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DEPARTMENT OF CITY PLANNING
CITY OF NEW YORK

ENVIRONMENTAL ASSESSMENT AND REVIEW DIVISION

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Department of City Planning

November 16, 2007

NOTICE OF COMPLETION OF THE FINAL ENVIRONMENTAL IMPACT STATEMENT

Manhattanville in West Harlem Rezoning and Academic Mixed-Use Development

Project Identification
CEQR No. 06DCP032M
ULURP Nos. 070495 ZMM, N070496 ZRM
SEQRA Classification: Type I

Lead Agency
City Planning Commission
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New York City Department of City Planning

Pursuant to City Environmental Quality Review (CEQR), Mayoral Executive Order No. 91 of 1977, CEQR Rules of Procedure of 1991 and the regulations of Article 8 of the State Environmental Conservation Law, State Environmental Quality Review Act (SEQRA) as found in 6 NYCRR Part 617, a Final Environmental Impact Statement (FEIS) has been prepared for the action described below. Copies of the FEIS are available for public inspection at the office of the undersigned. The proposal involves actions by the City Planning Commission and Council of the City of New York pursuant to Uniform Land Use Review Procedures (ULURP). A public hearing on the Draft Environmental Impact Statement (DEIS) was held on October 3, 2007. Written comments on the DEIS were requested and were received by the Lead Agency until the 10th calendar day following the close of the public hearing. This FEIS incorporates responses to the public comments received on the DEIS and additional analysis conducted subsequent to the completion of the DEIS.

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A. PROJECT DESCRIPTION

PROJECT IDENTIFICATION

Columbia University proposes the Manhattanville in West Harlem Rezoning and Academic Mixed-Use Development project (the "Proposed Actions"/"Proposed Project") in an approximately 35-acre area (the "Project Area") of Manhattanville in West Harlem in Manhattan (see Figure S-1). The rezoning would amend the zoning map in the Project Area and create the Special Manhattanville Mixed-Use Zoning District, thereby facilitating Columbia's development of an Academic Mixed-Use plan (the "Academic Mixed-Use Development") on approximately 17 acres (the "Academic Mixed-Use Area") within the 35-acre Project Area, as well as commercial and residential development in other portions of the Project Area.

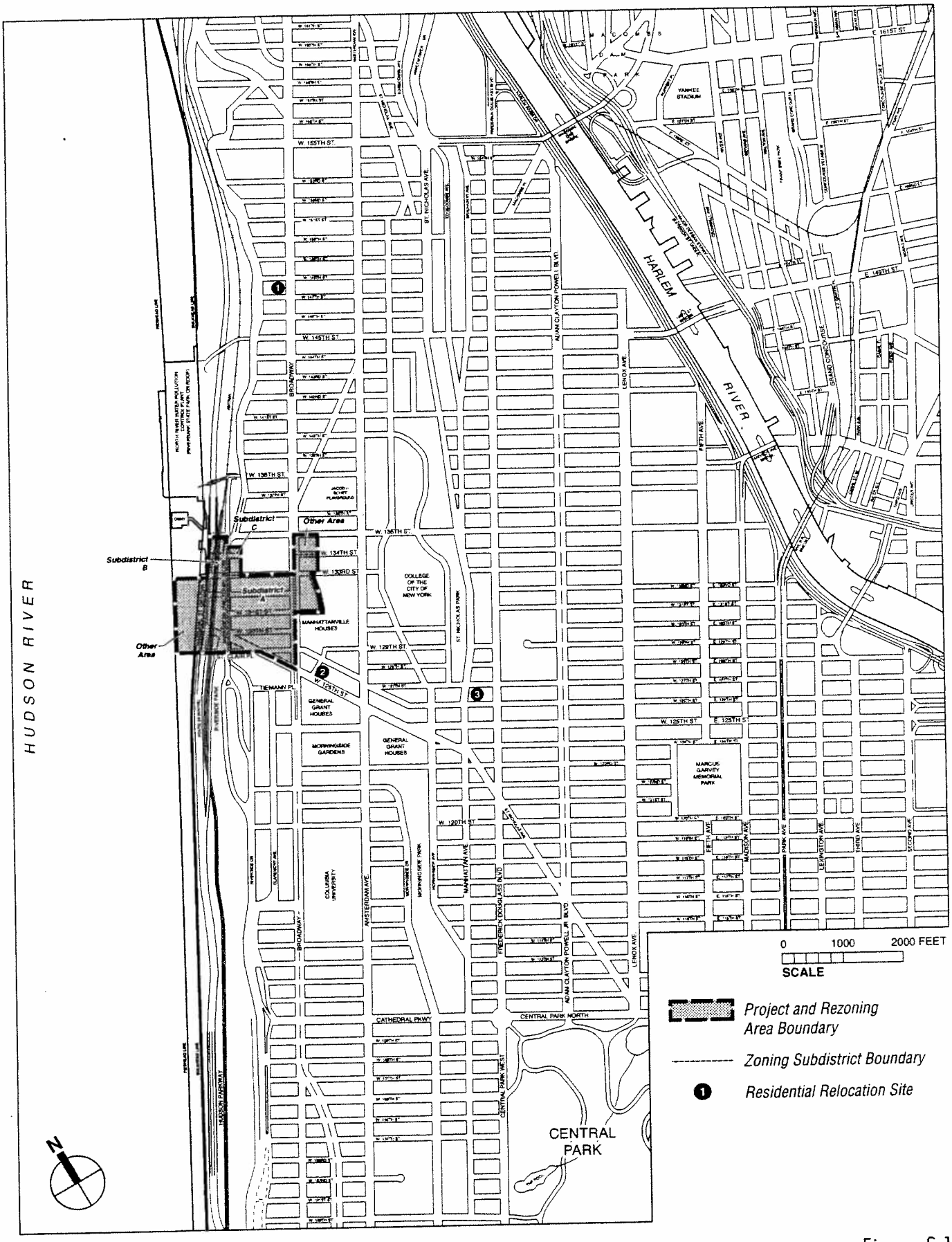
As proposed, the Academic Mixed-Use Development would total approximately 6.8 million gross square feet (gsf) above and below grade. Such development would consist primarily of community facility uses serving the University, with street-level retail and other active ground-floor uses. The remaining 18 acres within the Project Area would consist of 9 acres located primarily between Twelfth Avenue and Marginal Street and east of Broadway (which are estimated to result in another 329,500 gsf of commercial and residential development), and 9 acres between Marginal Street and the pierhead line, of which 2 acres comprise the area of the new West Harlem Waterfront park and 7 acres comprise City-owned land under water. This land under water cannot be developed, nor can it generate development rights transferable to other parcels. In all, the proposed rezoning would result in an estimated 7.1 million gsf of development. Since publication of the DEIS, Columbia has identified and included as part of the Proposed Project three sites in West Harlem for the relocation of a church and residents who would be displaced by the Proposed Actions, as shown in Figure S-1.

The Academic Mixed-Use Area constitutes Subdistrict A of the proposed Special Manhattanville Mixed-Use Zoning District (see Figure S-2). In addition to the rezoning, implementation of the Academic Mixed-Use Development plan would entail the adoption of a General Project Plan (GPP) and subsequent acquisition of certain property within the Academic Mixed-Use Area by the New York State Urban Development Corporation (doing business as the Empire State Development Corporation [ESDC]), either through the discretionary exercise of ESDC's power of eminent domain or otherwise under the New York State Urban Development Corporation Act (UDC Act) and the subsequent disposition by ESDC of any such property to Columbia for purposes of project development. The GPP would provide for the implementation of features of the Academic Mixed-Use Development plan that may not be mandated through zoning regulations or other mechanisms, such as preservation of specified historic resources, permitted uses in below-grade spaces, minimum and maximum floor area thresholds for all components, and limitations on the allowable uses on proposed development sites. Deed restrictions and other mechanisms enforceable by New York City and/or ESDC would be used to administer and enforce those features.

PROJECT PURPOSE AND NEED

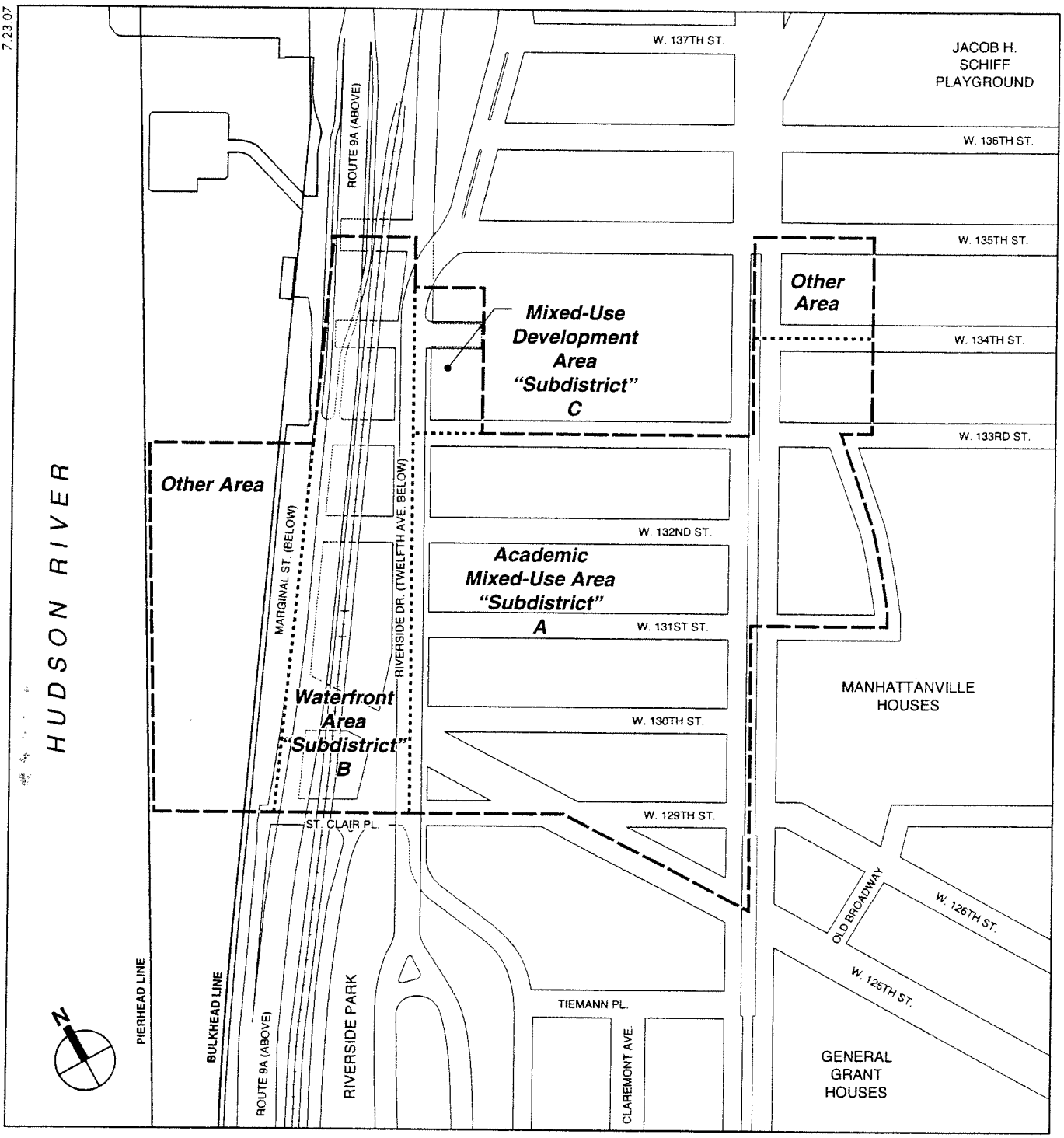
The Proposed Actions seek to establish a new Special Manhattanville Mixed-Use Zoning District in the Project Area to achieve two goals and their related objectives:

1) To allow Columbia to fulfill its role as a leading academic institution that makes a significant contribution to the economic, cultural, and intellectual vitality of New York City by



MANHATTANVILLE IN WEST HARLEM REZONING AND ACADEMIC MIXED-USE DEVELOPMENT

Figure S-1
Project Location



Note: The subdistrict boundaries correspond to the proposed zoning subdistricts (see Figure S-3)

Figure S-2

Proposed Special Manhattanville Mixed-Use District and Subdistricts

enabling it to expand and modernize its facilities within a 17-acre Academic Mixed-Use Area within the proposed 35-acre Special District. Objectives to support this goal are:

- Allow Columbia to construct 5 to 6 million square feet (sf) of University program space over the next 25 years;
- Create a plan that permits Columbia to build modern and flexible space for state-of-the-art educational and research facilities, particularly for modern scientific and technological research ("academic research");
- Allow for Columbia's expansion in a designated area to create an integrated, urban campus environment, which would promote interaction among students, faculty, and researchers of all disciplines;
- Create an open university campus with a central publicly accessible open space and amenities for people associated with the University, and neighborhood residents and workers alike; and
- Avoid attempted ad hoc acquisition of land to meet Columbia's space needs through the purchase of property in neighborhoods outside of Columbia's existing campuses, which would not create a campus environment and can cause community conflict.

2) To facilitate the revitalization, improvement, and redevelopment of a portion of the Manhattanville section of West Harlem by allowing greater density and a wider variety of land uses, within the context of the surrounding neighborhood. Objectives to support this goal are:

- Rezone the Project Area to allow for a wider mix of uses and greater density, including community facility and residential uses;
- Respect the context of surrounding neighborhoods by limiting the floor area ratio (FAR) in the new zoning to a maximum of 6;
- Enliven and activate West 125th Street as the gateway to the West Harlem Waterfront park, now under construction;
- Widen sidewalks and view corridors on east–west streets leading to the waterfront;
- Widen the sidewalk on Twelfth Avenue sufficient to open up views of the Riverside Drive viaduct and provide an open air public market near the waterfront;
- Provide for expansion of commercial uses west of Twelfth Avenue, but with height limits to protect views of and from the Riverside Drive viaduct;
- Promote new residential development in the Project Area east of Broadway;
- Provide publicly accessible open spaces throughout the area, and promote north-south pedestrian movement through the open space system;
- Require publicly accessible ground-floor uses along key streets leading to the waterfront; and
- Prohibit walls and gates that would block pedestrian access to and through the area.

The needs for these goals and objectives are described below.

EXPANSION AND MODERNIZATION OF COLUMBIA UNIVERSITY

Overview

Columbia University, established in 1754, is a major academic institution in New York City and contributes to the City's presence as a leader in higher education, academic research, and discovery. With more than 14,000 employees, Columbia University is the seventh-largest

nongovernmental employer in New York City, accounting for more than 10 percent of higher education employment throughout New York State. Some 68 percent of Columbia's employees live in New York City. Columbia spends approximately $2.4 billion annually (including in excess of $1.25 billion in payroll), approximately 70 percent of which is spent in the greater New York metropolitan area. Columbia has stated a strong commitment to remain in New York City.

As detailed below, Columbia has determined that it faces a critical need for new, modern, state-of-the-art facilities to maintain its presence in New York City and its position as a leading university. Many existing facilities are old, and many academic and academic research spaces are inadequate to accommodate new demands in the affected disciplines. In recent years, Columbia has renovated and expanded existing buildings, replaced buildings, filled in the remaining spaces on its campuses where development is feasible, and acquired and built on properties near its campuses when they have become available. However, these efforts have not met the space requirements identified by the University, particularly the need to grow in emerging academic and academic research fields. Assuming current trends continue, Columbia estimates it will need 5 to 6 million sf of program space over the next 25 years. The need for growth has been precipitated by major changes in academic disciplines and academic research fields, including an increased focus on interdisciplinary approaches, as well as the advent of new technologies. Without modern facilities for these fields and disciplines, Columbia believes that it will be unable to continue to attract top-ranked faculty and thus top-ranked students to the University.

Columbia's Statement of Long-Term Space Needs

Note: The following is based on statements provided by the University, more fully set forth in Chapter 1, "Project Description."

Need to Develop Modern Academic and Academic Research Facilities. Based on its inadequate existing space in many departments, the anticipated long-term growth of the University's existing programs, and the anticipated space requirements of new academic and academic research programs, particularly interdisciplinary ones, Columbia estimates that it must continue to expand at a rate equivalent to approximately 200,000 sf of new program space a year over the next approximately 25 years, resulting in an addition of 5 to 6 million sf. Based on current estimates of trends in graduate programs and academic research, Columbia projects that approximately half of this program space will be needed for academic research.

Columbia currently lags behind competitor institutions with highly rated programs in the total academic and academic research space available per student and is currently seeking space specifically for the Jerome L. Greene Science Center for Columbia's Mind, Brain and Behavior initiative, the Columbia Business School, the School of International and Public Affairs (SIPA), and portions of the School of the Arts. Other academic research programs in need of space include Biomedical Engineering; Environmental Sciences; Nanotechnology; Neuroscience; and Systems Biology. In its academic programs, Columbia has identified an early need for adequate space for its School of the Arts, the Columbia Business School, and SIPA. Other academic programs identified by Columbia as currently working in inadequate space include: Architecture, Planning and Historic Preservation; Astronomy; Astrophysics; Biological Sciences; Ecology, Evolution and Environmental Biology; Economics; English; Political Science; Psychology; and new interdisciplinary initiatives of the Columbia University Medical Center (CUMC).

Well-functioning, modern, state-of-the-art academic research facilities require more space, design flexibility, and larger floor plates than their predecessors, in order to support new

methods of research and interdisciplinary collaboration. Specifically, the demands of state-of-the-art, multidisciplinary research require spaces that have large, open floor plates with a minimum of obstructions, so that there is easy flow among laboratories, laboratory support spaces, and offices and meeting rooms. The simple rectangular shape accommodates these functions with the greatest flexibility, allowing for changing space requirements as the needs of state-of-the-art modern science research evolve over time. Modern academic research buildings are large, with a minimum of 250,000 gsf, and floor plates of at least 25,000 gsf. Buildings for modern academic space also need relatively large floor plates to enable effective layouts for classrooms and lecture halls, centralized meeting spaces, and other uses. In designing an academic research facility, floor plate and configuration are key to creating a building that will serve evolving state-of-the-art research functions well over the long term. Generally, large academic research structures are made up of multiple floors, all with the same basic form and layout, and sharing the same vertical core and infrastructure. The functional design objectives of an academic research building floor plate are to: (1) create flexible space for the long-term life of the building; (2) promote interaction among the research teams; (3) support the research functions in floor layout; and (4) keep the building systems as simple as possible.

Columbia's efforts over the past decade of building expansions, new construction, and adaptive reuse have resulted in the addition of a total of approximately 2 million sf. However, the University has only three sites remaining at its existing campuses or on University-owned off-campus properties that could approximate the building sizes and layouts needed for academic research or major graduate academic buildings.[1] Taken together, these sites could accommodate 670,000 sf, which would not meet Columbia's long-term space needs. Moreover, the sites are in three different locations and so would not contribute to the creation of a single campus, and all three are already slated for development: the site on West 115th Street is planned for University housing, the site between West 167th and West 168th Streets is adjacent to the Russ Berrie Medical Science Pavilion and planned to become a new extension of that facility, and the site at the southwest corner of West 125th Street and Broadway is slated for a new academic building.

The University has determined that 10 other, smaller sites could accommodate approximately 549,000 sf in total. These sites are planned to be developed for housing or small academic institutes or centers (not teaching programs), since they all are limited by various constraints such as their small size. However, any such development would also displace existing university uses on many of these sites. The University also evaluated the possible use of vacant land at the southern end of the Riverside South development area, which could have provided up to 2.6 million zoning sf of development on 9 acres between West 59th and West 62nd Streets west of West End Avenue. Aside from its limited size, which would not meet Columbia's articulated needs, the University concluded that this option was less desirable due to the substantial distance from Riverside South to the Morningside Heights campus and CUMC.

Columbia has also evaluated how best to make use of its facilities in New York outside Manhattan: Nevis Laboratories in Irvington (Westchester County), and Lamont-Doherty Earth Observatory in Palisades (Rockland County). Development at either location would be distant from Columbia's Morningside Heights and CUMC campuses, and would not meet Columbia's strong commitment to stay and expand in New York City. In addition, neither outlying campus is physically suited for development of large academic research and academic buildings.

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[1] Columbia also has an option to lease a site that would permit development of approximately 300,000 sf on the Close of the Cathedral of St. John the Divine. The University would not be able to develop this site without approval from the Cathedral and the appropriate public review processes.

Need to Create an Integrated Graduate School and Research Campus to Accommodate New Facilities and Future Growth. Columbia believes that it is particularly necessary to avoid reliance on ad hoc property acquisitions to accommodate its long-term growth over the next several decades, not only to avoid continual friction with local communities over individual building initiatives, but because the trends in academia toward coordination among programs and interdisciplinary education require an integrated campus setting, which could not be accommodated through ad hoc acquisitions. Moreover, the amount of space that Columbia needs makes the prospect of acquiring it in an ad hoc way extremely difficult. Columbia believes that physical proximity of facilities in a campus setting is the best way to promote integration of disciplines and interaction among the faculty and students, thus creating a learning community. A campus setting also makes possible the planned provision of open space and other amenities that benefit faculty, students, and neighborhood residents alike.

Need to Remain Competitive. Since its founding, and especially since the great expansion in higher education nationwide that began after World War II, Columbia has continually faced a competitive disadvantage resulting from the limits of its existing space and facilities to support its academic and academic research mission and to attract the best faculty and students. Columbia competes with a range of other institutions, depending on the program in question.

In addition to salary for faculty, and stipends and scholarships for students, Columbia believes that the factors that drive the decisions of talented faculty and students regarding where they will teach, conduct research, and study include:

- For faculty, the intellectual vitality of the program, the quality of related disciplines, the intellectual level of the students, the availability of funding for research, the staff and facilities available to support teaching and research, and modern laboratories and support space;
- For students, the stature of the faculty, the strength of the courses given, the intellectual level of fellow students, the research projects under way in the programs, and the physical facilities for learning, research, study, discussions, and conferences; and
- For both faculty and students, facilities that allow them to interact outside the classroom and the laboratory, including housing, dining venues, lounges, recreation facilities, and outdoor spaces, which are important to creating an environment in which faculty and students will want to teach, conduct research, and study.

Conclusion

Columbia has determined that it has largely exhausted opportunities to meet space needs on its existing campuses and on properties that it owns nearby. In accommodating long-term growth over the next several decades, the University wishes to avoid reliance on ad hoc acquisitions of property, as was done in the area surrounding the Morningside Heights campus, and to instead engage in the systematic, long-range planning and development of integrated facilities. Columbia has determined that this is particularly necessary because the trends in academia toward coordination among programs and interdisciplinary education require an integrated campus setting, which could not be accommodated through ad hoc acquisitions. Moreover, the amount of space that Columbia needs makes the prospect of acquiring it in an ad hoc manner extremely difficult. In addition, Columbia believes that ad hoc acquisitions would create continual friction with local communities over individual building initiatives. Moreover, the outcome of ad hoc expansion would be a miscellaneous collection of University buildings scattered in several urban neighborhoods and lacking a cohesive identity. There would be little or no connection among them, as there would be if the expansion took place in one area, creating a new integrated, modern, urban, and open campus.

Columbia believes that physical proximity of facilities in a campus setting is the best way to promote integration of disciplines and interaction among the faculty and students, and thus create a learning community. For example, the University's graduate schools and colleges share the Morningside Heights campus and use the same libraries, auditoriums, dining facilities, athletic center, and other facilities; students, faculty, and employees congregate in the open areas of the campus, and to some extent they share curricula. An interchange of ideas among various intellectual disciplines is greatly facilitated by having several schools in one place, and it is key to the accomplishments of the University's faculty, graduates, and students. A campus setting also makes possible the planned provision of open space and other amenities that benefit faculty, students, and neighborhood residents alike.

As a result of its evaluations, Columbia has determined that expansion in Manhattanville is the only reasonable solution to its critical need for new facilities for these principal reasons: (1) adequate land area to accommodate Columbia's long-term space needs; (2) enough land to create integrated University facilities, which could stimulate the intellectual achievements of the students and faculties of several graduate schools and programs, as well as provide open space and other amenities as part of an open campus environment; (3) an area large enough to benefit from and make cost-effective a continuous, deep, below-grade space that would provide efficient shared facilities, including academic research support facilities, classrooms and auditoriums, centralized loading and distribution systems, centralized mechanical systems (energy centers), and parking that meets anticipated demand; (4) location and proximity to the Morningside Heights campus and CUMC; (5) the prospect of improving Columbia's existing connection to West Harlem by providing greater access to and through the new campus, and building new—and enhancing existing—partnerships with the community; and (6) the opportunity to transform an aging, former manufacturing area into a vibrant, mixed-use development. The development of new graduate facilities in Manhattanville would also allow Columbia University to reorganize space at the Morningside Heights campus so that programs there can expand into space vacated by moving graduate programs to Manhattanville. The area is also close to City College, which is just a few blocks northeast of the Project Area, thus providing Columbia an opportunity to enhance its relationship with this largest campus in the CUNY system.

REVITALIZATION OF MANHATTANVILLE

Zoned predominantly for low-density manufacturing uses with maximum FARs of between 1 and 2, the Project Area between the waterfront and Broadway consists of primarily low-rise buildings with a few taller buildings, many of which date to the area's industrial prime prior to World War II. Several high-rise residential towers surround the Project Area, including the Riverside Park Community/3333 Broadway to the north, Manhattanville Houses to the east, and the Columbia University housing at 560 Riverside Drive to the south. The use restrictions and FAR limitations of the current zoning hinder both potential private and institutional development.

Both the City and local community have recognized opportunities to revitalize the Project Area. In 2002, the New York City Economic Development Corporation (EDC) released a study of Manhattanville area of West Harlem called the West Harlem Master Plan. The major objective of the Master Plan was to propose a cohesive plan for the economic development of West Harlem that enhances the character of the neighborhood and fulfills the vision of the community. To achieve these goals, the Master Plan proposed three components:

1) Improvements to the City-owned parking lot on Marginal Street between St. Clair Place and West 133rd Street to transform the area into a new West Harlem Waterfront park. This EDC

project, which is currently under way, is projected to be completed in 2008. The Master Plan recommends the development of an attractive waterfront amenity, links to the Manhattan Waterfront Greenway, and construction of two new piers, including an excursion pier, to allow docking for recreational excursions and ferry boats.

2) Various transportation improvements to encourage growth in the area. The plan recommends the development of an intermodal transportation center along the waterfront between West 125th Street and St. Clair Place that could provide access for ferry boats from the excursion pier, buses from West 125th Street, bicyclists from the surrounding paths, and the potential reestablishment of a Metro-North stop on the Amtrak line at West 125th Street. This component also includes the implementation of streetscape improvements along West 125th Street to encourage access to the waterfront; these improvements are currently in the design phase.

3) Economic development of the upland, which builds on the waterfront transportation improvements (components 1 and 2). The plan identifies the need to change the restrictive manufacturing zoning to allow a greater variety of uses and greater building bulk in the area near Broadway, while also recommending the reuse of existing buildings. In addition, the plan recommends partnering development with the neighboring institutions of Columbia University and City College, using the tax incentives and financial benefits of the Upper Manhattan Empowerment Zone, and expanding and enhancing community partnerships to attain economic development in West Harlem.

In addition to the EDC study, Manhattan Community Board 9 (CB9) has proposed a plan for Manhattanville, pursuant to Section 197-a of the New York City Charter (197-a Plan). The stated goals of the 197-a Plan include: improving the quality of life of neighborhood residents, preserving traditional building patterns and neighborhood scale, encouraging the creation and development of job-intensive businesses to benefit local residents, providing affordable housing, and allowing future growth while preserving the district's physical and demographic character without displacement of existing CB9 residents. The 197-a Plan calls for a mix of manufacturing, commercial, community facility, and residential uses in the Project Area. This mix of uses, achieved through a rezoning that would facilitate new construction and conversions, is aimed at preserving building patterns and neighborhood scale, while allowing for future growth.

The goals of the West Harlem Master Plan, the proposed 197-a Plan, and the Proposed Actions are similar in certain respects. All three would seek to widen the variety of uses that could be permitted in Manhattanville and to increase allowable densities. However, fulfilling Columbia's goal of an integrated university area with 5 to 6 million sf of academic program space would create a development defined by university uses over a large portion of the Project Area, unlike the more mixed-use development suggested by the West Harlem Master Plan and proposed in the CB9 197-a Plan.

Given the planning history and context in Manhattanville, the goals and objectives of the Proposed Actions have been framed to acknowledge the important role that the Project Area plays in the future of the neighborhood. These goals would promote use of the new Columbia campus by members of the community, as well as students, faculty, and other employees of the University, by:

- Using the streets through the Academic Mixed-Use Area to connect to the river and planned West Harlem Waterfront park to areas east of the Project Area, creating a lively, welcoming

urban environment for community residents and visitors as well as Columbia students, faculty, and other employees;

- Creating a lively, welcoming urban environment for community residents and visitors as well as Columbia students, faculty, and other employees; and
- Promoting meaningful employment opportunities for local residents.

To accomplish these goals, Columbia has incorporated the following objectives in its planning approach:

- Retain key aspects that recall Manhattanville's history;
- Revitalize West 125th Street;
- Connect West Harlem to the waterfront right through the University area;
- Construct significant new privately owned, publicly accessible open spaces;
- Employ publicly accessible ground-floor uses, widened sidewalks, landscaping, and lighting to create vibrant streets leading through the Project Area;
- Minimize the presence of cars and trucks on the streets; and
- Create a welcoming urban design by barring the use of fences or walls and formulating appropriate bulk controls, setbacks, and landscaping requirements.

In addition, the University has agreed to work with the City on its proposal to create a specialized science high school on property Columbia owns. The school initially will be located in transitional space in a temporary location. Its permanent location will be in Manhattanville. Enrollment will be selective, and priority will be given to high performing local students from northern Manhattan above 96th Street. At least half of the school's total enrollment will comprise students from northern Manhattan. (Approvals of site selection and funding for the school are not included as part of the proposed rezoning and Academic Mixed-Use Development.)

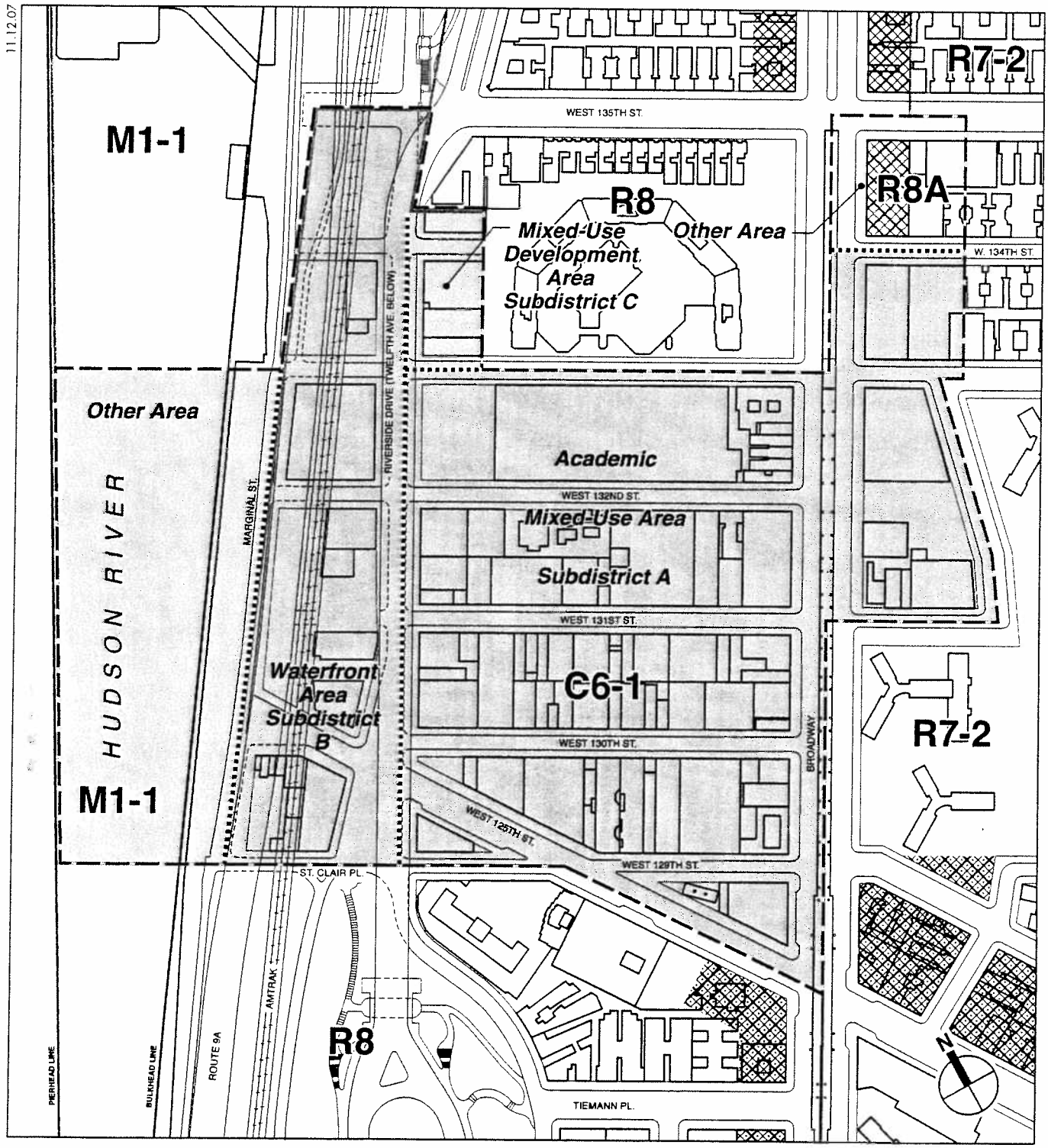
LAND USE AND RELATED ACTIONS

The land use actions required to permit changes in land uses and densities, and to create an Academic Mixed-Use Development, include rezonings and related actions by the City, and adoption of a GPP by ESDC.

SPECIAL MANHATTANVILLE MIXED-USE ZONING DISTRICT

The boundaries of the proposed Special Manhattanville Mixed-Use Zoning District are coterminous with the Project Area (see Figure S-3). The proposed rezoning would replace most of the current manufacturing districts in the Project Area and promote redevelopment adjacent to the waterfront consistent with several of the recommendations and planning objectives of EDC's West Harlem Master Plan. The rezoning would also allow Columbia University to develop the Academic Mixed-Use Development to meet its long-term needs for modernization and expansion.

The proposed rezoning includes: (1) Subdistrict A, within which the Academic Mixed-Use Development would occur, and (2) adjoining Subdistricts B and C, and the two "Other Areas," one area east of Broadway, and a second area along the waterfront west of Marginal Street (see Figure S-3).



Project Area and Proposed Manhattanville Special Mixed-Use District Boundary

Subdistrict Boundary

C1-4 Commercial Overlay

C1-2 Commercial Overlay

Proposed Zoning Districts

R8A General Residence District

M1-1 Light Manufacturing District

C6-1 Commercial District

C6-2 Commercial Overlay

C1-4 Commercial Overlay

MANHATTANVILLE IN WEST HARLEM REZONING AND ACADEMIC MIXED-USE DEVELOPMENT

Figure S-3

Proposed Zoning

The urban design requirements of the Special Manhattanville Mixed-Use Zoning District would promote strong visual and pedestrian connections linking the residential communities located east of Broadway and the Academic Mixed-Use Area to the waterfront, as follows:

- To keep the streets active and lively, Twelfth Avenue, West 125th Street, and Broadway (except for the Other Area east of Broadway) would be designated for active ground-floor uses, such as retail, galleries, performance spaces, and other space for community services;
- On such streets, any new development, change of use, or enlargements that would increase the floor area of the ground floor of a building by more than 25 percent would require that a minimum of 75 percent of the ground-floor frontage, for a minimum depth of 30 feet or the depth of the building, whichever is less, be allocated for active ground-floor uses;
- The Special Zoning District would also have transparency requirements in which at least 70 percent of a building's streetwall surface would be glazed, with at least 50 percent transparency from the floor level at the ground to the height of the ceiling, or not less than 15 feet, whichever is lower, for any new development, changes of use on the ground floor of a building, or enlargement that increases the floor area of the ground floor by more than 25 percent;
- There would also be mandatory streetwall and widened sidewalk requirements, and controls on building heights;
- The zoning would also require widened sidewalks on east–west streets in Subdistrict A (except West 125th Street, which is a wide street, and on the north side of West 131st Street, the south side of West 132nd Street, and the south side of West 129th Street), effectively widening the view toward the waterfront from Broadway. A required sidewalk widening on Twelfth Avenue (30 feet) would also provide additional light and air beneath the Riverside Drive viaduct along Twelfth Avenue;
- The zoning would also set maximum building heights on each site in the rezoning area, ranging from 60 feet on the west side of Twelfth Avenue to as much as 260 feet on Broadway. An additional 20 to 60 feet would be allowed to accommodate mechanical equipment in Subdistrict A; and
- There would also be mandatory streetwall requirements in Subdistricts A and B.

Academic Mixed-Use Area (Subdistrict A)

In Subdistrict A, the Special Manhattanville Mixed-Use Zoning District would change the existing low-density manufacturing zoning to a medium-density C6-1 district (see Figure S-3). Subdistrict A would allow for a range of uses, enabling the expansion of Columbia University. The 3.44 floor area ratio (FAR) for residential use corresponds to the R7 districts mapped to the north and east of the rezoning area. Under the Special Manhattanville Mixed-Use Zoning District regulations, the maximum floor area would be 6.0 FAR for commercial and community facility uses in Subdistrict A, which is below the 6.5 FAR maximum for community facility use in C6-1 districts. The maximum floor area permitted for manufacturing uses would be 2.0 FAR. These provisions are intended to maintain an appropriate scale and density.

In recognition that Columbia University would develop facilities in the area over time, the Special District would continue to permit a range of manufacturing uses to allow such uses at the same 2.0 FAR density currently in effect in existing and new buildings in Subdistrict A (except in the Other Area east of Broadway) prior to development by Columbia. (The 2.0 FAR limit would not apply in existing non-complying buildings to changes of use to permitted manufacturing uses.)

In addition, to allow flexibility for Columbia University to develop its facilities in response to evolving needs, the proposed Special District zoning text would allow for three types of floor area transfers within Subdistrict A; all would be subject to the maximum floor area permitted overall. Those transfers to be made from three open spaces delineated in the proposed Special District would be "as-of-right" by notice and would require certification by the Chair of the New York City Planning Commission (CPC) that the open space will be built to the specifications in the zoning. These bulk transfers are included in the Illustrative Plan, discussed below in "Description of the Proposed Academic Mixed-Use Development Plan." It is anticipated that Columbia will apply for such certifications at the time of development. All other transfers of floor area that would stay within the design "envelopes" set forth in the zoning's height, setback, and streetwall regulations for each site would be subject to both CPC Authorization and City Environmental Quality Review (CEQR) review. If the transfer would create a building that did not conform to the design regulations in the zoning, a Special Permit subject to both the City's Uniform Land Use Review Procedure (ULURP) and CEQR review would be required.

