A. INTRODUCTION

The FGEIS concluded that the illustrative development programs under the 12.0 FAR Rezoning Scenario's would result in significant adverse shadow impacts on the open spaces at Tudor City in the winter. The proposed development program's open spaces, building configurations, and building heights differ from those analyzed under the Rezoning Scenario in the FGEIS. Therefore, this chapter examines the shadows cast by the proposed development program's buildings on sun-sensitive resources, and considers whether the incremental shadows from those buildings would result in significant adverse impacts that differ from those identified in the FGEIS.

This analysis finds that the proposed development program would result in significant adverse shadow impacts in the winter (December 21 analysis day) on two sun-sensitive resources: the Manhattan Place Plaza and the Tudor City open spaces. In the case of Manhattan Place Plaza, there would be incremental shadows on December 21 from 8:51 AM to 12:15 PM and 1:00 PM to 2:53 PM (during the intervening period between 12:15 PM and 1:00 PM the plaza is fully shaded by an existing building to the south). Under either of the construction schedules analyzed in this SEIS, the significant adverse shadows impact on Manhattan Place Plaza would first occur in the winter of 2014, when the construction of both 616 First Avenue residential buildings is completed. In the case of the already partially shadowed Tudor City open spaces, there would be incremental shadows from 8:51 AM to 1:30 PM on the December analysis day. Under either of the construction schedules analyzed in this SEIS, the significant adverse shadows impact on Tudor City open spaces would first occur in the winter of 2010, when the construction of the 685 First Avenue residential building and the 708 First Avenue commercial office building are completed. No other significant adverse shadow impacts were identified.

B. COMPARISION TO FGEIS FINDINGS

The FGEIS concluded that all of the Rezoning Scenario's illustrative development programs would result in significant adverse shadow impacts to the Tudor City open spaces on the December 21 analysis day. The illustrative development programs also would have cast new shadows on Rivergate (Joseph Slifka Park), St. Vartan Park, the Manhattan Place Plaza, Robert Moses Playground, Trygve Lie Plaza, Corinthian Plaza, Glick Esplanade, and Ralph J. Bunche Park. However, the effects of incremental shadows on all resources except the Tudor City open spaces from those illustrative programs were not found to be significant because of the limited extent of those shadows, the lack of sun-sensitive uses, the lack of use in general, or the availability of alternative space within the open spaces that would not be in shadow during the analysis periods.

Similar to the illustrative development programs of the FGEIS, the proposed development program analyzed in this SEIS would cast new shadows on the parks identified above, and would result in a significant adverse shadow impact to the Tudor City open spaces on the

December analysis day. Additionally, unlike the illustrative development programs, the proposed development program would cause a significant adverse shadow impact to Manhattan Place Plaza on the December analysis day.

During the morning hours of the December analysis day, incremental shadow on the Tudor City open spaces would be similar between the illustrative development programs analyzed in the FGEIS and the proposed development program. At 12:45 PM the amount of incremental shadow under the proposed development program would again be comparable to that found in the FGEIS. With the proposed development program, both Tudor City Greens would be completely in shadow from a combination of existing buildings and the proposed buildings at 685 First Avenue and the Waterside parcel. Additionally, more than half of the Mary O'Connor Playground would be cast in incremental shadow, and a very small amount of incremental shadow would reach the Tudor Grove Playground. At the same time of day, under the Mixed-Use Development Programs in the FGEIS, both of the playgrounds and the southern Green would have been completely covered in existing and incremental shadows, while an area of the northern Green would have remained in sunlight. With the Residential Development Program, shadows would have been similar to the proposed development program, but slightly smaller so that a little more of the two playgrounds would have been in sunlight. Under the Mixed-Use Development Programs analyzed in the FGEIS the Tudor City Greens were totally covered in existing and incremental shadows at 1:30 PM. With the proposed development program however, only a very small section of the northern Tudor City Green would be cast in incremental shadow at this time of day, because the floorplate of the proposed 685 First Avenue building would be narrower (in the east/west dimension) and situated in the eastern half of the property, and so the shadow it would cast would be smaller and exit the Tudor City spaces earlier. At the end of the analysis period there would be no incremental shadows cast on the Tudor City Greens under either the Rezoning Scenario's illustrative development programs or the proposed development program.

Unlike the illustrative development programs, the proposed development program would result in a significant adverse impact on Manhattan Place Plaza in December. The new impact is due to a building proposed for the western portion of the 616 First Avenue site immediately south of the Manhattan Place Plaza, in addition to the proposed building on the eastern portion of the 616 First Avenue site. In all three illustrative development programs in the FGEIS, the development on this site would have provided a large plaza on the western end of the block.

C. METHODOLOGY

The guidelines of the *CEQR Technical Manual* require the preparation of a shadow assessment if a proposed action includes new structures tall enough (generally 50 feet high or taller) to cast new shadows on publicly accessible open spaces, architectural resources with sunlight-sensitive features, or important natural features. The uses and vegetation in an open space determine its sensitivity to shadows. Uses that rely on sunlight include passive uses, such as sitting or sunbathing, and such activities as gardening or wading in fountains or pools. Vegetation requiring sunlight includes the tree canopy and flowering plants. In open spaces where lawns are actively used, the grass also requires extensive sunlight. Four to six hours a day of sunlight is generally a minimum requirement, particularly in the growing season. Sun-sensitive features of architectural resources may include large windows admitting light into interior spaces, stained glass windows in churches, deeply sculpted façade ornamentation, and historic landscapes.

A shadow screening analysis was first used to identify sensitive receptors that could potentially be affected by the proposed development program. Computer-generated simulations of the incremental shadows resulting from the proposed development program were then prepared for representative times on four analysis days: March 21/September 21 (the equinoxes); May 6/August 6 (the midpoints between the equinoxes and the summer solstice); June 21 (the summer solstice); and December 21 (the winter solstice). Since the CEQR methodology does not consider shadows and incremental increases in shadows within 1½ hours of sunrise or sunset, the analysis period on each analysis day begins 1½ hours after sunrise and ends 1½ hours before sunset. Potential impacts were considered based on the coverage and duration of shadows on each sensitive receptor, as well as the presence or lack of sun-sensitive uses, the amount of use in general, and the availability of alternative space within each sensitive receptor.

Following the guidelines of the *CEQR Technical Manual*, the analysis focuses on the incremental or additional shadows cast by the proposed development program beyond the shadows from existing structures. The analysis examines the potential impact of these incremental shadows and takes into account uses and users of open space, landscaping and vegetation of open space and the characteristics of any significant natural features or historic resources with features or details that are sunlight-dependent and make such resources significant. The *CEQR Technical Manual* identifies the following situations when a proposed development program may result in a significant shadow impact:

- Substantial reduction in sunlight where a sensitive use is already subject to substandard sunlight (i.e., less than the minimum time necessary for plant survival);
- Reduction in sunlight available to a sensitive use from more to less than the minimum time necessary for plant survival;
- Substantial reduction in sunlight to a sun-sensitive use or feature; and
- Substantial reduction in the usability of the open space.

There may be situations where a very small loss of sunlight is important (for example, in areas where people sit or in a historic church with stained glass windows) or where a comparatively large loss is not significant (for example, where vegetative species are shade-tolerant). Although these situations represent a general guideline for determining significant adverse impacts, each case is reviewed on its own merits.

In the case of open spaces that are part of a proposed project or action, shadows are described, but such shadows are not considered impacts of an action because without the project or action the open space would not exist.

The shadow diagrams and analysis presented in this chapter were developed using building envelope and topographical information supplied by Fugro EarthData, Inc.. The project sponsors provided the 3D model of the proposed development program. Shadows were modeled using the solar rendering capabilities of MicroStation V8 software.

D. IDENTIFICATION OF SENSITIVE RECEPTORS

SCREENING ANALYSIS

To identify resources of concern, the potential maximum lengths of the project-generated shadows are first considered. For example, on the December 21 analysis day, a building has a maximum shadow length equal to 4.3 times its height at the beginning and end of the analysis period, when shadows are cast to the northwest and northeast, respectively. Toward midday, as

the sun rises in the sky, the shadow length factor is reduced to 2.07 times the height of the building. Shadow length factors for the remainder of the analysis periods are shorter than they are in December. However, the daylight hours are longer, resulting in longer analysis periods and, therefore, a larger shadow sweep.

