	Marginally Unacceptable (III)	33
		3rd to 6th Floor	76.0	Marginally Unacceptable (II)	31
		7th and 8th Floor	72.7	Marginally Unacceptable (I)	30[2]
		Top Floor	74.3	Marginally Unacceptable (II)	31
South Façade	X	All Floors	72.9	Marginally Unacceptable (I)	28[2]
East Façade	AA	1st to 8th Floor	70.6	Marginally Unacceptable (I)	28[2]
		Top Floor	75.5	Marginally Unacceptable (II)	31
North Façade	BB	All Floors	70.7	Marginally Unacceptable (I)	28[2]

Notes:
(1) Based on the predicted Build L_{10} values.
(2) While the minimum attenuation required is 30 dBA as specified in the 1992 Riverside South FEIS, the (E) designation that would mandate the attenuation levels in this table (as discussed below) supersede the requirements of the 1992 FEIS.

Table 21 shows the minimum window/wall attenuation necessary to meet *CEQR Technical Manual* requirements for internal noise levels at required attenuation levels were determined. The required attenuation levels would be mandated by (E) designation on the project site specifying the appropriate amount of window/wall attenuation. The (E) designation would supersede the requirements of the 1992 FEIS.

There are four levels of required noise attenuation depending upon the ambient noise levels, 28 dBA, 31 dBA, 33 dBA, and 37 dBA.

For facades and floors requiring 37 dBA noise attenuation, the following (E) designation noise text would apply:

In order to ensure an acceptable interior noise environment, future community facility uses with outdoor play areas must provide a closed window condition with a minimum of 37 dB(A) window/wall attenuation for the following façades and floors in order to maintain an interior noise level of 45 dB(A).

Façade	Floor Location
Western Façade (facing courtyard)	1st Floor

For facades and floors requiring 33 dBA noise attenuation, the following (E) designation noise text would apply:

In order to ensure an acceptable interior noise environment, future community facility uses with outdoor play areas must provide a closed window condition with a minimum of 33 dB(A) window/wall attenuation for the following façades and floors in order to maintain an interior noise level of 45 dB(A).

Façade	Floor Location
Western Façade (facing courtyard)	2nd Floor

For facades and floors requiring 31 dBA noise attenuation, the following (E) designation noise text would apply:

In order to ensure an acceptable interior noise environment, future community facility uses with outdoor play areas must provide a closed window condition with a minimum of 31 dB(A) window/wall attenuation for the following façades and floors in order to maintain an interior noise level of 45 dB(A).

Façade	Floor Location
Western Façade (facing courtyard)	3rd to 6th floors; Top Floor
East Façade	Top Floor

For facades and floors requiring 28 dBA noise attenuation, the following (E) designation noise text would apply:

In order to ensure an acceptable interior noise environment, future community facility uses with outdoor play areas must provide a closed window condition with a minimum of 28 dB(A) window/wall attenuation for the following façades and floors in order to maintain an interior noise level of 45 dB(A).

Façade	Floor Location
Western Façade (facing courtyard)	7th and 8th Floors
South Façade	All Floors
East Façade	1st to 8th Floors
North Façade	All Floors

In order to maintain a closed window condition, an alternate means of ventilation that brings outside air into the building without degrading the acoustical performance of the building must also be provided. Alternate means of ventilation include, but are not limited to, central air conditioning. The specific attenuation requirements to be implemented for all facades are provided in the Collegiate School at Riverside South Technical Memorandum, Table 21 (CEQR No. 85-253M), March 2015.

With the (E) Designation specified on the above facades and floors and the modification of the Riverside South Restrictive Declaration to include a solid wall as shown on drawings ZSK-002 and ZSK-003 of at least 5 feet in height, the proposed action would not result in any significant adverse noise impacts, and no further analysis is warranted.

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. Normally, a building façade is comprised of the wall, glazing, and any vents or louvers for air conditioning units in various ratios of area. The proposed building will include acoustically-rated windows and an alternate means of ventilation. At these specific locations, the proposed building would need to be designed to provide a composite Outdoor-Indoor Transmission Class (OITC) rating greater than or equal to the attenuation requirements listed in **Table 21**. The OITC classification is defined by ASTM International (ASTM E1332-10a) and provides a single-number rating that is used for designing a building façade including walls, doors, glazing, and combinations thereof. The OITC rating is designed to evaluate building elements by their ability to reduce the overall loudness of ground and air transportation noise. The analysis included contributions from vehicular traffic noise and playground noise sources. By adhering to these design requirements, the proposed project will provide sufficient attenuation to achieve the CEQR interior noise level requirements.

Mechanical Systems

The building mechanical system (i.e., heating, ventilation, and air conditioning systems) would be designed to meet all applicable noise regulations (i.e., Subchapter 5, §24-227 of the New York City Noise Control Code and the New York City Department of Buildings Code) and to avoid producing levels that would result in any significant increase in ambient noise levels.