To promote visual differentiation between the base and upper floors of new buildings and to maintain an appropriate streetscape, the proposed zoning would set mandatory streetwall heights for narrow streets and wide streets and distinguish between lower and upper streetwalls. These regulations would apply on most streets within Subdistrict A for buildings above a height of 60 feet on a narrow street or 85 feet on a wide street.

The Special Manhattanville Mixed-Use Zoning District text would also have design controls and other requirements to ensure the quality of, and public use and access to, privately owned, publicly accessible open space areas. In total, the Proposed Actions would create approximately 93,965 sf of publicly accessible open space. As shown in Figure S-4, these open areas would include a large through-block central open space (the Square), located between West 130th and West 131st Streets; the Small Square, located on the block between Broadway, Twelfth Avenue, and West 129th and West 130th Streets; the Grove, at the western tip of the triangular-shaped block formed by the intersections of Broadway, West 125th Street, and West 129th Street; and open areas that also serve as pedestrian passageways through the midblocks. These midblock open areas would be a minimum of 50 feet wide with no obstructions, oriented north–south between West 125th/West 129th Streets and West 133rd Street and a minimum of 60 feet oriented east–west between Broadway and old Broadway.

In addition, the Special Zoning District would require mandatory widened sidewalks within Subdistrict A. Five-foot mandatory widened sidewalks would be required on the east–west streets, except on West 125th Street, which is a wide street, on the south side of West 129th Street, and on the block between West 131st and West 132nd Streets, to account for the existing Studebaker Building. The mandatory widened sidewalks along the east side of Twelfth Avenue would be 30 feet with a 15-foot-wide zone for the provision of an open market and an adjacent 15-foot-wide clear path. Within the 15-foot open market zone, the zoning would also require permanent, fixed elements, such as landscaping and seating, with a minimum coverage of 5 percent of the market area.

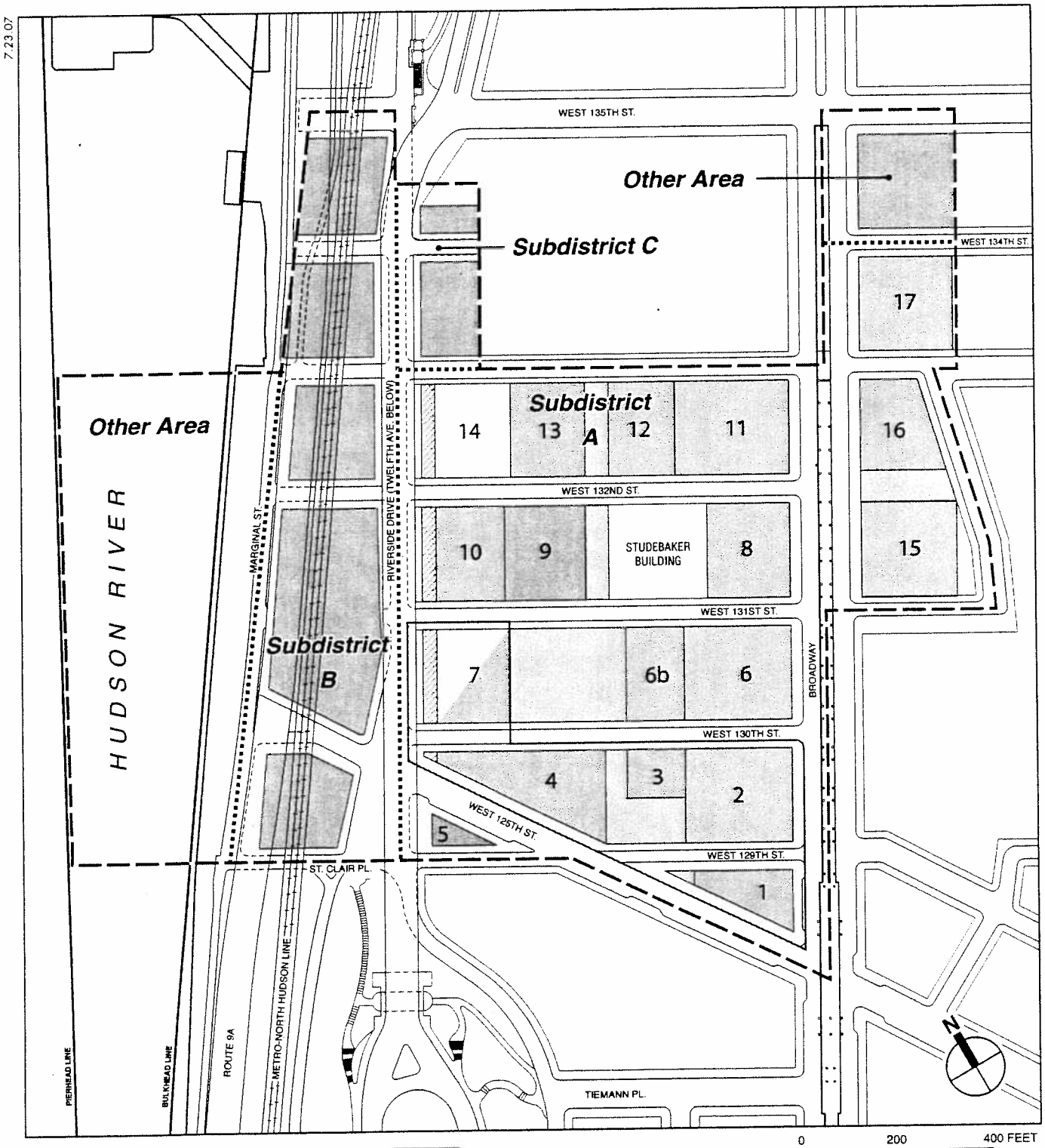


Figure S-4

MANHATTANVILLE IN WEST HARLEM REZONING AND ACADEMIC MIXED-USE DEVELOPMENT

Subdistrict A: Illustrative Land Use Plan

Subdistricts B[1], C, and the Other Areas

The Special Manhattanville Mixed-Use Zoning District would change the existing zoning in Subdistricts B, C, and the two Other Areas (see Figure S-3) to expand the range of permitted land uses and increase density to encourage commercial development in the westerly subdistricts, and a mix of commercial and residential use in the Other Area east of Broadway in a manner generally consistent with the recommendations of the West Harlem Master Plan.

Subdistrict B. Subdistrict B, consisting of approximately 8 acres along the west side of Twelfth Avenue to Marginal Street, would be rezoned from M1-1 and M2-3 to a C6-1 underlying zoning district to encourage commercial uses. However, to promote appropriate land uses and strengthen the visual east–west corridors to the waterfront within this subdistrict, residential development would be prohibited, commercial and community facility development would be limited to a maximum FAR 2.0, and a range of manufacturing uses would still be permitted. Community facility uses would be limited to 5,000 sf per establishment. Subdistrict B would also contain a height limitation of 60 feet, except for the southernmost block between St. Clair Place and West 125th Street, Marginal Street, and Twelfth Avenue, which would have a height limitation of 130 feet. The proposed rezoning changes for Subdistrict B would also allow the existing Fairway Market potential for expansion. In addition, Twelfth Avenue and West 125th Street in Subdistrict B would be designated for required active ground-floor uses in the Special Manhattanville Mixed-Use Zoning District. Any new development, enlargements, or change of use fronting on such streets would require 75 percent of the ground-floor frontage be allocated for active ground-floor uses.

Subdistrict C. Subdistrict C comprises three parcels on the east side of Twelfth Avenue between West 133rd Street and north of West 134th Street. Subdistrict C would be remapped to an underlying C6-2 zoning district, which would permit residential use at an R8 equivalent with a maximum 6.02 FAR, and commercial uses with a maximum FAR of 6.0. As in the Academic Mixed-Use Area, community facility uses would be limited to an FAR of 6.0 instead of 6.5. Subdistrict C would also contain a height limit of 120 feet above curb level, which is the height of the existing buildings.

Other Areas. As shown in Figure S-3, the Other Areas include one area with several parcels on the east side of Broadway between West 134th and West 135th Streets, and a second area comprising all of the waterfront west from Marginal Street to the pier line. Together, the two Other Areas comprise approximately 10.5 acres (29 percent) of the Project Area, with the Other Area east of Broadway totaling less than an acre (approximately 3 percent of the Project Area). The remaining 26 percent of the Project Area in the Other Areas includes 7 acres of City-owned land under water (which cannot be developed, nor can it generate development rights transferable to other parcels), and the approximately 2-acre West Harlem Waterfront park, under construction west of Marginal Street.

All of the Other Area east of Broadway would be mapped as an R8A contextual zoning district, requiring a base height of 60 to 85 feet followed by a setback, with a maximum building height of 120 feet. A C1-4 overlay would be mapped along the entire frontage of Broadway to a depth

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[1] CPC is contemplating certain modifications to Subdistrict B. The proposed modifications would rezone Subdistrict B to a modified M1-2 light manufacturing district to support light manufacturing and retail uses. It is anticipated that this modification would not result in any projected development sites in Subdistrict B. The proposed modifications are more fully described in Chapter 29, "Modifications to the Proposed Actions." Chapter 29 also analyzes the potential environmental impacts that could result from the proposed modifications.

of 100 feet east from Broadway. The maximum FAR would be 6.02 for residential uses and 6.5 for community facility uses. Where the C1-4 overlay is mapped, the maximum FAR would be 2.0 for commercial uses; although in a building with a residential use, commercial uses must be located below the second story. The remaining area located east of the C1-4 overlay on the same block would be mapped R8A, with a maximum FAR of 6.02 for residential uses and 6.5 for community facility uses. Commercial and manufacturing uses are not permitted in R8A districts, and manufacturing uses would not be permitted in the C1-4 overlay area, either. The Other Area west of Marginal Street would be mapped as M1-1. This is the area planned to be developed as the West Harlem Waterfront park. The proposed zoning change would allow the park to conform to zoning, since the existing M2-3 district does not allow for a park use.

GENERAL PROJECT PLAN

Subdistrict A would also be subject to the requirements of the GPP, which would control certain aspects of the plan that are not subject to City zoning. These would control development of the proposed subsurface spaces and include a requirement for preservation of a historic resource. In addition, to allow for flexibility in Columbia's future planning within an appropriate framework, the GPP would limit land uses on each development site to at most two permitted uses, and would set overall minimum and maximum floor areas for each land use component.

The Academic Mixed-Use Development would have an extensive below-grade component, including central energy plants to provide heating, ventilation, and air conditioning (HVAC) to all but one of the proposed buildings west of Broadway, academic research support facilities, parking and loading facilities, recycling, storage space, and recreational facilities. Under the GPP, Columbia would be required to retain and adapt for its use the former Warren Nash Service Station building at 3280 Broadway at the corner of West 133rd Street. This building has been determined to be a historic resource.

Under the GPP, one or two specified land uses would be permitted on each development site, as shown in Table S-1. (Commercial research is not included as a permitted use in the GPP, and is not allowed under the zoning text.)

As shown in Table S-2, the GPP would include maximum and minimum total floor areas for each proposed land use. However, in no case would the total zoning floor area in Subdistrict A exceed the 6.0 FAR equivalent of 4.4 million sf above grade, nor would the total gross floor area (including below-grade uses and above-grade mechanical space) exceed 6.8 million sf. The minimum floor area requirements represent Columbia's commitment to the basic elements of its proposal. The requirements of the GPP would be administered and enforced by the City of New York and/or ESDC through deed restrictions on the land and other mechanisms.

Table S-1
Permitted Uses by Development Site

Development Site	Illustrative Plan Use	Alternate Uses
1	Academic	–
2	Academic research	–
3	Academic	–
4	Academic	–
5	Retail	–
6	Academic research	Recreation
6b	Academic research	Academic
7	University housing and Academic	–
8	Academic research	Academic
9	Recreation	Academic research
10	Academic	Academic research
11	Academic research	Academic
12	Academic research	Academic
13	Academic	University housing
14	University housing	Academic
15	Academic research	Academic
16	Academic	–
17	Academic research	University housing
Note: See Figure 1-12 for Development Site locations.		

Table S-2
Subdistrict A: 2015 and 2030 Maximum and Minimum Proposed Academic Mixed-Use Above-Grade Development

Use	Maximum GSF[1]		Minimum GSF	
	2015	2030	2015	2030
Community Facility				
Academic research[2]	370,000	2,700,000	300,000	960,000
Academic	705,000	2,000,000	200,000	1,000,000
Housing for graduate students, faculty, and other employees	175,000	1,300,000	0	350,000
Recreation[3]	0	350,000	0	0
Commercial				
Active ground-floor uses[4]	180,000	600,000	36,500	130,000
Retail[4]	90,000	300,000	18,250	65,000

Notes:
Maximum academic uses would not occur with maximum housing for graduate students, faculty, and other employees.
1. In no case will the zoning floor area within the Academic Mixed-Use Area exceed 4,417,956 sf (6.0 FAR equivalent), nor would the total gross floor area (above and below grade) exceed 6,760,673 sf..
2. Does not include below-grade support.
3. Does not include below-grade swimming and diving center.
4. Included in active ground-floor uses.

Because the GPP may not be adopted by the time that CEQR Findings are adopted or the proposed rezoning is adopted, Columbia University will execute a Restrictive Declaration. That document will ensure that the above noted requirements and proscriptions are met.

PROPOSED ACADEMIC MIXED-USE DEVELOPMENT PLAN

PLANNING AND DESIGN APPROACH

As noted above, Columbia's planning and design of the Academic Mixed-Use Development seeks to use the streets through the Academic Mixed-Use Area to connect to the river and planned West Harlem Waterfront park to areas east of the Project Area; create a lively,

welcoming urban environment for community residents, workers, and visitors, as well as Columbia students, faculty, and other employees; and promote meaningful employment opportunities for local residents. To accomplish these goals, Columbia has incorporated the following objectives in the design approach:

1) Retain key aspects that recall Manhattanville's history, including maintaining the existing street grid, protecting the IRT and Riverside Drive viaducts, preserving the former Warren Nash Service Station building and adapting it for new use, and adapting the Studebaker Building for new University administrative uses.

2) Revitalize West 125th Street. Ground-floor retail and other uses would help create a lively streetscape similar to that of the streets in Central Harlem. Other features, such as a crossing light, clearly marked crosswalks, and landscaped open spaces fronting on the street, would make this street more pedestrian-friendly and draw people to the waterfront.

3) Connect West Harlem to the waterfront. The Academic Mixed-Use Area and all streets would remain open to the community without traditional campus walls or gates. Ground-floor setbacks would, in effect, widen the sidewalks on most side streets, enhance views to the waterfront, and encourage pedestrians to walk through the Academic Mixed-Use Area to reach the waterfront.

4) Construct significant new privately owned, publicly accessible open spaces. The open spaces that would be created with the Proposed Actions are described above under "Land Use and Related Actions."

5) Generate street vibrancy. Visually open and accessible space at the base of the new buildings would make streets in the Academic Mixed-Use Development Area lively and welcoming to students and the community.

6) Minimize the presence of cars and trucks on the streets. The Academic Mixed-Use Development's below-grade area would minimize vehicular presence on the streets and enhance the street-level pedestrian environment.

7) Create a welcoming urban design by barring the use of fences or walls and formulating appropriate bulk controls, setbacks, and landscaping requirements. Building height controls and streetwall requirements would ensure a design that relates to the topography and allows for a coordinated design of buildings of various uses. The maximum building heights would reflect the topography of the existing valley by stepping up the slope in height northward along Broadway and Twelfth Avenue and stepping down toward the valley's southwest low point roughly at West 125th Street and Twelfth Avenue.

DESCRIPTION OF THE PROPOSED ACADEMIC MIXED-USE DEVELOPMENT PLAN

Above Grade

The Proposed Actions would enable Columbia to build an estimated 6.8 million gsf of new space for academic research, academic (instruction), recreational use, housing for graduate students, faculty, and other employees; 935,965 sf of publicly accessible open space; and related support space in the Academic Mixed-Use Area. Approximately 4.8 million sf (equivalent to 4.4 million sf of zoning floor area) would be located above grade and 2.0 million sf located below grade. The total amount of program space for university uses (academic research, academic, University housing, and recreational), both above and below grade, would be approximately 5.12 million sf. This total includes below-grade academic research support; the total amount of program space, including pure academic research only, would be approximately 4.8 million sf.

Both totals[1] exclude active ground-floor uses, which are considered in this EIS to be retail uses and not university uses (although the ground-floor uses could include some publicly accessible university uses). The proposed uses are illustrated in Figure S-4, which presents Phase 1 as it is now proposed on Sites 1-4 and 7, and one of the specified uses on each of the other Academic Mixed-Use development sites; taken together, these sites and uses constitute the Phase 1 Plan and a Phase 2 Illustrative Plan, analyzed in this EIS. The Illustrative Plan represents the maximum 6.0 FAR equivalent for the Academic Mixed-Use Area and Columbia's current concept of its planned future development for the Academic Mixed-Use Area; however, it is possible that as the area develops over time, the plan may change.

The Academic Mixed-Use development is anticipated to take place incrementally over approximately 25 years. Since publication of the DEIS, plans for the first phase of the development have coalesced; the first phase would contain the Jerome L. Greene Science Center for Columbia's Mind, Brain, and Behavior Initiative, the Business School, the School for International and Public Affairs, the School of the Arts, University housing, and publicly accessible open space. Specifically, Columbia proposes that the academic research building on Site 2 would house the Jerome L. Greene Science, the academic building on Site 4 would house the Columbia Business School, and the academic building on Site 3 would be used for the Columbia Business School and the School of the Arts. Site 1 would contain academic support spaces for the School of the Arts, the Columbia Business School, and the Jerome L. Greene Science, including a large auditorium, meeting room space, and other academic space. The mixed-use academic and University housing building on Site 7 would house the School of International and Public Affairs (SIPA), as well as housing for graduate students, faculty, and other employees. Across West 125th Street, the Phase 1 development would face a renovated Prentis Hall (see Figure S-5), a new academic building containing a new City high school for math, science, and engineering, and 560 Riverside Drive, the base of which would be renovated and enlivened with publicly accessible uses.[2] A new traffic light would be installed at the intersection of West 125th and West 129th Streets to ease the connection between the two sets of University buildings.

This first phase of the Academic Mixed-Use Development plan would also provide 28,855 sf of publicly accessible open space (the Small Square and the Grove) surrounding and across West 129th Street from the building on Site 3. These open spaces would also constitute the first leg of the midblock open area, a north-south pedestrian pathway to eventually extend from West 125th to West 133rd Street. As mandated in the proposed zoning, the buildings would be set back from their property lines (except along Broadway), allowing for wider sidewalks with street trees and landscaping at the building bases. With new and renovated academic uses on both sides of the street, the Small Square and Grove in the midblock plus the setback and landscaping requirements of the proposed zoning, West 125th Street would be transformed into a gateway to the waterfront and, eventually, the gateway to the new campus.

Although the development is proposed as a long-term plan that could take more than 25 years to complete, the analysis conservatively assumed that by 2030, the rest of the Academic Mixed-

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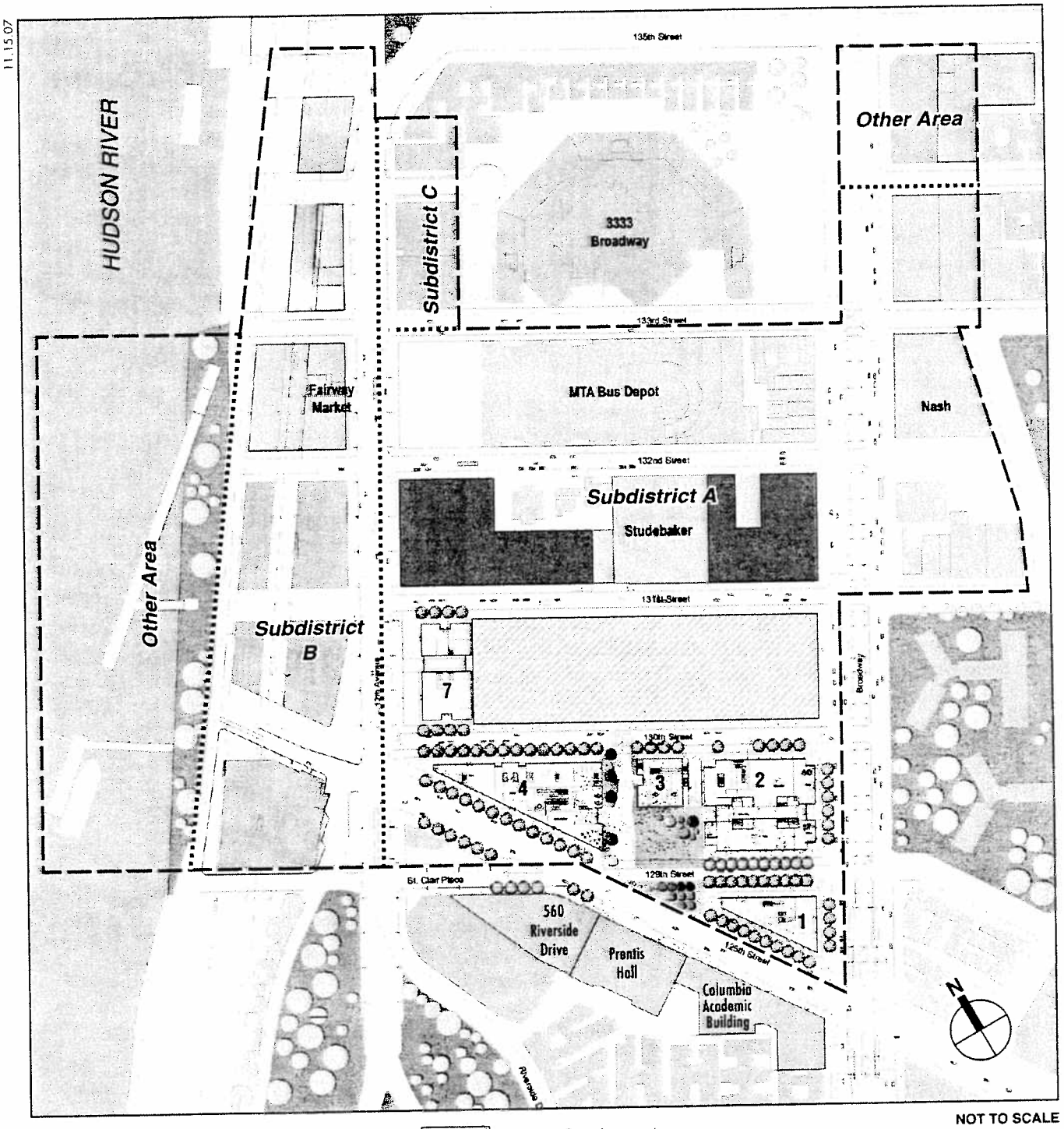
[1] Both totals for University program space are given here, because although the larger number (5.12 million gsf) technically includes all program space for university uses, the total excluding academic research support is required for an "apples-to-apples" comparison with certain alternatives (see Chapter 24, "Alternatives").

[2] As-of-right development on the south side of West 125th Street is not part of the Proposed Actions. The secondary school will be subject to its own Site Selection process and ULURP, including environmental review. This development is slated for completion before 2015.



Note: Building articulations and design features illustrative

Figure S-5

MANHATTANVILLE IN WEST HARLEM REZONING AND ACADEMIC MIXED-USE DEVELOPMENT

Subdistrict A: 2015 Phase I Site Plan

Use Area would be developed, for a total of 6.8 million gsf, according to the Illustrative Plan uses in Table S-1 and at the floor areas shown in Table S-3.

As shown in Figures S-4 and S-6, the full build-out of the Illustrative Plan would extend from West 125th Street to West 133rd Street, from Twelfth Avenue on the west to Broadway on the east; an additional academic area would occupy the frontage on the east side of Broadway, from West 131st Street to West 134th Street. The academic research buildings would be located primarily along the Broadway corridor, on Sites 2, 6, 6b, 8, 11, 12, 15, and 17. The Phase 1 plan includes academic uses along the West 125th/129th Street corridor on Sites 1, 3, 4 and 7; the Phase 2 Illustrative Plan proposes these uses on Twelfth Avenue (Site 10) in the midblock between West 132nd and West 133rd Streets (Site 13), and on the east side of Broadway in the former Warren Nash Service Station building (Site 16). University housing is assumed on two Twelfth Avenue sites—Sites 7 and 14. Site 9, in the midblock between West 131st and West 132nd Streets, would house a recreation center. In the full build-out, a landscaped midblock open area would be located adjacent to the large, publicly accessible open space between Sites 6b and 7 on the block extending from West 130th Street to West 131st Street. Another landscaped midblock open area would extend north–south from West 131st Street to West 132nd Street between the Studebaker Building and the recreation building on Site 9, and from West 132nd Street to West 133rd Street between Sites 12 and 13.[1]

Building heights would range from 140 feet to 260 feet to the roofline (without mechanical equipment). These rooflines would be lower than the building at 3333 Broadway to the north, which rises to an elevation of 325 feet, and within the range of the buildings of Manhattanville Houses to the south and east, which rise to 180 feet.

In addition to rooftop mechanical space, the buildings on Sites 1, 2, 14, 15, 16, and 17 would have several exhaust stacks. Each building's exhaust stacks would be clustered together as they extended upward through the structure and out above the roof. The configuration of the cluster on the roof visible from the street would most likely appear as two stacks. It is also possible that the clustered stacks could be contained within a single structure, which would not be larger than the two-stack configuration. The height of the stacks would differ, depending on the heights of the buildings on and near each site and on the constituents and velocities of each exhaust flow.

[1] Construction on the western portion of the block between West 132nd and West 133rd Streets, which is occupied by the MTA Manhattanville Bus Depot, would be contingent upon Columbia entering into an agreement with MTA for modifying or reconstructing the bus depot; this agreement has not been reached.

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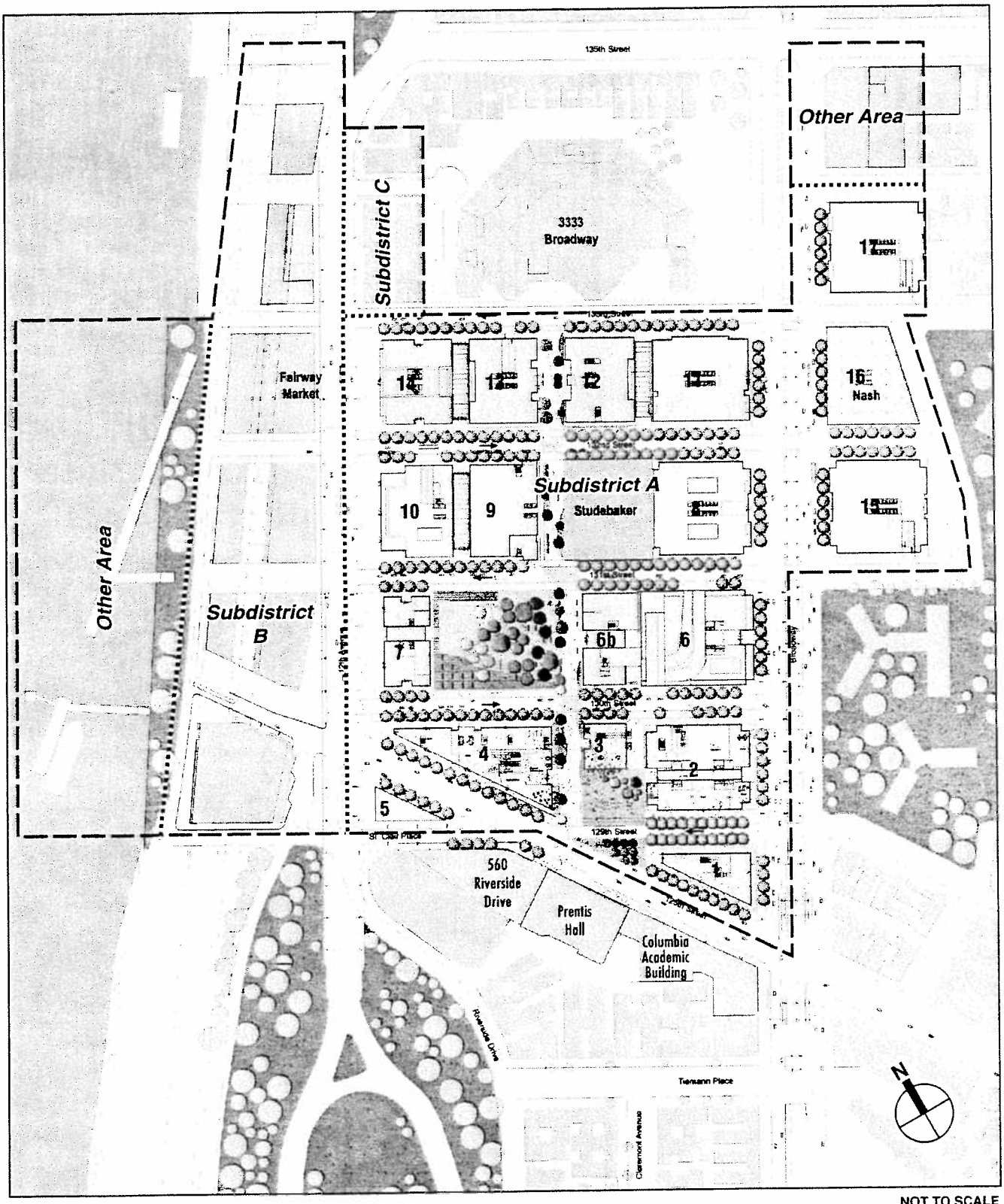

NOT TO SCALE

- Project and Rezoning Area Boundary
- Subdistrict Boundary
- 1 Development Site
- Existing Development
- Columbia University Development
- New Open Space
- Subdistricts B, C, and the Other Areas Projected Development Sites

Figure S-6

Subdistrict A: 2030 Illustrative Site Plan

MANHATTANVILLE IN WEST HARLEM REZONING AND ACADEMIC MIXED-USE DEVELOPMENT

Table S-3

Subdistrict A: Illustrative Plan by Development Site (in GSF)

Site #[1]	Academic	Academic Research	University Housing	Recreation	Active Ground-Floor Uses	Total
2015 Development Sites						
1	114,082				16,144	130,226
2		351,310			11,400	362,710
3	64,020					64,020
4	354,738				21,505	376,243
7	210,350		53,560		11,400	275,350
2015 Above Grade	743,190	351,310	53,600	0	60,449	**1,208,549**
Below-Grade Components						
Academic research support						58,563
Below-grade program						69,830
Central energy plant						50,870
Ramp, mechanical, freight, egress, switchgear, and loading facilities						94,638
Storage						31,294
					2015 Below Grade	**305,195**
					2015 TOTAL	**1,513,744**
2030 Development Sites						
5					10,969	10,969
6		367,261			11,400	378,661
6b		138,890				138,890
8		301,101			11,400	312,501
9				250,713		250,713
10	260,370				11,400	271,770
11		398,193			11,400	409,593
12		214,225				214,225
13	160,890					160,890
14			350,360		11,400	361,760
15		386,792			11,400	398,192
16	196,318				11,400	207,718
17		439,185			11,400	450,585
2030 Above Grade	1,360,768	2,596,957	403,960	250,713	162,618	**4,775,016**
Below-Grade Components						
West of Broadway						
Academic research support						296,201
Below-grade program						69,830
Central energy plant						70,199
Ramp, mechanical, freight, egress, switchgear, and loading facilities						384,512
Storage						189,225
Columbia University parking						556,933
Parking for Bus Depot employees						80,000
Swimming and diving center						145,431
					Subtotal West of Broadway	**1,792,331**
East of Broadway						
Ramp, mechanical, freight, egress, switchgear, and loading facilities						44,651
Parking						148,675
					Subtotal East of Broadway	**193,326**
					2030 Total Below-Grade	**1,985,657**
					2030 TOTAL (Including 2015 Sites)	**6,760,673**

Note: [1] Site reference corresponds to Figure S-4.

Below Grade

The proposed Academic Mixed-Use Development would include a central below-grade service area beneath the entire portion of Subdistrict A, west of Broadway and north of West 125th Street and West 129th Street (except for the area beneath the Studebaker Building). This area would contain science support space for academic research; a central loading area for all trucking associated with the University area; freight and utility distribution corridors connecting all the buildings below grade; University parking; two energy centers that would centralize delivery of steam, chilled water, and other utilities systems to the buildings above; program space for the Business School and other programs; a swimming and diving center; the reconstructed MTA Manhattanville Bus Depot with parking for bus depot employees; and a space for a large electrical switch gear, other mechanical space, ramps, maintenance, and storage. The new buildings on the periphery—Sites 1 (south of West 129th Street), 15, and 17 (east of Broadway)—would contain conventional basements, each containing boilers, utility access and service, loading areas, and storage. The former Warren Nash Service Station building (Site 16) contains only a partial cellar. The basements on Sites 15 and 17 would also provide accessory parking spaces.

The central below-grade service area would have a total of seven levels, but because the ground level ranges between 10 feet above Manhattan datum (defined as 2.27 feet above mean sea level) at West 130th Street and Twelfth Avenue to a high of 60 feet above Manhattan datum at Broadway and West 133rd Street, the actual depth and number of levels of the central below-grade service area would vary.

Level 5 would extend over all of the central below-grade area. The major science support area would extend the entire length of Broadway at this level, which would also contain a central truck loading facility located above the parking levels underneath the midblock between West 130th and West 131st Streets. On the perimeter of the loading area and connecting to all buildings, a two-way, 20-foot-wide corridor would provide continuous access and numerous connections among all the below-grade building cores and the loading docks at this level, for distribution of freight and collection of waste. The loading area and science support area would meet the requirements for laboratories, and the science support areas beneath the buildings would be interconnected. Also at this level would be program space for the Business School, space for recreation, and the lower level of the MTA Manhattanville Bus Depot, which is proposed to be reconstructed underground as part of the Proposed Actions.

The central below-grade service area is critical to meeting Columbia's need for program space, and it would enhance the above-grade urban environment, as follows:

- The science support space for academic research would be interconnected. This would avoid redundancy of equipment (such as a full range of imaging equipment and computational support) and service space (such as large climate-controlled storage facilities) that would occur if these facilities had to be provided above grade in separate, unconnected buildings. At approximately 296,200 sf, the ratio of this space to the 2.6 million sf of above-grade academic research program space proposed in the Illustrative Plan would be 11 percent. If the science support space had to be provided in individual buildings, it would have to be 500,000 sf—a ratio of 20 percent of the academic research program space, or more nearly twice the space provided underground. Conventional basements cannot serve this purpose, as they cannot feasibly provide adequate head space to accommodate the necessary large-scale equipment and facilities. Thus, the use of conventional basements would necessitate use of floor area above grade for science support. This would result in a reduction in the amount of academic research program space to approximately 2.1 million sf.

- The central loading area would focus all truck access into one major entrance and exit on West 131st Street, thus avoiding curb cuts and truck circulation throughout the Project Area at individual buildings. All trucks would enter one central space on Level 5, where deliveries could be off-loaded and trash/garbage loaded up. A 20-foot-wide, two-way corridor would allow the freight to be distributed to or from every building. Fewer loading docks and curb cuts at grade would also improve pedestrian circulation and avoid interruption of active ground-floor uses.
- Parking, which would be located on Levels 1, 2, 3, 6, and 7, would be accessed via three curb cuts, one each on West 130th, West 132nd, and West 133rd Streets. There would be one additional curb cut on West 133rd Street for entry to the MTA Manhattanville Bus Depot reconstructed below grade. If separate parking was provided in each building, there would be many more curb cuts in Subdistrict A, including five separate entries/exits, plus a curb cut for access to the bus depot, and separate truck access for loading at 12 locations. This would result in a total of 18 curb cuts west of Broadway as compared with six curb cuts required for the central below-grade area for the Proposed Actions. In addition, a scenario that has parking only in the basements of the few buildings where deep enough basements could be constructed would not provide the number of spaces available in the central below-grade service area. With only conventional basements, satisfying parking demand on site would require that the cars be accommodated in above-grade parking structures, with a consequent loss of above-grade program space.
- The proposed central energy centers' large boilers would operate more efficiently than would individual boilers in all 12 buildings; they would use less fuel and produce proportionally lower air pollutant emissions than the sum of the smaller boilers. Also, larger boilers associated with central energy systems offer better environmental performance compared with smaller boiler systems, since the larger systems must be designed to meet more stringent federal, state, and local regulatory requirements.
- The below-grade space would allow the University to provide space for program elements that do not need windows, such as the swimming and diving center beneath Sites 9 and 10, and additional classroom and auditorium space for the Business School and other instructional programs.

In summary, the central below-grade service area would provide for shared academic research support space, minimize circulation of trucks and cars within the Project Area, and reduce the number of curb cuts and loading docks that would be the consequence of having to provide such access in each building. It would reduce use of fuel and related pollutant emissions in operation of the University area, and would provide needed program space for academic and athletic programs.

CONSTRUCTION SEQUENCING

Since the issuance of the DEIS, modifications have been made to the proposed scheduling and sequencing of construction within the Academic Mixed-Use Area). The reasonable worst-case development scenario for construction analyzed in the FEIS assumes that all new construction would initially occur on the three blocks between West 125th and West 131st Streets and Broadway and Twelfth Avenue. This would be the project's Phase 1, slated for completion in 2015. The first activity would be abatement of asbestos and other hazardous materials within existing buildings and demolition of above-grade structures on the blocks bounded by West 125th and West 129th Streets, West 129th and West 130th Streets, and West 130th and West 131st Streets. Portions of the block bounded by West 131st and West 132nd Streets would also be abated and demolished. During this time, West 130th Street would be closed to traffic and

pedestrians. Following abatement and demolition on these blocks, a slurry wall would be constructed to enclose the two blocks from the north side of West 129th Street to the south side of West 131st Street, and the soil excavated to allow for below- and above-grade construction. The Phase 1 above-grade buildings would include an academic research building on Site 2 along Broadway; two academic buildings adjacent to the west on Sites 3 and 4; and an approximately 11,800-sf landscaped open space (the Small Square) surrounding the building on Site 3. An academic building plus a small triangle of open space (the Grove) on Site 1 to the south between West 129th and West 125th Streets at Broadway and the mixed-use academic and University housing building on Site 7 would also be constructed at this time. Construction would also begin on the properties to the east of Site 7 on the block between West 130th and West 131st Streets (the Square—an approximately 40,000-sf privately owned, publicly accessible open space, the midblock open area, and Sites 6 and 6b). Based on this Phase 1 construction schedule, the buildings on Sites 1, 2, 3, 4, and 7 would be operational by 2015. In addition, the public open space proposed as partial open space mitigation would be constructed on the triangular Site 5 block by 2015, assuming that the site could be acquired in that time frame.