Using the proposed buildings' heights (see Figure 6-1) and a detailed map of the surrounding area, the path and extent of shadow for each of the proposed buildings was delineated for each entire analysis day. Sun-sensitive resources located within these shadow sweeps were identified for further analysis in the 3D solar study.

OPEN SPACES

All the publicly accessible open spaces within the maximum shadow sweeps predicted for the proposed development program are listed in Table 6-1 and mapped in Figure 6-2.

HISTORIC RESOURCES

Historic or potential historic resources with sun-sensitive features within the maximum shadow sweep include the Ford Foundation (New York City Landmark [NYCL]), Tudor City (NYCL, State and National Registers of Historic Places), and the United Nations Headquarters (not designated). All of these resources are described below in the analysis by resource.

The former Kips Bay Brewery (a potential resource) is located on the east side of First Avenue just south of the Waterside parcel (700 First Avenue). It does not possess any sunlight-sensitive features and therefore, its historical significance would not be adversely impacted by a reduction of direct sunlight. In any case, any shadows from the proposed development program would fall on its north façade which, because it faces north, is predominantly cast in shadow throughout the year under existing conditions. Therefore, shadows on the former Kips Bay Brewery are not considered in the analysis.

EAST RIVER

The East River is a significant natural feature in the study area. Shadows from any new buildings on the development parcels would reach the East River in the afternoon throughout the year. Consequently, incremental shadows on this resource are examined in the detailed analysis. The effects of incremental shadow on the East River are also examined in Chapter 10, "Natural Resources."

E. ASSESSMENT OF SHADOW IMPACTS

The sun rises in the east and casts its earliest (and longest) shadows towards the west. Later in the morning, the sun rises higher in the sky, casting shorter shadows towards the northwest. At noon, the sun is at its highest point in the sky and casts the shortest shadows of the day directly north (during Daylight Savings Time, this occurs at 1 PM rather than at noon). In the afternoon, the sun continues to move west and begins to descend, casting longer shadows toward the northeast and east. At the end of the day, just before the sun sets in the west, shadows are very slightly shorter than just after sunrise.

Table 6-1
Open Spaces Within Shadow Sweep

Open Space Name	Corresponding Feature in Figure 6-2
Rivergate (Joseph Slifka Park)	1
St. Vartan Park	2
Manhattan Place Plaza—630 First Avenue	3
Corinthian Plaza—330 East 38th Street	4
Robert Moses Playground	5
Trygve Lie Plaza	6
Tudor City Green (South)	7
Tudor City Green (North)	8
Tudor Grove Playground	9
Mary O'Connor Playground	10
Ralph J. Bunche Park	11
Glick Esplanade	12
United Nations Park	13
300 East 34th Street	14
Murray Hill Mews—560 Third Avenue	15
240 East 38th Street	16
Eastgate Tower—222 East 39th Street	17
New York Tower—330 East 39th Street	18
Vanderbilt—235 East 40th Street	19
Highpoint—250 East 40th Street	20
600 Third Avenue	21
Grand Central Plaza—622 Third Avenue	22
Helmsley Hotel—212 East 42nd Street	23
201 East 42nd Street	24
International Plaza—303 East 43rd Street	25
UNICEF House—3 United Nations Plaza	26

Notes: The landscaped area at the Churchill—728 Second Ave., which was included in the FGEIS as an open space resource, has been omitted from this analysis. According to *Privately Owned Public Space: The New York City Experience* (2000), a collaboration of the New York City Department of City Planning (DCP) and Jerold S. Kayden of the Municipal Art Society, this resource is "visually accessible, but physically inaccessible" due to heavy landscaping.

In its yearly cycle, the height of the sun in the sky and the time and directional location at which it rises and sets varies by season. In the winter, the sun travels in a low arc across the southern sky, rising late in the southeast and setting early in the southwest. Because it is so low in the sky, it casts longer shadows. In the spring and fall, the sun arcs through the sky at a somewhat higher angle, rises earlier in the east, and sets later in the west. In these seasons, shadows are of moderate length. In the summer, the sun arcs through the sky at its highest angle, rising almost directly overhead at noon. For this reason, summer shadows are shortest. However, in the summer, the sun rises earliest and sets latest; it also travels farther, from the northeast to the northwest. Thus, the summer sun casts shadows in more directions than those seen in other seasons, and its late sunset and early sunrise create shadows earlier in the morning and later in the evening than in other seasons.

The project-generated shadow durations are shown below in Table 6-2. Shadows are discussed with respect to each affected resource. The detailed analysis determined that the proposed buildings would not cast incremental shadow on the following open spaces on any of the four analysis days, due to existing shadow cast by intervening buildings: 300 East 34th Street; Murray Hill Mews—560 Third Avenue; Eastgate Tower—222 East 39th Street; Vanderbilt—235 East 40th Street; Highpoint—250 East 40th Street; 600 Third Avenue; Grand Central Plaza—622 Third Avenue; Helmsley Hotel—212 East 42nd Street; 201 East 42nd Street; International Plaza—303 East 43rd Street; and UNICEF House—3 United Nations Plaza.

Table 6-2
Potential Extent and Duration of New Shadows: Proposed Development Program

	March 21 (8:36 AM – 5:29 PM EDT)[1]			May 6 (7:27 AM – 6:18 PM EDT)[2]			June 21 (6:57 AM – 7:01 EDT)			December 21 (8:51 AM – 2:53 PM EST)		
Open Space Name	**Enters**	**Exits**	**Total Duration[4]**	**Enters**	**Exits**	**Total Duration[4]**	**Enters**	**Exits**	**Total Duration[4]**	**Enters**	**Exits**	**Total Duration[4]**
Rivergate (Joseph Slifka Park)	—	—	—	7:27 AM	8:30 AM	1h 3m	6:57 AM	8:45 AM	1h 48m	—	—	—
St. Vartan Park	8:36 AM	12:45 PM	4h 9m	7:27 AM	12:45 PM	5h 18m	6:57 AM	12:30 PM	5h 33m	8:51 AM	9:45 AM	54m
Manhattan Place Plaza	10:45 AM	5:29 PM	6h 44m	11:45 AM	5:30 PM	5h 45m	12:30 PM	5:15 PM	4h 45m	8:51 AM 1:00 PM	12:15 PM 2:53 PM	5h 17m
Corinthian Plaza	8:36 AM 1:00 PM	9:00 AM 1:30 PM	54m	7:27 AM	10:00 AM	2h 33m	6:57 AM	10:30 AM	3h 33m	9:45 AM	1:00 PM	3h 15m
Robert Moses Playground	10:45 AM	5:15 PM	6h 30m	11:15 AM	5:45 PM	6h 30m	11:45 AM	5:45 PM	6h	8:51 AM	2:53 PM	6h 2m
Trygve Lie Plaza	10:30 AM 2:30 PM	1:45 PM 2:45 PM	3h 30m	11:15 AM	1:00 PM	1h 45m	12:00 PM	12:45 PM	45m	8:51 AM	1:15 PM	4h 24m
Ford Foundation	—	—	—	—	—	—	—	—	—	9:30 AM 12:00 PM	11:00 AM 12:30 PM	2h
Tudor City Green (South)/ Tudor Grove Playground	10:15 AM 1:00 PM	12:45 PM 2:00 PM	3h 30m	11:15 AM	11:30 AM	15m	—	—	—	8:51 AM 11:30 AM	10:00 AM 1:30 PM	3h 9m
Tudor City Green (North)/ Mary O'Connor Playground	—	—	—	—	—	—	—	—	—	9:45 AM	1:15 PM	3h 30m
Tudor City Open Spaces[3]	10:15 AM 1:00 PM	12:30 PM 2:00 PM	3h 30m	11:15 AM	11:30 AM	15m	—	—	—	8:51 AM	1:30 PM	4h 39m
Ralph J. Bunche Park	12:15 PM	1:45 PM	1h 30m	—	—	—	—	—	—	10:30 AM	1:30 PM	3h
U.N. Park	—	—	—	—	—	—	—	—	—	1:15 PM	2:53 PM	1h 38m
Glick Esplanade	3:15 PM	5:29 PM	2h 14m	2:45PM	6:18 PM	3h 33m	3:00 PM	7:01 PM	4h 1m	—	—	—
240 East 38th Street	8:45 AM	9:30 AM	45m	7:45 AM	9:00 AM	1h 15m	—	—	—	8:51 AM	9:30 AM	39m
New York Tower—330 East 39th Street	—	—	—	10:30 AM	11:00 AM	30m	—	—	—	—	—	—
East River	3:30 PM	5:29 PM	1h 59m	3:30 PM	6:18 PM	2h 48m	3:30 PM	7:01 PM	3h 31m	2:30 PM	2:53 PM	23m