CONCLUSION

With the proposed minor project improvements to the two intersections outlined above, the proposed modifications to Parcel K2 would not result in any new significant adverse impacts not already identified in either the 1992 Riverside South FEIS or the 2010 Riverside Center FSEIS and subsequent technical memoranda.

CITY PLANNING COMMISSION/REVIEW SESSION
March 30, 2015 @ 1:00 P.M.

	ULURP Number(s)	Description of Request(s) DISPOSITION
		Special Meeting
	C140440MMM N150127ZRM	Vanderbilt Corridor (M5/6) (3/30) *Commissioner Cerullo; recused* ***ADOPTED***
	C150128ZSM C150129ZSM C150130ZSM C150130(A)ZSM	One Vanderbilt Avenue (M5/6) (3/30) *Commissioner Cerullo; recused* ***ADOPTED***
	C140404ZSM C140405ZSM	39-41 West 23rd Street (M5) (3/30) ***ADOPTED***
	N150109ZRK	Cherry Hill Gourmet Text Amendment (K15) ***ADOPTED***
		Citywide Non-ULURP Referral
1	N150302ZRY	Special Regulations for Neighborhood Recovery; zoning text amendment. (Citywide) ***REFER TO COMMUNITY BOARD FOR 45 DAYS***
		Manhattan Certification
2	150203MMM N150267ZRM	St. Vincent's Park; city map and zoning text amendment. (M2) ***CERTIFIED {Commissioner Cerullo; recused}***
3	150248ZSM 150264CMM	Hospital for Special Surgery West Wing Addition; special permit; and CPC certification. (M8) ***CERTIFIED***
		Manhattan Non-ULURP Referral
4	N150281ZCM	560 7th Avenue Theater District Transfer; CPC certification. (M5) ***REFER TO CB, BOROUGH PRESIDENT and LOCAL COUNCILMEMBER FOR 60 DAYS***
		Manhattan Non-ULURP Post-Referral
5	M120228(B)ZSM	Seward Park Mixed-Use Development; modification to an existing special permit. (M3) ***SEND APPROVAL LETTER TO BUILDINGS DEPARTMENT***
6	M920358(F)ZSM	Collegiate School at Riverside South; modification to an existing special permit and Restrictive Declaration. (M7) ***SEND APPROVAL LETTER TO BUILDINGS DEPARTMENT***
		Bronx Certification
7	150306HAX 150303ZSX	Melrose Commons North RFP Site B; UDAAP designation, project approval, disposition of c-o-p and special permit. (X3) ***CERTIFIED***
		Brooklyn Certification
8	150188PCK	NYPD Evidence Storage and Central Records ; acquisition and site selection. (K7) ***CERTIFIED***
9	150305PCK	NY County District Attorney Storage Facility; acquisition and site selection. (K7) ***CERTIFIED***
		Brooklyn Pre-Hearing
10	C150179HAK	Pacific Street Apartments; UDAAP designation, project approval and disposition. (K16) (5/26) ***TO PUBLIC HEARING ON 4 / 1 / 15***
11	C150180HAK	Linwood Street Apartments; UDAAP designation, project approval and disposition. (K5) (5/26) ***TO PUBLIC HEARING ON 4 / 1 / 15***

CITY PLANNING COMMISSION/REVIEW SESSION
March 30, 2015 @ 1:00 P.M.

	ULURP Number(s)	Description of Request(s) ***DISPOSITION***
		Manhattan Pre-Hearing
12	C140363PQM	Early Life Center 13 Daycare Center; acquisition. (M10) (5/26) ***LAID OVER***
13	C150213ZSM	20 East 71st Street; special permit. (M8) (5/18) ***TO PUBLIC HEARING ON 4 / 1 / 15***
14	N090311ZRM	510-512 West 23rd Street Text Amendment; zoning text amendment. (M4) ***TO PUBLIC HEARING ON 4 / 1 / 15***
		Future Votes / Post Hearing Follow-Ups ***DISCUSSED***
		April 1st
15	N150196HAX et.al.	New Roads Plaza (X3) (4/20)
	C150174PQX et.al.	1561 Walton Avenue (X4) (4/24)
	C150149PQQ	Charles R. Drew Early Learning Center 3 & Theodora Jackson Senior Center (Q12) (4/24)
	N150019RCR	81, 77, 73 Jefferson Boulevard (SI3)
	N140338ZAR	4 Henderson Avenue (SI1)
	N060265RCR et.al.	176 Arbutus Avenue (SI3)
		April 22nd
		551 West 21st Street Parking Garage (M4) (5/26)
16	C150110ZSM	15 Windy Hollow (SI3)
	N150120ZAR	30 East Loop Road (SI2)
	N 150226ZAR	46 East Loop Road (SI2)
	N 150227ZAR	62 East Loop Road (SI2)
	N 150228ZAR	