Properties on the block to the north (between West 131st and West 132nd Streets) would be in use to support these construction activities with land for staging of construction materials and equipment and other construction support. Columbia would also use properties it currently owns on a portion of Sites 8, 9, 15, and 17 for interim parking (see Figure 1-33).

After 2015, construction would continue into Phase 2. The buildings on Sites 6 and 6b, and the Square and midblock open area would be completed early in Phase 2. East of Broadway, renovations, begun in 2014, to allow for the reuse of the former Warren Nash Service Station building (Site 16) would be completed by mid-2016. In 2018, construction of the building on Site 17 would begin.

West of Broadway, construction would proceed northward to the block between West 131st and West 132nd Streets. West 131st Street would be closed to traffic and pedestrians at this time. Following abatement and demolition, the slurry wall would be extended, encircling the portion of the block from West 131st to West 132nd Streets, Broadway to Twelfth Avenue, west of the Studebaker Building. East of the building, the area would be too small for cost-effective slurry wall construction, and subsurface conditions would permit more conventional construction of this portion of deep basement. Construction of the below-grade facility, new buildings (on Sites 8, 9, and 10), and reconstruction of West 131st Street would follow. Construction on the western portion of the block between West 131st and West 132nd Streets, which contains a cooling station for underground equipment belonging to Con Edison, would be contingent upon Columbia entering into an agreement with Con Edison for relocating the cooling station; this agreement has not been reached. Such an agreement would require the approval of the New York State Public Service Commission (PSC) pursuant to Public Service Law (PSL) Section 70, and such approval by PSC would be subject to review under SEQRA. Columbia and Con Edison are considering relocation sites within the Academic Mixed-Use Area (Subdistrict A), and have preliminarily identified a portion of the former Warren Nash Service Station building as a potential location. In the event that a relocation site outside Subdistrict A is later selected, the environmental impact of this relocation will be assessed in the PSC SEQRA review.

Construction on the block between West 132nd and West 133rd Streets would begin after all of the construction directly to its south was completed.[1] West 132nd Street would be closed to traffic and

[1] As noted in Chapter 2, "Procedural and Analytical Framework," construction on this block would be delayed, if the building at 3291 Broadway on the corner of West 133rd Street and Broadway, which was

pedestrians at this time. Following abatement and demolition, the slurry wall would be extended. The slurry wall would be limited to the western half of this block, because bedrock is higher on the eastern half and the underground space can be built there without a slurry wall. Construction of the below-grade facility, new buildings (on Sites 11, 12, 13, and 14), and reconstruction of West 132nd Street would follow. Construction on the western portion of this block, which is occupied by the MTA Manhattanville Bus Depot, would be contingent upon Columbia entering into an agreement with MTA for modifying or reconstructing the Manhattanville Bus Depot; this agreement has not been reached. Such an agreement would involve a variety of MTA processes addressing a modification or reconstruction plan, including but not limited to SEQRA and/or the National Environmental Policy Act (NEPA) and Title VI of the U.S. Civil Rights Act of 1964. These processes would include review and analysis of the feasibility and environmental and other impacts of any proposed modification or reconstruction plan, as of the time such a plan was to be formulated prior to any implementation. To address a reasonable worst case, the EIS analyzes a scenario in which the bus depot remains in the Project Area at a below-grade location generally beneath its existing site with Columbia buildings developed above. In the event that a different bus depot plan would ultimately be pursued, additional environmental review of the new scenario may be required at that time.

The last building to be completed would be on Site 15. At that point (anticipated to be 2030), the Proposed Project would be fully constructed.

As discussed above, construction activities associated with the Proposed Actions would include temporary street and sidewalk closures. Side streets between Broadway and Twelfth Avenue in Subdistrict A—West 130th, West 131st, and West 132nd Streets—would be closed to vehicular traffic and pedestrians for up to three years when the slurry walls and below-grade facilities are being constructed. West 132nd Street would be closed for a period of up to five years—three years while the below-grade space is being constructed, followed by two years, when the street would be used for access and staging while the block between West 132nd and West 133rd Streets is under construction. Access to the waterfront would be provided at all times; other than for intermittent periods (i.e., hours) no more than one of these three streets (West 130th, West 131st, and West 132nd Streets) would be closed for construction at any one time.

RELOCATION SITES

The proposed Academic Mixed-Use Development Plan would result in the direct displacement of existing residential units in seven buildings and in two church properties in Subdistrict A. Six of the residential buildings are located on the Broadway frontage of Block 1999, between West 132nd and West 133rd Streets, and one is located one block to the south (Block 1998) on the south side of West 132nd Street, between Broadway and Twelfth Avenue. The Iglesia el Enquentro con Dios is located on West 130th Street and Broadway; the Iglesia de Dios Pentacostal is located on West 131st Street west of Broadway. The building on West 132nd Street and one of those on Broadway (Block 1999) are owned by the New York City Department of Housing Preservation and Development (HPD) in connection with its Tenant Interim Lease (TIL) Program, which provides assistance and training to organized tenant associations in occupied City-owned buildings of three or more dwelling units to develop economically self-sufficient, low-income, tenant-owned cooperatives. Two of the other Broadway residential buildings are owned and operated by Charles

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constructed under federal and City agreements that remain in force until 2015 and 2029, respectively, cannot be demolished until 2029. The description of construction activities would remain the same no matter when the construction takes place.

Inniss Housing Development Fund Corporation, a subsidiary of the Harlem Congregations for Community Improvement, Inc. (HCCI). This HCCI project is funded by the City of New York and State of New York Homeless Housing Assistance Program (HHAP) and is subject to regulations which impose restrictions on the maximum rents within the buildings. Another two of the Broadway residential buildings are owned and operated by the WHGA Renaissance Apartments, Limited Partnership, a subsidiary of West Harlem Group Assistance (WHGA). This WHGA project is funded by the City of New York and Low Income Housing Tax Credits and is also subject to a regulatory agreement which imposes restrictions on the maximum rents within the buildings.

In order to be able to offer replacement housing to those displaced from the six buildings (HCCI, WHGA, HPD) described above and one of the church properties described above, Columbia has acquired control of three sites outside of the Project Area (see Figure S-1). Housing on the replacement sites would be of the same or better quality than those occupied by tenants in these six buildings at the same rents. Tenants would be able to relocate from the Project Area buildings, or from interim housing, when their new housing is ready for occupancy, which could occur prior to the 2015 analysis year.

Two of the relocation sites are located in Community Board 9: at 3581 Broadway, on the southwest corner of West 148th Street; and 555 West 125th Street, on the northeast corner of Old Broadway and West 125th Street. Tenants in the HPD buildings would be offered relocation apartments in the new building at 3581 Broadway; those tenants in the TIL program would be able to purchase their units in the new building. This building would also offer relocation space to the Iglesia el Enquentro con Dios, which would be displaced from its current location on the northwest corner of West 130th Street and Broadway, and would also replace the two units that are on the church property. Tenants in the WHGA buildings would be offered relocation units at 555 West 125th Street.

Tenants in the HCCI buildings would be offered relocation apartments in the new building at the third relocation site, located in Community Board 10 at 322-328 St. Nicholas Avenue and 319 West 126th Street, on the east side of St. Nicholas Avenue between West 126th Street and West 127th Street. Occupants of the units in the second church would be relocated to new residential units within the planned church building at its relocation site.

The seventh residential building is a privately owned apartment building at 600 West 133rd Street, for which Columbia has entered into a contract to purchase. The units in this building are subject to federal and City regulatory agreements which expire in 2015 and 2029, respectively. Before start of construction on that site under the Academic Mixed-Use Development Plan, ESDC would require that equal or better housing be provided for the tenants occupying these units.

A description of the replacement housing is also provided in Chapter 4, "Socioeconomic Conditions," and an analysis of the potential environmental impacts that could result from the construction and operation of the off-site new residential and mixed-use buildings is provided in Appendix B.2.

TRANSPORTATION IMPROVEMENTS

The Proposed Project would provide improvements at a number of study area intersections to maintain the safe and efficient vehicular and pedestrian flows and to avoid potential traffic impacts. These improvements—which include circulation/street directional changes, roadway reconfigurations, pavement markings, new crosswalks, new signals and signal retimings, and

other changes to ease the movement of vehicles and people through the study area, as described in detail below under "Q. Traffic and Parking"—will be subject to New York City Department of Transportation (NYCDOT) approval.

PROJECT APPROVALS

The Proposed Actions would entail a number of City and State approvals. Several of these are discretionary actions requiring review under CEQR and SEQRA. Others are ministerial and do not require environmental review; nonetheless, these are subject to review under each relevant agency's public mandate, as discussed below.

NEW YORK CITY ACTIONS

- Zoning Text amendment to establish a Special Manhattanville Mixed-Use Zoning District coterminous with the Project Area.
- Changes to zoning sectional maps 5c and 6a (1) to map a Special Manhattanville Mixed-Use Zoning District coterminous with the Project Area and (2) change underlying zoning districts, which are subject to ULURP.
- City approval pursuant to Section 14 of the UDC Act of dispositions of City-owned property to ESDC (City-owned property currently operated by MTA and property under the jurisdiction of the New York City Department of Housing Preservation and Development); and
- City approval of the transfer of HPD restrictions from HCCI and WHGA projects to replacement housing sites.

STATE-REQUIRED ACTIONS

- Adoption of a GPP by the ESDC and the making of related findings under the Urban Development Corporation Act,[1] SEQRA, and the Eminent Domain Procedure Law (EDPL).
- Pursuant to the GPP, and after the conduct of a public hearing, the acquisition of property by ESDC either through the exercise of its power of eminent domain, in the discretion of the ESDC directors, or otherwise under the UDC Act, and the subsequent disposition of such property by ESDC to Columbia for project development.
- Pursuant to a GPP, ESDC override of the City map with respect to certain below-grade areas of West 130th, West 131st, and West 132nd Streets and adjacent streets (for tie-backs and other structural supports) within the Academic Mixed-Use Area of the Special Manhattanville Mixed-Use District.
- New York State Department of Environmental Conservation (DEC) permit for construction and operation of the central energy plants.
- DEC State Pollutant Discharge Elimination System (SPDES) permit for stormwater discharges into the Hudson River through a connection to an existing outfall.

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[1] The New York State Urban Development Corporation (UDC) was established by the New York State Legislature in 1968 as a corporate governmental agency for the purposes of acquisition and construction on industrial, manufacturing, and commercial sites for the purpose of cultural, educational, or recreational facility use. UDC was granted the authority to acquire property from any individual or entity by purchase, condemnation, or other means.

- MTA/New York City Transit (NYCT) approval of the modification of the MTA Manhattanville Bus Depot and any temporary relocation of this bus depot during construction, as well as of the relocation of the MTA 131st Street Shop on Block 1997 Lot 6.
- PSC approval pursuant to Public Service Law Section 70 for the sale and relocation of the Con Edison facility on West 132nd Street located on Block 1998 Lot 49.
- HHAP approval of the development plan for the replacement housing building, the release of the lien on the existing building, and the transfer of funds to the replacement site.

CITY AND STATE APPROVALS NOT SUBJECT TO CEQR OR SEQRA

Others approvals do not require environmental review; nonetheless, they are subject to review under each relevant agency's public mandate:

- Public Authorities Control Board approval of ESDC actions.
- New York City Department of Environmental Protection (DEP) approval for an Amended Drainage Plan, a Private Drain Plan, and construction and operation of the central energy plants.
- NYCDOT approval for the proposed transportation improvements.
- NYCDOT permits/approvals to build within and rebuild West 130th, West 131st, and West 132nd Streets above the Academic Mixed-Use Development below-grade support facility.
- NYCDOT, Division of Franchises, Concessions, and Consents possible approval for revocable consent.
- The Proposed Actions are within the boundaries of the coastal zone, and will require a determination of consistency with New York City's Local Waterfront Revitalization Program (LWRP) from CPC.

B. PROCEDURAL AND ANALYTICAL FRAMEWORK

The process necessary to implement the Proposed Actions and an overview of the analytical framework used to guide the technical analyses are presented below.

ENVIRONMENTAL REVIEW PROCESS

This EIS (EIS) has been prepared in accordance with SEQRA and CEQR. The review process allows decision-makers to evaluate a proposed project's environmental effects, evaluate reasonable alternatives, and identify measures to mitigate significant adverse effects. The process also facilitates public involvement by providing the opportunity to comment on the Draft EIS (DEIS).

To help the public understand the environmental consequences of the agencies' decision-making, and to give the public an opportunity to participate, all discretionary decisions of an agency to approve, fund, or directly undertake an action, where that agency can exercise discretion over environmental concerns, are subject to review under SEQRA/CEQR. Discretionary decisions involve choices to be made by the decision-makers that determine whether and how an action is to be taken. Discretionary actions by CPC, the New York City Council, UDC (doing business as ESDC), the Public Service Commission (PSC), and DEC

would be required. For the Proposed Actions, two key public processes are required: (1) ULURP[1] and (2) GPP review and approval.

The ULURP process begins with certification by CPC that the ULURP application is completed. The application is then referred to the Community Board in which the project takes place (for the Proposed Actions, Manhattan Community Board 9, or "CB9"). CB9 has up to 60 days to review the proposal, hold a public hearing, and adopt a resolution regarding the proposal. Next, the Borough President has up to 30 days to perform the same steps. CPC then has up to 60 days to approve, disapprove, or approve with modifications, and during that time, a ULURP public hearing is held. When a DEIS accompanies the ULURP application, as with this proposal, the CEQR public hearing is held jointly with the ULURP hearing. (CPC held a public hearing on the DEIS at City College of New York, Aaron Davis Hall, 138 Convent Avenue at West 135th Street in Manhattan, on October 3, 2007. The period for the public to submit written comments remained open until October 15, 2007.) Comments made at the DEIS public hearing are incorporated into an FEIS; the FEIS must be completed at least 10 days before any action by CPC on the ULURP application. In the event of an approval or an approval with modifications, CPC forwards the application to the City Council, which has 50 days to review it (subject to extension to 65 days in the event the Council were to propose modifications). Following the Council's vote, the Mayor, at his discretion, may choose to veto the action. The City Council can override that veto.

The GPP approval process is generally as follows: ESDC initially adopts a GPP and makes it available for public review and comment, including a public hearing. After the hearing, the ESDC Board may affirm, reject, or modify the GPP. As an involved agency, ESDC must make formal findings under SEQRA relating to the Proposed Actions before it can adopt the GPP. The Proposed Actions contemplate that ESDC may acquire property through the use of the eminent domain process. As set forth in EDPL, upon demonstrating a public use, benefit, or purpose and need for acquiring property, and working through a highly regulated process of determining the value of the land to be acquired, the property may be acquired and then transferred to a public agency. This process will also include meeting local and State standards with respect to relocation assistance for affected residents and businesses. The use of eminent domain is discretionary and is therefore subject to SEQRA.

FRAMEWORK FOR ENVIRONMENTAL ANALYSIS

ANALYSIS SCOPE, ANALYSIS YEARS, AND STUDY AREAS

An EIS analyzes the effects of a proposed action on its environmental setting. Each technical chapter includes: a description of existing conditions, an assessment of conditions in the future without the Proposed Actions ("No Build") for the future year that the Proposed Actions would be completed, and an assessment of conditions for the same future year with the completion of the Proposed Actions. The evaluation of the Proposed Actions' effects is made for the "analysis year" or the "Build year," which is the year when a project would be substantially operational. Since the Proposed Actions would be developed or implemented over 25 years, two analysis years, 2015 and 2030, are analyzed. That is, conditions in the future without the Proposed

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[1] The zoning map amendments associated with the proposed Manhattanville in West Harlem Rezoning and Academic Mixed-Use Development are subject to the City's ULURP. Zoning text amendments are not subject to ULURP, but are subject to review by CPC and City Council under Sections 200 and 201 of the New York City Charter, and will be reviewed concurrently with ULURP applications.

Actions are evaluated against conditions in the future with the Proposed Actions for each analysis year.

For the construction analysis, several analysis years were selected to address conditions during construction prior to 2015 (completion of Phase 1), and conditions between 2015 and 2030 (Phase 2). For the purposes of assessing the reasonable worst-case development scenario for the Proposed Actions, it is anticipated that all of the projected development for Subdistrict B and the Other Areas would be completed by 2015, the year that Phase 1 of development in the Academic Mixed-Use District (Subdistrict A) is assumed to be completed. Thus, the Phase 1 construction analysis years would address peak construction in Subdistrict B and the Other Areas, plus construction of Phase 1 in Subdistrict A. The analysis years for construction between 2015 and 2030 would address conditions likely to have the greatest impact. From 2015 to 2030, construction would proceed northward through the Academic Mixed-Use District, so that the last block of construction would be between West 132nd and West 133rd Streets. "Background" conditions at this time would include traffic and other effects of nearly all of the proposed development for Subdistrict A, and the redevelopment assumed for Subdistrict B[1] and the Other Area east of Broadway. This development is assumed to be completed in 2029. The construction analysis years are selected to address the worst-case impacts for the discrete technical areas being analyzed. ("U. Construction," below, describes the likely construction schedule and evaluates the Proposed Project's construction-related impacts.)

For each technical area in which impacts may occur, a study area is defined for analysis. This is the geographic area likely to be affected by the Proposed Actions for a given technical area, or the area in which impacts of that type could occur. Appropriate study areas differ depending on the type of impact being analyzed. Often it is appropriate to use primary and secondary study areas: the primary study area is closest to the Project Area and, therefore, is most likely to be affected; the secondary study area is farther away and receives less detailed analysis. It is anticipated that the direct principal effects of the Proposed Actions would occur within the Project Area. The methods and study areas for addressing impacts are discussed in the individual technical analysis sections presented later in this Executive Summary.

DEFINING BASELINE CONDITIONS

This FEIS describes "existing conditions" for 2006 and assessments of future conditions without the Proposed Actions ("future without the Proposed Actions") and with the Proposed Actions ("probable impacts of the Proposed Actions") in 2015 and 2030. The existing conditions assessment establishes a baseline to predict future conditions. The future without the Proposed Actions condition adds to that baseline changes expected at various time periods in the future. For the most conservative analysis, the future without the Proposed Actions condition incorporates known development projects likely to be built by the analysis years independent of the Proposed Actions. Projects and public policy initiatives likely to be built by 2015 are presented in Table S-4 and shown in Figure S-7. There are no specific developments proposed or under construction for 2030 in the study area.

[1] As described earlier, CPC is contemplating certain modifications to Subdistrict B that would not result in any projected development sites in Subdistrict B. The proposed modifications are more fully described in Chapter 29, "Modifications to the Proposed Actions."

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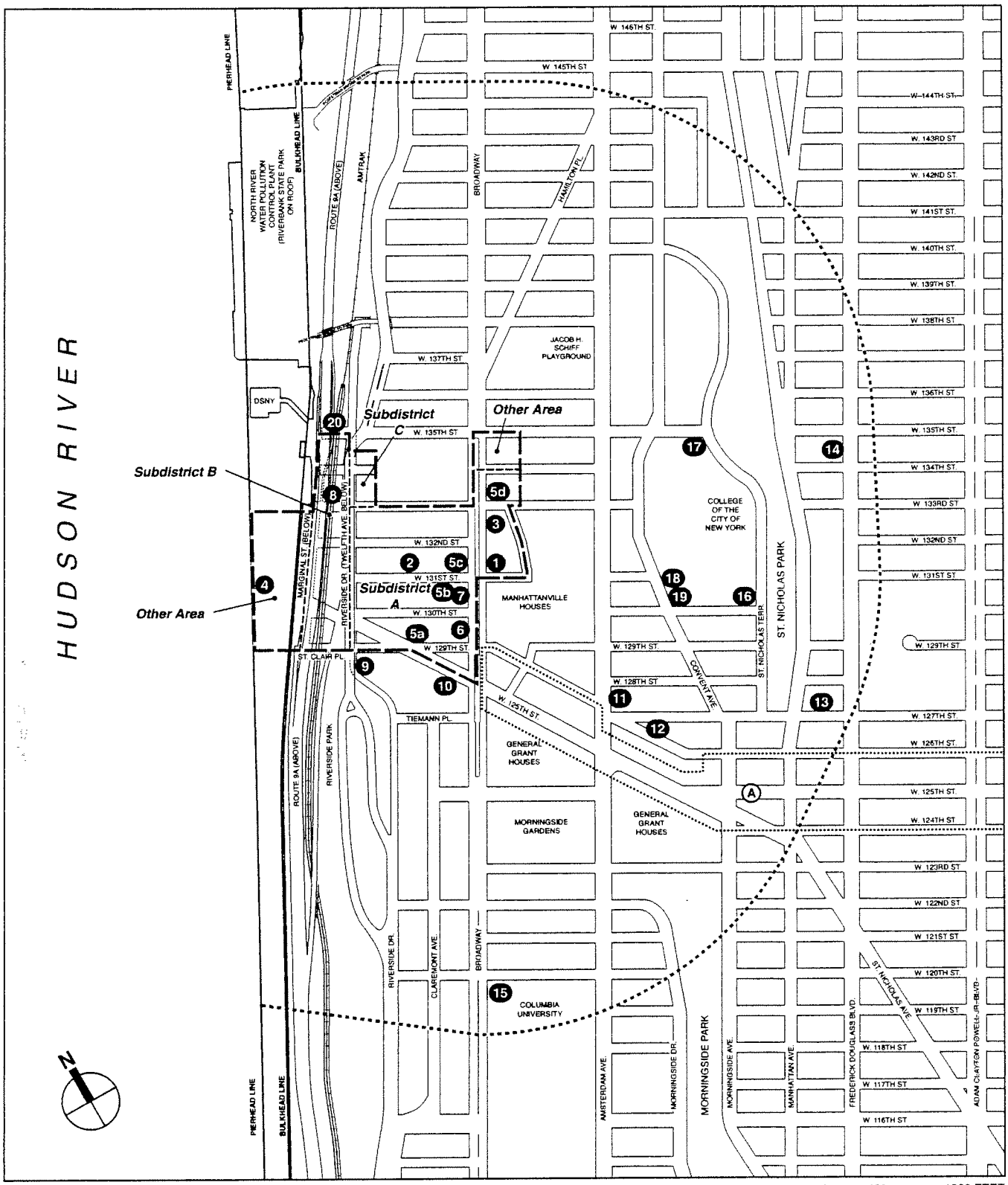

Project and Rezoning Area Boundary

Zoning Subdistrict Boundary

1/2-Mile Perimeter

Area-Wide Rezoning Project

Development Projects (2015)
Note: See Table S-4 for description of each project

Note: There are no specific developments proposed or under construction for 2030

Figure S-7

Future Without the Proposed Actions: Developments Proposed or Under Construction for 2015

MANHATTANVILLE IN WEST HARLEM REZONING AND ACADEMIC MIXED-USE DEVELOPMENT

Table S-4

Development Under Construction or Proposed in the Project and Study Areas Expected to Be Completed in the Future Without the Proposed Actions

Map No.[1]	Project Name/Address	Development Proposal/Program	Build Year[2]
1	Science, math, and engineering secondary school (grades 6-12) and Columbia University office space: east side of Broadway and West 132nd Street	90,000 sf; Approximately 650 students and 35 faculty/administrators 127,296 sf office space for Columbia University	2015
2	Columbia University, Studebaker Building615 West 131st Street	Conversion to 220,500 sf administration uses	2008
3	Columbia University, former Warren Nash Service Station building (3280 Broadway)	Conversion to 207,710 sf office space for Columbia University	2015
4	West Harlem Waterfront park Hudson River between St. Clair Place and West 133rd Street	Creation of waterfront destination with new piers, open space, gateway plaza, multi-purpose building (40,000 sf), landscaped areas (approx. 2.26 acres), and new pedestrian/bicycle way (9,995 sf); relocation of Fairway parking lot to upland location	2008
5a	655 West 125th Street rezoning from M1-2 to C6-2 (Block 1996, Lot 56)	Existing storage use and building to be demolished. New residential development. 80 residential units, 19,100 sf of retail; 19,100 sf community facility, and 32 parking spaces[3]	2009
5b	614 West 131st Street rezoning from M1-2 to C6-2 (Block 1997, Lot 44)	Existing storage use and building to be demolished. New residential development. 42 residential units, 12,000 sf community facility[3]	2009
5c	3261 Broadway rezoning from M1-2 to C6-2 (Block 1998, Lot 29)	Existing storage use and building to be demolished. New residential development. 113 residential units, 16,000 sf retail, 16,000 sf community facility, and 100 parking spaces[3]	2009
5d	3300 Broadway rezoning from M1-2 to C6-2 (Block 1987, Lot 1)	Existing commercial uses and building to be demolished. New residential development. 125 residential units, 19,600 sf retail, 19,600 sf community facility, and 100 parking spaces[3]	2009
5e	3320 Broadway rezoning from M1-2 to C6-2 (Block 1988, Lot 1)	Landmarked portion, Claremont Theater: rehabilitation and floor area transferred. Remainder of building: demolished. New residential development. 103 residential units, 19,800 sf retail; 19,800 sf community facility; 103 parking spaces	2009
6	3229 Broadway Rezoning	Conversion first floor to retail (4,733 sf), conversion floors 2-6 for residential and additional new floors 7-10 for residential, for total of 18 residential units	2008
	3247 Broadway Rezoning[5]	Not applicable	
8	2346 Twelfth Avenue/Hudson River Café	New 2,787-sf restaurant and outdoor seating area	2007
9	Columbia University, 560 Riverside Drive	Building a new entrance along West 125th Street	2010
10	Columbia University, new academic building at southwest corner of Broadway and West 125th Street	250,840-sf academic building	2010
11	Mink Building Amsterdam Avenue between West 126th and West 128th Streets	Conversion of approximately 120,000 sf to office space	2007

Table S-4 (cont'd)

Development Under Construction or Proposed in the Project and Study Areas Expected to Be Completed in the Future Without the Proposed Actions

Map No.[1]	Project Name/Address	Development Proposal/Program	Build Year[2]
12	Citarella (former Taystee Factory) West 126th Street between Morningside and Amsterdam Avenues	80,000 sf renovation, to include corporate offices, warehouse/storage area, food preparation/packaging/shipping, and some retail	2007
13	West 127th Street HPD Cornerstone Development	200 residential units, 40,000 sf commercial	2010
14	Strivers Gardens Frederick Douglass Boulevard between West 134th and West 135th Streets	170 residential units, 37,000 sf commercial space	2006[6]
15	Columbia University, academic/research building at southeast corner of Broadway and West 120th Street	170,000-sf academic/research building	2010
16	City College, new dormitory St. Nicholas Terrace and West 130th Street	180,000-sf (600-bed) student residence with housing for up to five faculty members	2006[6]
17	City College, School of Architecture	Conversion of 65,550 sf of space into a new School of Architecture, Urban Design and Landscape Architecture	2008
18	City College, new instructional research building on south campus	New 55,000-sf building for the Science Division	2009
19	City College, new research building on south campus	190,000-sf new CUNY science facility	2010
20	701 West 135th Street	Renovation of 2,386 sf of commercial space (currently vacant)	2007
A	125th Street Corridor Rezoning and Related Actions	260 residential units (52 affordable), 71,632 sf retail, 103,958 sf office, 11,890 sf community facility within ½ mile of Project Area (west of Frederick Douglass Boulevard)	2017[4]

Notes:

1. See Figure 2-1.
2. There are no specific developments proposed or under construction for 2030.
3. Residential reasonable worst-case development scenario as identified by that rezoning applicant in EAS documents dated July 2007.
4. Development will be assumed for the 2015 analysis year for this EIS.
5. The rezoning application for 3247 Broadway was included in the DEIS (Site 7 in Table 2-1 of the DEIS). Columbia University has since purchased the property. Although the EAS and rezoning application for this property has not been revised to reflect this new ownership, Columbia does not intend to move forward with this separate rezoning application.
6. The data collection efforts to establish some of the baseline conditions for the Proposed Actions were conducted in 2006. Several of the projects listed above have subsequently been completed since publication of the DEIS. Those projects have been updated in the existing conditions descriptions of various study areas in the technical chapters of the FEIS. For key quantitative technical analyses including traffic and transportation, noise, and air quality, the projects presented in Table 2-1 are not included in the existing conditions framework, but rather included in the 2015 future conditions analyses.

Sources:

New York City Economic Development Corporation, New York City Department of City Planning, Manhattan CB9, New York City Department of Housing Preservation and Development, *New York Construction*, March 2004; Columbia University; City College; *West Harlem Waterfront EAS*, August 2005; *Zoning Map Amendment 3261 Broadway EAS*, July 2007; *Zoning Map Amendment 3300-3320 Broadway EAS*, July 2007; *Zoning Map Amendment 655 West 125th Street EAS*, July 2007; *Zoning Map Amendment 614 West 131st Street EAS*, July 2007; *3229 Broadway Rezoning EAS*, July 2007; *125th Street Corridor Rezoning and Related Actions DEIS*, October 2007.

For some technical areas, a background growth factor is added to reflect a general increase in activity unrelated to known projects in addition to anticipated future projects. Other future

changes that will affect the environmental setting are considered as well, such as technology changes (e.g., advances in vehicle pollution control and roadway improvements) and changes to City policies, such as zoning regulations. In examining the project's potential environmental impacts, this FEIS analyzes the program as summarized above in "A. Project Description."

Generally, baseline conditions in the future with the Proposed Actions include all of the No Build projects (see Table S-4 and Figure S-7) as background conditions, except those proposed for sites in the Project Area. In this case, however, with the Proposed Actions, the public secondary school for science, math, and engineering (No. 1 in Figure S-7) would not be built in the Project Area on the east side of Broadway (as noted in Table S-4), and so it would likely be located on the south side of West 125th Street west of Broadway, on a site controlled by Columbia University. The Columbia building planned for that site (the south side of West 125th Street west of Broadway) in the future without the Proposed Actions would be modified to include the school in its base.

DEFINING THE ACTION FOR ENVIRONMENTAL ANALYSIS

The Proposed Actions would change the development potential of sites within the Project Area consistent with the Special Manhattanville Mixed-Use Zoning District and the GPP, and a range of new development is likely to occur within the Project Area. For analysis purposes, therefore, likely reasonable development scenarios that could result from the proposed land use control changes were first identified. From this range of reasonable development scenarios, the one with the worst environmental effect was chosen for each technical impact analysis—thus creating a "reasonable worst-case development scenario" tailored to each analysis.

The proposed zoning changes would allow development of buildings with new uses and density, and change the development potential of sites in the Project Area consistent with the Special Manhattanville Mixed-Use Zoning District and the GPP. For analysis purposes, therefore, the likely reasonable development scenario with the worst environmental effect that could result from the proposed land use control changes was chosen for each technical impact analysis, creating a "reasonable worst-case development scenario" tailored to each analysis. This FEIS assesses the development scenarios that could reasonably be constructed over a 22-year period for each subdistrict of the proposed Special Manhattanville Mixed-Use Zoning District. In addition, Appendix A.2 includes a conceptual analysis of the environmental impacts that could occur if one or more authorizations and Special Permits for transfer of development rights within Subdistrict A were to be approved.

Academic Mixed-Use Area (Subdistrict A)

For many of the technical areas assessed, the Illustrative Plan for the Academic Mixed-Use Development, described above in "A. Project Description," would be the reasonable worst-case development scenario for the Academic Mixed-Use Area (Subdistrict A). Because of the possibility that the actual development would differ from the Illustrative Plan, several categories of technical analysis have been analyzed assuming maximum and minimum uses of allowable floor areas where such uses would have impacts greater than those that would result with the Illustrative Plan. The maximum and minimum values, shown above in Table S-2, frame the outer limits of the program elements that may be built in the future. Although maximum and minimum ranges may be used, the development in the Academic Mixed-Use Area would not, under any circumstances, exceed 6,760,673 gsf. Accordingly, the reasonable worst-case development scenario for any technical area would not exceed the total development of the Illustrative Plan (6,760,673 gsf). The GPP will fix these minimum and maximum floor areas, thereby ensuring that future development would be consistent with the analyses in the EIS.

Subdistricts B, C, and the Other Areas

In Subdistricts B, C, and the Other Areas, new uses and uses with greater densities may develop as a result of the proposed rezoning. Therefore, this FEIS also considers a reasonable worst-case development scenario for the sites in Subdistrict B, C, and the Other Areas (see Table S-5 and Figure S-8). Although the actual future development for these areas is unknown, its potential characteristics are considered for analysis purposes. Regardless of what is actually developed for Subdistricts B, C, and the Other Areas, the impacts would be no worse than those considered in the FEIS for the reasonable worst-case development scenario.

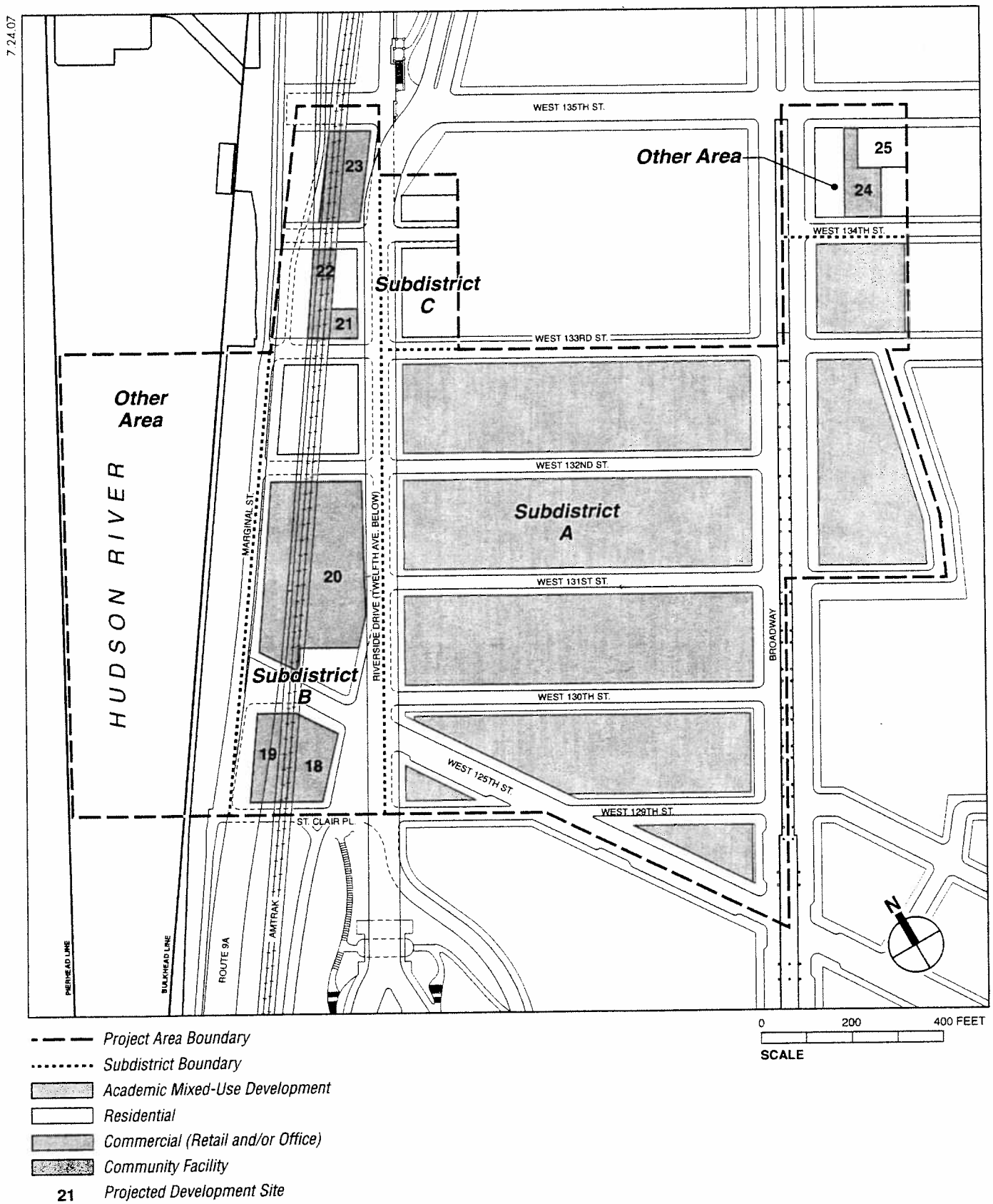

Figure S-8

Subdistricts B, C, and the Other Areas: Reasonable Worst-Case Development Scenarios

Table S-5

Subdistrict B and the Other Areas: Projected Development Sites

	Site Description		Existing						Future with the Proposed Actions					
Site Ref[1]	Block: Lot(s)	Lot Area[2]	Existing Use	Existing Zoning District	Built FA	Built FAR	Permitted FA	Permitted FAR	Proposed Zoning District	Permitted FAR	Maximum Floor Area by Use (SF)	Floor Area Total (SF)	Incremental Development (SF)	Comments
18	2004: 12	12,196	Wholesale, auto repair	M1-2	24,392	2.0	24,392	2.0	C6-1	2.0	12,196 office 12,196 retail	24,392	0.0	Redeveloped as first floor retail, second floor office
19	2004: 8	18,750	Warehouse, parking	M1-2	563	0.03	37,500	2.0	C6-1	2.0	18,750 retail	18,750	18,188	Only enough clearance under highway overpass for one story retail
20	2004: 46, 50, 65, 68, 71, 72, 171	74,800	Commercial, warehouse, and parking	M2-3	26,180	0.35	149,600	2.0	C6-1	2.0	74,500 retail 35,000 office	109,500	83,320	35,000 sf of lot east of and 39,800 sf under highway overpass. Ground- floor retail and second floor office east of overpass and one-story retail west of overpass
21	2005: 12	4,312	Auto repair	M1-1	4,312	1.0	4,312	1.0	C6-1	2.0	4,312 retail 4,312 office	8,624	4,312	Retail ground floor, office above
22	2005: 9	17,125	Storage, vacant	M1-1	17,960	1.0	17,125	1.0	C6-1	2.0	11,138 retail 17,960 storage	29,098	11,138	Existing building remains. 1-story retail on vacant area.
23	2005: 32	15,670	Warehouse with billboard and vacant areas	M1-1	3,000	0.2	15,670	1.0	C6-1	2.0	3,300 retail 3,300 office	6,600	3,600	Ground floor retail, office above on 3,300 sf portion east of highway overpass. Low headroom and lack of access to develop under highway overpass. Warehouse stays to keep highway billboard.
	Subtotal				**76,407**		**248,599**					**196,964**	**120,558**	
							Other Area East of Broadway							
24	1988: 60	9,492	Health center	M1-2	18,829	2.0	18,984	2.0	R8A	6.5 Com. Fac., 6.02 Res	61,698 community facility	61,698	42,869	Health center could expand to maximum 6.5 FAR
25	1988: 53[3]	15,987	Office	M1-1; R7-2	43,000	2.7	70,982	1.0 (M1-1) 3.44 (R7-2)	R8A /R7-2 (existing)[3]	6.02 (R8); 3.44 (R7-2)	88,819 res.	88,819	45,819	Use additional 11,912 floor area available from adjacent Lot 8.
		Subtotal			**61,829**		**89,966**					**150,517**	**88,688**	
		TOTAL			**138,236**		**338,565**					**347,481**	**209,246**	

Notes:

FA = floor area

There are no projected development sites in Subdistrict C.