Notes:
[1] September 21 corresponds to March 21.
[2] May 6 corresponds to August 6.
[3] "Tudor City Open Spaces" includes Tudor City Green (South)/Tudor Grove Playground and Tudor City Green (North)/Mary O'Connor Playground.
[4] Total Duration reflects time that any part of incremental shadow falls on any portion of open space as it enters, moves across, and exits the space.
EST—Eastern Standard Time
EDT—Eastern Daylight Time

RIVERGATE (JOSEPH SLIFKA PARK)

Rivergate (Joseph Slifka Park) is located on the east side of First Avenue between East 34th and 35th Streets, directly south of the 616 First Avenue site. This space contains basketball courts, a playground, a lawn area, and seating areas.

The buildings on the 616 First Avenue development parcel would cast incremental shadows on the Rivergate (Joseph Slifka Park) open space for brief periods during the morning hours of the May and June analysis days. The proposed buildings would not cast shadow on the Rivergate (Joseph Slifka Park) open space on the March/September and December analysis days.

As detailed below, due to the short durations and small size of the incremental shadows, there would be no significant adverse impacts to the park.

MAY 6TH/AUGUST 6TH

At 7:27 AM, the beginning of the analysis period, the eastern 616 First Avenue building would cast shadow on the northwest corner of the Rivergate (Joseph Slifka Park) open space removing the only sunlight at that time (see Figure 6-8). The children's playground is located in this portion of the open space. By 8:30 AM the incremental shadow would exit the open space, allowing more sunlight to reach the open space. This would not result in a significant amount of new shadow on the open space, and it would not constitute a significant adverse impact.

JUNE 21ST

From 6:57 AM to 8:45 AM the eastern 616 First Avenue building would cast incremental shadows on the Rivergate (Joseph Slifka Park) open space. As on the May analysis day, the incremental shadows would fall on the northwest corner of the park, removing the last of the sunlight (see Figure 6-13). The incremental shadow would then decrease, and exit the open space entirely by 8:45 AM. This would not result in a significant amount of incremental shadow on the open space, and it would not be a significant adverse impact.

ST. VARTAN PARK

St. Vartan Park stretches from First to Second Avenue between East 35th and 36th Streets, directly west of the 616 First Avenue site. The park is divided by an access road for the Queens-Midtown Tunnel (QMT). The smaller western section has basketball and handball courts along Second Avenue. Amenities in the larger eastern section include a large paved ball field adjacent to the access road as well as a playground with a sitting area in the middle. The playground includes a water feature used during the summer. The First Avenue frontage of the park is a fenced lawn area that is not publicly accessible.[1] While the lawn area contributes to the general attractiveness of the park when seen from near First Avenue, it is not an important natural feature of the landscape. The eastern section of the park also has tall London plane trees (*Platanus x acerifolia*), which form a fairly continuous tree canopy about 30 feet above street level.

[1] The fenced lawn at the eastern end of the park is currently being used by the St. Vartan Play Group, a cooperative playgroup for pre-school-aged children sponsored by the New York City Department of Parks and Recreation (DPR). The playgroup generally meets from 10:30 AM to 1:00 PM three or four times a week in the adjacent structure and typically uses the lawn at the end of this period for an outdoor activity when weather permits. The fenced lawn is otherwise inaccessible to the public.

The buildings on the 616 First Avenue parcel would cast incremental shadows on St. Vartan Park in the morning during all seasons. The building on the southwest corner of the Waterside development parcel would also cast a shadow on the western end of the park briefly at the beginning of the analysis period in May and June. The portion of the park that would be in shadow the longest would be the inaccessible lawn, as it is closest to 616 First Avenue. Further, since the existing buildings south of the park are relatively short (5 and 6 stories), the park would still receive ample sunlight for the remainder of the day. While the enjoyment of the passive recreation areas of the park, such as the seating areas, would be reduced in the mornings during all four seasons, the overall usability of the park would not be affected, and the park would continue to receive substantial sunlight in the afternoon and evening hours. Therefore, as described below, there would be no significant adverse shadow impacts to the park.

MARCH 21ST/SEPTEMBER 21ST

The 616 First Avenue buildings would cast incremental shadows on the park starting at 8:36 AM, the beginning of the analysis day, when incremental shadows would cover about half of the park including the inaccessible lawn (see Figure 6-3). The incremental shadows would move north across the park through the morning hours. At 9:45 AM they would cover nearly the entire park (see Figure 6-4). But the incremental shadow would keep moving northeast and by 11:00 AM, only the northeastern quarter of the park (including much of the inaccessible lawn) would receive incremental shadows (see Figure 6-5). At 12:45 PM, the incremental shadows would completely exit the park. The park would then be in full sunlight until after 3:00 PM when shadows of existing buildings enter the southern edge of the park and remain on a small portion of the park until the end of the analysis period.

Although the buildings on the 616 First Avenue parcel would greatly reduce the amount of sunlight on the park in the morning hours of the analysis day, the park would still receive ample sunlight in the afternoon. As the majority of the park is dedicated to active play areas, the overall usability of the park would not be significantly reduced. The tree species in the park are tolerant to shade, and the approximately four hours of incremental shadow in the morning would not cause a significant adverse impact (for further discussion of tree species see the May 6/August 6 section below). Even the fenced-in lawn area would still receive sunlight in the afternoon for over five hours, which is ample sunlight for survival of the plantings. Therefore, while the park would be less attractive to passive users during the morning hours, overall there would be not be significant adverse shadow impacts on the March/September analysis days.

MAY 6TH/AUGUST 6TH

At 7:27 AM most of the park is shaded by existing buildings. The proposed building on the southwest corner of the Waterside parcel would cast new shadows on a paved, active recreation area in the northwest corner of the park along Second Avenue from 7:27 AM to 8:15 AM. The 616 First Avenue buildings would also cast an incremental shadow on the southeast corner of the park at 7:27 AM (see Figure 6-8). The shadows would move quickly, and by 9:45 AM there would be sunlight on about half the park (see Figure 6-9). At 11:00 AM the incremental shadow would still cover approximately one-third of the open space, but half the area in shadow would be the inaccessible lawn (see Figure 6-10). At 12:45 PM the incremental shadow would exit the park. The park would remain in full sunlight until 5:30 PM, when existing shadows would enter the western edge of the park and remain for the final 48 minutes of the analysis period. The majority of the mature trees in the park are London plane tree. This species is a popular street tree planting as it is tolerant of urban conditions, and can grow in partial shade conditions. On

May 6th and August 6th, which represent the late spring and mid to late summer portions of the growing season, the London plane trees along First Avenue would receive at least 4.5 hours of full sunlight with the Proposed Actions. In general, most flowering trees need between four to six hours of sunlight for good flowering. The projected duration of sunlight in the eastern portion of the park where the trees are located would be expected to be sufficient to maintain the photosynthetic processes required for growth and survival. Other plantings within the park that would be covered by incremental shadows include young magnolia (*Magnolia sp.*) and Japanese maple (*Acer palmatum*). These species are similarly tolerant to partial shade, and therefore would not likely have significant adverse impacts as a result of the proposed buildings. Given several factors—the incremental shadows being greatest in the early morning, when the park is likely to have the fewest users, the large proportion of the incremental shadow on the park falling on the inaccessible lawn and paved ball fields, and the amount of sun on the park the rest of the day—the shadows in May/August are not a significant adverse impact. However, the enjoyment of the children's play area and the seating there may be diminished until 11:45 AM.