1. Site reference corresponds to Figure 2-2.
2. Based on preliminary estimates of lot area from New York City Department of Finance's Real Property Assessment Database (RPAD) and calculated ZFA.
3. Lot is split in two zoning districts. The western portion of the lot is located in the Project Area in an M1-1 district, and the eastern portion is located in an R7-2 district outside of the Project Area. As a result of the Proposed Actions, the western portion of the lot would be rezoned to R8A, and therefore the entire lot could potentially be redeveloped for residential uses.
4. Lot could receive 11,912 sf of additional floor area from adjacent lot (Lot 8), which is part of an existing residential building that would be rezoned to R8A.
5. Future without the Proposed Actions condition is anticipated to be a continuation of existing conditions.

REASONABLE WORST-CASE DEVELOPMENT SCENARIO: PROJECT AREA SUMMARY

As shown in Table S-6, the reasonable worst-case development scenario assumes that in 2015, there will be approximately 1.74 million gsf of new development in the Project Area, with nearly 1.41 million gsf attributable to the Academic Mixed-Use Development/Subdistrict A, and approximately 0.33 million gsf attributable to Subdistrict B and the Other Areas. By 2030, the reasonable worst-case development scenario assumes that development in Subdistrict A will increase to approximately 6.8 million gsf, for a total of approximately 7.1 million gsf in the overall Project Area. For Subdistrict A, the Illustrative Plan is used to array the breakdown of floor area by land use; as noted above (and in the table footnote), this breakdown would not be the same for the reasonable worst-case development scenario in all technical areas. However, the total floor area for Subdistrict A remains the same for all impact analyses.

Table S-6
Project Area Reasonable Worst-Case Development Scenario

Proposed Manhattanville Mixed-Use Zoning Subdistrict	2015 (Gross Square Feet)	2030 (Gross Square Feet)
Subdistrict A – Illustrative Plan[1]		
Community Facility Uses		
Academic research	351,310	2,596,957
Academic	532,840	1,225,528
Housing for graduate students, faculty, and other employees	158,840	509,200
Recreation	0	250,713
Commercial Uses		
Active ground-floor uses	60,449	162,618
Support Uses (Below Grade)		
Academic research support	58,563	296,201
Below-grade program	69,830	69,830
Central energy plant	50,870	70,199
Ramps, mechanical, freight, egress, switchgear, and loading	94,638	429,163
Storage	31,294	189,225
Parking	0	785,608
Swimming and diving center	0	145,431
Subtotal	**1,408,634**	**6,760,673**
Subdistrict B (Non-Columbia Development)		
Commercial Uses		
Retail	124,196	124,196
Office	54,808	54,808
Subtotal	**179,004**	**179,004**
Subdistrict C[2] (Non-Columbia Development) Subtotal	**0**	**0**
Other Areas		
Residential (99 units)	88,819	88,819
Community facility	61,698	61,698
Subtotal	**150,517**	**150,517**
Total	**1,738,155**	**7,090,194**

Notes:

1. The Academic Mixed-Use Development Illustrative Plan would be the reasonable worst-case development scenario for many of the technical areas assessed in the EIS, except for socioeconomic conditions, community facilities, open space, shadows, urban design and visual resources, infrastructure, traffic and parking, transit and pedestrians, air quality, and noise.
2. There are no projected development sites in Subdistrict C.

MITIGATION

CEQR requires that any significant adverse impacts identified in the EIS be minimized or avoided to the fullest extent practicable, given costs and other factors. In the DEIS, options for mitigation can be presented for public review and discussion, without the lead agency having selected those for implementation. Where no practicable mitigation is available, the EIS must disclose the potential for unmitigated significant adverse impacts.

Where such impacts have been identified in this FEIS—on socioeconomic conditions (indirect residential displacement), open space (indirect impacts), historic resources, shadows, traffic, parking, subway stations, bus line haul, noise, and construction traffic and noise—specific mitigation measures have been examined or identified that have the potential to minimize or eliminate the significant adverse impacts, and are discussed below. The effect of proposed traffic mitigation measures on air quality is also discussed. Since issuance of the DEIS, certain mitigation measures for areas in which significant adverse impacts were identified have been further refined and are presented in greater detail in Chapter 23, "Mitigation," of the FEIS.

ALTERNATIVES

"W. Alternatives," below, summarizes the assessment of several alternatives to the Proposed Actions. CEQR and SEQRA require that a description and evaluation of the range of reasonable alternatives to the action be included in an EIS at a level of detail sufficient to allow a comparative assessment of the alternatives to a proposed action. If a feasible alternative that eliminates or minimizes adverse impacts is identified, the lead agency may want to consider adopting that alternative as the proposed action. CEQR/SEQRA requires consideration of a "No Action Alternative," which evaluates environmental conditions that are likely to occur in the future without the proposed action. In addition to the No Action Alternative, the analysis considers three other types of development scenarios: alternatives to reduce or avoid significant impacts; two planning alternatives (the CB9 197-a Plan Alternative, analyzed pursuant to a request made by Community Board 9, Manhattan), and the Expanded Infill Alternative; and a design alternative (Cogeneration Energy Supply Alternative). The "Alternatives" chapter also includes a discussion of alternatives considered and eliminated from consideration because they did not meet the goals and objectives of the Proposed Actions. These include construction of new University facilities on top of the existing above-grade bus depot, and an Infill Alternative.

C. LAND USE, ZONING, AND PUBLIC POLICY

The Proposed Actions would improve conditions in and be generally consistent with public policies for the Project Area, primary study area, and secondary study area. No significant adverse impacts on land use and zoning would result.

The FAR and use restrictions under the current zoning are not conducive to redevelopment and economic growth. The Proposed Actions are intended to provide the zoning and land use changes to revitalize Manhattanville and allow Columbia University to develop a new Academic Mixed-Use Development for its long-term growth needs.

The Proposed Actions' new uses would create a vibrant, mixed-use neighborhood in an area virtually devoid of open spaces and generally characterized by auto repair businesses, parking lots, moving and storage facilities, and sites with low-density commercial or industrial buildings. The active ground-floor uses, as required by the proposed Special Manhattanville Mixed-Use Zoning District, located along West 125th Street, Twelfth Avenue, and Broadway, would create compatible uses along these commercial corridors and, in combination with the proposed zoning

urban design requirements such as widened sidewalks and open space, would serve to connect these blocks to the residential neighborhoods along Broadway to the north and south. The projected commercial development that would be built on the west side of Twelfth Avenue in Subdistrict B[1], along with the active ground-floor uses on the east side of Twelfth Avenue in Subdistrict A, would draw new activity and pedestrians along Twelfth Avenue and link the upland neighborhoods with the West Harlem Waterfront park. The Proposed Actions would create lively and attractive streets, improve the pedestrian experience in the Project Area, and enhance pedestrian access to the waterfront.

As described above, the worst-case development scenario assumes that the Proposed Actions would be well under way by 2015, with five sites of the Academic Mixed-Use Development (Subdistrict A) in operation, including academic, academic research, and University housing uses, and anticipated development in other subdistricts completed, including new retail, office, and residential redevelopment. This FEIS conservatively assumes that the all of the Academic Mixed-Use Development in Subdistrict A would be completed by 2030.

Overall, the Proposed Actions would promote redevelopment of the Project Area, including the portion adjacent to the waterfront, and would be generally consistent with public policy throughout the Project Area, primary study area, and secondary study area. The Proposed Actions would be consistent with a number of the goals and objectives of the West Harlem Master Plan, but would not advance all of its recommendations. However, given the nature of the plan, which sets forth broad goals and objectives for Manhattanville, rather than specific regulations, these inconsistencies are not considered significant adverse impacts for CEQR purposes.

D. SOCIOECONOMIC CONDITIONS

As summarized below, by 2015, with the socioeconomic reasonable worst-case development scenario, the Proposed Actions would not cause any significant adverse impacts as measured by the five socioeconomic areas of concern in the *CEQR Technical Manual*. By 2030, there would be the potential for a significant adverse impact related to indirect residential displacement, limited to the primary study area. Columbia proposes to partially mitigate this impact through several means. Development resulting from the Proposed Actions would generate substantial economic benefits for New York City and State.

DIRECT RESIDENTIAL DISPLACEMENT

The Proposed Actions would not result in significant adverse impacts due to direct residential displacement. Although by 2030 all residents from the 135 housing units located in the Academic Mixed-Use Area would be displaced (it is estimated that 298 residents currently occupy those housing units), the number and types of people displaced would not be enough to alter neighborhood character.

Columbia has acquired control of three sites outside of the Project Area (but within the study areas) to provide relocation sites for new, permanent, and affordable replacement housing buildings for tenants directly displaced from existing residential buildings in Subdistrict A of the Project Area. If the owners listed here were to agree, the three sites would accommodate tenants

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[1] As described earlier, CPC is contemplating certain modifications to Subdistrict B that would not result in any projected development sites in Subdistrict B. The proposed modifications are more fully described in Chapter 29, "Modifications to the Proposed Actions."

of: the two residential buildings owned by HPD as part of its Tenant Interim Lease (TIL) Program; the two residential buildings that are owned and operated by the Charles Innis Housing Development Fund Corporation, a subsidiary of the Harlem Congregations for Community Improvement, Inc. (HCCI); and the two residential buildings owned and operated by the West Harlem Group Assistance (WHGA) Renaissance Apartments, Limited Partnership, a subsidiary of WHGA. In addition, two units on the property of the Iglesia el Encuentro con Dios would also be replaced on one of the three relocation housing sites. Occupants of the units in the Iglesia de Dios Pentecostal would be relocated to new residential units in the planned church building at its own relocation site. This move would occur with or without the Proposed Actions.

Housing on the replacement sites would be constructed by third party developers in accordance with HPD standards and would be of the same or better quality than those units occupied by tenants in these six buildings. The new housing would provide tenants equal rental rates and homeownership opportunities compared with their existing terms within the Project Area. Tenants would relocate from these buildings, or from interim housing, when their new housing is ready for occupancy, which could occur prior to the 2015 analysis year.

Dwelling units within the existing privately owned apartment building at Broadway and West 133rd Street are subject to federal and City regulatory agreements which extend until 2015 and 2029, respectively. Before that site would be available to Columbia to commence construction of the Academic Mixed-Use Development Plan, ESDC would require that the occupants of these units be relocated to equal or better housing units, at affordable rents. Therefore, by 2030, it is anticipated that all residents in the Academic Mixed-Use Area would be relocated to new housing within the study areas.

DIRECT BUSINESS AND INSTITUTIONAL DISPLACEMENT

The Proposed Actions would not cause significant adverse impacts from direct business and institutional displacement. By 2030, the Proposed Actions could directly displace 85 businesses and institutions (approximately 880 employees) from the Project Area. The potentially displaced businesses and institutions were determined not to be of substantial economic value to the City or region, as defined under CEQR, and would be able to relocate in the study areas or elsewhere in the City. These businesses and institutions also do not contribute substantially to a defining element of neighborhood character outside the Project Area, in the primary and secondary study areas.[1] The economic sectors with the highest employment in the study areas (those which define the character of the area in an economic sense) are not, in large part, based in the Project Area, and, therefore, the loss of displaced businesses and institutions due to the Proposed Actions would not substantially alter neighborhood character in the study areas.

INDIRECT RESIDENTIAL DISPLACEMENT

IDENTIFICATION OF IMPACTS

Under the socioeconomic reasonable worst-case development scenario, by 2030, the Proposed Actions could introduce as many as 3,362 new University-affiliated residents (comprising University graduate students, faculty, other employees, and their families) within 1,131 units who may seek non-University housing in the primary and secondary study areas (with 2,717 new

[1] The primary study area is the area surrounding and within approximately ¼ mile of the Project Area; the secondary study area includes the primary study area and covers the blocks within approximately ½ mile of the Project Area.

University-affiliated residents within 839 units in the primary study area only). In addition, new development in the Project Area could affect both the immediate neighborhood and the study area more broadly, by increasing the area's livability and overall residential appeal. By 2030, this increase in appeal could add pressure to increase market rents in the primary study area compared with conditions in the future without the Proposed Actions.

Residential demand generated by the Proposed Actions would be partially absorbed by individuals' purchases of owner-occupied housing in the study area, and by turnover within the rent-regulated housing stock in the study area. The remaining demand could place upward rent pressure on the 1,318 units in the primary study area that would be vulnerable to rent increases, which in turn could lead to the indirect displacement of approximately 3,293 residents of these at-risk units by 2030. While it is impossible to quantify the exact number of at-risk residents who would be indirectly displaced as a result of the Proposed Actions, there is the potential for the indirect residential displacement impact within the primary study area to be significant and adverse.

The potential for significant indirect residential displacement impacts would be limited to the primary study area because there would be much less University-generated housing demand in this area (University-generated housing demand of only 26 percent of the 1,131-unit demand, or 292 units, is projected to occur outside the primary study area); and because the potential scale of the general upgrading influence of the new university area would be in large part a function of the area's visibility from, and connectivity to, surrounding neighborhoods. In this respect, the Proposed Actions' influences would be somewhat limited by the Project Area's relatively isolated location, surrounded by transportation viaducts and taller institutional and residential redevelopment, and the distance of the secondary study area from the Project Area. As discussed in Chapter 4, "Socioeconomic Conditions, Section D: Detailed Analysis, Indirect Residential Displacement," overall, in the portions of the secondary study area outside of the primary study area, other market forces are likely to play a larger role in shaping development trends in the future with and without the Proposed Actions.

MITIGATION

Columbia has agreed to address the need for affordable housing within Community Board 9 (CB9). Specifically, Columbia has proposed to: (1) establish a $20 million fund to develop or preserve affordable housing; and (2) enact a range of programs to reduce University-generated housing demand, as discussed below. Collectively, these measures would partially mitigate the significant adverse impacts of the Proposed Actions.

Columbia has committed $20 million toward the establishment of the Manhattanville Neighborhood Preservation Fund whose purpose would be to provide financing to encourage and facilitate the preservation and development of affordable housing in CB9. The Fund is intended to provide a range of flexible and affordable financing products to community-based and private developers, and it is expected that approximately 1,110 affordable units would be created or preserved. To help ensure that this projection would be met and that financing opportunities would be oriented toward mitigation of the indirect residential displacement impact, the Fund would be organized to: 1). maximize the number of affordable housing units preserved and/or created by the Fund within CB9; and 2). operate in manner consistent with City housing policies.

In addition, to the Fund, residential development on Project Area relocation sites would result in 31 additional incremental affordable housing units in the study area (above the 75 units for directly displaced residents). Taken together, these measures would result in the preservation

and/or development of an estimated 1,141 units. While some of the 1,141 units could be located outside of the primary study area within CB9, the total amount (1,131 units) represents approximately 86 percent of the total number of at-risk units in the primary study area.

Starting in 2009 and continuing through 2030, Columbia would commit to provide funding for anti-eviction/anti-harassment legal assistance for Manhattanville residents. Starting in 2015, Columbia would commit to provide additional funding for this legal assistance. Funding would be provided for staff lawyers at legal assistance provider(s) serving the Manhattanville area, acceptable to HPD. Funding would continue through 2030 and would total approximately $4 million.

Programs to Reduce University-Generated Housing Demand

Under the socioeconomic reasonable worst-case development scenario, the unmet demand for Columbia students and faculty within the primary study area is estimated to be 839 units. Columbia proposed three measures in the DEIS to reduce the potential demand for housing in the study area by its employees and graduate students. Since the DEIS, Columbia has established the details of each and in doing so, has refined the estimated mitigation effect of each program.

1. *University Retiree Units.* Currently, more than 200 University units within the secondary study area are occupied by retirees and their spouses. Beginning in 2012, Columbia would reserve and allocate units vacated by University retirees for housing new faculty by University retirees for housing new faculty members of the faculties of Arts and Sciences and other schools that would have programs in the Project Area.

2. *Develop a Graduate Student Residence Outside the Project Area.* Columbia would utilize a development site located on Broadway and West 172nd Street. The site has a lot area of approximately 10,566 square feet and could accommodate at least 200 graduate students and post-doctorate researchers in 159 units, an increase over the 110 units estimated in the DEIS. Columbia would commit to developing this site no later than 2013 to accommodate the graduate students and post-doctorate researchers associated with Phase 1 and Phase 2 programs. An analysis of the potential environmental impacts that could result from the construction and operation of the University housing building is provided in Appendix P.2

3. *Residential Loan Program for Faculty.* Columbia launched a pilot residential loan assistance program in the spring of 2007 to encourage ownership by faculty outside the primary and secondary study areas. In the first six months of this pilot program, six residential loans were issued to newly recruited faculty who would have otherwise sought University housing. Based on the success of this pilot program, Columbia has committed to a faculty residential loan program to satisfy an average demand of 15 residential loans per year. Columbia would reserve and allocate some portion of the 15 residential loans per year to new faculty members of the faculties of Arts and Sciences and other schools that would have programs in the Project Area.

The development of a graduate student residence would reduce University-generated demand in the primary study area in 2030 by at least 159 units (200 students). The two additional measures would further reduce University-generated demand.

The Illustrative Plan[1]—which is the program currently envisioned by the University—contains 87 additional on-site housing units for University affiliates (for a total of 649 units). Columbia would commit to develop these additional units, which—when combined with the mitigation

[1] The Illustrative Plan in the DEIS has been revised in the FEIS to reflect the addition of the School of International and Public Affairs to Site 7.

measures detailed above—could reduce the University-generated demand for off-site housing within the primary study area by at least 246 units. These units would satisfy at least 29 percent of the maximum Columbia off-site housing demand within the primary study area.

With these mitigation measures in place, there would be some remaining off-site housing demand from the University-generated population, and there would be demand generated by the non-University population due to the increased livability and overall residential appeal of the neighborhood. While indirect displacement could still occur with the Proposed Actions, with the preservation and/or development of a substantial amount of affordable housing within CB9 and other mitigations described above, the amount of displacement would likely be less. These measures will be set forth in a Restrictive Declaration.

INDIRECT BUSINESS AND INSTITUTIONAL DISPLACEMENT

The Proposed Actions would not result in significant adverse impacts due to indirect business and institutional displacement. While the Proposed Actions could result in the indirect displacement of some existing retail establishments in the immediate vicinity of the Project Area due to rent increases, their dislocation would not constitute a significant adverse impact under CEQR. The stores that would be vulnerable to indirect displacement would not meet the *CEQR Technical Manual* criteria for significant displacement impact—i.e., collectively, they are not of substantial economic value to the City; they can be relocated elsewhere in the City; they are not subject to regulations or publicly adopted plans to preserve, enhance, or protect them; and they are not a defining element of neighborhood character. In addition, storefronts that are vacated due to indirect displacement would be unlikely to remain vacant; they would turn over to other retail uses that could afford to pay higher rents. Given the high residential density and the strong residential market in the study area, there would still be the local demand for neighborhood retail and services necessary to maintain the strong retail presence along West 125th Street and the avenues within the study areas. The limited indirect retail displacement that could result from increased rents would not lead to major changes within nearby commercial strips, nor would it result in adverse changes to neighborhood character.

The Proposed Actions could lead to limited increased demand for space within the M1-1 area to the southeast of the Project Area (bounded by West 130th Street to the north, West 125th Street to the south, Morningside and Convent Avenues to the east, and Amsterdam Avenue to the west), which in turn could lead to indirect displacement of some existing industrial businesses. The potentially vulnerable businesses in the manufacturing zoned area would not meet the *CEQR Technical Manual's* criteria for significant displacement impact—i.e., collectively, they are not of substantial economic value to the City; they can be relocated elsewhere in the City; they are not subject to regulations or publicly adopted plans to preserve, enhance, or protect them; and they are not a defining element of neighborhood character. In addition, there is already a trend within the study areas' manufacturing zones toward conversion of manufacturing uses to other uses. Therefore, while the Proposed Actions could lead to indirect business displacement in the above-identified manufacturing-zoned area, this would not be considered a significant adverse impact.

ADVERSE EFFECTS ON SPECIFIC INDUSTRIES

The Proposed Actions would not cause significant adverse impacts on any specific industry. Businesses subject to direct displacement vary in type and size, and are not concentrated in any specific industry sector. In addition, none of the businesses subject to displacement are essential to the survival of an industry sector within, or outside of, the study area.

ECONOMIC AND FISCAL BENEFITS AND COSTS

The construction and operation of development resulting from the Proposed Actions would generate substantial employment, economic output, and fiscal benefits for New York City and State. Construction of the development under the Proposed Actions would be a significant investment in New York City. Under the Illustrative Plan, the estimated $5.81 billion in direct construction-related expenditures (all figures in 2007 dollars) would generate an estimated 26,732 person-years (a person-year is the equivalent of one person working full-time for one year) of direct construction employment (or the equivalent of 1,215 full-time construction jobs per year for 22 years, of which 1,200 would be generated by construction activity in Columbia's Academic Mixed-Use Area), and an estimated 12,691 person-years of indirect and induced employment within New York City (i.e., employment resulting from construction expenditures in business establishments providing goods and services to the contractors, and additional employment from those expenditures). The total direct and generated jobs in New York City from construction would be 39,423 person-years (the equivalent of 1,792 full-time jobs per year for 22 years). The total economic activity—including indirect expenditures—that would result from construction is estimated at $10.69 billion in New York State, of which $9.36 billion would occur in New York City. Construction activity would generate an estimated $134.45 million in tax revenues for New York City, $274.04 million for New York State (separate from the New York City amount), and $9.00 million for MTA.

Upon completion, the Illustrative Plan would generate 7,086 permanent jobs directly on site (6,399 jobs within the Academic Mixed-Use Area and 687 in Subdistrict B and the Other Areas). There would also be new jobs created in business establishments providing goods and services to the occupants of the buildings, resulting in indirect and generated employment of an additional 3,960 permanent jobs within New York City, bringing the total direct and generated jobs from the annual operation of the development to 11,046 jobs within New York City. The Illustrative Plan would generate an estimated $1.17 billion annually in direct benefits for New York City, measured as economic output or demand. The total economic activity, including indirect and induced expenditures (those generated by the direct expenditures), that would result from operations is estimated at $2.00 billion annually in New York State, of which $1.74 billion annually would occur in New York City. The annual operation of the completed development would generate non-property-related tax revenues estimated at $30.10 million annually for New York City, $63.72 million annually for New York State (separate from the New York City amount), and $1.49 million annually for MTA.

Assuming existing tax rates, by 2030 in the future without the Proposed Actions, the property in the entire Project Area is projected to pay property taxes equal to about $7.18 million annually, an increase of about $4.31 million over the amount paid in 2004/2005.

If businesses directly displaced by the Proposed Actions are unable to relocate within New York City, the economic and fiscal benefits that are currently generated by those businesses (i.e., direct and indirect jobs, tax revenues, and economic output) would be lost to the City's economy. The analysis of direct business and institutional displacement in the "Socioeconomic Conditions" chapter did not identify any specific businesses, institutions, or business sectors that would be unable to relocate within the study areas, Manhattan, or New York City more generally. And while it is reasonable to assume that some directly displaced businesses may choose not to relocate in the City, it would be speculative to identify any specific business or business sector for purposes of estimating lost economic and fiscal benefits. Therefore, this FEIS does not quantify any lost economic or fiscal benefits as a result of the Proposed Actions.

The Proposed Actions would not cause the City to incur costs for physical improvements to the Project Area (e.g., streetbed or sidewalk construction) or for mitigation measures. Such measures would be borne by the University.

E. COMMUNITY FACILITIES AND SERVICES

Although the Proposed Actions would introduce new residents to Manhattanville, no significant adverse impacts on community facilities and services would result.

By 2030, the community facilities reasonable worst-case development scenario for the Proposed Actions would add approximately 3,132 residents and 2,186 new housing units, which would likely generate approximately 328 new elementary- and intermediate-school children in the area. Even with this increased enrollment, the public elementary schools within approximately ½ mile of the Project Area would continue to operate below capacity. While intermediate schools in the ½-mile study area would be above capacity with the Proposed Actions, the increase in the deficiency of seats would be less than the *CEQR Technical Manual* threshold value of 5 percent, compared with the future without the Proposed Actions. Therefore, no significant impacts on public intermediate schools would result with the Proposed Actions.

In addition, the new residents added to library service areas by the Proposed Actions would be a very small percentage (1.1 percent) of the total annual library users. Therefore, the Proposed Actions would not cause a significant adverse impact on library resources.

According to the thresholds set forth in the *CEQR Technical Manual*, the Proposed Actions would not have significant adverse impacts on hospitals or health care facilities, or day care facilities. The Proposed Actions would not affect the physical operations of, or access to and from, a fire station or police precinct house, and therefore the Proposed Actions would not have a significant adverse impact on police and fire services.

F. OPEN SPACE

The Proposed Actions would establish new areas of passive open space in Manhattanville that would be available to area residents, existing and future workers, and visitors. Proposed open spaces would be located in the new Academic Mixed-Use Development between Broadway and Twelfth Avenue, including on the block bounded by Broadway and Twelfth Avenue, West 129th, and West 130th Streets (the Small Square); at the western tip of the triangular block bounded by Broadway, West 125th Street, and West 129th Streets (the Grove); and just west of the center of the new Academic Mixed-Use Development between West 130th and West 131st Streets (the Square). The Proposed Actions would also include midblock open areas extending north-south between West 129th and West 133rd Streets, and east-west between Broadway and Old Broadway. These open spaces would be landscaped plazas with seating. In total, the Proposed Actions would create 2.16 acres (93,965 sf) of privately owned, publicly accessible open space. The Proposed Actions would add open space in the Project Area, but as they would also add population (residents, workers, and students), they would result in significant adverse open space impacts, as discussed below. The mitigation measures that would be implemented to address these impacts are also discussed below.

DIRECT EFFECTS

IDENTIFICATION OF IMPACTS

Shadows from the Proposed Actions would result in direct significant adverse impacts on open spaces. In 2015, the Proposed Actions would result in no impacts, but in 2030, shadows from the

proposed buildings are expected to result in a significant adverse impact on the I.S. 195 Playground during the March and December analysis periods, when large incremental shadows would cover the playground for long durations.

MITIGATION

Since issuance of the DEIS, several options were considered to mitigate the shadow impacts on the I.S. 195 Playground. The I.S. 195 Playground is small, 0.68 acres, and rectangular shaped, extending narrowly between the edge of the I.S. 195 school building and Broadway. The use of the space in the playground is maximized to accommodate several active recreation features. Based on the extent of the shadow coverage in the March and December analysis periods and the size and shape of the playground, the existing recreational facilities could not be relocated within the playground space itself to avoid sunlight loss. The playground is located within the I.S. 195 school property, and therefore it would not be desirable to relocate or replace the facilities at another nearby site, particularly since that would require crossing Broadway or another street from I.S. 195. After considering these options, it was determined that mitigation measures to reduce the loss of sunlight on the playground could not be achieved.

Other options were also explored with the New York City School Construction Authority (SCA), acting as Agent for the Department of Education (DOE), as well as the Manhattan Borough President regarding potential enhancements to the I.S. 195 Playground. Although the specific enhancements have not been determined at this time, those enhancements would be designed with the intention of increasing the overall attractiveness and usability of the playground when it would be in shadow. Columbia will work with DOE and SCA to determine the details of the process for implementing the funding and executing the enhancements.

This funding would not directly address the significant adverse shadow impacts at the playground because it would not decrease the loss of sunlight at the I.S. 195 Playground during the March and December analysis periods. Therefore, the funding for enhancements would only partially mitigate the significant adverse shadow impacts on this open space. Columbia's funding commitment described above will be set forth in a Restrictive Declaration.

Chapter 24, "Alternatives," also considers alternatives to reduce or eliminate the shadow impact on the I.S. 195 Playground. As noted in Chapter 24 of the DEIS, to eliminate the shadow impact, the academic research building on Site 17 would have to be reduced by four stories overall and several floors from Site 17 would have to be accommodated in the other academic research buildings (on Sites 2, 6, 6b, 8, or 15). Also being considered in Chapter 24 of the FEIS, as a result of comments made during DEIS and project review, is the option to place University housing on Sites 17 and 11, which would greatly reduce the height of buildings on those sites would reconfigure and lower the height of the academic research buildings on Site 12, and would proportionally reduce shadows. The alternative use and height scenario described in Chapter 24 of the FEIS would substantially reduce the extent and duration of incremental shadow during the March/September analysis period, particularly during the late morning and early afternoon.

As noted in Chapter 24 of the FEIS, after reviewing each of the potential options for reducing or eliminating the impact, this FEIS concludes that the two realistic options to address the shadow impacts on the I.S. 195 Playground are either to maintain the project and building heights as proposed, allowing the impact to occur, but applying the funding for enhancements as partial mitigation to the playground, or to seek a modification to the Proposed Actions to change the uses and related building heights and configuration and thus the building sizes on Sites 17, 12, and 11..

INDIRECT EFFECTS

As shown in Table S-7, in the existing and future without the Proposed Actions conditions, passive open space ratios are all above the City's open space guidelines. Like many areas in Manhattan, the existing and future without the Proposed Actions active open space ratio and the combined total residential study area open space ratio are below City guidelines of 2.0 acres of active open space per 1,000 residents and 2.5 acres of total open space per 1,000 residents. However, the *CEQR Technical Manual* recognizes that these goals are not feasible for many areas of the City, and they are not considered specific impact thresholds. Rather, the ratios are benchmarks that represent areas well served by open space.

Table S-7
Summary Open Space Ratios, 2015 and 2030

Ratio	City Guideline Ratio	Existing Ratio	Future Without the Proposed Actions Ratio	Future with the Proposed Actions Ratio	Percent Change
2015 Non-Residential Study Area					
Passive/non-residents	0.15	5.04	4.13	2.45	(40.7)
Passive/total population	0.40	0.78	0.78	0.71	(9.0)
2015 Residential Study Area					
Total/residents	2.5	1.68	1.64	1.66	1.2
Passive/residents	0.5	0.90	0.88	0.90	2.3
Active/residents	2.0	0.79	0.75	0.76	1.3
Passive/total population	0.39	0.66	0.63	0.61	(3.2)
2030 Non-Residential Study Area					
Passive/non-residents	0.15	5.04	4.13	1.66	(59.8)
Passive/total population	0.38	0.78	0.73	0.59	(19.2)
2030 Residential Study Area					
Total/residents	2.5	1.68	1.52	1.52	0
Passive/residents	0.5	0.90	0.82	0.83	1.2
Active/residents	2.0	0.79	0.70	0.69	(1.4)
Passive/total population	0.38	0.66	0.60	0.55	(8.3)

Note: Ratios in acres per 1,000 people.

The Proposed Actions would increase the residential and non-residential population over the existing and future without the Proposed Actions conditions in both 2015 and 2030 and would also create new privately owned, publicly accessible open space resources for a total of approximately 93,965 sf by 2030. The Proposed Actions would not displace or eliminate any existing open space resources, and the new resources are intended to provide a better connectivity of open space resources to existing and future workers and residents in the area.

IDENTIFICATION OF IMPACTS

The combined effect of this change is presented in Table S-7, which shows that while overall open space ratios would decrease with the Proposed Actions, the combination of existing and new resources would provide for all passive open space ratios to be substantially higher than established City guidelines. However, because passive open space ratios would decrease in the

non-residential study area, the Proposed Actions would result in a significant adverse impact on passive open spaces in this study area in both the 2015 and 2030 analysis years.

Although the active open space ratios in the future with the Proposed Actions would continue to be below the levels recommended by the City, it is recognized that this goal is not feasible for many areas of the City, and they are not considered impact thresholds. According to the *CEQR Technical Manual*, a 5 percent decrease in open space ratios is considered a substantial change warranting a detailed analysis. However, in areas where the open space ratio is very low (e.g., below 1.5 acres per 1,000 residents), a decrease of less than 1 percent in the open space ratio may result in a potential significant adverse impact on open space. The Proposed Actions would reduce the active open space ratio by 1.4 percent by 2030. Because the active open space ratio is substantially lower than established City guidelines, this decline would constitute a significant adverse impact on active open spaces in the 2030 analysis year.

In considering the significance of the projected decline in the open space ratios, it is important to note that the Proposed Actions would add open space where it would not otherwise exist. There are a number of factors not accounted for in the quantitative analysis of open space ratios in the future with the Proposed Actions. As described in Appendix A.1, mandatory five-foot widened sidewalks on some east–west cross streets would be required, and on the east side of Twelfth Avenue a 30-foot widening would be required. The setbacks along the east–west streets would have to be improved as paved surfaces with planted landscape treatments permitted, potentially including seating. On Twelfth Avenue, the setbacks would require a 15-foot open market zone with permanent fixed elements, such as landscaping and seating, and an adjacent 15-foot-wide clear pedestrian path. While these open areas would be accessible directly from an adjoining public sidewalk, they are not included in the quantitative analysis as passive open space.

MITIGATION

Since issuance of the DEIS, several options were considered to mitigate the significant adverse indirect open space impacts. Columbia University has agreed to create publicly accessible open space on Block 1996, Lot 1, which is currently occupied by the Cotton Club. Columbia proposes to acquire Block 1996, Lot 1, through either: (a) negotiation with the Cotton Club and relocating the Cotton Club within the immediate area (if reasonable terms can be agreed upon); or (b) through the subsequent discretionary exercise by ESDC of condemnation of such lot, subsequent to the adoption of a General Project Plan (GPP) and compliance with the Eminent Domain Procedure Law. Assuming that the site is acquired by Columbia, and subject to the approval of DPR, Columbia would convey the site to the City and would be responsible for up to $30,000 per year for 25 years to be used for site maintenance. Columbia would construct the new publicly accessible open space in accordance with all DPR requirements. It is anticipated that the new publicly accessible open space would be constructed and open by 2015, subject to acquisition of the site by Columbia.

This site would provide an additional 6,300 sf of open space, which would result in a total of approximately 2.3 acres of new publicly accessible open space in the Project Area. The size, triangular shape, and location of this open space would not be appropriate to accommodate any active open space facilities. Therefore this space would be developed as passive open space. Although the specific passive open space programming for this site has not been determined at this time, it is anticipated that passive open space features such benches and landscaping would be included to create new high quality open space. This amount of new passive open space would not substantially increase the passive open space ratios in the future conditions with the Proposed Actions to eliminate the significant adverse indirect impact. As noted above, this new

open space could not accommodate active open space features; therefore it would not directly address the significant adverse indirect active open space impact. However, the additional open space would serve as partial mitigation because it would improve the overall availability of passive open space in the study area. This new publicly accessible open space would enhance the open space network of the Project Area and connection to the West Harlem Waterfront park. Development of this new triangular open space would further the transformation of West 125th Street into a gateway to the waterfront.

Additional options were also explored with DPR to create new open space elsewhere in the study area and/or improve existing open spaces in the study area to increase their utility, safety, and capacity to meet identified needs in the study area. Columbia has agreed to contribute $500,000 per year, increasing at 3 percent annually, for the West Harlem Waterfront park (currently under construction) for a period of 25 years. The funding would commence following the approval of the proposed rezoning but not later than the opening of the park. This funding would not directly address the significant adverse indirect open space impacts because it would not result in a decrease in the demand on existing open spaces in the study area. However, the funding is intended to allow DPR to hire dedicated staff and to provide services to promote the attractiveness of the space for increased usage, access, convenience, safety. This funding would only partially mitigate the significant adverse indirect open space impacts. Additional details regarding the funding will be included in an agreement between DPR, the New York City Economic Development Corporation (EDC), and Columbia. Columbia's funding commitment described above will be embodied in a legally binding instrument.

Overall, the measures described above would only partially mitigate the indirect significant adverse impacts on open space. Columbia's commitments described above will be set forth in a Restrictive Declaration.

G. SHADOWS

There are no sun-sensitive historic resources within the shadow sweep of the Proposed Actions' buildings. Only a very small portion of the Hudson River, a natural feature, is in the study area. Therefore, no significant adverse impacts would occur on historic resources or natural features due to shadows from the Proposed Actions.

The Proposed Actions would create a series of open spaces linking West 125th to West 133rd Streets, and along the line of West 132nd Street between Broadway and Old Broadway. Based on the full build-out of the Proposed Actions in 2030, these open spaces would receive incremental shadows from the Academic Mixed-Use Development buildings for long durations throughout the year for most or all of the analysis periods, as described below. However, this is not considered to be significant or adverse impact, because these open spaces are created as part of the Proposed Actions. The Proposed Actions' incremental shadows would also fall on other nearby open spaces, as summarized below.

West Harlem Waterfront Park. Buildings in Subdistrict B and the Academic Mixed-Use Area would cast incremental shadows on the West Harlem Waterfront park between St. Clair Place and West 133rd Street for about an hour in the early morning throughout the year. These incremental shadows would be small and would add to shadows already cast by the elevated Route 9A and Amtrak viaducts. They are not considered significant adverse impacts on the West Harlem Waterfront park because the park would receive full sunlight from late morning to evening for most of the year. No significant adverse impacts on this open space are expected.

The Broadway Malls. Buildings in the Academic Mixed-Use Area and the Other Area east of Broadway would cast shadows on portions of Broadway's landscaped median between West 135th and West 136th Streets for most of the December 21 analysis day. However, no significant adverse impacts are expected because the adjacent malls to the north between West 136th and West 137th Streets, and between West 137th and West 138th Streets—which are visible and accessible to the users of the malls that would be affected by the shadows—would be mostly or completely in sunlight during the same period. Therefore, the incremental shadows would not reduce the overall usability of the Broadway Malls due to their limited effects over the course of the year.

Manhattanville Houses Open Spaces. From March through September in the afternoon, the Proposed Actions' buildings in the Academic Mixed-Use Area would cast shadows on the open spaces of the Manhattanville Houses located east of Broadway. The incremental shadows, which would be relatively small, would last for ½ to 2¼ hours, depending on the analysis day. No significant adverse impacts on the open spaces at the Manhattanville Houses during any of the analysis periods are anticipated because of the short duration and small size of the incremental shadows. Although the Proposed Actions would remove the last of the sunlight on two areas of open space during the late afternoon hours between September and March, the largest open space would remain unaffected.

Riverside Park. Riverside Park would receive incremental shadows in the early morning from March through September from the buildings in the Academic Mixed-Use Area. The largest incremental shadows are projected for the beginning of the analysis period in the early morning. However, they would still be very small considering the total size of Riverside Park. Further, these shadows would decrease in size rapidly and move off the open space by 9:00 AM, and Riverside Park would receive ample sunlight for the remainder of the day. Therefore, no significant adverse impacts would occur on Riverside Park.

IDENTIFICATION OF IMPACTS

I.S. 195 Playground. Throughout the year, existing buildings, including 3333 Broadway, the buildings along the west side of Broadway between West 132nd and West 133rd Streets, and buildings across Broadway to the east, cast shadows on the I.S. 195 Playground. On all four analysis days, incremental shadows from the buildings in the Academic Mixed-Use Area would remove the last remaining sunlight from the playground in the mid-afternoon and late afternoon hours. On the May 6 and June 21 analysis days, large portions of the playground would receive sunlight for much of the morning and afternoon hours. Therefore, a significant adverse impact is not expected on these analysis days. However, during the March 21 and December 21 analysis days, incremental shadows from the buildings in the Academic Mixed-Use Area would cover significantly more area during the late morning and early afternoon hours, when the playground is in use. Furthermore, the increased incremental shadows would occur during the fall, winter, and early spring months, when cooler temperatures would likely make sunlight more valuable to users of the playground. Given these factors, it is expected that the incremental shadows created by the Proposed Actions would cause significant adverse shadow impacts on the March 21 and December 21 analysis days.

MITIGATION

As summarized above in "F. Open Space," Columbia has agreed to fund an enhancement of the I.S. 195 Playground. Columbia will work with DOE and SCA to determine the details of the process for funding and executing the enhancements. Overall, these measures would partially

mitigate the significant adverse shadow impacts on open space. If the proposed mitigation measures are determined to be infeasible, the significant adverse impacts would remain unmitigated. In addition, Section W, "Alternatives," below, summarizes alternatives that could potentially reduce shadow impacts on the playground to within acceptable limits.

H. HISTORIC RESOURCES

The New York State Office of Parks, Recreation and Historic Preservation (OPRHP) and the New York City Landmarks Preservation Commission (LPC) were consulted to determine whether the Project Area may contain archaeological resources. In accordance with OPRHP's and LPC's recommendations, an archaeological study was prepared for the Project Area. The Project Area was determined not to be sensitive for archaeological resources (see Appendix D.1). Therefore, the Proposed Actions would not have adverse impacts on archaeological resources, and no further consideration of such resources is required for the Proposed Actions.

As part of its initial planning efforts for this project, Columbia has incorporated one of the area's most significant architectural resources—the former Warren Nash Service Station building—into the Academic Mixed-Use Development. Alterations to the building as part of the Proposed Actions would be undertaken in consultation with OPRHP. To guide the conversion of the building, which would be adaptively reused, a Preservation Approach has been prepared and submitted to OPRHP for review. Columbia would implement an approved Preservation Approach to avoid any adverse impacts on the former Warren Nash Service Station.

Also in the Academic Mixed-Use Area, Columbia is currently renovating the Studebaker Building for administrative office space. Renovation of the building, which has been conducted in consultation with OPRHP, will continue whether or not the Proposed Actions are approved. Though consultation with OPRHP was initially informal, since the renovation of the Studebaker Building was proceeding as-of-right, Columbia subsequently applied for financing from the Dormitory Authority of the State of New York (DASNY). In connection with that financing, OPRHP has reviewed the proposed modifications to the building and determined that the Proposed Project would have no adverse impacts on the Studebaker Building. Columbia has also discussed the proposed modifications with LPC.

A construction protection plan (CPP) has been prepared to avoid adverse construction-related impacts on architectural resources located within 90 feet of the Academic Mixed-Use Development in the Academic Mixed-Use Area. The protection measures contained in the CPP were approved by LPC on November 8, 2007 and by OPRHP on November 14, 2007 (see Appendix D.2). This CCP would be implemented before any demolition or construction activities commence in the Subdistrict A as part of the Proposed Actions. Structures outside Subdistrict A would be protected by the New York City Department of Buildings (DOB)'s *Technical Policy and Procedure Notice* (TPPN) #10/88. In addition, to avoid and minimize any adverse impacts on the 125th Street IRT Station and the Manhattan Valley IRT viaduct from the proposed replacement of the two non-historic escalators with escalators of a larger capacity, OPRHP would review the escalators with respect to how they connect to the historic material of the station and, if applicable, the viaduct structure. In addition, a CPP would be developed among MTA/NYCT, Columbia University, and OPRHP to avoid construction-related impacts.

As part of the Proposed Actions, a study to evaluate the feasibility of reusing the former Sheffield Farms Stable at 3229 Broadway in the Academic Mixed-Use Area was prepared and submitted to OPRHP for review. The study and further analysis responding to a comment from OPRHP conclude that it is not feasible to retain or reuse the former Sheffield Farms Stable (see Chapter 24, "Alternatives"). Measures that would partially mitigate the significant adverse impact resulting from

the demolition of the building for the initial (2015) phase of development are described in Chapter 23, "Mitigation." Redevelopment by 2030 would result in the removal of the West Market Diner in the Academic Mixed-Use Area. Columbia would relocate the West Market Diner's 1948 dining car to a new site in the Project Area or study area and consult with OPRHP regarding its relocation and rehabilitation. The 1948 dining car was designed as a movable structure and the other portions of the diner retain little historic integrity (see Appendix D.2). As determined in consultation with OPRHP, moving the 1948 dining car and rehabilitating it would not result in significant adverse impacts.

The Proposed Actions are not expected to have any significant adverse impacts on architectural resources outside the Project Area. These resources are located more than 90 feet from the Project Area and, therefore, outside the area of potential physical impacts. The Proposed Actions would also not block significant views of any resource, significantly alter the visual setting of any resource, or introduce incompatible contextual elements to any resource's setting in the study area.

IDENTIFICATION OF IMPACTS

Demolition of the former Sheffield Farms Stable at 3229 Broadway for the 2015 development phase constitutes a significant adverse impact.

MITIGATION

Measures that would partially mitigate the impact of the demolition of the former Sheffield Farms Stable include Historic American Buildings Survey (HABS) Level I documentation of the former Sheffield Farms Stable, to be conducted by a recognized professional credentialed for preparing such reports, to be submitted to OPRHP, the New York Historical Society, and the Museum of the City of New York; and development and installation of a permanent interpretive exhibit or exhibits in or near the Project Area to document the history of the former Sheffield Farms Stable and to encompass the larger historic of the Manhattanville neighborhood.

Also, to avoid construction-related impacts on architectural resources within 90 feet of project construction, including the West Market Diner, the Manhattan Valley IRT viaduct, the 125th Street IRT Subway Station, the Riverside Drive viaduct, the Claremont Theater building and—to the extent necessary—the former Warren Nash Service Station building and the Studebaker Building, a construction protection plan (CPP) has been developed and the protection measures contained in the CPP approved by OPRHP and the New York City Landmarks Preservation Commission (LPC). This approved CPP would be implemented by a professional engineer before any demolition, excavation, and construction.

As described in Chapter 18, "Transit and Pedestrians," modifications would need to be made at the 125th Street IRT Subway Station and the Manhattan Valley IRT viaduct. These modifications would involve replacing the existing escalators with larger capacity escalators. Since the existing escalators are not contributing historic features, having replaced original circulation elements, their removal and replacement with new escalators would not adversely impact the historic character or integrity of the station or the Manhattan Valley IRT viaduct. To avoid any adverse impacts to these historic resources, OPRHP would be consulted with respect to how the new escalators connect to the historic material of the station and the viaduct, if applicable. A CPP would also be prepared to avoid any inadvertent construction-related impacts on these historic structures.

I. URBAN DESIGN AND VISUAL RESOURCES

The Proposed Actions would cause no significant adverse urban design and visual resources impacts in the Project Area and larger study area. As summarized below, the Proposed Actions would have generally positive effects on urban design and visual resources in the Project Area and study area.

URBAN DESIGN

The Proposed Actions would positively affect the Project Area's urban design in both the 2015 and 2030 analysis years. The Special Manhattanville Mixed-Use Zoning District's urban design controls would promote a consistent design for the Academic Mixed-Use Development through mandatory widened sidewalks, controls on maximum building heights, mandatory streetwall requirements, and pedestrian improvements in the Project Area. The pedestrian improvements would include widened sidewalks with permitted landscaping, north–south midblock open areas, and other publicly accessible open spaces (described in "A. Project Description.") Required active ground-floor uses and glazed, transparent storefronts would provide street-level visual interest, pedestrian activity, and neighborhood amenities along Twelfth Avenue, Broadway, and West 125th Street. With the Proposed Actions, there would also be mandatory streetwalls, maximum buildings heights, and required active ground-floor uses for projected development in Subdistrict B.[1] Throughout the Project Area, the streets would become inviting to pedestrians, thereby establishing connections through the Project Area to the waterfront.

There would also be no adverse impacts on the topography, natural features, street pattern and hierarchy, and block shapes of the Project Area and study area in 2015 and 2030. Although the construction of multiple buildings with large footprints on large zoning lots would alter the existing building arrangements in the Academic Mixed-Use Area, this change would not be an adverse impact, as there are many examples of freestanding buildings with large footprints throughout the study area, and the buildings would be developed through a coordinated plan.

In the urban design reasonable worst-case development scenario for the Academic Mixed-Use Development, the new buildings that would be built in Subdistrict A would range in maximum height from 60 feet to 260 feet (80 to 320 feet with mechanical space) to replace a range of primarily low-rise nondescript brick buildings devoted to auto-related and storage uses. This reasonable worst-case development scenario assumes that each building in Subdistrict A is constructed to the allowable maximum building height specified by the proposed zoning. Although the Academic Mixed-Use Development buildings would be taller and bulkier than, and different in design from, the existing buildings that make up the Project Area, the transformation of the largely industrial area into an area with academic and retail uses and significant open spaces is not expected to be an adverse impact on building bulk, use, and type. Likewise, there would be no significant adverse impacts on building bulk, use, and type in Subdistrict B and the Other Area east of Broadway.

VISUAL RESOURCES

The Proposed Actions would have largely beneficial effects on visual resources in 2015 and 2030. Views west through the Project Area to the Hudson River would be enhanced by widened

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[1] As described earlier, CPC is contemplating certain modifications to Subdistrict B that would not result in any projected development sites in Subdistrict B. The proposed modifications are more fully described in Chapter 29, "Modifications to the Proposed Actions."

view corridors with landscaped streets. Lively streetscapes of buildings with active-ground floor uses on West 125th Street, Broadway, and Twelfth Avenue would enhance views and are intended to create additional pedestrian activity and new viewers of the area's visual resources. Views of the Manhattan Valley IRT and Riverside Drive viaducts would not be blocked in either analysis year, and the expected design of the new buildings in the Illustrative Plan would reference those structures. There would only be a slight visual relationship between the Academic Mixed-Use Development and the northern end of Riverside Park at St. Clair Place, and no visual relationship to St. Mary's Protestant Episcopal Church on West 126th Street.

Although eastward views of the Studebaker Building on West 131st and 132nd Streets would be blocked by new development in 2030 analysis year, the large publicly accessible Square that would be constructed in the 2030 analysis year to the south across West 131st Street would improve that visual resource's setting, while providing vantage points for new views. In addition, new development would not abut the west façade of the Studebaker Building, and a 50-foot-wide, publicly accessible north–south open area would be immediately adjacent to it, thereby enhancing the building's setting. The Square and the adjacent midblock open area would create a new northward view corridor to the Studebaker Building from the Small Square that would be constructed in the 2015 analysis year. From West 125th and West 129th Streets, there would be views to the Studebaker Building through the Academic Mixed-Use Development, and along that same view corridor, there would be views south from the Square to Prentis Hall on West 125th Street. By the 2030 analysis year, the publicly accessible Square would also provide views to the Riverside Drive viaduct and toward the waterfront.

J. NEIGHBORHOOD CHARACTER

The Proposed Actions would clearly and substantially alter the Project Area's neighborhood character, as defined by CEQR. The aging industrial area would be replaced with a major graduate school and academic research campus of Columbia University, and a mixed-use development adjacent to the waterfront and on the east side of Broadway. The Proposed Actions would improve the streetscapes, provide active retail uses along Broadway, West 125th Street, and Twelfth Avenue, improve connections to the waterfront, and introduce substantial new publicly accessible open space.

In both 2015 and 2030, the changes in the Project Area would not adversely affect neighborhood character in the primary and secondary study areas. Columbia's proposed urban design (in Subdistrict A) would create inviting visual corridors toward the waterfront and improve the pedestrian experience on West 125th Street. Redevelopment along the west side of Twelfth Avenue in Subdistrict B would add to the attractiveness of the waterfront as a destination. Redevelopment in the Other Area east of Broadway would introduce new residential and commercial uses, which would enliven the Broadway corridor in the Project Area and the primary study area.

In Subdistrict A, the Proposed Actions would facilitate new Columbia University land uses, create new publicly accessible open spaces, enhance urban design and visual resources, and preserve and create an appropriate context for two historic resources, the Studebaker Building and the former Warren Nash Service Station building. The redevelopment in Subdistrict A would also require the relocation of the West Market Diner and the demolition of the former Sheffield Farms Stable (currently occupied by a moving and storage company), both historic resources. The 1948 dining car of the West Market Diner would be relocated to a new site in the Project Area or study area and restored to the extent practicable. Moving the 1948 dining car and rehabilitating it would not result in significant adverse impacts. Demolition of the former

Sheffield Farms Stable would result in a significant adverse impact on this historic resource. However, there are a number of buildings and historic structures (some of which are visual landmarks) that are more prominent on the urban landscape, which contribute more significantly to the character of the neighborhood. Therefore, the demolition of the former Sheffield Farms Stable, while having an adverse effect on neighborhood character, would not constitute a significant adverse impact.

In both project phases, the Proposed Actions would displace jobs, some of which are held by study area residents, and replace them with a greater number of job opportunities in a broader range of job classifications, thus preserving and expanding the potential employment base for local residents. In general, the Proposed Actions would introduce new residents, either in University housing or in the primary and secondary study areas. By 2030, the new residential demand from faculty, researchers, and graduate students, coupled with the effect that redevelopment of the Project Area would have on the attractiveness of the study areas as places to live, could lead to rent increases in units not protected by rent control, rent stabilization, or a public housing program. This would create a significant adverse indirect residential displacement impact in the primary study area. However, housing in the primary study area would remain typified by large publicly subsidized housing complexes and other rent-regulated housing (representing 73.1 percent of all units), which would be unaffected by the Proposed Actions. Therefore, the significant adverse indirect residential displacement impact of the Proposed Actions would not result in a significant adverse impact on neighborhood character.

The population characteristics of the new residents would probably more closely reflect the characteristics of Manhattan residents as a whole, but the numbers of new residents would not be high enough to make a significant difference in the population characteristics prevailing in the study areas.

The limited indirect retail displacement that could result from increased rents in the immediate vicinity of the Project Area would not lead to major changes within the primary study area's commercial strips, and would not result in adverse changes to neighborhood character.

Along with the increase in density and activity, the Proposed Actions would increase vehicular, transit, and pedestrian demand. The traffic impacts predicted to occur in 2030 with the Proposed Actions would be located along 125th Street, a street that is already heavily traveled and subject to congestion, so the change from the Proposed Actions would not affect neighborhood character there. The increases in traffic on the local side streets in the Project Area would be associated with the increases in activity from the new, denser development and so would reflect the new neighborhood character. With implementation of the transportation improvements included as part of the Proposed Actions, these increases would not cause significant adverse traffic impacts. The increase in traffic and the installation of a traffic light on West 125th Street between Broadway and Twelfth Avenue would lead to a significant adverse noise impact on pedestrians (see "T. Noise"). However, in 2030 this site would be surrounded by commercial uses and a University building, which would be constructed to fully mitigate the effect of high ambient noise levels. Thus, the noise effects of the Proposed Actions would not affect neighborhood character.

In summary, the Proposed Actions would significantly change neighborhood character in the Project Area and, overall, in the primary and secondary areas, but this change would not be adverse, and there would be no significant adverse impact on neighborhood character.

K. NATURAL RESOURCES

The Proposed Actions would not result in significant adverse impacts on the floodplain, groundwater, or terrestrial natural resources in the vicinity of the Project Area, or on water quality and aquatic biota of the Lower Hudson River Estuary in 2015 or 2030. The Academic Mixed-Use Area (Subdistrict A), the Other Area east of Broadway, and Subdistrict C are not within the 100-year floodplain. Therefore, development in these portions of the Project Area in 2015 and 2030 would not affect flooding within and adjacent to the Project Area. A portion of Subdistrict B near the Hudson River is within the 100-year floodplain. Within Subdistrict B, the floodplain is currently covered by impervious surfaces. The projected stimulation of retail and office redevelopment in Subdistrict B resulting from the Proposed Actions would not be expected to result in a reduction in imperviousness within this portion of the floodplain. Therefore, redevelopment of this area would not change the floodplain's ability to contain flood waters, or exacerbate flooding conditions within or adjacent to the Project Area. The construction and operation of the new buildings within the Academic Mixed-Use Area by 2030 would not result in significant adverse impacts on groundwater resources. Construction of the buildings would result in the removal or capping of contaminated soils and historic fill, minimizing the potential for adverse impacts on groundwater quality. Although the construction of the slurry walls would modify groundwater flow pattern in the immediate vicinity of the walls, groundwater would be expected to flow around the slurry walls and then continue toward the Hudson River.

Construction within the Academic Mixed-Use Area in 2015 and 2030 may result in the removal of some street trees. These trees would be removed and replaced in accordance with permits issued by DPR. Similarly, any removal of street trees resulting from redevelopment activities within other portions of the Project Area (Subdistricts B, C, and the Other Areas) would also require permits from DPR and replacement of trees. Additionally, the proposed privately owned, publicly accessible open space within the Academic Mixed-Use Area would be designed to allow landscaping. This would result in increased vegetation resources within the Academic Mixed-Use Area and the amount of potential habitat available to birds and other wildlife. The maximum building heights allowed for the new buildings proposed to be completed by 2030 would be similar to the heights of surrounding buildings and would not be expected to result in a significant increase in the loss of migratory birds due to building collisions.

The central energy plants and smaller package boiler systems proposed at various locations to provide heating and cooling to the new buildings in the Academic Mixed-Use Area would not result in discharges to the Hudson River and would not affect aquatic resources. As presented in Chapter 19, "Air Quality," air emissions from the proposed central energy plants and package boilers would not result in significant adverse air quality impacts. Therefore, potential air emissions from the proposed energy plants and package boiler systems would not be expected to result in significant adverse impacts on terrestrial or aquatic natural resources.

The development of Columbia's facilities in the Academic Mixed-Use Area would not have an adverse impact on the environment due to the earthquake potential of the New York City metropolitan region.

During Phase 1 construction activities, stormwater generated within the Project Area would be discharged to the municipal combined sewer system and would only be discharged directly to the Hudson River during combined sewer overflows (CSOs). During Phase 2 construction activities (2015 and 2030), some stormwater generated within the Project Area would be discharged to the municipal combined sewer system and would only be discharged directly to the Hudson River during CSOs, and some stormwater would be directed toward the existing

CSO outfall at the western terminus of St. Clair Place. Implementation of erosion and sediment control measures, and stormwater management measures during construction as part of the Stormwater Pollution Prevention Plan (SWPPP), would minimize potential impacts on the municipal combined sewer system and on the Hudson River associated with stormwater runoff. The construction of slurry walls would minimize dewatering[1] during construction of below-ground project elements. However, should construction dewatering activities be required, the recovered groundwater would be treated, as necessary, prior to discharge to the combined sewer system. Therefore, no adverse impacts on surface water quality of the Hudson River would be expected to occur during the construction of the Proposed Actions in 2015 and 2030.

The increase in the volume of sewage treated by the North River Water Pollution Control Plant (WPCP) in 2015 and 2030 would not be expected to adversely affect the WPCP's ability to meet the effluent limitations of the North River WPCP's SPDES permit, or adversely affect water quality of the Hudson River in the vicinity of the North River WPCP even after consideration of projected flow increases from other proposed projects within the North River WPCP drainage area. Appendix E.1, "Water Quality Modeling," provides a detailed assessment of potential impacts on water quality of the Hudson and Harlem Rivers from the Proposed Actions.

In 2015, with no partial separate stormwater system, the number of CSO events would increase by one, and CSO volume would increase by approximately 0.3 million gallons per year (mgy) when compared with the 2015 future without the Proposed Actions condition. The increase in mass loadings of pollutants during CSO events would be extremely small. The water quality in the Hudson and Harlem Rivers would be essentially identical to those projected for the 2015 future without the Proposed Actions. These increases would not be expected to result in significant adverse impacts on water quality or aquatic biota of the Hudson and Harlem Rivers, even after consideration of DEP projections of future sewage flows within the North River WPCP service area that were developed on the basis of the New York City Department of City Planning (DCP) population projections for 2015 and 2030[2]. Therefore, the projected increase in sewage volume in 2015 due to the Proposed Actions would not be expected to result in significant adverse impacts on water quality or aquatic biota of the Hudson and Harlem Rivers.

In 2015 with a partial separate stormwater system in place, the number of CSO events would remain unchanged, and CSO volume would decrease by approximately 0.6 million mgy when compared with the 2015 future without the Proposed Actions conditions. The decrease in CSO volume would be a result of the partial separate stormwater system, which would divert stormwater from the combined sewer system. The mass loadings of pollutants during CSO events would decrease slightly, and the water quality in the Hudson and Harlem Rivers would not be adversely affected due to the Proposed Actions. Pollutant loading to the Hudson River from the possible operation of the new storm sewer on West 130th Street and subsequent discharge from the CSO outfall at St. Clair Place by 2015 would not be expected to result in significant adverse impacts on water quality or aquatic biota, or result in adverse impacts on the aquatic habitat enhancement measures implemented as part of the West Harlem Waterfront park project.

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[1] Dewatering is the removal of rainwater or groundwater from within an excavated area during construction.

[2] New York City Department of City Planning. December 2006. New York City Population Projections by Age/Sex & Borough 2000-2030. Department of City Planning, 22 Reade Street, New York, NY 10007-1216, nyc.gov/planning.

In 2030, the proposed separate stormwater system would be fully operational. The separate stormwater system with the Proposed Actions would result in a decrease of CSO volume of 1.6 million mgy and therefore a decrease in associated pollutant loadings. The CSO volume would decrease by approximately 0.4 percent. The number of CSO events would remain unchanged. Pollutant loading to the Hudson River from the operation of the new storm sewer and subsequent discharge from the CSO outfall at St. Clair Place would not be expected to result in significant adverse impacts on water quality or aquatic biota, or result in adverse impacts on the aquatic habitat enhancement measures implemented as part of the West Harlem Waterfront park project. The new storm sewers would be expected to include measures to contain floatables (e.g., standard DEP catchbasin with sump and hood), and to trap sediment and oil (e.g. catchbasins with hydrodynamic separators). The hydrodynamic separators would be voluntary measures, or measures used as part of the SWPPP prepared for the project. Therefore, the Proposed Actions would not adversely impact water quality, sediment quality, or aquatic biota of the Lower Hudson River Estuary in 2015 and 2030.

The Proposed Actions would not adversely impact water or sediment quality in 2015 or 2030 when the facilities are constructed and operating in the Academic Mixed-Use Area and redevelopment has occurred in the remaining portions of the Project Area. Therefore, no adverse impacts would occur on the New York State- and federally listed endangered shortnose sturgeon identified as present in the Hudson River in the vicinity of the Project Area. Similarly, the Proposed Actions would not be expected to result in adverse impacts on the Lower Hudson Reach Significant Coastal Fish and Wildlife Habitat. The active New York State-listed endangered peregrine falcon nest is far enough away from the Project Area (0.4 miles, or 0.6 kilometers) that it would not be adversely affected by the Proposed Actions in 2015 or 2030. Coordination with DEC's New York Natural Heritage Program (NYNHP) has been conducted regarding the peregrine falcon nest, and additional coordination would be conducted prior to the anticipated start of construction.

L. HAZARDOUS MATERIALS

Potential contaminants identified in the Academic Mixed-Use Area would be remediated (cleaned up) as part of the development of this area by Columbia University. Contaminated soil, historic fill, and demolition debris would be either disposed of off-site in accordance with all applicable regulations or capped (i.e., covered by a building, paving, or other impervious material).

Potential impacts during construction and development activities would be avoided by implementing a Construction Health and Safety Plan (CHASP). The CHASP would ensure that there would be no significant adverse impacts on public health, workers' safety, or the environment as a result of potential hazardous materials exposed by or encountered during construction. Following construction, any remaining contamination would be isolated from the environment, and it is expected that there would be no further potential for exposure. In addition, to address the remediation of known or potential environmental conditions that may be encountered during proposed construction and development activities, a Remedial Action Plan (RAP) would be prepared. (Both the RAP and CHASP would be approved by DEP and DEC, if necessary, in response to a reported petroleum spill.) To ensure the implementation of these measures, Restrictive Declarations would be placed against these Columbia-owned properties, as required by DEP.

An E-designation would be placed on lots comprising development sites in the Academic Mixed-Use Area not owned or controlled by Columbia University at the time the zoning is

approved and for the remainder of the Project Area, pursuant to Section 11-15 of the New York City Zoning Resolution. An E-designation is a mechanism to ensure that properties that are subject to an area-wide rezoning, but cannot be investigated as part of the CEQR process in connection with a rezoning because they are not owned or controlled by the applicant, are properly investigated and remediated, if necessary, before redevelopment. The owner and developer of a lot with an E-designation must prepare a Phase I Environmental Site Assessment (Phase I ESA) and, if necessary, implement a testing and sampling protocol and Health and Safety Plan (HASP) to the satisfaction of DEP before DOB issues a building permit. Based on the results of the sampling protocol, if remediation is necessary, an RAP and CHASP must be submitted and approved by DEP. Because it is anticipated that Columbia would acquire all properties in Subdistrict A, either through purchase or from ESDC as the result of eminent domain, Columbia would be responsible for addressing hazardous materials conditions according to the E-designations.

With these measures in place, no significant adverse impacts related to hazardous materials are expected to occur with the Proposed Actions.

M. WATERFRONT REVITALIZATION PROGRAM

The Proposed Actions would be consistent with the City's 10 Waterfront Revitalization Program (WRP) coastal policies and the WRP's goals of enlivening the waterfront and attracting the public to the City's coastal areas. The Proposed Actions would require widened sidewalks on east–west streets in Subdistrict A, except West 125th Street, the south side of West 129th Street, on the north side of West 131st Street, and the south side of West 132nd Street. Two new significant publicly accessible open spaces with north–south midblock connections would also be created west of Broadway. These features would result in greater and livelier street-level activity, greenery, and enhanced westward views to the Hudson River, making the Project Area more welcoming to pedestrians. Further, these new streetscape features would contribute to an improved pedestrian corridor along West 125th Street to the West Harlem Waterfront park.

The Proposed Actions would not result in adverse impacts on terrestrial plants or animals, water quality, or aquatic biota. Construction associated with the Proposed Actions has the potential to result in the removal of some existing street trees, which would be removed and replaced in accordance with permits issued by DPR. In addition, the proposed Special Manhattanville Mixed-Use Zoning District would have landscaping requirements for all open space areas. This would result in increased vegetation resources within the Academic Mixed-Use Area. The new buildings would be similar in height to the surrounding buildings and are not expected to cause an increased loss of migratory birds from building collisions. The Academic Mixed-Use Development plan and the proposed rezoning of the remaining 18 acres in the Project Area (consisting of 11 acres of land and 7 acres within the Hudson River, which would support no development) would facilitate the revitalization of Manhattanville, which would be consistent with the City's WRP.

N. INFRASTRUCTURE

By 2015, the uses from the Proposed Actions are expected to generate net new water usage of about 411,929 gallons per day (gpd) and net new wastewater flows of 204,081 gpd within the Project Area. The difference between water demand and sewage generation is caused by water demand for air conditioning, which evaporates and does not enter the sewer system. By 2030, the net new water usage is estimated to be 1,809,848 gpd, and net new sanitary sewage flow would be 953,964 gpd.

The projected development that would likely result from the Proposed Actions would create new demand for water and wastewater treatment. With the Proposed Actions, an amended drainage plan would be instituted for the Project Area, and a new sewer system would be constructed in Subdistrict A that would separate stormwater and sanitary flow, sending storm flows directly to the Hudson River through an existing CSO outfall at the western terminus of St. Clair Place. With the proposed amended drainage plan sewers built by the applicant, the local wastewater collection system would have the capacity to meet the expected demand. Therefore, no significant adverse impacts are expected to result on these services.

O. SOLID WASTE AND SANITATION SERVICES

Compared with existing conditions, the Proposed Actions would generate a net increase of about 56 tons of solid waste per week in 2015 and about 146 tons per week in 2030. Although the new development would create new demand for the disposal of solid waste, municipal and private solid waste services have adequate capacity to meet these increases in demand. Therefore, no significant adverse impacts from the Proposed Actions on these services are expected.

Certain solid wastes, such as regulated medical wastes and spent chemicals, would likely be generated by the uses contemplated under the Proposed Actions. Specialty waste handling companies (not the New York City Department of Sanitation [DSNY] or ordinary private carters) would be used to manage these wastes. These companies are regulated and licensed by both the New York State and federal governments. The regulations for the collection, handling, transportation, and final destruction of these wastes ensure that significant adverse impacts would not result. The specialty companies are able to expand their services to meet the demand and are expected to be available to handle the wastes.

P. ENERGY

The development that could occur with the Proposed Actions in 2015 and 2030 would increase energy demand, but not to the degree that it would cause a significant adverse impact on energy generation, transmission, and distribution systems.

Construction of the new Columbia buildings in Subdistrict A located between West 131st and West 132nd Streets and Broadway and Twelfth Avenue would be contingent upon Columbia entering into an agreement with Con Edison for relocating a Con Edison cooling station located on that block; this agreement has not been reached. Columbia and Con Edison are considering relocation sites within the Academic Mixed-Use Area (Subdistrict A) and have preliminarily identified a portion of the former Warren Nash Service Station building as a potential location. The equipment can operate either on an open site or within an enclosed space. The only discharge would be hot air from the heat exchangers. The relocation of the West 132nd Street cooling station is not expected to have a significant adverse impact on the transmission of electricity by Con Edison or on their rate payers.

Q. TRAFFIC AND PARKING

TRAFFIC

The Proposed Actions would add a substantial number of vehicle trips in the Project Area. Largely due to traffic improvements that are proposed as part of this project, no significant adverse traffic impacts would occur at intersections bordering and within the Project Area.

IDENTIFICATION OF IMPACTS

At study area locations farther away from the Project Area, particularly at locations where congested conditions would already exist for conditions in the future without the Proposed Actions, significant adverse traffic impacts may occur. Specifically, the Proposed Actions would result in significant adverse traffic impacts at four, four, and five intersections during the AM, midday, and PM peak hours, respectively, in 2015, and at three, three, and seven intersections during the AM, midday, and PM peak hours, respectively, in 2030, as listed below.

2015 AM Peak Hour

- Amsterdam Avenue and West 125th Street
- Frederick Douglass Boulevard and West 125th Street
- Madison Avenue and East 125th Street
- Second Avenue and East 125th Street

2015 Midday Peak Hour

- Amsterdam Avenue and West 125th Street
- Madison Avenue and East 125th Street
- Second Avenue and East 125th Street
- Broadway and West 145th Street

2015 PM Peak Hour

- Riverside Drive and West 135th Street
- Amsterdam Avenue and West 125th Street
- Frederick Douglass Boulevard and West 125th Street
- Madison Avenue and East 125th Street
- Second Avenue and East 125th Street

2030 AM Peak Hour

- Amsterdam Avenue and West 125th Street
- Madison Avenue and East 125th Street
- Second Avenue and East 125th Street

2030 Midday Peak Hour

- Amsterdam Avenue and West 125th Street
- Second Avenue and East 125th Street
- Broadway and West 145th Street

2030 PM Peak Hour

- Riverside Drive and West 135th Street
- Amsterdam Avenue and West 135th Street
- Amsterdam Avenue and West 125th Street
- Broadway and West 145th Street
- Madison Avenue and East 125th Street
- Second Avenue and East 125th Street
- First Avenue and East 125th Street

Since the publication of the DEIS, the traffic studies presented in Chapter 17 have been revised to provide detailed midday peak hour analyses and to reflect recently developed traffic information from the 125th Street Corridor Rezoning and Related Actions and East 125th Street Development background projects.

MITIGATION

All of the impacts detailed above would be mitigated with standard traffic mitigation measures, such as revised signal retiming, restriping approaches, daylighting, and lane modifications, as summarized below in Tables S-8 through S-19. To ensure mitigation, these measures would be implemented in close coordination with NYCDOT.

Table S-8

Comparison of 2015 No Build, Build, and Mitigated AM Peak Hour Conditions
Primary Study Area Signalized Intersection Level-of-Service Analysis

	2015 No Build AM Peak Hour				2015 Build AM Peak Hour				2015 Mitigated Build AM Peak Hour				
Intersection	Lane Group	V/C	Delay (spv)	LOS	Lane Group	V/C	Delay (spv)	LOS	Lane Group	V/C	Delay (spv)	LOS	Changes
Riverside Drive @ West 135th Street													
Westbound	L	0.59	35.0	C	L	0.33	28.2	C	L	0.33	28.2	C	Provide 2 Thru & 1 Right NB.
	R	0.43	31.7	C	R	0.45	32.1	C	R	0.45	32.1	C	
Northbound	TR	0.23	8.2	A	TR	0.23	8.2	A	T	0.16	7.7	A	
									R	0.20	8.4	A	
Southbound	LT	0.86	13.6	B	LT	0.88	14.5	B	LT	0.85	12.7	B	
	Int.		15.5	B	Int.		14.9	B	Int.		13.7	B	
Amsterdam Avenue @ West 125th Street													
Eastbound	L	1.39	264.3	F	L	1.39	264.3	F	L	1.39	262.8	F	Restripe to add one NB right turn
	TR	0.99	60.5	E	TR	1.05	75.6	E+	TR	0.95	48.8	D	lane.
Westbound	L	1.08	148.3	F	L	1.20	194.1	F+	L	0.97	110.5	F	Transfer 3 seconds from NS to EW.
	TR	1.02	66.8	E	TR	1.12	100.5	F+	TR	1.02	62.6	E	
Northbound	L	0.35	15.7	B	L	0.37	16.1	B	L	0.40	18.9	B	
	TR	0.73	28.6	C	TR	0.73	28.5	C	T	0.43	23.5	C	
									R	0.77	42.7	D	
Southbound	L	0.53	26.7	C	L	0.54	27.1	C	L	0.50	22.9	C	
	TR	0.44	21.6	C	TR	0.44	21.7	C	TR	0.48	24.4	C	
	Int.		56.1	E	Int.		70.7	E	Int.		51.9	D	

Notes:
L = Left Turn; T = Through; R = Right Turn; DefL = Defacto Left Turn; Int. = Intersection
V/C = Volume to Capacity; LOS = Level of Service; + indicates movements with significant impacts in Build condition

Table S-9

Comparison of 2015 No Build, Build, and Mitigated Midday Peak Hour Conditions
Primary Study Area Signalized Intersection Level-of-Service Analysis

Intersection	2015 No Build Midday Peak Hour				2015 Build Midday Peak Hour				2015 Mitigated Build Midday Peak Hour				Changes
	Lane Group	V/C	Delay (spv)	LOS	Lane Group	V/C	Delay (spv)	LOS	Lane Group	V/C	Delay (spv)	LOS	
Riverside Drive @ West 135th Street													
Westbound	L	0.23	26.5	C	L	0.21	26.2	C	L	0.21	26.2	C	Provide 2 Thru & 1 Right NB.
	R	0.38	30.1	C	R	0.46	32.2	C	R	0.46	32.2	C	
Northbound	TR	0.21	8.0	A	TR	0.20	8.0	A	T	0.17	7.8	A	
									R	0.11	7.6	A	
Southbound	LT	0.11	7.4	A	LT	0.13	7.6	A	LT	0.13	7.5	A	
	Int.		12.8	B	Int.		13.4	B	Int.		13.3	B	
Amsterdam Avenue @ West 125th Street													
Eastbound	L	1.10	145.3	F	L	1.33	235.8	F+	L	1.09	140.2	F	Restripe to add one NB right turn
	TR	1.00	62.1	E	TR	1.08	87.3	F+	TR	0.99	55.2	E	lane.
Westbound	L	0.51	45.7	D	L	0.51	45.7	D	L	0.51	43.8	D	Transfer 3 seconds from NS to EW.
	TR	0.84	38.0	D	TR	0.93	48.3	D+	TR	0.85	36.0	D	
Northbound	L	0.07	10.1	B	L	0.08	10.2	B	L	0.09	12.0	B	
	TR	0.52	23.3	C	TR	0.51	23.2	C	T	0.31	21.9	C	
									R	0.54	30.7	C	
Southbound	L	0.62	25.0	C	L	0.62	25.0	C	L	0.61	23.8	C	
	TR	0.33	20.2	C	TR	0.34	20.2	C	TR	0.37	22.6	C	
	Int.		44.0	D	Int.		58.4	E	Int.		41.8	D	

Notes:
L = Left Turn; T = Through; R = Right Turn; DefL = Defacto Left Turn; Int. = Intersection
V/C = Volume to Capacity; LOS = Level of Service; + indicates movements with significant impacts in Build condition

Table S-10

Comparison of 2015 No Build, Build, and Mitigated PM Peak Hour Conditions
Primary Study Area Signalized Intersection Level-of-Service Analysis

Intersection	2015 No Build PM Peak Hour				2015 Build PM Peak Hour				2015 Mitigated Build PM Peak Hour				Changes
	Lane Group	V/C	Delay (spv)	LOS	Lane Group	V/C	Delay (spv)	LOS	Lane Group	V/C	Delay (spv)	LOS	
Riverside Drive @ West 135th Street													
Westbound	L	0.20	26.0	C	L	0.17	25.6	C	L	0.20	29.2	C	Shift 4 seconds from EW and 5
	R	0.61	38.4	D	R	0.67	41.2	D	R	0.56	31.6	C	seconds from NS to new SB only
Northbound	TR	1.07	51.8	D	TR	1.02	34.3	C	T	1.04	47.1	D	phase.
									R	0.49	14.8	B	Provide 2 Thru & 1 Right NB.
Southbound					DefL	0.90	90.7	F+	DefL	0.50	32.9	C	Provide a new phase for SB only.
	LT	0.21	8.2	A	T	0.20	8.1	A	T	0.18	6.4	A	
	Int.		46.3	D	Int.		33.9	C	Int.		38.4	D	
Amsterdam Avenue @ West 125th Street													
Eastbound	L	1.06	144.6	F	L	1.13	168.5	F+	L	0.99	119.2	F	Restripe to add one Northbound right
	TR	1.08	84.5	F	TR	1.18	125.2	F+	TR	1.02	62.4	E	turn only lane.
Westbound	L	0.60	54.1	D	L	0.60	54.1	D	L	0.60	51.6	D	Transfer 4 seconds from NS to EW
	TR	0.96	52.1	D	TR	1.05	75.0	E+	TR	0.93	43.8	D	phase.
Northbound	L	0.23	16.9	B	L	0.24	17.5	B	L	0.24	15.5	B	Daylight SB approach.
	TR	0.90	38.5	D	TR	0.90	38.0	D	T	0.73	30.5	C	
									R	0.60	32.5	C	
Southbound	L	0.75	45.0	D	L	0.78	47.8	D	L	0.76	44.3	D	
	TR	0.81	38.6	D	TR	0.83	40.7	D	TR	0.44	24.5	C	
	Int.		56.2	E	Int.		74.0	E	Int.		44.7	D	