JUNE 21ST

The proposed building on the southwest corner of the Waterside parcel would cast incremental shadow on the park from 6:57 AM to 8:30 AM, removing all the sunlight from the western paved section of the open space for a short time at the beginning of the analysis period (see Figure 6-13). The 616 First Avenue buildings would then cast incremental shadows on portions of St. Vartan Park from 8:30 AM to 12:30 PM. The incremental shadow would first enter the southeast corner of the park, falling on the inaccessible lawn. By 9:00 AM the incremental shadow would begin to encroach on the playground and seating area, and at 10:00 AM it would cover half of the playground and seating area and two-thirds of the inaccessible lawn. By 11:00 AM the incremental shadow would cover approximately the eastern third of the open space, including the inaccessible lawn and part of the central playground area (see Figure 6-14). The incremental shadow would fall only on the inaccessible lawn area after 11:15 AM, and exit the park completely at 12:30 PM. The open space would remain in full sunlight until 5:30 PM when existing shadows would enter the western edge of the park. Because of the warm weather in June the incremental shadows may be welcome and in any case are unlikely to diminish the usability and enjoyment of the seating areas. Further, the park would still receive ample sunlight for most of the analysis day, which is the longest day of the year. As the majority of the park is for active recreation, the overall usability of the open space would not be significantly reduced. In addition, the lawn would be in sun for more than six hours, from 12:30 PM until the end of the analysis period at 7:01 PM. As noted in the previous section above, this duration of sunlight during the middle of the growing season would be expected to be sufficient for the survival of the London plane trees and other plantings in and around the lawn. Therefore, the incremental shadows would not create a significant adverse shadow impact.

DECEMBER 21ST

The 616 First Avenue buildings would cast incremental shadows on the northeastern corner of the park at the beginning of the analysis period, 8:51 AM, when the incremental shadows would remove the last sunlight from the park (see Figure 6-17). The incremental shadow would exit the park by 9:45 AM. Existing buildings cast the southern edge of the park in shadow for the entire analysis period, and by the end of the analysis period the existing shadows almost completely cover the park (see Figures 6-18 to 6-21). Given the short duration of the incremental shadow

and its occurrence in the early morning, the proposed buildings would not have a significant adverse shadow impact on the December analysis day.

MANHATTAN PLACE PLAZA

Manhattan Place is located at 630 First Avenue on the east side of First Avenue between East 36th and 37th Streets, directly north of the 616 First Avenue site. Its triangle-shaped public plaza has benches, seating, flower beds, and a large fountain at its southwest corner. Located at the base of a large residential building with ground-floor retail space that has been occupied by food purveyors, it has the potential to be well-used in the warmer months as well as on sunny days in cooler months. However, site visits during the fall of 2006 and spring of 2007 revealed that the ground-floor retail space has been vacant since at least September 2006 and that use of the plaza has been light throughout the period of these visits.

On the March/September analysis day, the buildings on the 616 First Avenue development parcel would cast incremental shadows on the plaza for much of the analysis day and would greatly reduce the amount of sunlight and the usability of the plaza, creating an adverse impact. This adverse impact would not be considered significant for users of the space, due to the availability, during the periods of incremental shadow described below, of other sunlit areas in public open spaces on adjacent blocks. Most of the seating areas in St. Vartan Park and the Corinthian plaza—both one block away—are sunlit during the periods on March 21 when incremental shadow would fall on portions of Manhattan Place Plaza. Additionally, areas of the proposed open space at 616 First Avenue, directly across East 36th Street from the plaza, would experience sunlight during periods of incremental shadow on Manhattan Place. The incremental shadows on the May/August and June analysis days would not have a significant adverse impact as the plaza would still receive ample sunlight throughout the day. However, as described below, on the December analysis day, the incremental shadow would have a significant adverse impact due to large areas and long durations of incremental shadow and a lack of available alternative sunlit open spaces on adjacent blocks.

MARCH 21ST/SEPTEMBER 21ST

The 616 First Avenue buildings would cast incremental shadows on the plaza beginning at 10:45 AM when the incremental shadow would enter the southwest corner of the open space (see Figure 6-5). The incremental shadow would move across the open space until the end of the analysis period, 5:29 PM, when it would cover a small section of the southeast corner, leaving sunlight on only a small part of the plaza when combined with existing shadows (see Figures 6-6 and 6-7). The Manhattan Place building itself casts a shadow on the plaza during the morning hours, and the 616 First Avenue buildings would add incremental shadow for most of the day, thereby greatly reducing the amount of sunlight the plaza receives on the March/September analysis day and making it less attractive to users during the spring and fall months. However, large areas of St. Vartan Park, the Corinthian plaza, and the proposed open space at 616 First Avenue would be in sunlight between 10:45 AM and 5:29 PM. These public open spaces, all located one block away from Manhattan Place, contain passive recreation facilities. This availability of public open spaces with sunlit passive-use facilities on adjacent blocks during the affected periods would ameliorate the effects of the adverse impact on potential users.

MAY 6TH/AUGUST 6TH

The incremental shadows from the 616 First Avenue buildings would reach Manhattan Place Plaza starting at 11:45 AM, and they would remain on the open space until 5:30 PM. At the beginning of the analysis period, the plaza is covered in existing shadow from the Manhattan Place building (see Figure 6-8), and the existing shadows continue to cover much of the open space throughout the morning hours (see Figures 6-9 and 6-10). The 616 First Avenue buildings would cast new shadows on the open space as the existing shadows exit (see Figure 6-11) and would remain on the plaza until 5:30 PM. The incremental shadow would be greatest at 2:30 PM when it would cover about half of the open space. The incremental shadow would become smaller during the late afternoon leaving most of the plaza in sunlight (see Figure 6-12). While the 616 First Avenue buildings would cast new shadows on the plaza for most of the May analysis day, at least half of the plaza would remain in sunlight for the entire afternoon, and, therefore, the general usability of the plaza would not be significantly affected. The sensitive uses and plantings would receive adequate sunlight throughout the day, and nearby seating areas, such as those in St. Vartan Park, would be in sunlight while the plaza is in incremental shadow. Therefore, there would be no significant adverse impacts to the Manhattan Place Plaza on the May/August analysis day.

JUNE 21ST

At the beginning of the analysis day, the plaza is completely in shadow from the existing Manhattan Place building (see Figure 6-13). At 12:30 PM the eastern 616 First Avenue building would cast new shadows on the plaza. At 1:00 PM both buildings on 616 First Avenue would cast small shadows on the plaza (see Figure 6-15). At 2:15 PM the incremental shadow from the western 616 First Avenue building would cover half of the plaza but would begin to decrease in size. By 3:30 PM only the southeast corner of the plaza would still be in shadow (see Figure 6-16), and by 5:15 PM the plaza would be in full sun. Since at least half of the plaza would remain in sunlight for the entire analysis period, users could find a place to sit in the sun and the plantings would receive adequate sunlight throughout the day. During the afternoon hours when there would be incremental shadow, the plaza would have ample sunlight and nearby seating areas, such as those in St. Vartan Park, would also be available. Further, the warm summer weather may make shaded areas more attractive to some open space users. Therefore, there would be no significant adverse impacts on the June 21st analysis day.

DECEMBER 21ST

On the December 21st analysis day, the eastern building at 616 First Avenue would cast incremental shadows on the plaza starting at 8:51 AM, the beginning of the analysis period, covering the southwest corner (see Figures 6-17 and 6-17a). These incremental shadows would move across the plaza and exit by 12:15 PM (see Figures 6-18 and 6-18a). From 12:15 PM until 1:00 PM the plaza would be covered in existing shadow (see Figures 6-19 and 6-19a). Additional incremental shadow cast by the western 616 First Avenue building would fall on the plaza beginning at 1:00 PM and last until the end of the analysis period at 2:53 PM (see Figures 6-20, 6-20a, 6-21 and 6-21a). While it is likely that the plaza would be used less during this time of year compared to the other times of year due to colder weather, the 616 First Avenue buildings would significantly reduce the amount of sunlight on the plaza on the December analysis day. Additionally, on December 21 the other nearby open spaces are mostly shaded through much of the analysis day, which would greatly limit the availability of alternative sunlit open spaces.