Notes:
L = Left Turn; T = Through; R = Right Turn; DefL = Defacto Left Turn; Int. = Intersection
V/C = Volume to Capacity; LOS = Level of Service; + indicates movements with significant impacts in Build condition

Table S-11

Comparison of 2015 No Build, Build, and Mitigated AM Peak Hour Conditions
Secondary Study Area Signalized Intersection Level-of-Service Analysis

Intersection	2015 No Build AM Peak Hour				2015 Build AM Peak Hour				2015 Mitigated Build AM Peak Hour				Changes
	Lane Group	V/C	Delay (spv)	LOS	Lane Group	V/C	Delay (spv)	LOS	Lane Group	V/C	Delay (spv)	LOS	
Frederick Douglass Boulevard @ West 125th Street													
Eastbound	LTR	1.01	61.0	E	LTR	1.08	84.2	F+	LTR	1.01	60.2	E	Transfer 2 seconds from NB/SB
Westbound	LTR	0.86	32.4	C	LTR	0.92	38.4	D	LTR	0.87	31.8	C	phase to EB/WB phase.
Northbound	LT	0.19	15.5	B	LT	0.19	15.5	B	LT	0.20	16.7	B	
	R	0.30	17.6	B	R	0.30	17.6	B	R	0.31	19.2	B	
Southbound	LT	0.57	17.6	B	LT	0.57	17.6	B	LT	0.60	19.8	B	
	R	0.24	14.3	B	R	0.24	14.3	B	R	0.26	16.0	B	
	Int.		33.2	C	Int.		41.5	D	Int.		33.9	C	
Madison Avenue @ East 125th Street													
Eastbound	LT	1.14	102.5	F	LT	1.22	134.4	F+	LT	1.10	86.9	F	Transfer 3 seconds from NB
Westbound	TR	0.80	28.9	C	TR	0.85	32.0	C	TR	0.79	26.0	C	phase to EB/WB phase.
Northbound	LTR	0.59	17.4	B	LTR	0.59	17.4	B	LTR	0.64	20.7	C	
	Int.		50.4	D	Int.		62.6	E	Int.		45.4	D	
Second Avenue @ East 125th Street													
Eastbound	T	1.46	252.1	F	T	1.51	274.2	F+	TR	1.10	97.1	F	Shift 4 seconds from SB phase -
	R	0.37	36.1	D	R	0.40	36.8	D					2 seconds to EW phase and 2
Westbound	DefL	1.13	128.5	F	DefL	1.13	128.5	F	DefL	1.02	91.6	F	seconds to SWB phase.
	T	1.35	217.2	F	T	1.43	248.2	F+	T	1.29	187.7	F	Restripe EB Approach.
Southbound	LTR	0.59	20.6	C	LTR	0.59	20.6	C	LTR	0.66	25.2	C	
Southwestbound	TR	1.22	149.2	F	TR	1.29	178.7	F+	TR	1.17	125.8	F	
	Int.		119.2	F	Int.		134.0	F	Int.		81.6	F	

Notes:
L = Left Turn; T = Through; R = Right Turn; DefL = Defacto Left Turn; Int. = Intersection
V/C = Volume to Capacity; LOS = Level of Service; + indicates movements with significant impacts in Build condition

Table S-12

Comparison of 2015 No Build, Build, and Mitigated Midday Peak Hour Conditions
Secondary Study Area Signalized Intersection Level-of-Service Analysis

Intersection	2015 No Build Midday Peak Hour				2015 Build Midday Peak Hour				2015 Mitigated Build Midday Peak Hour				Changes
	Lane Group	V/C	Delay (spv)	LOS	Lane Group	V/C	Delay (spv)	LOS	Lane Group	V/C	Delay (spv)	LOS	
Madison Avenue @ East 125th Street													
Eastbound	LT	1.02	60.1	E	LT	1.10	85.4	F+	LT	1.01	56.2	E	Transfer 3 seconds from NB
Westbound	TR	0.63	22.3	C	TR	0.69	23.8	C	TR	0.64	20.6	C	phase to EB/WB phase.
Northbound	LTR	0.48	15.9	B	LTR	0.48	15.9	B	LTR	0.52	18.9	B	
	Int.		34.7	C	Int.		45.4	D	Int.		34.0	C	
Second Avenue @ East 125th Street													
Eastbound	T	1.47	257.3	F	T	1.55	291.3	F+	TR	1.20	136.4	F	Shift 4 seconds from SB phase -
	R	0.60	43.8	D	R	0.66	46.7	D					2 seconds to EW phase and 2
Westbound	LT	0.91	67.2	E	LT	0.99	85.4	F+	LT	0.83	51.8	D	second to SWB phase.
Southbound	LTR	0.38	18.3	B	LTR	0.38	18.3	B	LTR	0.43	22.1	C	Restripe EB Approach.
Southwestbound	TR	0.76	42.3	D	TR	0.82	45.8	D	TR	0.74	39.3	D	
	Int.		103.1	F	Int.		118.0	F	Int.		70.3	E	
Broadway @ West 145th Street													
Eastbound	LTR	0.27	25.9	C	LTR	0.27	25.9	C	LTR	0.26	25.1	C	Transfer 1 second from NS
Westbound	LTR	0.97	69.3	E	LTR	1.00	75.2	E+	LTR	0.96	64.7	E	phase to EW phase.
Northbound	LTR	0.69	23.0	C	LTR	0.72	23.9	C	LTR	0.74	25.1	C	
Southbound	L	0.36	12.4	B	L	0.37	12.7	B	L	0.38	13.4	B	
	TR	0.54	12.0	B	TR	0.56	12.3	B	TR	0.57	13.0	B	
	Int.		26.8	C	Int.		28.2	C	Int.		27.1	C	

Notes:
L = Left Turn; T = Through; R = Right Turn; DefL = Defacto Left Turn; Int. = Intersection
V/C = Volume to Capacity; LOS = Level of Service; + indicates movements with significant impacts in Build condition

Table S-13

Comparison of 2015 No Build, Build, and Mitigated PM Peak Hour Conditions
Secondary Study Area Signalized Intersection Level-of-Service Analysis

Intersection	2015 No Build PM Peak Hour				2015 Build PM Peak Hour				2015 Mitigated Build PM Peak Hour				Changes
	Lane Group	V/C	Delay (spv)	LOS	Lane Group	V/C	Delay (spv)	LOS	Lane Group	V/C	Delay (spv)	LOS	
Frederick Douglass Boulevard @ West 125th Street													
Eastbound	LTR	1.25	149.6	F	LTR	1.40	214.5	F+	LTR	1.22	134.2	F	Transfer 4 seconds from NB/SB
Westbound	LTR	1.49	255.6	F	LTR	1.67	334.2	F+	LTR	1.46	237.5	F	phase to EB/WB phase.
Northbound	LTR	0.72	21.9	C	LTR	0.73	22.3	C	LTR	0.82	30.5	C	
Southbound	LT	0.44	18.5	B	LT	0.45	18.6	B	LT	0.50	21.9	C	
	R	0.34	19.3	B	R	0.34	19.3	B	R	0.38	23.0	C	
	Int.		125.5	F	Int.		170.7	F	Int.		120.9	F	
Madison Avenue @ East 125th Street													
Eastbound	LT	1.45	234.8	F	LT	1.61	303.3	F+	LT	1.41	215.2	F	Transfer 4 seconds from NB only
Westbound	TR	0.71	24.7	C	TR	0.77	26.8	C	TR	0.70	21.6	C	phase to EB/WB phase.
Northbound	LTR	0.74	20.4	C	LTR	0.74	20.5	C	LTR	0.83	26.9	C	
	Int.		99.2	F	Int.		128.0	F	Int.		96.2	F	
Second Avenue @ East 125th Street													
Eastbound	T	1.34	196.3	F	T	1.43	233.2	F+	TR	1.14	109.3	F	Shift 3 seconds from SB phase -
	R	0.33	31.7	C	R	0.41	33.5	C					1 second to EW phase and 2
Westbound	LT	0.91	63.8	E	LT	0.97	76.1	E+	LT	0.91	61.1	E	second to SWB phase.
Southbound	LTR	0.89	30.5	C	LTR	0.89	30.5	C	LTR	0.95	37.6	D	Restripe EB Approach.
Southwestbound	TR	1.06	88.6	F	TR	1.13	112.4	F+	TR	1.02	74.0	E	Daylight WB approach.
	Int.		81.8	F	Int.		97.3	F	Int.		64.4	E	

Notes:
L = Left Turn; T = Through; R = Right Turn; DefL = Defacto Left Turn; Int. = Intersection
V/C = Volume to Capacity; LOS = Level of Service; + indicates movements with significant impacts in Build condition

Table S-14

Comparison of 2030 No Build, Build, and Mitigated AM Peak Hour Conditions
Primary Study Area Signalized Intersection Level-of-Service Analysis

Intersection	2030 No Build AM Peak Hour				2030 Build AM Peak Hour				2030 Mitigated Build AM Peak Hour				Changes
	Lane Group	V/C	Delay (spv)	LOS	Lane Group	V/C	Delay (spv)	LOS	Lane Group	V/C	Delay (spv)	LOS	
Riverside Drive @ West 135th Street													
Westbound	L	0.62	35.9	D	L	0.30	27.4	C	L	0.36	31.6	C	Transfer 4 seconds from WB phase and 9 seconds
	R	0.47	32.8	C	R	0.51	33.9	C	R	0.61	42.6	D	from NS phase to SB only phase.
Northbound	TR	0.25	8.3	A	TR	0.23	8.2	A	T	0.20	12.2	B	Provide a new SB protected phase.
									R	0.23	13.0	B	Restripe NB from 2 TR to 2T and 1 R
Southbound	LT	0.94	19.8	B	LT	0.97	24.6	C	LT	0.88	11.4	B	
	Int.		19.7	B	Int.		22.0	C	Int.		14.4	B	
Amsterdam Avenue @ West 135th Street													
Eastbound	LT	0.44	28.8	C	LT	0.55	32.1	C	L	0.34	29.1	C	Change EB 1 LT & 1 R to 1 L, 1 T & 1 R. Restripe
	R	0.41	30.6	C	R	0.58	37.1	D	T	0.29	25.6	C	and Daylight EB approach.
									R	0.60	38.2	D	
Westbound	LTR	0.47	29.6	C	LTR	0.51	30.8	C	LTR	0.51	30.7	C	
Northbound	LTR	0.53	8.4	A	LTR	0.58	9.4	A	LTR	0.58	9.4	A	
Southbound	LTR	0.62	9.6	A	LTR	0.72	11.6	B	LTR	0.72	11.6	B	
	Int.		14.2	B	Int.		16.6	B	Int.		16.1	B	
Amsterdam Avenue @ West 125th Street													
Eastbound	TR	1.18	125.8	F	TR	1.33	188.6	F+	TR	0.87	39.7	D	Restripe EB from 2TR to 3 TR and restripe WB from
Westbound	TR	1.21	139.4	F	TR	1.49	260.7	F+	TR	0.99	56.1	E	2TR to 3TR.
Northbound	L	0.39	16.7	B	L	0.47	18.9	B	L	0.47	18.9	B	Daylight EB and WB approach.
	TR	0.82	30.4	C	TR	0.82	30.3	C	TR	0.82	30.3	C	
Southbound	L	0.60	31.6	C	L	0.60	31.5	C	L	0.60	31.5	C	
	TR	0.53	21.1	C	TR	0.53	21.3	C	TR	0.53	21.3	C	
	Int.		79.4	E	Int.		134.9	F	Int.		38.3	D	

Notes:
L = Left Turn; T = Through; R = Right Turn; DefL = Defacto Left Turn; Int. = Intersection
V/C = Volume to Capacity; LOS = Level of Service; + indicates movements with significant impacts in Build condition

Table S-15

Comparison of 2030 No Build, Build, and Mitigated Midday Peak Hour Conditions
Primary Study Area Signalized Intersection Level-of-Service Analysis

Intersection	2030 No Build Midday Peak Hour				2030 Build Midday Peak Hour				2030 Mitigated Build Midday Peak Hour				Changes
	Lane Group	V/C	Delay (spv)	LOS	Lane Group	V/C	Delay (spv)	LOS	Lane Group	V/C	Delay (spv)	LOS	
Riverside Drive @ West 135th Street													
Westbound	L	0.25	26.8	C	L	0.23	26.5	C	L	0.28	30.4	C	Transfer 4 seconds from WB phase and 9
	R	0.40	30.6	C	R	0.52	33.9	C	R	0.62	42.4	D	seconds from NS phase to SB only phase.
Northbound	TR	0.22	8.1	A	TR	0.21	8.1	A	T	0.22	12.5	B	Provide new SB protected phase.
									R	0.14	12.0	B	Provide 2 Thru & 1 Right NB.
Southbound	LT	0.12	7.5	A	LT	0.15	7.7	A	LT	0.14	6.1	A	
	Int.		12.9	B	Int.		13.9	B	Int.		17.3	B	
Amsterdam Avenue @ West 135th Street													
Eastbound	LT	0.25	25.5	C	LT	0.35	27.6	C	L	0.32	28.0	C	Change EB 1 LT & 1 R to 1 L, 1 T & 1 R.
	R	0.25	26.2	C	R	0.49	32.3	C	T	0.08	22.9	C	Restripe and Daylight EB approach.
									R	0.51	32.9	C	
Westbound	LTR	0.57	33.2	C	LTR	0.61	34.4	C	LTR	0.60	34.1	C	
Northbound	LTR	0.60	9.7	A	LTR	0.70	12.0	B	LTR	0.70	12.0	B	
Southbound	LTR	0.53	8.4	A	LTR	0.59	9.2	A	LTR	0.59	9.2	A	
	Int.		13.7	B	Int.		16.0	B	Int.		16.0	B	
Amsterdam Avenue @ West 125th Street													
Eastbound	TR	1.19	130.8	F	TR	1.36	201.1	F+	TR	0.89	41.2	D	Restripe EB from 2TR to 3 TR and
Westbound	TR	1.00	64.3	E	TR	1.15	113.3	F+	TR	0.76	33.4	C	restripe WB from 2TR to 3TR.
Northbound	L	0.08	9.2	A	L	0.11	9.6	A	L	0.11	9.6	A	Daylight EB and WB approaches.
	TR	0.62	23.4	C	TR	0.62	23.3	C	TR	0.62	23.3	C	
Southbound	L	0.69	30.1	C	L	0.68	29.7	C	L	0.68	29.7	C	
	TR	0.37	18.7	B	TR	0.37	18.8	B	TR	0.37	18.8	B	
	Int.		65.4	E	Int.		102.4	F	Int.		31.3	C	

Notes:
L = Left Turn; T = Through; R = Right Turn; DefL = Defacto Left Turn; Int. = Intersection
V/C = Volume to Capacity; LOS = Level of Service; + indicates movements with significant impacts in Build condition

Table S-16

Comparison of 2030 No Build, Build, and Mitigated PM Peak Hour Conditions
Primary Study Area Signalized Intersection Level-of-Service Analysis

Intersection	2030 No Build PM Peak Hour				2030 Build PM Peak Hour				2030 Mitigated Build PM Peak Hour				Changes
	Lane Group	V/C	Delay (spv)	LOS	Lane Group	V/C	Delay (spv)	LOS	Lane Group	V/C	Delay (spv)	LOS	
Riverside Drive @ West 135th Street													
Westbound	L	0.21	26.3	C	L	0.18	25.8	C	L	0.22	29.5	C	Shift 4 seconds from WB to SB and
	R	0.66	40.9	D	R	0.74	46.3	D+	R	0.55	30.5	C	Shift 5 seconds from NS phase to
Northbound	TR	1.15	83.7	F	TR	1.10	62.2	E	T	1.13	77.8	E	SB only phase.
									R	0.52	15.5	B	Provide 2 Thru & 1 Right NB.
Southbound					DefL	0.98	110.7	F+	DefL	0.55	35.0	D	Provide a new phase for SB only.
	LT	0.14	7.6	A	T	0.21	8.2	A	T	0.20	6.5	A	Daylight the WB approach.
	Int.		72.6	E	Int.		57.3	E	Int.		59.8	E	
Amsterdam Avenue @ West 135th Street													
Eastbound	LT	0.65	39.0	D	LT	1.12	122.9	F+	L	0.76	44.9	D	Transfer 4 seconds from NB/SB
	R	0.28	26.9	C	R	0.46	31.4	C	T	0.16	21.1	C	phase to EB/WB phase. Change EB
									R	0.40	26.5	C	1 LT & 1 R to 1 L, 1 T & 1 R.
Westbound	LTR	0.70	39.1	D	LTR	0.89	60.9	E+	LTR	0.61	30.9	C	Restripe and Daylight EB approach.
Northbound	LTR	0.76	13.4	B	LTR	0.82	16.3	B	LTR	0.89	25.4	C	
Southbound	LTR	0.61	9.5	A	LTR	0.67	10.6	B	LTR	0.73	15.1	B	
	Int.		18.0	B	Int.		33.5	C	Int.		24.1	C	
Amsterdam Avenue @ West 125th Street													
Eastbound	TR	1.14	108.5	F	TR	1.44	235.8	F+	TR	0.95	44.8	D	Restripe EB from 2TR to 3 TR and
Westbound	TR	1.02	66.3	E	TR	1.15	109.4	F+	TR	0.76	31.0	C	restripe WB from 2TR to 3TR.
Northbound	L	0.27	20.5	C	L	0.31	21.6	C	L	0.31	21.6	C	Daylight EB and WB approaches.
	TR	1.07	74.9	E	TR	1.07	76.9	E	TR	1.07	76.9	E	
Southbound	L	0.81	54.2	D	L	0.81	54.3	D	L	0.81	54.3	D	
	TR	0.98	63.8	E	TR	0.99	67.1	E	TR	0.99	67.1	E	
	Int.		77.1	E	Int.		126.5	F	Int.		52.8	D	

Notes:
L = Left Turn; T = Through; R = Right Turn; DefL = Defacto Left Turn; Int. = Intersection
V/C = Volume to Capacity; LOS = Level of Service; + indicates movements with significant impacts in Build condition

Table S-17

Comparison of 2030 No Build, Build, and Mitigated AM Peak Hour Conditions
Secondary Study Area Signalized Intersection Level-of-Service Analysis

Intersection	2030 No Build AM Peak Hour				2030 Build AM Peak Hour				2030 Mitigated Build AM Peak Hour				Changes
	Lane Group	V/C	Delay (spv)	LOS	Lane Group	V/C	Delay (spv)	LOS	Lane Group	V/C	Delay (spv)	LOS	
Madison Avenue @ East 125th Street													
Eastbound	T	0.87	32.7	C	T	0.91	37.2	D	T	0.89	33.9	C	Transfer 1 second from NB to
													EB/WB phase.
Westbound	TR	0.85	32.0	C	TR	0.97	47.8	D+	TR	0.95	42.2	D	
Northbound	LTR	0.68	19.0	B	LTR	0.69	19.3	B	LTR	0.71	20.5	C	
	Int.		27.1	C	Int.		33.8	C	Int.		31.5	C	
Second Avenue @ East 125th Street													
Eastbound	T	1.55	290.0	F	T	1.59	310.7	F+	TR	1.18	127.9	F	Transfer 2 seconds from SB to
	R	0.39	36.4	D	R	0.49	40.2	D					EB/WB phase. Transfer 3
Westbound	DefL	1.21	158.7	F	DefL	1.21	158.7	F	DefL	1.10	116.8	F	seconds from SB to SWB.
	T	1.44	251.3	F	T	1.62	329.3	F+	T	1.43	244.4	F	Restripe EB approach.
Southbound	L	0.52	26.2	C	L	0.52	26.2	C	L	0.61	33.0	C	
	TR	0.69	24.2	C	TR	0.69	24.2	C	TR	0.81	31.8	C	
Southwestbound	TR	1.18	129.1	F	TR	1.31	186.0	F+	TR	1.15	115.2	F	
	Int.		129.8	F	Int.		155.0	F	Int.		97.4	F	

Notes:
L = Left Turn; T = Through; R = Right Turn; DefL = Defacto Left Turn; Int. = Intersection
V/C = Volume to Capacity; LOS = Level of Service; + indicates movements with significant impacts in Build condition

Table S-18

Comparison of 2030 No Build, Build, and Mitigated Midday Peak Hour Conditions
Secondary Study Area Signalized Intersection Level-of-Service Analysis

Intersection	2030 No Build Midday Peak Hour				2030 Build Midday Peak Hour				2030 Mitigated Build Midday Peak Hour				Changes
	Lane Group	V/C	Delay (spv)	LOS	Lane Group	V/C	Delay (spv)	LOS	Lane Group	V/C	Delay (spv)	LOS	
Second Avenue @ East 125th Street													
Eastbound	T	1.41	228.1	F	T	1.48	258.0	F+	TR	1.22	144.5	F	Transfer 1 second from SB to EB/WB. Transfer 2 seconds from SB to SWB.
	R	0.56	39.3	D	R	0.67	45.1	D+					
Westbound	LT	0.87	59.0	E	LT	0.95	71.8	E+	LT	0.85	53.6	D	
Southbound	L	0.56	27.7	C	L	0.56	27.7	C	L	0.62	32.2	C	Restripe EB approach.
	TR	0.39	20.1	C	TR	0.39	20.1	C	TR	0.43	23.1	C	Daylight WB approach.
Southwestbound	TR	0.81	45.3	D	TR	0.88	50.6	D+	TR	0.79	41.8	D	
	Int.		94.2	F	Int.		107.0	F	Int.		74.4	E	
Broadway @ West 145th Street													
Eastbound	LTR	0.29	26.2	C	LTR	0.29	26.2	C	LTR	0.28	25.3	C	Transfer 1 second from NS phase to EW phase.
Westbound	LTR	1.05	89.1	F	LTR	1.09	102.0	F+	LTR	1.05	87.6	F	
Northbound	LTR	0.75	24.7	C	LTR	0.80	27.0	C	LTR	0.82	28.8	C	
Southbound	L	0.40	13.5	B	L	0.41	14.1	B	L	0.42	14.9	B	
	TR	0.58	12.6	B	TR	0.62	13.4	B	TR	0.63	14.2	B	
	Int.		31.1	C	Int.		34.2	C	Int.		32.7	C	

Notes:
L = Left Turn; T = Through; R = Right Turn; DefL = Defacto Left Turn; Int. = Intersection
V/C = Volume to Capacity; LOS = Level of Service; + indicates movements with significant impacts in Build condition

Table S-19

Comparison of 2030 No Build, Build, and Mitigated PM Peak Hour Conditions
Secondary Study Area Signalized Intersection Level-of-Service Analysis

Intersection	2030 No Build PM Peak Hour				2030 Build PM Peak Hour				2030 Mitigated Build PM Peak Hour				Changes
	Lane Group	V/C	Delay (spv)	LOS	Lane Group	V/C	Delay (spv)	LOS	Lane Group	V/C	Delay (spv)	LOS	
Madison Avenue @ East 125th Street													
Eastbound	T	1.02	56.6	E	T	1.18	114.1	F+	T	1.01	51.6	D	Transfer 3 seconds from NB phase to EW/WB phase.
Westbound	TR	0.75	26.0	C	TR	0.81	28.7	C	TR	0.75	24.0	C	
Northbound	LTR	0.86	24.7	C	LTR	0.86	24.9	C	LTR	0.93	33.8	C	Daylight EB approach.
	Int.		35.5	D	Int.		57.7	E	Int.		37.9	D	
Second Avenue @ East 125th Street													
Eastbound	T	1.30	175.0	F	T	1.45	242.4	F+	TR	1.28	166.6	F	Transfer 1 second from EB/WB to SB. Transfer 1 second from EB/WB to SWB.
	R	0.31	29.6	C	R	0.45	32.8	C					
Westbound	LT	0.86	53.4	D	LT	0.92	62.1	E+	LT	0.84	50.1	D	
Southbound	L	1.87	431.8	F	L	1.87	431.8	F	L	1.81	402.3	F	Restripe EB approach.
	TR	0.83	31.4	C	TR	0.83	31.4	C	TR	0.80	29.4	C	Daylight WB approach.
Southwestbound	TR	1.07	90.8	F	TR	1.12	109.9	F+	TR	1.07	89.2	F	
	Int.		146.3	F	Int.		166.9	F	Int.		140.5	F	
First Avenue @ East 125th Street													
Eastbound	L	1.13	106.7	F	L	1.23	145.4	F+	L	1.13	104.4	F	Transfer 3 seconds from NB Only phase to EB Only phase.
	LT	0.59	26.0	C	LT	0.66	28.2	C	LT	0.61	24.4	C	
Northbound	L	0.18	10.0	B	L	0.19	10.1	B	L	0.20	12.2	B	
	T	0.70	14.8	B	T	0.70	14.8	B	T	0.75	18.1	B	
	R	0.52	15.0	B	R	0.52	15.0	B	R	0.56	18.2	B	
	Int.		33.1	C	Int.		42.2	D	Int.		35.8	D	
Broadway @ West 145th Street													
Eastbound	LTR	0.28	26.0	C	LTR	0.28	26.0	C	LTR	0.27	25.2	C	Transfer 1 second from NS phase to EW phase.
Westbound	LTR	1.00	71.7	E	LTR	1.03	79.1	E+	LTR	0.99	66.7	E	
Northbound	LTR	0.91	33.5	C	LTR	0.93	37.0	D	LTR	0.96	41.6	D	
Southbound	L	0.47	16.9	B	L	0.48	17.5	B	L	0.49	18.4	B	
	TR	0.51	11.6	B	TR	0.53	11.8	B	TR	0.54	12.5	B	
	Int.		33.1	C	Int.		36.0	D	Int.		36.1	D	

Notes:
L = Left Turn; T = Through; R = Right Turn; DefL = Defacto Left Turn; Int. = Intersection
V/C = Volume to Capacity; LOS = Level of Service; + indicates movements with significant impacts in Build condition

PARKING

IDENTIFICATION OF IMPACTS

By 2015, the Proposed Actions would result in an off-street parking shortfall of up to approximately 260 spaces due to the displacement of existing public parking facilities in the Project Area. While this would be a significant adverse parking impact, it is possible that market forces may result in the construction of new off-street parking facilities to satisfy additional demand. Furthermore, these same market forces are likely to result in increased fees at existing area parking facilities, which may encourage people who currently park in facilities in the Project Area because they are inexpensive to seek parking in facilities outside of the Project Area that may be less expensive.

By 2030, the Proposed Actions would cause an off-street parking shortfall of just over 120 spaces[1] as a result of the displacement of existing public parking facilities in the Project Area.

MITIGATION

To address the shortfall in 2015, Columbia University, working with DEP, has developed a plan to license portions of the DEP property between West 135th and West 145th Streets beneath the Henry Hudson Parkway for use as a public parking facility. This area would accommodate approximately 400 parking spaces.

An analysis was performed to determine the effect of traffic entering and exiting this proposed parking lot on the Project Area intersections. As shown in Appendix Figures P.3-1 to P.3-2 of this FEIS, the rerouting of peak hour trips associated with the entire projected parking shortfall in 2015 would result in increases of fewer than 50 peak hour vehicle trips at all intersections within the Project Area. Therefore, no further detailed analysis is warranted. Implementation of this parking mitigation would fully mitigate the projected significant adverse parking impact while not resulting in the potential for significant adverse traffic impacts.

Columbia University is also prepared to add up to 72 parking spaces through an improvement of operational efficiency and parking configuration at its 560 Riverside Drive parking garage, thereby providing additional supply at area public parking facilities. This measure would partially mitigate the projected significant adverse parking impact in 2015 if the above public parking facility is not developed. Since the additional parking spaces at 560 Riverside Drive would amount to fewer than the number of spaces that would be occupied by redirected traffic at the above public parking facility, there would also not be a potential for significant adverse traffic impacts associated with this mitigation option.

As with 2015, the proposed public parking facility under the Henry Hudson Parkway north of West 135th Street would fully mitigate the projected significant adverse parking impacts identified for 2030. The rerouting of traffic resulting from the provision of this parking facility would not have the potential for significant adverse traffic impacts. As discussed above, Columbia University is also prepared to reconfigure the 560 Riverside Drive Columbia University parking garage to add up to 72 parking spaces. This measure would partially mitigate the projected significant adverse parking impact in 2030 if the above parking facility is not developed.

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[1] Approximately 300 off-street spaces would be freed up for the use by the public due to Columbia University relinquishing monthly parking leases and accommodating this demand within the below-grade on-site parking facility.

R. TRANSIT AND PEDESTRIANS

The Proposed Actions would result in significant adverse bus line-haul impacts on the Bx15 cross-town route in the 2015 Build year. The Proposed Actions, when fully completed in 2030, would also result in significant adverse transit impacts at the E101 down escalator during the AM peak hour and the E102 up escalator at the 125th Street No. 1 train subway station during the PM peak hour. In addition, significant adverse bus line-haul impacts would occur on the Bx15 cross-town route in 2030. No significant adverse subway line-haul or pedestrian impacts are anticipated in either the 2015 or the 2030 Build year.

TRANSIT—SUBWAY

IDENTIFICATION OF IMPACTS

The Proposed Actions, when fully completed in 2030, would result in significant adverse transit impacts at the E101 down escalator during the AM peak hour and the E102 up escalator at the 125th Street No. 1 train subway station during the PM peak hour.

MITIGATION

To increase capacity, these escalators would need to be converted from 24 inches to 40 inches. While more spatially efficient construction is possible, it was assumed that the 40-inch tread escalators could add 1 foot in width to the escalators. Replacing the escalator would allow the elevator structure to be shifted closer to the future curb line. Therefore, although taking some sidewalk space would be required, this mitigation would result in a wider sidewalk and create additional pedestrian space. Design and implementation of the mitigation measures, to be reviewed by and coordinated with NYCT, would be the responsibility of Columbia. The mitigation would occur at the beginning of Phase 2 development.

TRANSIT—BUS LINE HAUL

IDENTIFICATION OF IMPACTS

The Proposed Actions would result in significant adverse bus line-haul impacts on the eastbound Bx15 cross-town route in the 2015 PM peak period. In addition, a significant adverse bus line-haul impact would occur on the eastbound Bx15 cross-town route during the 2030 PM peak period and on the westbound Bx15 bus route in the 2030 AM peak period.

MITIGATION

To mitigate these significant adverse impacts, one, one, and four additional buses would need to be scheduled in the eastbound direction during the 2015 PM peak period, in the westbound direction during the 2030 AM peak period, and in the eastbound direction during the 2030 PM peak period, respectively. MTA/NYCT would evaluate these needs and make the necessary adjustments where warranted, subject to financial and operational constraints. With these increases in service, the Bx15 route would have adequate capacity to accommodate the projected increase in bus ridership

S. AIR QUALITY

The Proposed Actions would not cause any significant adverse air quality impacts on sensitive uses in the surrounding community, nor would the Proposed Actions be adversely affected by new or existing air emission sources in the Project Area.

Concentrations of carbon monoxide (CO) and fine particulate matter (PM_{10}) from project-generated traffic would not result in any violations of National Ambient Air Quality Standards (NAAQS). CO impacts would also not exceed CEQR *de minimis* criteria, while $PM_{2.5}$ increments would not exceed the City's current interim guidance criteria. Concentrations of CO from along the elevated Riverside Drive at proposed adjacent University housing sites would be below NAAQS.

Impacts from the Proposed Actions' parking facilities would not result in significant adverse impacts on air quality. Provisions of the Restrictive Declaration for the Academic Mixed-Use Area would restrict the locations of ventilation exhausts to ensure that the parking facilities would not result in any significant air quality impacts.

The proposed central energy plants and boilers in the Academic Mixed-Use Area would require permits from DEC and DEP. Emissions and dispersion of nitrogen oxides (NO_x), CO, PM_{10}, and sulfur dioxide (SO_2) from the Academic Mixed-Use Area's stationary sources (i.e., the proposed central energy plants and package boilers) would not violate NAAQS. Likewise, the maximum incremental increases in annual average $PM_{2.5}$ concentrations from stationary sources would be below the significant impact thresholds, as well as the 24-hour average interim guidance criterion of 5 micrograms per cubic meter ($\mu g/m^3$). Maximum 24-hour $PM_{2.5}$ concentrations from the Proposed Actions' central energy plants and package boilers were predicted to exceed the City's interim guidance criterion of 2 $\mu g/m^3$; however, based on the magnitude, and the limited frequency and extent of these occurrences, no significant adverse air quality impact is predicted due to emissions of $PM_{2.5}$. To ensure the avoidance of impacts, limitations on annual fuel usage and minimum stack heights would be included in the Restrictive Declaration for the Academic Mixed-Use Area. For Site 15, the Restrictive Declaration would include a provision limiting the package boilers to natural gas.

Other projected development sites within the Project Area (at Site 5, Subdistrict B, and the Other Areas) were analyzed using a conservative screening procedure to determine whether fossil fuel-fired equipment would result in any potential significant adverse air quality impacts on nearby buildings. The results demonstrated that for Sites 20, 24 and 25, an air quality E-designation is necessary to ensure that concentrations from emissions of fossil fuel-fired equipment do not result in a violation of ambient air quality standards or exceedances of the City's $PM_{2.5}$ interim guidance criteria. The E-designations would require the use of certain types of fossil fuels and/or place restrictions on where exhaust stacks for fossil fuel-fired equipment could be located. The other projected developments would also not result in any violation of ambient air quality standards when firing natural gas or fuel oil.

Nearby existing combustion sources at large industrial, institutional, or residential developments were analyzed for their potential impact on the Proposed Actions. These sources were also analyzed with the proposed central energy plants and package boilers in the Academic Mixed-Use Area and other projected developments to determine cumulative impacts. These analyses determined that maximum future pollutant levels would be below NAAQS at all receptor locations.

The Proposed Actions were also evaluated to assess potential impacts from plume fogging, rime icing, and elevated visible plumes from operation of the proposed cooling towers. The cooling

tower fogging model predicted that there would be no hours of ground-level fogging or rime icing. While a water vapor plume would be visible at various times, the cooling towers would not cause a significant visual impact from elevated plumes.

The results of the laboratory chemical spill modeling analysis demonstrated that a potential spill in a fume hood would produce maximum concentrations at the nearest on-site or off-site location below the toxicity exposure thresholds established for the chemicals of primary concern. The Restrictive Declaration for the Academic Mixed-Use Area would include provisions to require a minimum laboratory fume hood exhaust height for each site having an academic research use. For laboratory facilities at Site 12, the initial modeling results predicted an exceedance of toxicity thresholds for the analyzed chemicals. Therefore, the Restrictive Declaration for the Academic Mixed-Use Area would include additional requirements relating to the fume hood mechanical equipment design for Site 12 to preclude the potential for significant adverse air quality impacts from the laboratory fume hood ventilation system on nearby receptors.

Nearby existing sources from manufacturing or processing facilities were analyzed for their potential impacts on the Proposed Actions. The results of the industrial source analysis demonstrated that there would be no significant adverse air quality impacts on the Proposed Actions.

The analysis was performed to assess pollutant levels from the existing bus depot in the 2015 Build condition, and from the proposed bus depot in the 2030 Build condition determined that the maximum concentrations of CO and PM_{10} from the bus depot's operations, when added to ambient background levels, would be well below the NAAQS. However, to ensure that significant impacts of $PM_{2.5}$ receptor locations in the community do not occur, the Restrictive Declaration for the Academic Mixed-Use Area would include provisions for the reconstructed bus depot to utilize clean burning natural gas, and for the locations and height of combustion exhaust stacks.

Provisions of the Restrictive Declaration relating to the ventilation systems associated with the reconstructed MTA Manhattanville Bus Depot would ensure that emissions from future bus depot operations would not cause any significant air quality impacts.

T. NOISE

IDENTIFICATION OF IMPACTS

In 2015, the Proposed Actions would cause a significant adverse noise impact at Receptor Site 10 on West 125th Street at St. Clair Place. At Receptor Site 10, $L_{eq(1)}$ values would increase by 3.2 and 5.0 dBA during the AM and PM peak periods, respectively, exceeding the CEQR impact criteria. The impact would be caused by a combination of project-generated traffic and assumes the installation of a traffic signal midblock (between Twelfth Avenue and Broadway) on West 125th Street to improve pedestrian traffic flow at this currently unsignaled intersection. There are no non-Columbia buildings immediately adjacent to this location that would be impacted. The impact at this location would affect pedestrians and would be considered an unmitigated significant adverse impact.

In 2030, the increase in noise levels from project-generated traffic at Receptor Site 10 during the AM and PM peak periods would exceed the *CEQR Technical Manual* impact criteria as well. Compared with $L_{eq(1)}$ 2030 No Build noise levels, 2030 Build noise levels at Receptor Site 10 from project-generated traffic would increase by 3.5 and 4.9 dBA during the AM and PM peak periods, respectively. There are no non-Columbia buildings immediately adjacent to this location

that would be impacted. (See paragraph above for more details.) In addition, noise levels in the Proposed Actions' new open space areas would be above the *CEQR Technical Manual* noise exposure guideline of 55 dBA $L_{10(1)}$ for outdoor areas requiring serenity and quiet. Although noise levels in the open space would be above the CEQR guideline, they would be comparable to noise levels in several other New York City open space areas and parks, including Hudson River Park, Riverside Park, Central Park, Bryant Park, and Paley Park, and would not result in a significant adverse noise impacts.

MITIGATION

Development Sites 4 and 5 of the Proposed Project are immediately adjacent to Noise Receptor 10; Site 4 is proposed for academic use (or for University housing), and Site 5 is proposed for retail use. These buildings would be designed with double-glazed windows and air conditioning to avoid significant adverse noise impacts on their users. Therefore, the noise impact at Noise Receptor Site 10 would be limited to an adverse impact on pedestrians at street level.

U. CONSTRUCTION

LAND USE AND NEIGHBORHOOD CHARACTER

The Proposed Actions would result in construction in Subdistrict A over a 22-year period, with successive phases of construction generally moving from the south to the north. Development of the below-grade space would require that West 130th and West 131st Streets be closed for a period of two to three years (but not at the same time, except in situations where overlapping closures may occur for no more than a day or so), and that West 132nd Street be closed for a period of approximately five years; a major sewer relocation would require that West 129th Street also be closed for less than one year. The inconvenience and disruption arising from these closures would include diversions of pedestrians, vehicles, and construction truck traffic to other streets. With slurry wall construction required for most of the below-grade space and then the buildings above, each construction area in Subdistrict A would be under construction for several years (up to eight years within the Phase 1 construction area, and up to six years on each of the two Phase 2 construction areas), and the inconveniences of construction traffic, noise, and dust would continue in the general vicinity of that construction area for that period of time. No one location would be in construction for the full 22 years; however, some portion of the Project Area and the surrounding primary study area would be subject to the inconveniences and disruptions of construction throughout this period. Throughout the construction period, access to surrounding residences, businesses, institutions, and waterfront uses in the Project Area and primary study area would be maintained. In addition, throughout the construction period, measures would be implemented to control noise, vibration, and dust on construction sites, including the erection of construction fencing and, in some areas, fencing incorporating sound-reducing measures. Because none of these impacts would be continuous in any one location or ultimately permanent, they would not create significant impacts on land use patterns or neighborhood character in the area.

In addition to the activity associated with construction, some properties not yet in construction would be used for construction staging and for interim use, such as parking. These uses are considered "industrial" and would not conflict with the primarily light industrial, warehouse and storage, transportation and utilities, and auto-related uses that would remain in Subdistrict A on an interim basis or with uses in Subdistrict B.

Construction activities would not significantly affect neighborhood character in the primary or secondary study areas, although there would be some inconvenience to neighboring land uses, as with any construction. There would be no significant adverse impacts on land use or neighborhood character from construction in Subdistrict B or the Other Area east of Broadway.

SOCIOECONOMIC CONDITIONS

Construction activities associated with the Proposed Actions would, in some instances, temporarily affect pedestrian and vehicular access within, and in the vicinity of, the Project Area. However, these lane and/or sidewalk closures are not expected to obstruct entrances to any existing businesses, or obstruct major thoroughfares used by customers, and businesses are not expected to be significantly affected by any temporary reductions in the amount of pedestrian foot traffic or vehicular delays that could occur as a result of construction activities. Utility service would be maintained to all businesses, although very short term interruptions (duration in hours) may occur when new equipment (e.g., a transformer, or a sewer or water line) is put into operation. Overall, construction of the Proposed Project is not expected to result in any significant adverse impacts on surrounding businesses.

During the installation of the new sewer mains, West 129th Street would be closed for less than a year, but would remain open during all other construction activities. In addition, during major sewer relocation/construction activities in 2008, it is possible that some parking and travel lane closures would occur on Broadway southbound between West 130th and West 129th Streets, West 125th Street between West 129th Street and Twelfth Avenue, and Twelfth Avenue between West 125th Street and St. Clair Place. Because such closures would occur along streetfronts that would no longer contain operating businesses, the closures would not adversely affect pedestrian or vehicular access to any businesses.

HISTORIC RESOURCES

ARCHITECTURAL RESOURCES

A construction protection plan (CPP) outlining how Columbia would avoid adverse construction-related impacts on architectural resources in the vicinity of a construction site in the Academic Mixed-Use Area has been provided to the New York State Office of Parks, Recreation and Historic Preservation (OPRHP) and the New York City Landmarks Preservation Commission (LPC). The protection measures contained in the CPP were approved by LPC on November 8, 2007 and by OPRHP on November 14, 2007 (see Appendix D.2). Adjacent construction is defined as any construction activity that would occur within 90 feet of an architectural resource, as defined in the New York City Department of Buildings (DOB)'s *Technical Policy and Procedure Notice* (TPPN) #10/88. Architectural resources located more than 90 feet from the Project Area are outside the area of potential physical impacts. Implementation of the CPP would avoid adverse construction-related impacts on architectural resources located in this area. As described in Chapter 8, "Historic Resources," DOB's *TPPN #10/88* would provide protection measures for historic resources within 90 feet of the projected development site in Subdistrict B and the Other Area east of Broadway while these projected development sites are under construction. Therefore, the potential for construction period damage to these resources would be eliminated, and no adverse impacts are anticipated.

ARCHAEOLOGICAL RESOURCES

The Project Area was determined by OPRHP and LPC not to be sensitive for archaeological resources, and, therefore, construction activities would not cause significant adverse impacts on archaeological resources.

HAZARDOUS MATERIALS

Potential contaminants identified in the Academic Mixed-Use Area on lots owned or controlled by Columbia University at the time of construction would be remediated (cleaned up) as part of the development of this area by Columbia University. Contaminated soils, historic fill, and demolition debris would be either disposed off-site in accordance with all applicable regulations, or capped. Potential impacts during construction and development activities would be avoided by implementing a CHASP, which would ensure that there would be no significant adverse impacts on public health, workers' safety, or the environment as a result of potential hazardous materials exposed by or encountered during construction. In addition, to address the remediation of known or potential environmental conditions that may be encountered during proposed construction and development activities, a RAP has been prepared. (Both the RAP and CHASP have been approved by DEP and would be approved by DEC, if necessary, in response to a reported petroleum spill.)

An E-designation would be placed on lots comprising development sites in the Academic Mixed-Use Area not owned or controlled by Columbia University at the time the proposed zoning is approved and for the remainder of the Project Area, pursuant to Section 11-15 of the New York City Zoning Resolution. An E-designation is a mechanism to ensure that properties that are subject to an area-wide rezoning, but cannot be investigated as part of the CEQR process in connection with a rezoning because they are not owned or controlled by the applicant, are properly investigated and remediated, if necessary, before redevelopment. The owner and developer of a lot with an E-designation must prepare a Phase I ESA and, if necessary, implement a testing and sampling protocol and HASP to the satisfaction of DEP before DOB issues a building permit. Based on the results of the sampling protocol, if remediation is necessary, an RAP and CHASP must be submitted and approved by DEP.

With these measures in place, no significant adverse impacts related to hazardous materials are expected to occur as a result of the Proposed Actions.

INFRASTRUCTURE

The Proposed Actions would involve a major sewer relocation/construction activity, and removal and replacement of other utilities during construction in Subdistrict A.

The sewer lines would be designed and constructed to DEP standards, and DEP would approve the design before the sewer lines are installed. New water connections would be made before the old water pipes are removed. Removal of the utility lines would be coordinated with DEP and the private utility companies to ensure that service to customers in nearby areas is not disrupted. DEP and the private utilities would have to review and approve the temporary measures. All new utility lines would be located either in the streetbed or within the below-grade space. Residents and workers in nearby buildings are not expected to experience any major disruptions to water supply or wastewater removal. Any disruption to service that may occur when new equipment (e.g., a transformer, or a sewer or water line) is put into operation is expected to be very short term (i.e., hours).Therefore, the construction of the infrastructure improvements would not cause any significant adverse impacts on the users of these services.

TRAFFIC

IDENTIFICATION OF IMPACTS

In 2008, the sewer improvement work would result in intermittent lane and roadway closures, resulting in temporary capacity constraints at numerous intersections along the sewer improvement route and traffic diversions during the closure of West 129th Street between Broadway and West 125th Street. The analysis results show that temporary traffic impacts would occur at one intersection during the AM commuter peak hour, one intersection during the midday peak hour, and three intersections during PM commuter peak hour. Because these temporary impacts would be of short durations and do not occur simultaneously, no specific traffic mitigation measures are recommended. Rather, appropriate MPT strategies, as stipulated by NYCDOT, are expected to be employed to maintain adequate traffic flow.

For peak Phase 1 construction in 2011, when West 130th Street is closed (except to construction-related trucks), significant adverse traffic impacts would occur at one and five study area intersections during the 6:00–7:00 AM and 3:00–4:00 PM analysis hours, respectively.

In 2022, when West 131st Street is closed (except to construction-related trucks), significant adverse traffic impacts were identified at one and two study area intersections during the 6:00–7:00 AM and 3:00–4:00 PM analysis hours, respectively.

For peak Phase 2 construction in 2027, when West 132nd Street is closed (except to construction-related trucks), significant adverse traffic impacts were identified at two and four study area intersections during the 6:00–7:00 AM and 3:00–4:00 PM analysis hours, respectively.

MITIGATION

All projected impacts in 2011 and 2022 could be mitigated with either an early implementation of Build condition mitigation strategies, or applying other operational mitigation measures. For peak Phase 2 construction in 2027, when West 132nd Street would be closed, significant adverse traffic impacts were identified at two and four study area intersections during the 6–7 AM and 3–4 PM analysis hours, respectively. In addition to early implementation of Build condition mitigation strategies or the application of other standard traffic engineering measures, operational strategies involving lane channelization and the deployment of a traffic control officer (TCO) during the 3–4 PM analysis hour would be required at the Broadway and West 130th Street intersection to fully mitigate the projected significant adverse traffic impacts in 2027.

PARKING

Parking for construction workers would be accommodated off-street throughout the construction period. While there may be occasions when the parking demand could not be met, these occurrences would be infrequent and for short durations. Therefore, the temporary parking shortfall situations would not be a significant adverse parking impact. Even on the infrequent occasions where construction worker parking demand exceeds the off-street supply, or when there would be limited curb lane disruptions, the effect of construction on the supply and location of neighborhood parking is not expected to be significant, due to the short term nature of the shortfall.

TRANSIT

Because the construction workers would use various subway and bus routes, station entrances, and bus stops near the Project Area, only small increases in transit demand would be experienced along each route and at each access location during hours outside the typical commuter peak periods. Therefore, there would be no potential for significant adverse transit impacts from the construction workers' transit trips. While there may be temporary bus stop relocations along bus routes adjacent to the Project Area during the construction period, adequate access to transit service would be maintained through coordination with NYCDOT and NYCT.

PEDESTRIANS

Because pedestrian trips by construction workers would occur during off-peak hours and be distributed among numerous sidewalks and crosswalks in the area, there would be no potential for significant adverse impacts from construction workers' pedestrian trips. Additionally, pedestrian circulation and access would be available at all times through alternate routes.

AIR QUALITY

Under both SEQRA and CEQR, the determination of the significance of impacts is based on an assessment of the predicted intensity, duration, geographic extent, and the number of people who would be affected by the predicted impacts. In most cases, the predicted increments on air quality from construction of both Columbia University and non-Columbia University construction would be limited in extent, duration, and severity.

Columbia University construction under the Proposed Actions would not result in predicted significant adverse impacts on air quality. Columbia University would implement an emissions reduction program that would exceed that of any large-scale private project constructed in New York City to date, and substantially reduce $PM_{2.5}$ emissions due to Columbia University construction. E-designations on non-Columbia University projected development sites would be implemented as necessary to reduce $PM_{2.5}$ concentrations resulting from construction at these locations. With these measures in place, no significant adverse air quality impacts would occur from the projected development sites.

For both Columbia University construction (in Subdistrict A) and construction at non-Columbia University projected development sites, concentrations of particulate matter, CO, and NO_2 could increase at locations near the areas of construction, but would not result in significant adverse impacts.

COLUMBIA UNIVERSITY CONSTRUCTION

$PM_{2.5}$ concentrations would increase the greatest in areas immediately adjacent to the construction; for the most part, these elevated concentrations would occur on sidewalks and covered walkways along the construction fences and in some cases across the street and would not be significant. In no instances were $PM_{2.5}$ annual increments greater than 0.3 $\mu g/m^3$ and 24-hour increments greater than 2 $\mu g/m^3$ at nearby residences or schools.

Localized elevated CO concentrations were predicted in a few limited cases. In the area of the Columbia University construction (Subdistrict A), a limited number of discrete events were predicted during the 2008 construction period when predicted CO levels that would exceed the CO NAAQS level might occur on a very small area of sidewalk immediately adjacent to certain gasoline engines if those engines were functioning on up to three days each year when specific

meteorological conditions leading to higher concentrations might exist, and if those engines were located immediately adjacent to the construction fence. In the unlikely event that these engines would be used and would be located in the same spot during one of these events, CO levels would exceed the NAAQS level. Based on the limited duration and extent of these predicted exceedances, the low likelihood of occurrence, and the limited potential for exposure, this would not result in significant adverse impacts.

NON-COLUMBIA UNIVERSITY CONSTRUCTION

For construction in Phase 1 on the non-Columbia University projected development sites in Subdistrict B and the Other Areas, elevated $PM_{2.5}$ concentrations were predicted to occur during construction in the near vicinity of the projected development sites in Subdistrict B and Other Area east of Broadway both with respect to annual average and 24-hour average $PM_{2.5}$ levels. However, since the publication of the DEIS, project modifications have been identified, that would result in no new development taking place in Subdistrict B (see Chapter 29, "Modifications to the Proposed Actions"); the only non-Columbia University sites which may still be expected to be developed as a result of this rezoning action are Sites 24 and 25. An emission reduction program would be instituted for any construction on those sites, implemented through E-designations. The program would include early electrification to ensure that large generators are not used on the sites, the use of ULSD for all diesel engines, and the use of Tier 2 certified engines or cleaner equipped with DPF tailpipe controls. With these measures in place, no significant adverse $PM_{2.5}$ impact would occur as a result of construction on Sites 24 and 25.

Local elevated CO concentrations were predicted in a few limited cases. At sidewalk locations adjacent to the projected development sites, 1-hour average CO concentration may exceed the NAAQS level during up to three discrete hourly events, and 8-hour average CO concentration may exceed the NAAQS level up to two days per site if certain gasoline-powered engines are functioning during the discrete events when specific meteorological conditions exist. Based on the limited duration, the low likelihood of occurrence, the limited potential for exposure, and limited extent of these predicted exceedances, this would not result in predicted significant adverse impacts.

NOISE

IDENTIFICATION OF IMPACTS

During Phase 1, construction activities are expected to cause significant noise impacts at:

- Residences at elevated locations of Riverside Park Community (3333 Broadway) which have a direct line-of-sight to areas of Phase 1 construction (receptor Sites 5, and 5b); and
- Residences at 560 Riverside Drive which have a direct line-of-sight to the areas of Phase 1 construction (Receptor Sites 7 and 8).

During Phase 2, construction activities would be expected to result in significant noise impacts at:

- Residences at Riverside Park Community (3333 Broadway) which have a direct line-of-sight to areas of Phase 2 construction (receptor Sites 1, 4, 5, 5a, and 5b);

- Residences at 560 Riverside Drive (receptor Site 8[1]); and
- Residences at two buildings of Manhattanville Houses (95 Old Broadway and 1430 Amsterdam Avenue) which have a direct line-of-sight to the areas of Phase 2 construction (receptor Site 14).

MITIGATION

The residential locations where significant construction noise impacts would occur have double-glazed windows, which produce approximately 30 to 35 dBA of noise attenuation when closed. Only limited attenuation (i.e., approximately 10 dBA) is provided when windows are open, except for 560 Riverside Drive and other buildings with air conditioning. Residents in buildings without air conditioning in units which have a direct line-of-sight to the areas of construction would be significantly impacted by the proposed construction and would experience noise levels that are above the 45 dBA L10 noise level recommended by CEQR for residences. Some residents in buildings with air conditioning in units which have a direct line-of-sight to the areas of construction may also be significantly impacted because insufficient attenuation would be provided by the air-conditioning units.

To address the significant adverse noise impacts to residents at the 3333 Broadway (Riverside Park Community) and 95 Old Broadway and 1430 Amsterdam Avenue (Manhattanville Houses), the buildings with direct line-of-sight to the Subdistrict A construction, Columbia University would make available air conditioning units (e.g. sleeve units for residents of 3333 Broadway and window units for residents of 95 Old Broadway and 1430 Amsterdam Avenue), at no cost to the residents for the units, as mitigation for construction impacts. Prior to the commencement of construction in the vicinity of the affected sites, Columbia would notify each of the affected residents that they are eligible to receive an air conditioning unit. Columbia would have in place an arrangement with a vendor and the residents would notify the vendor of their desire to receive a unit. The vendor would, at Columbia's expense, install the air conditioners. If the air conditioners become the property of the residents and a resident were to remove the air conditioner upon vacating his or her apartment, Columbia would provide a replacement unit.

This commitment would partially mitigate a temporary noise impact due to construction activities. Even with these air conditioning units, for some periods of time, construction noise may result in noise levels which would be above the 45 dBA L_{10} noise level recommended by CEQR for residences, and are noisy and intrusive. In addition, some residents in buildings either with existing air conditioning units or with air conditioning units provided as mitigation by Columbia University, which have a direct line-of-sight to the areas of construction may be significantly impacted because of insufficient window/wall attenuation.

With regard to the one institutional location where significant noise impacts are predicted to occur—Prentis Hall (which is being renovated)—the design for this building will incorporate sufficient sound attenuation measures (e.g., double-glazed windows and alternative ventilation [air conditioning], which would provide approximately 35 dBA of attenuation), to mitigate the significant impacts due to construction activities for users of this facility.

With regard to vibration, measures would be implemented to prevent structural or architectural damage to nearby fragile buildings and structures, such as the former Warren Nash Service

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[1] The impact at this location during Phase 2 is principally due to the installation of a traffic light midblock on West 125th Street between Broadway and Twelfth Avenue, and not due to Phase 2 construction-related activities.

Station building, the Studebaker Building, and the Claremont Theater building, and the Riverside Drive and the Manhattan Valley IRT viaducts. At all other locations, the distance between construction equipment and receiving buildings or structures is sufficiently large to avoid vibratory levels that could cause architectural or structural damage. However, for limited periods, pile driving and other construction activities would produce perceptible and annoying vibration levels. These levels would be of limited duration and would not be considered significant adverse impacts. In addition, where rock removal is necessary, and where other rock excavation methods (e.g., mechanical excavators, rock splitters, and expansive chemical rock-splitting methods) could not practicably be employed, some amount of blasting would be necessary. All blasting would be performed in accordance with New York City Fire Department (FDNY) regulations and other applicable regulations. Timed multiple charges of limited intensity, and blastmats, would be used to limit potential impacts. With these measures, blasting would result in vibration levels below the impact criteria, and the limited amount of blasting would not cause any significant adverse vibration impacts.

PUBLIC HEALTH

See "V. Public Health," below.

RODENT CONTROL

During construction, a rodent (mouse and rat) control program would be implemented to ensure proper site sanitation. Before the start of construction, the contractor would survey and bait the appropriate areas and provide for proper site sanitation. During the construction phase, the contractor would carry out a maintenance program. Coordination would be maintained with appropriate public agencies. Only U.S. Environmental Protection Agency (EPA) and DEC-registered rodenticides would be permitted, and no hazards to people, domestic animals, and other non-target wildlife would result.

V. PUBLIC HEALTH

The analysis (summarized below by technical area) concludes that the Proposed Actions would not cause any significant adverse impacts on public health.

AIR QUALITY

In considering the public health significance of predicted air quality increments summarized in Sections S and U, above, it is important to recognize that ambient air quality emission standards are set to limit the public health risks within large populations. The determination of whether an identified increment in particulate matter has a public health impact necessarily takes into account a number of factors: (1) the extent of the increment, taking into account environmental epidemiological studies which demonstrate a variety of concentration-response functions; (2) duration and frequency of the added exposure; and (3) the geographic extent of the exposure in its setting.

The air quality analyses in the Draft Environmental Impact Statement (DEIS) for Columbia University construction and operation of the Proposed Actions show 24-hour average $PM_{2.5}$ concentration increments greater than 2 $\mu g/m^3$ (but not at any nearby residences or schools with respect to construction). These increments, which are also shown in the air quality analyses for the FEIS, reflect only slight elevations in PM for a very small number of days and within highly localized areas. For these reasons, no significant adverse public health impacts from $PM_{2.5}$ are expected from project operations and from Columbia University construction.

With respect to construction and operations at non-Columbia sites, as noted above, the only sites which may still be expected to be developed as a result of this rezoning action are Sites 24 and 25 (see Chapter 29). An emission reduction program would be instituted for any construction on those sites, implemented through E-designations. E-designations on those sites would ensure that concentrations from emissions of fossil fuel-fired equipment do not result in a violation of ambient air quality standards or with respect to the City's $PM_{2.5}$ interim guidance criteria. With these measures in place, no significant adverse $PM_{2.5}$ impacts would occur from these non-Columbia sites. For these reasons, no significant adverse public health impacts from $PM_{2.5}$ are expected from project operations and from non-Columbia University construction.

NOISE

As described in Sections T and U, above, the Proposed Actions would result in significant adverse noise impacts both during project operation and construction. Based upon the magnitude and location of the noise impact during project operations, however, a significant adverse impact on public health is not expected. Maximum predicted noise levels at discrete locations during construction would be of limited duration, and the predicted overall changes in noise levels would not be large enough to significantly affect public health. While construction activities would produce noise levels of a magnitude that at times are annoying and intrusive, and would be considered undesirable, construction activities would only occur for a limited number of hours per day, and for a limited time period. Based upon the limited durations of these noise levels, the noise produced by construction activities would not result in a significant adverse public health impact.

Therefore, no significant adverse health impacts from noise are expected from construction and operation of the Proposed Actions.

HAZARDOUS MATERIALS

All sites that would undergo construction as part of the Proposed Actions would be remediated (cleaned up) for their potential hazardous materials pursuant to Restrictive Declarations on sites owned or controlled by Columbia at the time of the proposed rezoning and E-designations on all other sites. Potential impacts during construction and development activities would be avoided by implementing a CHASP, and any contamination encountered would be addressed under an RAP. (Both the RAP and CHASP would be approved by DEP and DEC, if necessary, in response to a reported petroleum spill.)

With these measures in place, no significant adverse public health impacts related to hazardous materials are expected to occur as a result of the Proposed Actions.

RODENT CONTROL

As discussed above in "U: Construction," construction contracts would include provisions for a rodent (mouse and rat) control program. Before the start of construction, the contractor would survey and bait the appropriate areas and provide for proper site sanitation. During the construction phase, as necessary, the contractor would carry out an ongoing prevention, inspection, and response program. Coordination would be maintained with appropriate public agencies. Only registered rodenticides would be permitted, and the contractor would be required to perform rodent control programs in a manner that avoids hazards to persons, domestic animals, and non-target wildlife.

W. ALTERNATIVES

A total of nine alternatives were assessed to determine whether they have the potential to reduce or eliminate significant adverse impacts identified for the Proposed Actions and whether they would substantively meet the goals and objectives of the Proposed Actions. These include: two that were considered by Columbia during planning, but found to be infeasible; a No Action Alternative, in which the Proposed Actions are not undertaken; three alternatives to reduce or eliminate significant impacts identified in the technical analyses; a cogeneration energy supply alternative, which would increase reliability and lower costs of energy for the Academic Mixed-Use Development; and two alternative development scenarios: the Expanded Infill Alternative (development on Columbia and public property only) and the Community Board 9 (CB9) proposed 197-a Plan Alternative. The 197-a Plan Alternative is included at the request of CB9 in order to facilitate a comparison between the Proposed Actions and the 197-a Plan during the parallel public review of both proposals. The alternatives analysis in this chapter is distinct from the environmental review of the 197-a Plan, necessary to support review of the Plan under Section 197-a of the City Charter, and which accompanies that application. Instead, this EIS alternatives analysis considers whether potential zoning regulations consistent with the recommendations of the 197-a Plan would have the same or fewer significant adverse impacts than those of the Proposed Actions, and the extent to which the Plan would meet the some or all of the goals of the Proposed Actions. This alternative has been revised since the Draft EIS (DEIS), primarily to allow for more development of community facility uses on properties owned or controlled by Columbia.

PRINCIPAL CONCLUSIONS

The conclusion of the alternatives analysis is that six of the nine alternatives would not substantively meet the goals and objectives of the Proposed Actions. Of the three remaining alternatives, two—one intended to reduce an identified significant shadow impact and the other a significant impact on a historic resource—can address specific shortcomings through several options, as discussed below. The other remaining alternative is an option to include cogeneration for one of the proposed energy plants for energy supply. The feasibility of this alternative depends on several factors, including the cost of producing electricity on campus vs. the cost of buying the service from Con Edison. Each of the alternatives is summarized briefly below, followed by a more detailed chapter analysis.

ALTERNATIVES CONSIDERED AND REJECTED

Two alternatives to the Academic Mixed-Use Development were considered both during Columbia's planning process and subsequently in response to public comments on the Draft Scope for the Draft EIS (DEIS), but were eliminated from further consideration because they did not substantively meet the goals and objectives of the Proposed Actions.

One of these rejected alternatives would keep the Metropolitan Transportation Authority (MTA) Manhattanville Bus Depot above-grade between West 132nd and West 133rd Streets and Broadway and Twelfth Avenues, with Columbia buildings above. (In comparison, the Proposed Actions, subject to MTA agreement and further review processes, would rebuild the bus depot underground.) This alternative would result in buildings substantially exceeding the proposed zoning's maximum building heights. Further, this alternative would not achieve the Proposed Actions' overall urban design goals and objectives (such as the mandatory streetwall, setbacks at grade, and active ground-floor use requirements), and other Special Manhattanville Mixed-Use

District requirements (such as the north–south midblock open area between West 132nd and West 133rd Streets, which could not be built).

An Infill Alternative was suggested during Scoping as an option to accommodate the University's proposed new campus only on sites currently owned or controlled by Columbia, in order to preserve buildings not owned or controlled by Columbia and thereby maintain more of the existing character of Subdistrict A, avoid direct residential displacement, and avoid the possible use of eminent domain. This alternative was evaluated for two scenarios: one (the "FAR 6" scenario) under which the Proposed Actions' zoning is assumed (with certain necessary exceptions) and the floor area ratio (FAR) of Columbia-owned or controlled sites would be 6, as with the Proposed Actions; and one (a "Full Build" scenario) under which the FAR on the Columbia-owned or controlled sites would be unconstrained by the proposed zoning to accommodate all of Columbia's long-term needs on those sites only. In both scenarios, there would be no central, below-grade service area; with the Infill Alternative, most of the uses proposed for the central below-grade space with the Proposed Actions would have to be accommodated above grade. In addition, given the reduced development area in the Infill Alternative compared with the Proposed Actions, both of its scenarios do not include major publicly accessible open spaces.

The Infill Alternative was eliminated from further consideration for the following reasons:

- The FAR 6 Scenario of the Infill Alternative would not meet the goal and purpose of the Proposed Actions to accommodate Columbia's long-term need for program space (5 to 6 million gross square feet [gsf]), since it would accommodate only approximately 42 percent of the total program space (4.8 million gsf) under Columbia's Academic Mixed-Use Development with the Proposed Actions. This situation would require Columbia to seek development sites in Manhattanville, in Morningside Heights, in Washington Heights, and possibly even outside New York City, to accommodate its long-term space needs. In formulating the Proposed Actions, Columbia has determined that ad hoc acquisition of space is not suitable as a long-term growth strategy, because the trends in academia toward coordination among programs and interdisciplinary education require proximity and an integrated campus setting. The Proposed Actions further reflect Columbia's determination that such acquisitions would create continual friction with local communities over individual building initiatives and that the outcome of ad hoc expansion would be a miscellaneous collection of University buildings scattered in several urban neighborhoods, with little or no connection among them, as there would be if the expansion took place in one area, creating a new "campus."

- Although the Full Build Scenario could theoretically achieve the programmatic floor area identified by the University as necessary for its long-term growth, the resulting development plan would be inconsistent with the goals and objectives of the Proposed Actions, since it would be unconstrained by envelope controls of the proposed Special Manhattanville Mixed-Use Zoning District and would require an FAR of 10. The building heights would not be compatible with either the surrounding structures in the primary study area or the character of the remaining buildings in Subdistrict A; nor would the overall density be compatible with surrounding zoning patterns.

- The Infill Alternative would also not support the goals and objectives of the Proposed Actions to create an, integrated, modern, urban, and open University campus. Under the Infill Alternative, incompatible industrial and transportation uses would be intermixed with university uses, which would detract from the sense of an integrated campus. There would be no central public open spaces, which could be the focus of such a campus. In addition,

without a centralized below-grade space for parking and loading, individual curb cuts and loading doors at each new building would be added to the existing ones, further decreasing any sense of a cohesive academic area.

- The Infill Alternative would not support the goals and objectives of the Proposed Actions to create an area that provides amenities for people associated with the University and local residents alike. Because setback and landscaping requirements would only apply to new construction sites, the widening of the sidewalks on east–west streets and the resulting increase in visual access to the waterfront would be irregular and therefore less effective than with Proposed Actions. The need to maximize program space would also result in significantly fewer street-level retail and other publicly accessible uses, which are intended to enliven the streetscape, particularly along West 125th Street, and draw people toward the waterfront.
- In both scenarios, the lack of the central below-grade space would greatly decrease the functionality of the University development and would require that above-grade development include several floors of academic research support and mechanical space. Further, the need to load at each building from the street and to have parking either above grade in each building (Full Build Scenario) or little or no parking at all (FAR 6 Scenario) would increase the number of curb cuts on the streets, discourage pedestrians, and increase the level of loading and parking activity in and around the area. These activities would not be compatible with the establishment of a cohesive University campus.

NO ACTION ALTERNATIVE

In the No Action Alternative, the proposed zoning changes and other land use actions would not be implemented. Unlike the Proposed Actions, which would add new community facilities, University housing, commercial uses, and open space to the Project Area, with the No Action Alternative, there would be a limited amount of new commercial and residential development in the Project Area.

Since the project-related development would not occur in the No Action Alternative, it would not result in the significant adverse impacts that would occur with the Proposed Actions. Specifically, this includes indirect displacement of low-income residents, indirect impacts on passive and active open space, shadows on the I.S. 195 Playground, demolition of a historic building (the former Sheffield Farms Stable), and various traffic, parking, transit, noise, and construction impacts. As with the Proposed Actions, the No Action Alternative would have no significant adverse impacts in the other technical areas. Modifications of the 125th Street IRT subway station and the Manhattan Valley IRT viaduct, which are proposed to address transit impacts, would not be provided in the No Action Alternative.

The existing manufacturing zoning districts in the Project Area do not permit college or university uses (or other related community facility uses listed under zoning use group 3). As a consequence, Columbia University would not be able to develop any academic uses in the No Action Alternative; this alternative would only contain Columbia University administrative buildings in the Project Area. As a consequence, the No Action Alternative would not facilitate the creation of modern facilities of a major university with space for teaching, academic research, the study of arts and humanities, and the education of professionals. In addition, the changes anticipated in Subdistrict B and the Other Area east of Broadway, changes that would enliven Twelfth Avenue in support of a new waterfront park and bring new activity to the Broadway corridor, would not occur. Thus, the No Action Alternative would not meet the goals and objectives of the Proposed Actions, including the revitalization, improvement, and

redevelopment of a portion of the Manhattanville section of West Harlem, and the fulfillment of Columbia's role as a leading academic institution that makes a significant contribution to the economic, cultural, and intellectual vitality of New York City. In addition, the No Action Alternative would not realize the economic benefits of the Proposed Actions, including the creation of an average of approximately 1,215 full-time equivalent construction jobs for 22 years and 7,086 permanent jobs.

ALTERNATIVES TO REDUCE OR AVOID SIGNIFICANT ADVERSE IMPACTS

The impact analyses for the Proposed Actions identified shadows, historic resources, and noise significant impacts for which there is no practicable mitigation. The feasibility of alternatives that would reduce or eliminate these unmitigated significant impacts is examined below.

Shadows

As mentioned above, new construction from the Proposed Actions would cast incremental shadows on the I.S. 195 Playground, with significant adverse impacts during the December and March analysis periods. Recognizing that the December shadows would be impossible to reduce enough to affect the impact and that the colder weather is a time when the playground is less well-used, the analysis concentrated on the March/September 21 analysis period. To reduce the incremental shadows from the Proposed Actions to within acceptable limits, the maximum heights of the buildings on Sites 11 (west side of Broadway at West 133rd Street) and 12 (just west of Site 11) would have to be modified, to lower the height on Site 11 and increase it on Site 12, and the mass of the building on Site 11 would have to be arranged so that the eastern half of the site had a height of no more than 146 feet. This would reduce noontime and afternoon shadows from the Proposed Actions to within acceptable limits. To decrease the morning shadows, however, would require that the academic research building proposed for Site 17 (east side of Broadway between West 133rd and 134th Streets) be reduced in height by at least four stories, perhaps more, depending on how the rooftop mechanical structures could be located. The academic research floor area removed from Site 17 could be accommodated within the maximum height and FAR limitations on the four other sites assumed for academic research use (located west of Broadway between West 129th and West 132nd Streets). This approach could also be taken to reduce the height of the building on Site 11 without changing the height or bulk on Site 12. However, accommodating this floor area on the four "receiving" buildings would result in these buildings being taller than they would otherwise have been under the University's Illustrative Plan. The Illustrative Plan, which demonstrates the University's current approach to the design of the development, attempts to limit the height of the buildings along the Broadway corridor opposite the Manhattanville Houses.

Another approach would be to simply reduce the size of the buildings that create the impact, without replacing the space elsewhere. However, this option would reduce the total program space by approximately 449,000 square feet (sf) to approximately 4.4 million sf, and thus it would conflict with the goal of the Proposed Actions to provide 5 to 6 million sf of program space for Columbia's long-term space needs.

Also being considered as a result of comments made during DEIS and project review is the option to place University housing on Sites 11 and 17, which would greatly reduce the height of buildings on those sites and proportionally reduce shadows. This alternative arrangement would greatly reduce shadows on the playground during the March/September 21 analysis days, so they would not be on the playground for the entire day, in contrast to the Proposed Actions' shadows. There would be some shadow from Site 17 in the morning, but it would move off the playground much more quickly, so that at 10:00 AM it would cover only a small area along the southeast

edge, rather than more than half the space as under the Proposed Actions. By 10:45 AM the shadow would be gone; under the Proposed Actions, the shadow would not exit until 12:45 PM. In the afternoon, under both scenarios an incremental shadow from the building on Site 11 would enter the southern part of the playground. However, the alternative use and height scenario would substantially reduce the extent and duration of the incremental shadow during the early afternoon.

This is one alternative/project modification that would address the shadows impact. After reviewing each of the potential options for reducing or eliminating the impact, this FEIS concludes that the two realistic options are either to maintain the project land uses and building heights as proposed, allowing the impact to occur, but applying mitigation to the playground, or to seek a modification to the Proposed Actions and to change the uses and related building heights and configuration, and thus the building sizes on Sites 11, 12, and 17.

Historic Resources

Under the Proposed Actions, the former Sheffield Farms Stable is proposed to be demolished—a significant adverse impact on this historic resource. Measures were developed under the Proposed Actions to partially mitigate the adverse impacts. These measures include Historic American Buildings Survey (HABS) Level I documentation of the exteriors and interiors of the former Sheffield Farms Stable and development and installation of a permanent interpretive exhibit or exhibits in or near the Project Area to document the history of the former Sheffield Farms Stable and to encompass the larger history of the Manhattanville neighborhood. Elements that would be considered for the exhibit include the HABS Level I documentation, salvaged elements of the former Sheffield Farms Stable, historic and current photographs and a historical narrative, historic industrial elements salvaged from the Studebaker Building, and interactive and multimedia features. However, these measures would not fully mitigate the significant adverse impact.

Potential alternatives to eliminate the impact of removal were evaluated, including the following:

- Retaining and reusing the building for academic research use,
- Incorporating all or a portion of the building into the proposed Jerome L. Greene Science Center, including retaining 50 percent of the building and just its Broadway façade, and
- Relocating the Jerome L. Greene Science Center to another location in the Phase 1 development area.

These options were considered in a historic feasibility study that was submitted to OPRHP for review that considered factors associated with retaining and adaptively reusing the building for academic research use. The study concluded that it is not feasible to adaptively reuse the former Sheffield Farms Stable for academic research use, or incorporate all or a portion of the building into the proposed Jerome L. Greene Science Center, or move the building to another location in the Phase 1 area, since such alternatives would not allow the project to meet its goals and objectives with respect to the Jerome L. Greene Science Center, and would significantly reduce the amount of usable space above grade and below grade associated with the Jerome L. Greene Science Center.

In a letter dated November 14, 2007, OPRHP concurred that it is not appropriate to retain just a portion of the former Sheffield Farms Stable or just its façade, but requested that an additional alternative be studied, as follows:

- Relocate the Jerome L. Greene Science Center to the southern half of Block 19xx, avoiding the former Sheffield Farms Stable altogether, and provide appropriate floor area for the academic research building in a long rectangular shape. This would produce a building of approximately 100 by 345 feet. It would extend westward from Broadway; its west façade would abut the north-south midblock passage. This relocation would eliminate the small square from south side of the block and the "Lantern" building from Site 3. OPRHP has suggested that to retain these two uses in the project, consideration could be given to moving them to the north side of the block (on the south side of West 130th Street) where they would not be visible from West 125th Street.

This alternative was found to be not feasible for the following reasons:

- A footprint of 34,500 sf (100 feet by 345 feet) would be hypothetical only and not achievable under this scenario. In reality, assuming a reduction of 15 percent for internal and external articulation, a 29,325-gsf floor plate would result, which could accommodate 8 full Principal Investigator units averaging 3,500 gsf per team. Under the Proposed Actions, the Jerome L. Greene Science Center would function in research neighborhoods of between 9 and 10 Principal Investigators on each academic research floor, at the 3,500 gsf per team necessary for the advanced neuroscience and interdisciplinary research program of the facility.
- A narrow, long building would not allow for the efficient use of space on each floor. Corner-to-corner walking distances would be greatly increased, central conference and break areas—which promote collaboration—could not be achieved, and vertical circulation would be decentralized. The benefits of a more square configuration of the Jerome L. Greene Science Center under the Proposed Actions, which allows for offices and other key local lab support functions to be in close proximity to the lab benches, would not be achieved in a long, narrow building.
- To accommodate a larger floor plate for the Jerome L. Greene Science Center would require that the building extend into the area planned for the midblock north-south passageway, thereby effectively eliminating one of the remaining open space features of Phase 1 and removing one leg of the north-south open area which, under the Proposed Actions, would extend physically and visually from Prentis Hall through to West 133rd Street. Further elongation of the building would exacerbate the problems cited above. Another option to achieve the building's full program would be to add floors. To accommodate at least 75 Principal Investigator units required in the buildings' program, two additional academic research floors would be necessary.
- Retaining the Sheffield Farms Stable poses considerable engineering problems with respect to building the below-grade research support space, because of site conditions that require slurry wall construction. It is more practicable to build the slurry wall through the block at a point at least 100 feet west of Broadway, instead of trying to build the wall around the building. However, with the slurry wall located 100 feet or more west of Broadway, the portion of the site east of the wall could only have a conventional basement. This would result in approximately 20,000 gsf less for each of the two below-grade research support floors; a portion of that space would have to be provided above grade. Added to the two additional floors required to adjust to the smaller floor plate, this means that the building would be at least three stories (approximately 48 feet) taller than the building proposed under the Proposed Actions. The narrower below-grade support space below the Jerome L. Greene Science Center would constrain Columbia's ability to program that space efficiently for use by all of the Broadway academic research buildings.