On December 21, large areas and long durations of incremental shadow cast by the proposed buildings, coupled with a lack of nearby alternative sunlit open spaces, would result in a significant adverse impact on any users who might wish to sit in the plaza in the sun. Under either of the construction schedules analyzed in this SEIS, the significant adverse shadows impact would first occur in the winter of 2014, when the construction of both 616 First Avenue residential buildings is completed.

CORINTHIAN PLAZA

The Corinthian located at 330 East 38th Street on the west side of First Avenue has a well-used plaza. It contains benches alongside plants and trees. A sculpture and fountain are adjacent to the building's covered passenger drop-off area but are not directly accessible or particularly visible from the sidewalk along First Avenue.

New shadows from the 616 First Avenue buildings would reach this open space in March and December. The building on the southwest corner of the Waterside development parcel would also cast a shadow on the plaza at the beginning of the analysis periods in March, May, and June. Due to the small size and duration of the incremental shadow and the amount of sunlight that would remain on the plaza on each of the analysis days, there would be no significant adverse impacts to this open space.

MARCH 21ST/SEPTEMBER 21ST

The building on the southwest corner of the Waterside development parcel would briefly (8:36 AM to 9:00 AM) cast an incremental shadow on the northern edge of the Corinthian Plaza removing most of the remaining sunlight (see Figure 6-3). Four hours later, the eastern building at 616 First Avenue would cast an incremental shadow on the plaza from 1:00 PM to 1:30 PM. There would then be full sunlight on the open space until 2:30 PM when the Corinthian building itself begins to cast shadows on the plaza. Due to the short duration and small size of the incremental shadows there would be no significant adverse impacts to the plaza.

MAY 6TH/AUGUST 6TH

The building on the southwest corner of the Waterside development parcel would cast new shadows on the Corinthian Plaza from 7:27 AM to 10:00 AM (see Figures 6-8 and 6-9). The plaza would be mostly or completely in sun from 10:00 AM until 1:45 PM when the Corinthian building begins to cast shadows on its own open space. The size and duration of the incremental shadow from this Waterside building would be limited to small portions of the plaza and would not significantly reduce the amount of sunlight on the sensitive uses or plantings in the plaza. Therefore, there would be no significant adverse impacts to the plaza.

JUNE 21ST

The building on the southwest corner of the Waterside development parcel would cast incremental shadow on a portion of the Corinthian Plaza from 6:57 AM to 10:30 AM. At 6:57 AM the incremental shadow in combination with existing shadow would remove almost all of the sunlight from the park (see Figure 6-13). The incremental shadow would diminish in size, and by 9:00 AM only the northern half of the plaza would be in shadow, while the southern half would be in full sunlight. The plaza would be in full sunlight from 10:30 AM until 1:45 PM when the Corinthian building itself would begin to cast shadows on the open space. The shadows from the Corinthian building remain on the plaza until the end of the analysis period

when they almost completely cover the plaza in shadow. The incremental shadows would make portions of the plaza less attractive to users until 10:30 AM. However, the plaza would receive ample sunlight in the late morning and afternoon hours, and the overall usability of the plaza would not be significantly reduced. Therefore, there would be no significant adverse impacts to the plaza on the June analysis day.

DECEMBER 21ST

The 616 First Avenue buildings would cast new shadows on the Corinthian Plaza from 9:45 AM to 1:00 PM (see Figures 6-18 and 6-19). At 9:45 AM, the plaza is already partially in existing shadow, and the 616 First Avenue building would remove much of the remaining sunlight. However, by 12:45 PM more sunlight would reach the plaza, and between 1:30 PM and 2:53 PM most of the plaza would be in sunlight (see Figures 6-19, 6-20, and 6-21). Further, the fountain is turned off in the winter and there are likely to be fewer users in the winter. Therefore, the proposed buildings would not result in any significant adverse impacts on the December analysis day.

ROBERT MOSES PLAYGROUND

Robert Moses Playground is located just north of the 708 First Avenue site, between East 41st and 42nd Streets, the FDR Drive, and First Avenue. It shares this block with a large ventilation structure for the Queens-Midtown Tunnel. While the open space does contain some benches and a number of trees, it is primarily a place of active recreation. On the west end there is a large paved area with a baseball backstop and two benches on the south end. North of the ventilation structure in the middle of the block along 42nd Street is a dog run. It also has benches where dog owners or walkers sit. East of the ventilation structure along the FDR there is a comfort station, hand ball courts and basketball courts. Along the curve formed by the access road from 42nd Street to the FDR Drive, there are also benches. Many of the activities at the playground occur in shade under existing conditions, given the QMT ventilation structure in the midst of the open space and the surrounding buildings that cast shadows on the space during much of the day. The dog run where owners often sit on benches is generally in shadow as it is immediately north of the ventilation structure. The handball and basketball courts are east of the ventilation structure and receive its shadow in the afternoon. However, the recent demolition of the Con Edison structures south of East 41st Street has allowed more sunlight to reach Robert Moses Playground than in the past.

The building at 708 First Avenue would cast additional shadows on Robert Moses Playground on all four analysis days. The 685 First Avenue building would also cast incremental shadows on the December analysis day. However, given the active nature of most of the uses, the incremental shadows cast by the 708 First Avenue and 685 First Avenue buildings would not be considered a significant adverse impact.

MARCH 21ST/SEPTEMBER 21ST

The proposed 708 First Avenue building would cast new shadows on Robert Moses Playground starting at 10:45 AM when the incremental shadow would enter the southwest corner of the open space (see Figure 6-5). The building would continue to cast incremental shadow on the open space, and by 3:45 PM this shadow would cover almost the entire open space (see Figure 6-6). The incremental shadow would then shrink towards the eastern edge of the space and exit at 5:15 PM. The 708 First Avenue building would remove a significant amount of sunlight from

the park during the afternoon. However, because this open space is mainly dedicated to active uses, incremental shadows are not expected to reduce the usability of the park or the number of users in the park, and there would be no significant adverse impact.

MAY 6TH/AUGUST 6TH

The incremental shadows cast by the 708 First Avenue building would first reach this open space at 11:15 AM. By 1:00 PM the incremental shadows would cover about half of the open space (see Figure 6-11). The incremental shadow would continue to fall on the open space throughout the afternoon hours. By 3:45 PM the shadows cast by existing buildings would begin to reach the park. By 4:30 PM the incremental shadow from the 708 First Avenue building would only add a small amount of new shadow to the southern portion of the park (see Figure 6-12), and at 5:45 PM the incremental shadow would exit the park. The park would remain mostly in shadow from existing buildings until the end of the analysis period. Similar to the March 21st/September 21 analysis day, incremental shadows are not expected to reduce the usability of the park or the number of users in the park, and there would be no significant adverse impact.

JUNE 21ST

The 708 First Avenue building would cast the first incremental shadow on Robert Moses Playground starting at 11:45 AM. An hour later at 1:00 PM, the incremental shadow would cover approximately a third of the open space in the southwest section (see Figure 6-15). The incremental shadow would continue to move across the park, and by 3:30 PM the western section of the park would be almost in full sun, while the eastern edge would be in incremental shadow (see Figure 6-16). A small amount of incremental shadow would remain on the open space until 5:45 PM, but at that time the playground would be almost completely in shadow from existing buildings. Incremental shadows are not expected to reduce the usability of the park or the number of users in the park, and the shadows might be appreciated by the users of the active recreation facilities during the hot, summer months. Therefore, there would be no significant adverse impact.

DECEMBER 21ST

The 708 First Avenue building would cast varying amounts of incremental shadow on the playground for the full analysis period, 8:51 AM to 2:53 PM (see Figures 6-17 to 6-21). At the beginning of the analysis period, the 708 First Avenue building would only add a small amount of new shadow to the playground (see Figure 6-17). However, as the morning hours progress the incremental shadows would cover more of the playground, and by 11:15 AM the incremental shadow would cover almost all of the park west of the ventilation structure. Incremental shadows would continue to cover the western half of the park until the end of the analysis period when a small amount of sunlight would reach this area (see Figures 6-18 to 6-21). At the end of the analysis period, the 685 First Avenue building would also cast a small amount of shadow on the playground and only a small amount of sunlight would reach the playground (see Figure 6-21). Given this amount and duration of shadow, the attractiveness of Robert Moses Playground would be diminished for any users in the cold winter months. However, this adverse impact would not be significant due to the active nature of most of the playground's uses.

TRYGVE LIE PLAZA

Trygve Lie Plaza is a widened sidewalk on the west side of First Avenue between East 41st and 42nd Streets. It contains four benches and is separated from First Avenue traffic by a railing. It runs adjacent to a windowless basement wall of a Tudor City building. London plane trees and oaks (*Quercus* sp.) have been planted both along First Avenue, and along the basement wall of the Tudor City Building. This blank wall and the proximity of the First Avenue traffic make the plaza unattractive to users. It is not well-used even as a pedestrian path.

The 708 First Avenue building would cast incremental shadows on Trygve Lie Plaza during all seasons. On the May and June analysis days, there would not be a significant adverse impact on the plaza because of the short duration and small extent of incremental shadow. Although the March duration of three hours and forty-five minutes and the December duration of over four and a half hours would reduce the attractiveness of the plaza, there would not be a significant adverse impact to the plaza because its usability is limited due its lack of amenities and proximity to traffic, and the benches are least likely to be used during the cooler months. The incremental shadow cast on the trees in the plaza would not have significant adverse impacts. London plane trees and oak species used as street plantings are tolerant of urban conditions and partial shade. Given the short duration of the incremental shadow during the principal growing season (April to October), this would not be a significant adverse impact on this resource.

MARCH 21ST/SEPTEMBER 21ST

The 708 First Avenue building would cast an incremental shadow on Trygve Lie Plaza from 10:30 AM until 1:30 PM (see Figure 6-5), and the northernmost proposed building on the Waterside parcel would cast a small incremental shadow from 1:30 PM to 1:45 PM. The shadows would move across the plaza and would allow some sunlight on the plaza during this time. From 2:30 PM until 2:45 PM, the 685 First Avenue building would cast an incremental shadow on the southern section of the plaza, though the northern section of the plaza would remain in sunlight. Half an hour later, shadows from existing buildings would enter the plaza and would remain there until the end of the analysis period (see Figures 6-6 and 6-7). The periods of incremental shadow in the morning and early afternoon would not have a significant adverse impact on the plaza since its usability is already limited due its lack of amenities and proximity to traffic. As discussed above, tree species in the park are tolerant of urban conditions and partial shade. Therefore the incremental shadow would not be a significant adverse impact to vegetation.

MAY 6TH/AUGUST 6TH

The incremental shadow cast by the 708 First Avenue building would first enter the plaza at 11:15 AM and would exit the plaza at 1:00 PM. The plaza would be in full sun during the morning hours, though during the late afternoon and evening hours the plaza would largely be cast in existing shadows (see Figure 6-12). The limited duration and small area of incremental shadow would not result in a significant adverse impact.

JUNE 21ST

The 708 First Avenue building would cast incremental shadows on Trygve Lie Plaza for only thirty minutes, from 12:00 PM until 12:45 PM. This short duration and small area of new shadow would not cause a significant adverse impact.

DECEMBER 21ST

The 708 First Avenue building would cast new shadow on the plaza from 8:51 AM until 1:15 PM (see Figures 6-17 to 6-19). At the beginning of the analysis period, the incremental shadow would cover the southern half of the plaza (see Figure 6-17). By 10:00 AM the incremental shadow would cover the entire plaza and would continue to do so until 12:00 PM, when some sunlight would reach the plaza. Fifteen minutes later, shadows from the northern Waterside building would reach the plaza, covering those portions not in shadow from existing buildings (see Figure 6-19). From 12:15 PM to 1:15 PM the plaza would be in shadow from a combination of existing and proposed buildings; after 1:15 PM the plaza would remain in shadow from existing buildings until the end of the analysis period (see Figures 6-20 and 6-21). Despite the nearly four and a half hour duration, the December incremental shadows would not have a significant adverse impact on this plaza since it is not well-used, particularly in the colder winter months, and additionally because December does not fall within the growing season.

TUDOR CITY GREENS (NORTH & SOUTH)/MARY O'CONNOR PLAYGROUND/TUDOR GROVE PLAYGROUND

The Tudor City open spaces consist of four sections. There are north and south Greens that run along the west side of Tudor Place, between East 41st and 43rd Streets, north of the development parcels. The Greens, as well as Tudor Place, are at an elevation approximately 30 feet above First Avenue and 42nd Street. These passive open spaces contain trees and benches. In addition, there are two playgrounds. Tudor Grove Playground is located just west of the south Green on the south side of 42nd Street. It is primarily an active open space with a children's play area, trees, and some benches. Mary O'Connor Playground is just west of the north Green on the north side of 42nd Street. Like Tudor Grove Playground, Mary O'Connor Playground has a children's play area, benches, and trees. All four sections of the Tudor City open spaces are publicly accessible, and must be included in any analysis of potential shadow impacts.

In addition, Tudor City is a historic resource and these open spaces are its sun-sensitive features. However, due to their location in the midst of Tudor City, these popular open spaces are already at least partially in shadow most of the time. The Tudor City buildings themselves have no sun-sensitive features. The north façades of the buildings face away from the sun and are exactly the same as the south façades. The buildings do not feature any major public interior spaces that might be sunlight-dependent.

The proposed development program would result in incremental shadows on the open spaces in Tudor City on the March/September, May/August and December analysis days. On December 21 the 708 First Avenue building would remove much of the available sunlight on the Tudor City open spaces during the morning hours, while the 685 First Avenue building would remove much of the sunlight on these open spaces around noon. This loss of sunlight would be considered a significant adverse impact. The loss of sunlight would be less severe on the March/September analysis day and would not be a significant adverse impact. On the May/August analysis day an exceedingly small section would be affected for approximately 15 minutes and this would not cause a significant impact.

The proposed development program buildings would not cast shadows reaching the Tudor City open spaces on the June analysis day.

MARCH 21ST/SEPTEMBER 21ST

The 708 First Avenue building would cast an incremental shadow on the south Greens starting at 10:15 AM removing the early sunlight from the open space. By 11:00 AM this incremental shadow would reach a portion of the Tudor Grove Playground as well, however there would be some sun on both Tudor Grove and Mary O'Connor Playgrounds as well as some on the north Green (see Figure 6-5). At 12:45 PM, the incremental shadow cast by the 708 First Avenue building would exit the south Green. At 1:00 PM an incremental shadow from the 685 First Avenue building would enter the south Green. This incremental shadow would grow to cover the southern half of the south Green but then exit the space completely at 2:00 PM. During the three hours that the south Green and the Tudor Grove Playground would be affected by incremental shadow, portions of the north Green and much of the Mary O'Connor Playground would be in sunlight. After 2:00 PM, the Tudor City Greens and Playgrounds would be mostly or completely in sunlight until late afternoon. Given the availability of sunlit open space over the course of the day, particularly in the northern open spaces, and the relatively short duration of incremental shadow, there would be no significant adverse impact on the March/September analysis day.

MAY 6TH/AUGUST 6TH

A small area at the southern edge of the south Greens would be cast in incremental shadow by the 708 First Avenue building between 11:15 AM and 11:30 AM. This would not be considered a significant adverse impact.