In addition, the relocation option identified by OPRHP would significantly affect the ability of the plan to achieve key goals and purposes, as follows:

- With the arrangement of buildings and open space, the Phase 1 development would not create a gateway to the waterfront along West 125th/129th Street. The street would be characterized by a small open space (the Grove) viewed against the large continuous streetwall of the Jerome L. Greene Science Center behind it. The view north into the campus would be through a 50-foot-wide midblock passageway between two large buildings. The two loading docks slated for the Jerome L. Green Science Center on West 130th Street would have to be moved to West 129th Street, where they would be partially visible from West 125th Street and where their curb cut would reduce the attractiveness of West 129th Street as a pathway to West 125th Street and the river.
- The arrangement of open spaces under this alternative would not meet the goals of the Proposed Project. The relocated Small Square would not function as an entrance to the new campus, for it could not be seen from West 125th Street. Similarly, the midblock open area would be confined to a lane between two buildings, and it could not offer views of the large Square and the Studebaker Building to the north. Thus, the pattern of development this alternative would require would reduce the functionality of the Proposed Project's open spaces and would detract from the ability of the Phase 1 development to function as a campus and to appear as a gateway to the remainder of the campus to the north.

Measures that would partially mitigate the significant adverse impact resulting from the demolition of the building for the initial (2015) phase of development are described in Chapter 23, "Mitigation." Consultation among OPRHP, ESDC, and Columbia will continue.

Noise

The Proposed Actions would result in an unmitigated significant noise impact on pedestrians at noise receptor Site 10, where installation of a new midblock traffic signal at West 125th Street between Twelfth Avenue and St. Clair Place would result in increased noise levels. Eliminating this significant noise impact requires an alternative that does not provide for a new traffic signal at this location. As such an alternative would not improve pedestrian safety and would fail to meet the needs for traffic management at noise receptor Site 10, it is not considered a reasonable alternative.

EXPANDED INFILL ALTERNATIVE

In response to comments made during public review of the DEIS and the Illustrative Plan, an alternative has been developed which considers whether the goals and purposes of the Proposed Actions could be accommodated under a scenario that assumes Columbia University would develop using only public property and property owned or controlled by Columbia. The alternative assumes that publicly owned properties, both above and below grade, could be acquired for redevelopment as part of the Academic Mixed-Use program. Under this alternative, some portions of most of the blocks in the Academic Mixed-Use Development area would be excluded from the University development. The development scenario created for this alternative assumed that the proposed zoning, including FAR limitations and maximum heights, would apply to all development sites in the Project Area.

Academic Mixed-Use Development Plan—Development Plan and Scenario

This alternative would contain all the uses in the Academic Mixed-Use Development scenario for the Proposed Actions, but would give preference to academic research to the extent possible. The development sites under this alternative would be more limited and of different sizes and

shapes than those of the Proposed Actions; therefore, the development scenario would assume uses for each site based on its suitability for a particular type of development, irrespective of the General Project Plan (GPP) use limitations for development sites under the Proposed Actions. This alternative assumes the same minimum floor plate—25,000 sf to accommodate an academic research use and 15,000 sf to accommodate an academic use—as the Proposed Actions. The alternative also assumes that public land under streets could be acquired; there would be some deep below-grade support space for some of the functions accommodated in the Proposed Actions.

This alternative would provide publicly accessible open spaces, also a goal of the Proposed Actions, but these would be fewer and smaller than those of the Proposed Actions. This alternative would also seek to accommodate all the parking demand of the Academic Mixed-Use Development, as the plan in the Proposed Actions does.

The University land use pattern under this alternative would differ from that of the Proposed Actions. The six academic research sites would not be concentrated along Broadway; they would be located, instead on Twelfth Avenue, in the midblocks, and on Broadway. Sites for academic buildings and University housing would also be fit in wherever possible, and the sites for the housing would be small. Other aspects, such as the central Square, would be smaller, although located in the same place as with the Proposed Actions. The north-south midblock pedestrian passage would be shorter, while the east-west one would be the same as with the Proposed Actions. This alternative would require that parking be provided above grade in a garage on Site 13; the recreation program, reduced to a third, would be located above the garage. The former Warren Nash Service Station building would be converted to academic use, as with the Proposed Actions, and the academic research building on Site 15 would be similar in size and scale to that of the Proposed Actions. Under this alternative, there would only be a smaller deep basement limited to the area beneath the two academic research sites on Twelfth Avenue and beneath the central Square. This alternative could also add parking levels below grade at this location, and could accommodate the relocation of the MTA Manhattanville Bus Depot below grade. This alternative would require more street-level loading docks in more locations and more curb cuts for car ramps than the Proposed Actions (although it would not require a truck or bus ramp).

This alternative could achieve only 65 percent of the total University program available under the Proposed Actions and 60 percent of its academic research space. The reduced floor area available for program space is a function of several factors. There would be less lot area available under this alternative than under the Proposed Actions. Below-grade space would be smaller and would provide shared academic research support for only two buildings. In addition, there would be no centralized mechanical space. Consequently, mechanical space and academic research support space would have to be provided above grade—with redundant facilities, further limiting the amount of space available for academic research programs.

This alternative would also not allow for development of Phase 1 of the Columbia plan, and the Jerome L. Greene Science Center would not be built on Site 3. Moreover, because the site of the academic building intended for the Business School in the Proposed Actions (Site 4) would be constrained by the private property directly to its west, it would be necessary to eliminate the Lantern building and the Small Square that are part of the Proposed Actions in order to fit it. If Site 3 were instead used for academic research purposes, the amount of floor area needed on Site 3 would reduce the amount of floor area on Site 4, since development on this block is subject to zoning floor area limitations. This, in turn, would result in insufficient floor area to accommodate the Business School. Columbia advises that if the Business School were unable to come to Manhattanville, a relocation of the School of International and Public Affairs (SIPA)

would be unlikely as well. Finally, there would be no room for the School of the Arts due to the loss of the Lantern building.

Without these key program uses and lacking the open spaces of the Proposed Actions, Phase 1 program goals would not be achieved. The collection of buildings that would result in the Phase 1 area under this alternative would not fulfill the land use and urban design objectives of Phase 1 to create a West 125th Street gateway to the waterfront, as well as a gateway to the new campus.

Assumptions for Private Development

The Expanded Infill Alternative assumes that most of the private properties in Subdistrict A not in Columbia's ownership or control would be redeveloped to market-rate residential uses, under the regulations of the proposed Special Manhattanville Mixed-Use District. Altogether, this alternative would produce 337 units of housing, 293,280 sf of retail use, 54,800 sf of office use, and 61,700 sf of community facility use. Total new development in the Project Area under this alternative would be 5.5 million sf as compared with 7.09 million sf for the Proposed Actions.

Expanded Infill Alternative Compared With the Proposed Actions

A comparison of the impacts of the Expanded Infill Alternative compared with the Proposed Actions found the following:

- Neither the Proposed Actions nor the Expanded Infill Plan would generate significant adverse impacts on land use, zoning, and public policy; community facilities, urban design and visual resources; neighborhood character; natural resources; hazardous materials; waterfront revitalization; infrastructure; solid waste and sanitation services; energy; traffic in the Project Area; pedestrians; air quality; or public health.
- Like the Proposed Actions, by 2030 the Expanded Infill Alternative would have no significant adverse impact on direct residential or business displacement, on indirect business displacement, or on specific industries, but it could have a significant adverse impact on indirect residential displacement, affecting 1,319 unprotected units in the primary study area, including 823 units in the Riverside Park Community/3333 Broadway. However, the likelihood of this impact occurring would be somewhat less under the Expanded Infill Alternative than with the Proposed Actions.
- Like the Proposed Actions the Expanded Infill Alternative would add areas of passive open space in the Project Area (1.6 acres to the Proposed Actions' 2.16 acres), but it would also add population and thereby decrease open space ratios, resulting in significant adverse open space impacts. Both alternatives would result in a decline in active open space ratios by 2030, and would therefore require mitigation.
- The Expanded Infill Alternative would result in significant traffic impacts requiring mitigation on East 125th Street; these impacts would be similar to those identified for the Proposed Actions.
- Compared with the Proposed Actions, this alternative would produce a greater parking shortfall (530 spaces vs. 120 spaces). Mitigation measures for the Proposed Actions would eliminate this significant impact; for this alternative the measures would only partially mitigate the impact.
- Although the Expanded Infill Alternative would generate fewer bus trips than the Proposed Actions, significant adverse bus impacts are still expected to occur, albeit at lower magnitudes and requiring fewer additional buses to mitigate the projected impacts.

- Both alternatives would result in significant noise impacts at receptor Site 10. At all other locations, both alternatives, with or without traffic improvements, would not result in any significant noise impacts. It is expected that comparable levels of attenuation, and at the same locations, would be necessary under the Expanded Infill Alternative as those specified under the Proposed Actions.
- The Proposed Actions would result in traffic and noise impacts during construction; under the Expanded Infill Alternative, such impacts could occur, but most likely at a lower level than with the Proposed Actions.
- Unlike the Proposed Actions, the Expanded Infill Alternative would not have any of the following significant adverse impacts: shadow impacts on the I.S. 195 Playground; impacts on historic resources; or an impact from an increase of passengers on the escalator at the 125th Street No. 1 subway station.

Ability to Meet the Goals and Objectives of the Proposed Actions

The Expanded Infill Alternative would only partially meet the goals and objectives of the Proposed Actions for the following reasons:

- The Alternative could not accommodate Columbia's long-term needs for space. Whereas the Proposed Actions would produce 4.8 million sf of academic program space, the Expanded Infill Alternative would produce only 3.1 million sf of academic program space, or 65 percent of the required floor area. Space for academic research, the University's key program objective, would be only 60 percent of that of the Proposed Actions (1.6 million sf compared with 2.6 million sf). Because this Alternative would not fulfill long-term needs for space, the University would not be able to avoid ad hoc acquisition of properties in neighborhoods outside of Columbia's existing campuses.
- The loss of floor area compared with the Proposed Actions would occur at critical locations, which would further reduce the alternative's ability to meet project goals and objectives. In particular, there would not be enough space for the Phase 1 uses—the Jerome L. Greene Science Center, the Business School, and the School of the Arts. In addition, according to Columbia University, SIPA has been attracted to a location in Manhattanville based largely on the presence of the Business School, with which it enjoys a strong relationship; Columbia advises that if the Business School were unable to come to Manhattanville, a relocation of SIPA would be unlikely as well. There would also be less room for active, contiguous ground-floor retail, no space at all for the Small Square, and the land for the Grove would not be available. Thus, this alternative would not achieve the Phase 1 objectives of transforming West 125th Street as a gateway to the waterfront and the West Harlem Waterfront park, or of acting as a major entrance to the proposed new graduate Manhattanville campus for Columbia University.
- The lack of the full central below-grade service area would reduce the functionality of the Academic Mixed-Use Development, restrict the ability of the University to produce buildings with full program space, and limit the ability to create a campus environment. Specifically, without the full central below-grade service area, below-grade parking and loading would be limited, and shared academic support space would serve only two buildings. There would also be no centralized below-grade mechanical systems and no additional floor area below-grade for Business School classrooms and other academic programs. Also, each building would need to have its own truck loading docks and those buildings with below grade parking would each have car ramps on the streets. Above-grade loading and parking facilities would interrupt the continuity of active ground-floor uses and

result in parking and loading activities that would be incompatible with a campus environment. In addition, support uses that would be shared among buildings when located below grade under the Proposed Actions would, if located above grade, have to be duplicated in each building—each building would have its own boilers and mechanical system, each would have to have a mechanical floor above grade, and each academic research building would have academic research support space occupying at least two above-grade floors. Locating support space above grade would restrict the amount of program space that could be achieved in each building, and the ability of the University to achieve its program goals would be constrained.

- This alternative would create a development with less open space and fewer amenities for University and community users, without substantially improved pedestrian conditions or improved visual and physical access to the waterfront. As noted above, the open spaces would be fewer and smaller than under the Proposed Actions, and the north-south pedestrian path would be only two blocks long, although there would be a central square. The curb cuts and truck docks would diminish the attractiveness of the area for pedestrians. The reduction in active ground floor uses and their lack of contiguity would also decrease the area's attractiveness for pedestrians. The absence of widened sidewalks on the narrower side streets would also reduce this alternative's ability to improve views of and access to the waterfront.

COMMUNITY BOARD 9 PROPOSED 197-A PLAN ALTERNATIVE

During this DEIS's public scoping process, CB9 and other community members requested that the CB9's proposed 197-a Plan ("197-a Plan") be considered as an alternative to the Proposed Actions. The 197-a Plan calls for a mix of manufacturing, commercial, community facility, and residential uses in the Project Area, consistent with one goal of the Proposed Actions. However, the 197-a Plan differs substantively from the Proposed Actions with regard to accommodating the long-term needs of Columbia University for expansion. The focus of the 197-a Plan objectives is on preserving and attracting manufacturing uses to form a job base for local residents, increasing affordable housing opportunities in the area and maintaining the current neighborhood character with a wider mix of uses.

Working with CB9 leadership, the New York City Department of City Planning (DCP) developed a set of potential zoning regulations consistent with the 197-a Plan, to be used for purposes of this analysis. These regulations would increase density in the portion of the Project Area east of a line parallel to and 250 feet east of Twelfth Avenue plus the Other Area east of Broadway (which together constitute Subdistrict 2[1] of the 197-a Plan), and would permit residential and community facility uses in that area. Development for residential use would require a significant affordable housing component. A key aspect of the zoning for Subdistrict 2 would be the requirement that 80 percent of the first two floors of any new construction or conversions/expansions be devoted to manufacturing use; the remaining 20 percent would be commercial use. (After a good faith effort of one year to obtain manufacturing tenants on the first two floors of their buildings, owners could apply for a Special Permit, which would permit them to develop commercial and community facility space instead.) In addition, the zoning in

[1] Subdistrict 1 and Subdistrict 2 of the 197-a Plan Alternative correspond to the Project Area. The Academic Mixed-Use Development Area (Subdistrict A of the proposed rezoning) includes a portion of Subdistrict 1, covering the area up to 250 feet east of Twelfth Avenue, and most of Subdistrict 2. Other Area east of Broadway is included in Subdistrict 2, but it is not part of the proposed rezoning's Subdistrict A.

Subdistrict 2 would preserve the existing streetwall, so that new infill development would relate to the existing built environment. In an area which corresponds to Subdistrict B, plus the portion of the Project Area east and within 250 feet of Twelfth Avenue (Subdistrict 1 of the 197-a Plan), a manufacturing zoning designation would remain, and residential and community facility uses would continue to be prohibited. In Subdistrict 1, retail uses would be limited to the sale of items produced in the manufacturing space.

Working with CB9 leadership, DCP also developed a set of development assumptions (including identification of projected development sites and likely uses for Subdistrict 2), which were used to form the basis for a development scenario, assuming a build-out under the hypothetical zoning regulations. This scenario assumed both conversions and new construction in Subdistrict 2, but virtually no change in Subdistrict 1. In total, the 197-a Plan Alternative development scenario assumed that approximately 2.2 million gsf of mixed-use development would be created, including approximately 1.3 million sf of office/community facility uses, 378,920 sf of residential uses (approximately 421 units), 249,490 sf of retail uses, and 261,765 sf of manufacturing uses. The development scenario would also accommodate the science, math, and engineering public secondary school (as in the future without the Proposed Actions), and 17,849 sf of public open space. The scenario was developed without regard to current ownership patterns and was based upon zoning capacity rather than upon market demand analyses for its component uses; it thus responds to the CB9 request by providing a comparison of the impacts of the Proposed Actions with those of the 197-a Plan, assuming that the development goals of the 197-a Plan were realized. However, a number of factors suggest that the amount and type of development in the scenario is unlikely to be fully realized under current or likely future market conditions. Accordingly, the analysis of the 197-a Plan Alternative likely overstates its potential adverse impacts in some areas, such as potential traffic, socioeconomic, and open space impacts. At the same time, it also likely overstates its benefits, particularly in terms of its employment generation and the extent to which the rezoning area would be revitalized.

197-a Plan Alternative Compared with the Proposed Actions

A comparison of the impacts of the 197-a Plan Alternative with those of the Proposed Actions found the following:

- Neither the Proposed Actions nor the 197-a Plan Alternative would generate significant adverse impacts on land use, zoning, and public policy; community facilities; urban design and visual resources; neighborhood character; natural resources; hazardous materials; waterfront revitalization; infrastructure; solid waste; energy; air quality; or public health.
- Like the Proposed Actions, by 2030 the 197-a Plan Alternative development scenario, if realized, would create a significant adverse indirect residential displacement impact affecting up to 1,319 unprotected housing units in the primary study area, including 823 units in the Riverside Park Community/3333 Broadway. However, the indirect residential displacement pressure would most likely be at a lower level than with the Proposed Actions.
- Like the Proposed Actions, the 197-a Plan Alternative would result in a significant adverse impact on passive open space in 2015 and 2030.
- Like the Proposed Actions without project-related improvements (see Appendix M), the 197-a Plan Alternative development scenario, if realized, would create significant adverse traffic impacts at a number of study area locations, and similarly, all of these impacts could be fully mitigated. With regard to parking, the 197-a Plan Alternative would result in significant adverse impacts both on-street and off-street, whereas the Proposed Actions would only result in significant adverse off-street impacts. Like the Proposed Actions

without project-related improvements, the 197-a Plan Alternative would also result in significant pedestrian impacts at the Broadway/West 125th Street and Broadway/West 129th Street west crosswalks, but during fewer time periods. Unlike the Proposed Actions without project-related improvements, it would not result in significant adverse pedestrian impacts at the Broadway/West 130th Street west crosswalk. Crosswalk impacts of both the Proposed Actions without project-related improvements and the 197-a Plan Alternative could be fully mitigated by widening the appropriate crosswalks. Under the Proposed Actions with project-related improvements (see Chapter 18, "Transit and Pedestrians"), there would not be any significant adverse pedestrian impacts. Like the Proposed Actions, the 197-a Plan Alternative would have significant impacts on the Bx15 in the PM; however, the 197-a Plan Alternative would require less mitigation than the Proposed Actions.

- The 197-a Plan Alternative would not have any unmitigated noise impacts. The Proposed Actions with traffic improvements would have a significant, unmitigated pedestrian level noise impact on West 125th Street near Twelfth Avenue; without the traffic improvements, the Proposed Actions, like the 197-a Plan Alternative, would not have a significant noise impact at that or any other location.
- The Proposed Actions would result in traffic and noise impacts during construction; under the 197-a Plan Alternative, such impacts could occur, but most likely at a lower level than with the Proposed Actions.
- Unlike the Proposed Actions, the 197-a Plan Alternative would not have any of the following significant adverse impacts: shadow impacts on the I.S. 195 Playground; an indirect impact on active open space; impacts on historic resources; or an impact from an increase of passengers on the escalator at the 125th Street No. 1 subway station.

Ability to Meet Goals and Objectives of the Proposed Actions

The 197-a Plan Alternative would not meet the goals and objectives of the Proposed Actions, for the following reasons:

- The use provisions of Subdistrict 1 of the 197-a Plan Alternative would preclude development of most community facilities (including Columbia academic and academic research buildings) and approximately 1.15 million sf of development proposed by Columbia would not be achieved under the 197-a Plan Alternative in this area. Based on the Illustrative Plan for the Proposed Actions, this loss would include all of the proposed University housing and one full academic building and portions of other buildings, as well.
- In Subdistrict 2, the 197-a Plan Alternative development scenario assumes that approximately 662,000 sf of the 1.324 million sf assumed for office or community facility space would be occupied by community facilities, so the maximum amount of space theoretically available under this alternative would be about 14 percent of the program space (4.8 million gsf) under Columbia's Academic Mixed-Use Development with the Proposed Actions. However, under the design regulations assumed for the 197-a Plan Alternative development scenario, none of the sites considered adequate for new construction of a University use could yield the floor plates and size appropriate for the academic research buildings. Thus, this alternative would not be able to accommodate the new, state-of-the-art academic research facilities which have been identified by Columbia as a key goal and objective of the Proposed Actions.
- Of the development sites with approximately 662,000 sf available for community facility use, Columbia believes that under the design regulations assumed for the 197-a Plan Alternative development scenario, only three would be large enough to construct new

buildings, and these would be feasible only for academic use. Adding to the three new construction sites the adaptive reuse of the former Warren Nash Service Station building, proposed for academic use under both the 197-a Plan Alternative and the Proposed Actions, there would be only four academic buildings plus a few smaller structures. The total floor area available (662,000 sf) represents approximately 14 percent of the 4.8 million gsf of program space provided in the Proposed Actions to meet Columbia's long-term needs.

- The 197-a Plan Alternative would not support the goals and objectives of the Proposed Actions to create an integrated, modern, urban, and open University campus. The three new and one converted academic buildings that could be developed would be spread out in the Project Area, interspersed with a variety of other uses (industrial and transportation uses, commercial offices, and housing) and could not create an integrated campus setting. This arrangement also would not provide a central open space, which would be the focus of such a campus.
- Under the 197-a Plan Alternative, Columbia would likely have to attempt to meet its needs for program space through ad hoc acquisition or properties as near to its existing campuses as possible. In formulating the Proposed Actions, and as discussed in Chapter 1, Columbia has determined that this approach is infeasible as a long-term growth strategy, for the following reasons: the trends in academia toward coordination among programs and interdisciplinary education require an integrated campus setting; there is no assurance that the amount of space needed could actually be acquired through ad hoc acquisitions; Columbia believes that ad hoc acquisitions would create continual friction with local communities over individual building initiatives; and the outcome of ad hoc expansion would be a miscellaneous collection of University buildings scattered in several urban neighborhoods and lacking any cohesive identity.
- The 197-a Plan Alternative would not support the goals and objectives of the Proposed Actions to create an area that provides amenities for people associated with the University and local residents alike. Given the scarcity of program space, there would be no opportunity under this alternative to provide a central, publicly accessible open space to serve as a gathering place for both the University and the community.

As indicated above, several features of the potential zoning regulations under the 197-a Plan Alternative severely constrain the ability to develop program space suitable for Columbia academic and academic research buildings. These include the requirement for a continuous streetwall and rear yard regulations. If the requirement for a continuous streetwall were relaxed, through-block buildings with rear yard equivalents would become possible, and the use of zoning lot mergers to assemble larger sites would become feasible. However, even under these revised assumptions (which are inconsistent with the potential zoning regulations of the 197-a Plan Alternative) and assuming further that all sites currently owned or controlled by Columbia were available exclusively for community facility use rather than the community facility/commercial use split assumed under the 197-a Plan Alternative development scenario, only three sites that could accommodate academic research were identified, with four smaller sites identified for new construction of academic use, five buildings for conversion to academic use, and six small sites identified for University housing. Even with these revised assumptions, the 197-a Plan Alternative would not meet the goals and purposes of the Proposed Actions, for the following reasons:

- The total gross floor area above grade for Columbia program space would total 1.9 million sf; with the addition of below-grade space in the newly constructed buildings, this total would be 2.1 million. Approximately 875,000 gsf would be for academic research, 667,000 for academic use, and 138,800 for University housing. The Columbia buildings would also

contain approximately 250,000 gsf of ground-floor retail, which would be required under the 197-a Plan Special Permit to permit uses other than manufacturing on the first two floors of newly constructed or converted buildings. Thus, of the 1.9 million sf available, the total floor area of University-related program space would be approximately 1.7 million gsf. This floor area is approximately 35 percent of the 4.8 million of gsf program space provided in the Proposed Actions and identified by Columbia in development of the Proposed Actions as necessary to meet its long-term needs (5-6 million sf). In addition, two of the three possible academic research buildings cited above would not have the rectangular floor plates that Columbia has identified as optimal for state-of-the-art modern science research facilities.

- Similar to the CB9 197-a Plan Alternative development scenario, the scenario with revised assumptions could not provide substantial publicly accessible open space or a central below-grade service area with shared program and support space. Thus, this scenario would not fulfill the goals and objectives of the Proposed Actions to create an integrated, modern, urban, and open campus for the University.

COMMUNITY BOARD 9 PROPOSED 197-A PLAN ALTERNATIVE 2

Subsequent to issuance of the DEIS, CB9 proposed changes in the boundaries of the Manhattanville Special Purpose District's Subdistricts 1 and 2, as well as land use and floor area requirements and design regulations. According to CB9, these revisions would (1) "allow CB9 to better achieve its stated objective of establishing a mixed-use, mixed-ownership commercial, light manufacturing, academic and residential community, with an active street life open to all its constituents"; and (2) "enable Columbia to redevelop its properties to meet its needs in a manner consistent with the goals and objectives of the 197-a Plan." The Resolution also states that in accommodating more community facility development, the revisions would "allow Columbia University to meet its current and forecasted needs."

Subdistrict 1: New Consolidated Manufacturing District

In the revised plan, Subdistrict 1 would be reduced from that of 197-a Plan Alternative 1, but it would still envision Subdistrict 1 as a manufacturing district with local retail. The zoning would be similar to that of 197-a Plan Alternative 1 for its larger Subdistrict 1; however, super specialty manufacturing with a ground-floor retail outlet has been changed from a requirement to an incentive. Unlike the original plan, an FAR bonus of 1.0 or 1.5 would be granted for developments that include production uses with ancillary retail on the ground floor or first two floors of the district. Zoning regulations in Subdistrict 1 under 197-a Plan Alternative 2 are virtually identical to those of 197-aPlan Alternative 1. Like the development scenario assumptions for Subdistrict 1 in 197-a Plan Alternative 1, new industrial development with manufacturing and related retail use is considered unlikely in this area and, thus, no major land use change would be expected in this area under the development scenario for Subdistrict 1. In general, it is assumed that Subdistrict 1 would retain its existing uses.

Subdistrict 2: New Broadway Mixed-Use District

Subdistrict 2 of the 197-a Plan Alternative 2 is larger than Subdistrict 2 under the original plan. The zoning assumptions for 197-a Plan Alternative 2 would differ materially from 197-a Plan Alternative 1 and would increase the FAR of manufacturing, commercial, community facility, and residential uses. Instead of requiring that 80 percent of the first two floors be manufacturing, as in the original plan, the revised plan would provide an FAR bonus as an incentive. Development for residential use would require a significant affordable housing component. The Plan identifies 12 sites in Subdistrict 2 as worthy of preservation through conversion and reuse, because of their historic and cultural value to CB9. Five of these sites, owned or controlled by

Columbia and located west of Broadway, would be preserved in the alternative's development plan. It is assumed for purposes of the development scenario for the 197-a Plan Alternative 2 that below-grade space would consist of conventional basements.

This scenario is substantially different from that of 197-a Plan Alternative 1. That scenario produced a development plan with office, community facility, housing, retail, and industrial uses on many separate sites, none of which was large enough to accommodate an academic research building, i.e., with a floor plate of at least 25,000 sf and total floor area of at least 250,000 sf. Thus, its community facility component provided only 13 percent of the program space needed by Columbia University over the long-term and accommodated in the Proposed Actions. By relaxing some of the requirements of 197-a Plan Alternative 1, the community facility component increased to about a third of that of the Proposed Actions. Based on revisions to the 197-a Plan for Subdistrict 2 (expansion of the area available for community facility development; increase in the community facility FAR; and elimination of mandatory ground-floor uses) and development assumptions provided by CB9, which recognize that Columbia would develop property for its own, rather than mixed use, the 197-a Plan Alternative 2 would provide additional opportunities for the types of buildings sought by Columbia under the Proposed Actions. However, it would still provide only approximately half of the program space available under the Proposed Actions, and only half of academic research program space. It would not include below-grade shared space, and there would be no use of publicly owned or private sites or new construction on sites of historic interest to CB9.

With regard to non-Columbia development, the Chevy Service Station and Buick buildings located on the east and west sides of Broadway as resources of historic interest to CB9, would be converted to residential use with construction of new floors above. Two sites owned by Tuck-It-Away would be demolished and redeveloped with new residential buildings. In the portion of Subdistrict 2 containing the properties known as Other Area east of Broadway in the Proposed Actions, the Claremont Theater would be preserved with a residential overbuild.

The private sites under 197-a Plan Alternative 2 would produce 402 units of housing (362,340 sf of residential use), of which 201 would be affordable units and 192,550 sf of retail use. This is slightly less than the original 197-a Plan, which was estimated to generate 420 units, of which 210 would be affordable. Total new development under the 197-a Plan Alternative 2 would be 3.57 million sf, compared with 7.09 million sf for the Proposed Actions. The potential effects of the alternative are assessed and compared with those of the Proposed Actions, below.

197-a Plan Alternative 2 Compared with the Proposed Actions

A comparison of the impacts of 197-a Plan Alternative with those of the Proposed Actions found the following:

- Neither the Proposed Actions nor 197-a Plan Alternative 2 would generate significant adverse impacts on land use, zoning, and public policy; community facilities; urban design and visual resources; neighborhood character; natural resources; hazardous materials; waterfront revitalization; infrastructure; solid waste and sanitation services; energy; traffic in the Project Area,; pedestrians; air quality; or public health.
- Like the Proposed Actions, by 2030, 197-a Plan Alternative 2 would have no significant adverse impact on direct residential or business displacement, on indirect business displacement, or on specific industries, but it could have a significant adverse impact on indirect residential displacement, affecting 1,319 unprotected units in the primary study area, including 823 units in the Riverside Park Community/333Broadway. However, the likelihood of this impact occurring

and its extent would be somewhat less under the 197-a Plan Alternative 2 than with the Proposed Actions.

- Like the Proposed Actions, 197-a Plan Alternative 2 would add areas of passive open space in the Project Area (0.41 acres to the Proposed Actions' 2.16 acres), but it would also add population and thereby decrease open space ratios, resulting in significant adverse open space impacts. Both alternatives would result in a decline in active open space ratios by 2030, and would therefore require mitigation.
- 197-a Plan Alternative 2 would include the traffic improvement plan for the Project Area and its immediate surroundings. However, like the Proposed Actions, it would result in significant traffic impacts requiring mitigation outside of the study area—on East 125th Street.
- Compared with the Proposed Actions, this alternative would produce a greater parking shortfall (950 spaces vs. 120 spaces). Mitigation measures for the Proposed Actions would eliminate this significant impact; for this alternative the measures would only partially mitigate the impact.
- Although 197-a Plan Alternative 2 would generate fewer bus trips than the Proposed Actions, significant adverse bus impacts are still expected to occur, albeit at lower magnitudes and requiring fewer additional buses to mitigate the projected impacts.
- Both alternatives would result in significant noise impacts at receptor Site 10. At all other locations, both alternatives, be it with or without traffic improvements, would not result in any significant noise impacts. It is expected that comparable levels of attenuation, and at the same locations, would be necessary under 197-a Plan Alternative 2 as those specified under the Proposed Actions.
- 197-a Plan Alternative 2 could result in air quality impacts during construction; these would not occur under the Proposed Actions. E-designations or similar measures could be applied to provide for emission reduction measures and therefore mitigate any impacts.
- Unlike the Proposed Actions, 197-a Plan Alternative 2 would not have any of the following significant adverse impacts: shadow impacts on the I.S. 195 Playground; impacts on historic resources; or an impact from an increase of passengers on the escalator at the 125th Street No. 1 subway station.

197-A PLAN ALTERNATIVE 2 WITH FURTHER REVISIONS

CB9 also proposed a "relaxed" version of the development assumptions for 197-a Plan Alternative 2, under which the requirement to preserve buildings of historic interest to CB9 would be removed. As a result, the four buildings owned by Columbia and assumed to be preserved in 197-a Plan Alternative 2 would be demolished, allowing buildings with more regular floor plates. The West Market Diner, also owned by Columbia, was assumed to be relocated to another site in Subdistrict 1. Also, the Chevy and Buick Service Station buildings, owned by Tuck-It-Away, were assumed to be demolished and replaced by new construction. In addition, this version of the 197-a Plan acknowledges Columbia's ownership of the Broadway frontage on the triangular site for the proposed park on West 125th Street and assumes that Columbia would build an academic building there. Thus, the size of the park would be reduced.

The 197-a Plan Alternative 2-Relaxed would offer more opportunities for the types of buildings accommodated in the Proposed Actions than the 197-a Plan Alternative 2, but it would still provide only 53 percent of the program space available under the Proposed Actions, and only half of academic research program space. In addition, the private sites under 197-a Plan Alternative 2-

Relaxed would produce the same amount of housing as they would with the 197-a Plan Alternative 2, because the residential maximum FAR of 6 would limit that use, whether it was produced through conversion or new construction. Total new development under the 197-a Plan Alternative 2-Relaxed would be 3.79 million sf, compared with 7.09 million sf for the Proposed Actions.

Ability to Meet the Goals and Objectives of the Proposed Actions

Both 197-a Plan Alternative 2 and its "relaxed" scenario would not meet the goals and objectives of the Proposed Actions for the following reasons:

- The alternative could not accommodate Columbia's long-term needs for space. Whereas the Proposed Actions would produce 4.8 million sf of academic program space, 197-a Plan Alternative 2 would produce only 2.4 million sf of academic program space, or 50 percent of the required floor area. The relaxed scenario would raise this total to 2.6 million sf, or 53 percent of the required floor area. Space for academic research, the University's key program objective, would be only 50 percent of that of the Proposed Actions (1.2 million sf compared with 2.6 million square feet) in the 197-a Plan Alternative 2 or 50 percent with the relaxed scenario. Because this alternative would not fulfill long-term needs for space, the University would not be able to avoid ad hoc acquisition of properties in neighborhoods outside of Columbia's existing campuses.

- The reduced floor area compared with the Proposed Actions would occur at critical locations, which would further reduce the alternative's ability to meet project goals and objectives. In particular, the alternative could not accommodate the Phase 1 uses of the Proposed Actions. The tall academic research building on Site 3 would be sufficient to meet the program floor area goals (350,000 sf) for the Jerome L. Greene Science Center, but there would be insufficient space and floor area for the Business School and the School of the Arts. Columbia would be unable to achieve the diverse mix of major anchor programs planned for Phase I, and advises that the likelihood that the Jerome L. Greene Science Center would alone advance is uncertain. In addition, according to Columbia, SIPA has been attracted to a location in Manhattanville based largely on the Business School, with which it enjoys a strong relationship. Columbia advises that if the Business School were unable to come to Manhattanville, a relocation of SIPA would be unlikely as well. There would also be less room for active, contiguous ground-floor retail, no space at all for the Small Square, and the land for the Grove would not be available. Thus, this alternative would not achieve the Phase 1 objectives of transforming West 125th Street as a gateway to the waterfront and the West Harlem Waterfront park, or of acting as a major entrance to the proposed new graduate Manhattanville campus for Columbia University. The relaxed scenario would provide slightly more floor area in this location, but with a smaller park. This would not alter the conclusion for the 197-a Plan Alternative 2.

- The lack of the full central below-grade service area would reduce the functionality of the Academic Mixed-Use Development, the ability of the University to produce buildings with full program space, and limit the ability to create a campus environment. Specifically, without the central below-grade service area, there would be no central loading facility and centralized parking, no major shared academic support space, no centralized mechanical systems, and no additional floor area for Business School classrooms, and other academic programs. As a result, each building would have its own truck loading docks and those buildings with below-grade parking would each have car ramps on the streets. These features would be incompatible with a campus atmosphere. In addition, support uses that would be shared among buildings when located below grade, if located above grade would have to be

duplicated in each building—each building would have its own boilers and mechanical system, each would have to have a mechanical floor above grade, and each academic research building would have academic research support space occupying at least two above-grade floors. Locating support uses above grade would restrict the amount of program space that could be achieved in each building, and the ability of the University to achieve its program goals would be constrained.

- This alternative would create a development with less open space and fewer amenities for University and community users, without substantially improved pedestrian conditions or improved visual and physical access to the waterfront. As noted above, the open spaces would be fewer and smaller than under the Proposed Actions and there would be no north-south pedestrian path, central large Square, or Small Square. The curb cuts and truck docks would diminish the attractiveness of the area for pedestrians. The reduction in active ground floor uses and their lack of contiguity would also decrease the area's attractiveness for pedestrians. The absence of widened sidewalks on the narrower side streets would also reduce this alternative's ability to improve views of and access to the waterfront. As noted above, the inability to create the full Phase 1 program, with the Jerome L. Greene Science Center and three key graduate schools plus new open space, would reduce this alternative's ability to enliven and activate West 125th Street as a gateway to the waterfront.

COGENERATION ENERGY SUPPLY ALTERNATIVE

The academic research facilities proposed for the Academic Mixed-Use Area would have high year-round energy requirements and would need highly reliable utilities. A cogeneration plant, which could generate a portion of the electricity needed to serve the academic research buildings and the other campus facilities, instead of purchasing electricity from Con Edison, is being considered as an option to increase reliability of electrical service and potentially decrease its costs.

In the Cogeneration Energy Supply Alternative, a cogeneration plant would be constructed to provide a portion of the power, as well as heating and cooling, for the buildings in the Academic Mixed-Use Area in the area bounded by Broadway, West 125th Street, Twelfth Avenue, and West 132nd Street. It would be located beneath Site 3, in the southern portion of the central, below-grade service area. In this alternative, the central energy plant proposed at Site 14, and package boiler systems proposed for the three buildings east of Broadway and one building on Site 1 south of West 129th Street, would be identical in terms of equipment and operation to those proposed as part of the Proposed Actions.

Compared with the Proposed Actions, the Cogeneration Energy Supply Alternative would result in similar levels of pollutant emissions. Like the Proposed Actions, no significant adverse air quality impacts are expected.

X. MODIFICATIONS TO THE PROPOSED ACTIONS

Since the issuance of the DEIS, CPC has contemplated modifications to Subdistrict B of the Special Manhattanville Mixed-Use Zoning District, which would rezone Subdistrict B to an underlying M1-2 district instead of C6-1. Modifications to some of the M1-2 underlying district requirements are also proposed for Subdistrict B.

All manufacturing and commercial uses permitted in the M1-2 underlying district would be permitted in Subdistrict B. Residential uses and college or university uses (or other related community facilities listed under zoning use group 3) would not be permitted in Subdistrict B by

the proposed modifications. The underlying M1-2 district requirements for FAR for manufacturing, commercial, and community facility uses would apply to Subdistrict B with the proposed modifications. The M1-2 district parking requirements would not apply to Subdistrict B of the Special Manhattanville Mixed-Use Zoning District. Height limits would not change with the proposed modifications. The proposed modifications would eliminate the requirements for active ground-floor uses along Twelfth Avenue and West 125th Street, streetwall requirements, and streetwall transparency requirements for Subdistrict B.

The proposed modifications would not substantially change the mix of retail and manufacturing uses that are currently permitted under the existing zoning, and, with the exception of a small portion of the Subdistrict currently zoned M1-1, would not result in a increase in the maximum permitted FAR, as compared with existing zoning. Therefore, no projected development sites for new construction are identified for Subdistrict B with the proposed modifications.

The Proposed Actions with the modifications to Subdistrict B would not result in significant adverse impacts on land use, zoning, and public policy; community facilities; urban design and visual resources; neighborhood character; natural resources; hazardous materials; waterfront revitalization; infrastructure; solid waste and sanitation services; energy; air quality; and public health. The Proposed Actions with the modifications to Subdistrict B would result in significant adverse impacts on indirect residential displacement; open space; historic resources; shadows; traffic; parking; subway station; bus line haul; noise; and construction (traffic and noise). With the proposed modifications, no new construction would occur in Subdistrict B, eliminating the elevated $PM_{2.5}$ concentrations predicted for the construction activities in Subdistrict B.

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