DECEMBER 21ST

The 708 First Avenue building would remove the only sunlight from the already heavily-shadowed south Green at 8:51 AM, the beginning of the analysis day (see Figures 6-17 and 6-17b). The adjacent Tudor Grove Playground would also be in shadow. However there would be some sunlight on Mary O'Connor Playground and the north Green. At 9:30 AM the incremental shadow would exit the south Green, and at 10:00 AM it would exit Tudor Grove Playground as well; however both of these open spaces would remain in complete shadow, from existing buildings. By 9:45 AM the incremental shadow from 708 First Avenue would move into the north Green, and by 10:15 AM it would remove the remaining sunlight from that space. At 11:15 AM the south Green and Tudor Grove Playground would continue to be covered fully by existing shadow; the north Green and the Mary O'Connor Playground would be in full shadow as well, from a combination of existing and incremental shadow (see Figures 6-18 and 6-18b). At 11:30 AM an incremental shadow from the proposed building at 685 First Avenue would enter Tudor Grove Playground, and at 12:15 PM this incremental shadow would reach the south Green; all sunlight would continue to be blocked from these two open spaces during this time. At 12:45 PM, an incremental shadow from 685 First Avenue would fall on both the north and south Greens and the Mary O'Connor Playground; at this time both Greens and most of the two Playgrounds would be cast in a combination of existing and incremental shadow (see Figures 6-19 and 6-19b). By 1:45 PM there would be no incremental shadow on Tudor City open spaces (see Figures 6-20 and 6-20b). While Tudor Grove Playground would be in existing shadow, there would be sunlight on all of the north Green and Mary O'Connor Playground and on part of the south Green.

In conclusion, the loss of sunlight between the start of the analysis day and 1:30 PM due to the proposed buildings is a significant adverse impact, because the incremental shadows remove all or part of the small amount of remaining sunlight in Tudor City's areas of passive recreation for

significant portions of the analysis period. Under either of the construction schedules analyzed in this SEIS, the significant adverse shadows impact on Tudor City open spaces would first occur in the winter of 2010, when the construction of the 685 First Avenue residential building and the 708 First Avenue commercial office building is completed.

FORD FOUNDATION

The Ford Foundation is a New York City Landmark (NYCL) and its glass-walled and skylit atrium, a sun-sensitive feature, is a designated Interior Landmark. The building is located immediately west of Tudor City between 42nd and 43rd Streets. The atrium has large glass walls on 42nd Street and Mary O'Connor Playground, and it can be seen from both the 42nd Street sidewalk and Mary O'Connor Playground as well as through the entrance lobby on 43rd Street. The Ford Foundation atrium is open to the public weekdays from 10 AM to 4 PM. Landscaped plants within the atrium include a wide variety of trees, shrubs, ground-cover plants, aquatic plants and various seasonal plantings. Vegetation types include: rhododendron, gardenia, camellia, azalea, and bougainvillea shrubs, and acacia, magnolia, and eucalyptus trees. In addition to natural lighting, the planted species within the atrium are supported by interior lighting, including 76 spotlights from the 11th floor and 43 ground lights.

Incremental shadows from the 685 First Avenue and 708 First Avenue buildings would only reach the Ford Foundation on the December analysis day, when shadows are longest. The 708 First Avenue building would cast shadow on the building from 9:45 AM until 11 AM. Starting 45 minutes later, at 11:45 AM, the 685 First Avenue building would cast an incremental shadow on the Ford Foundation building. This incremental shadow would last until 12:30 PM. These incremental shadows would fall on some portion of the south and/or east façade or the roof. Since the atrium is on the southeast corner of the building, which is closest to 685 First Avenue, it would receive less sunlight during this period. However, the use of the atrium and its plantings would not be adversely affected, as the incremental shadow would be limited to the morning hours of only one of the analysis days, December. Any decrease in natural light that would occur due to the incremental shadows cast in December would be compensated for by the existing internal lighting system. In addition, the atrium is a climate-controlled interior space, and the plantings are professionally maintained. The professional care, interior lighting, and climate control keep the vegetation in visibly good health. This loss of sunlight is not considered a significant adverse impact.

RALPH J. BUNCHE PARK

Ralph J. Bunche Park is a continuation of the linear open space of Trygve Lie Plaza and is located on the west side of First Avenue between East 42nd and 43rd Streets. Stairs at the north end of the park connect it to Tudor City above. It consists of a few benches, a community-tended landscaped area that separates the seating from the First Avenue traffic, and a sculpture along an enlarged portion of the sidewalk. The landscaped area is planted predominately with London plane tree, rose bushes (*Rosa sp.)*, boxwood (*Buxus* sp.), and juniper (*Juniperus sp.*).

The 708 First Avenue building would only cast incremental shadow on Ralph J. Bunche Park on the March/September and December analysis days. The extent and duration of incremental shadow would be limited on the March/September analysis days, and this would not be a significant adverse impact. The substantial reduction of sunlight during the winter months would not be a significant adverse impact as the open space is little used in the cold weather months and it is not within the principal growing season for the vegetation.

MARCH 21ST/SEPTEMBER 21ST

The park is cast in shadow by existing buildings at the beginning of the analysis period (see Figure 6-3). As the morning progresses, existing shadows move off the park and the park experiences full sun during the late morning and afternoon hours. At 12:15 PM the 708 First Avenue building would begin to cast incremental shadow on the park; the incremental shadow would enter the southern section of the park and would only last for a total of one and a half hours. The incremental shadow would be small for most of this period, covering between half and two-thirds of the park between 1:00 PM and 1:30 PM before exiting at 1:45 PM. Later in the day the park would be cast in shadow from the existing building located to the west of the park. Given the small size and short duration of the incremental shadow, this would not be a significant adverse impact.

DECEMBER 21ST

The park is partially covered with existing shadow at the beginning of the analysis period (see Figure 6-17). By 9:30 AM, the park would be in full sun and remain so until 10:30 AM when the 708 First Avenue building would cast an incremental shadow on the southern portion of the park. As the morning progresses, the incremental shadow would continue to fall on the park and by 11:30 AM would completely remove all of the sunlight from it (see Figure 6-18). At 1:30 PM the park would be in almost full sun (see Figure 6-20). The period of sunlight would be short and by the end of the analysis period, 2:53 PM, the open space is completely shadowed by existing buildings (see Figure 6-21). Despite three hours of partial or complete coverage by incremental shadow, there would not be a significant adverse impact due to the park receiving sunlight at other hours and being only lightly used for passive recreation in the cold weather.

UNITED NATIONS HEADQUARTERS

Although not officially designated, the United Nations Headquarters complex on First Avenue north of 42nd Street is a potential historic resource, as described in Chapter 7, “Historic Resources.” The southern face of the United Nations Library, which fronts on 42nd Street, is a glass curtain wall, approximately 220 feet long and 40 feet tall. However, as explained in the FGEIS, many factors indicate that this is not a sun-sensitive feature. The north façade is exactly the same as the south façade and faces away from the sun. There are no major interior spaces such as an atrium along the inside of the south wall that might be sunlight-dependent. The shades are drawn in many of the windows indicating that the occupants want to keep direct sunlight out. Further, it appears that a reflective film has been placed on the windows to lower the heat and light transfer, even when the shades are up. None of the other buildings have sun-sensitive features either. The United Nations Park, which is also part of the complex, runs from 46th to 48th Streets between First Avenue and the East River. It contains seating areas, walkways, lawns, and a paved plaza. The 708 First Avenue building would cast new shadows on the United Nations Park on the December 21st analysis day from 1:15 PM until the end of the analysis period, at 2:53 PM (see Figures 6-20 and 6-21). Given that the vegetation is dormant at this time of year, the coverage area would be small, and the shadow would move quickly across the park, this would not be considered a significant adverse impact.

GLICK ESPLANADE

Glick Esplanade is located east of the 616 First Avenue site between East 36th and 38th Streets. This paved area between the FDR Drive and the East River contains a walking path, seating, a fountain, flowers, and an exercise station.

The 616 First Avenue buildings would cast new shadows on the esplanade during three of the four analysis days. During the evening hours of the spring and summer months, incremental shadows would fully cover the portion of the esplanade not in existing shadow; however, the esplanade would remain in full sun for the majority of the three analysis days and would still be a useable and attractive open space. Therefore, the reduction of sunlight in the evening hours during spring and summer would not be considered a significant adverse impact.

MARCH 21ST/SEPTEMBER 21ST

The incremental shadows would enter the open space at 3:15 PM and would continue to cast new shadows on the open space until the end of the analysis period. While the first incremental shadow would be small, at 3:45 PM the incremental shadow would cover at least half of the open space (see Figure 6-6). By 4:30 PM the incremental shadow would cover the remainder of the esplanade and would continue to do so until the end of the analysis period at 5:29 PM (see Figure 6-7). Given the ample sunlight in the morning and early afternoon hours, there would not be a significant adverse impact on this analysis day.

MAY 6TH/AUGUST 6TH

The 616 First Avenue building would cast incremental shadows on the esplanade beginning at 2:45 PM and would continue to cast new shadows on the open space until the end of the analysis period at 6:18 PM. While the first incremental shadow would be small, the incremental shadow would continue to grow in size and would remove a significant amount of sunlight from the open space in late afternoon hours (see Figure 6-12). By 5:15 PM the incremental shadow would cover the remaining portions of the esplanade and would continue to do so until the end of the analysis period. The esplanade would remain sunny and attractive for passive recreation throughout the morning and much of the afternoon, so there would not be a significant adverse impact on this analysis day.

JUNE 21ST

The 616 First Avenue building would cast incremental shadows on the esplanade beginning at 3:00 PM and would continue to cast new shadows on the open space until the end of the analysis period at 7:01 PM. As compared with the incremental shadows cast in March and May, the incremental shadows on the June analysis day would be smaller in size, allowing some sunlight to reach the esplanade throughout the afternoon and evening hours (see Figure 6-16). There would not be a significant adverse impact on this analysis day.

There would no incremental shadows on the esplanade during the December analysis day.

240 EAST 38TH STREET

This privately owned public plaza consists of two separate spaces flanking the north and south sides of this through-block building between East 37th and 38th Streets just west of Second Avenue. The northern space is largely empty, with some trees and seating ledges. The southern side contains stands of trees and moveable café chairs and tables.

Project-generated incremental shadow would be cast on this open space in the morning hours of three of the four analysis days, but the very short durations would not cause any significant adverse impacts.

MARCH 21ST/SEPTEMBER 21ST

The southernmost proposed building on the Waterside parcel would cast incremental shadow on the northern space from 8:45 AM to 9:30 AM. This very short duration of new shadow would not cause a significant adverse impact.

MAY 6TH/AUGUST 6TH

The proposed building at 685 First Avenue would cast incremental shadow on portions of the northern open space from 7:45 AM to 9:00 AM. The incremental shadow would remove the remaining sunlight from this open space during this period. However, much of the space would be in sunlight for the rest of the morning and early afternoon, and the short duration of early-morning new shadow would not cause a significant adverse impact.

DECEMBER 21ST

A proposed building at 616 First Avenue would cast incremental shadow on the southern space from 8:51 AM to 9:30 AM. This very short duration of new shadow would not cause a significant adverse impact.

330 EAST 39TH STREET—NEW YORK TOWER

The front entrance to the residential New York Tower is located on 39th Street between First Avenue and the Midtown Tunnel Access Road, but its publicly accessible plaza is located behind the building, at the corner of East 38th Street and the Access Road. The gate was locked during a late-afternoon site visit. The space consists of a large, empty concrete space with a water pool in the middle.

Incremental shadow would only reach this space on the May 6 analysis day, for 30 minutes in the late morning. The proposed buildings on the Waterside parcel would cast incremental shadow on a very small portion of this space from 10:30 AM to 11:00 AM. This short duration of new shadow would not cause a significant adverse impact.

EAST RIVER

Incremental shadow from proposed buildings would be cast on portions of the East River from the mid-afternoon to the end of the analysis day on all four analysis days. On the March 21, May 6 and June 21 days, incremental shadow would begin moving across areas of the river at 3:30 PM, and on the December 21 day incremental shadows would reach the edge of the river at 2:30 PM. On all four days, the new shadows would fall on relatively small portions of the river as they traveled east. The duration of incremental shadow is very brief on December 21, and ranges between two to three and a half hours in the other analysis periods.

The current flows rather swiftly in the East River and would move phytoplankton and other natural elements quickly through the shaded areas. Therefore, project-generated shadow would not be expected to affect primary productivity. As described further in Chapter 10, “Natural Resources,” shadows from the proposed buildings would not significantly affect aquatic resources (plankton or fish) in the East River, nor would they significantly affect any

recreational boating. Consequently, project-generated shadow would not cause significant adverse impacts on the East River.

PROPOSED OPEN SPACE RESOURCES

The proposed development would create a total of 4.84 acres of publicly-accessible open space on the development parcels. The 685 First Avenue parcel would contain 7,605 square feet (0.17 acres) of publicly accessible open space primarily along East 40th Street and First Avenue. The 616 First Avenue site would provide 34,507 square feet (0.79 acres) of publicly accessible open space. There would be a through-block open space located between the two buildings on the site. It would be open and accessible from both East 35th and East 36th Streets. The parcels at 700 and 708 First Avenue would include a total of 168,659 square feet (3.87 acres) of publicly accessible open space. For additional detail on the open spaces and amenities generated by the Proposed Actions, see Chapter 5, "Open Space."

The following section describes the shadows on the proposed open spaces. This discussion is provided for informational purposes; the effects of the shadows on the proposed publicly accessible open spaces are not considered to be the subject of impact analyses under CEQR.

685 FIRST AVENUE

Throughout most of the year, the proposed open space at 685 First Avenue would be partially shaded in the morning hours by the proposed buildings across First Avenue, and in the early afternoon by buildings south and southwest, including the proposed 685 First Avenue building. From mid-afternoon to late afternoon, most or all of the space would be in shadow cast by the 685 First Avenue building and other buildings to the west.

In the morning of March 21 and September 21, the northern half of the open space would be in sun while the southern half would be shaded by the buildings on the Waterside parcel (see Figures 6-3 and 6-4). These shadows would move east and shadow cast by the 685 First Avenue building would move onto the space as well, so that by 11:30 AM the entire space would be in shadow. At 1:30 PM the shadows cast by the proposed Waterside buildings would begin moving off the open space, and from 2:00 PM to 2:45 PM a portion of the space along First Avenue would be in sun. From 2:45 PM until 5:29 PM, the entire space would be in shadow (see Figure 6-6 and 6-7).

On May 6 and August 6, the space would be fully shaded by the proposed buildings to the east in the early morning (see Figure 6-8), but these shadows would move northeast and by 9:30 AM, more than half of the open space would be in sun (see Figure 6-9). This would remain the case until approximately noon. Between noon and 2:45 PM, portions of the space would be in sun, and portions in shade (see Figure 6-11). Nearly the entire space would be in shadow from 2:45 PM to 6:18 PM (see Figure 6-12).

In the early morning of June 21, the space would be fully shaded (see Figure 6-13). By 9:45 AM half the space would be in sun. Between 9:45 AM and 2:15 PM, shadows would move across different areas of the space, keeping roughly half the total area shaded and half in sun at any given time during this period (see Figures 6-14 and 6-15). After 2:45 PM most or all of the space would be shaded (see Figure 6-16).

On December 21, most or all of the space would be in shadow throughout the day, except for about 30 minutes in the early afternoon when the portion of the open space along First Avenue would be sunlit (see Figures 6-17 through 6-21).

616 FIRST AVENUE

The proposed open space at 616 First Avenue would be shadowed during the morning hours, partially shadowed during the late morning and early afternoon hours, and generally sunlit from early afternoon to late afternoon. Later in the afternoon, the proposed building to the west would cast large areas of shadow on the open space.

On the March 21 / September 21 analysis day, nearly the entire proposed open space would be in shadow from the proposed eastern building until about 11:00 AM (see Figures 6-3, 6-4 and 6-5), when shadow cast by the tower portion of the eastern building would begin moving eastward off the space. Between about 11:15 AM and 1:15 PM areas in the northern part of the open space would be in sunlight, while shadow from the Rivergate would cover large areas on the southern side. Between 1:30 PM and 2:00 PM virtually the entire space would be shadowed by the Rivergate; then this shadow would move eastward off the space and between 2:30 and 4:30 much of the space would be in sunlight (see Figure 6-6). Small areas of sunlight would remain in the southeastern portions until 5:15. The analysis day ends at 5:29 PM.

On the May 6/ August 6 day, much of the proposed space would experience shadow from 7:27 AM until about noon (see Figures 6-8, 6-9 and 6-10). From 12:00 PM to 3:15 PM half or more of the open space would be in sun (see Figure 6-11). Between 3:15 PM and 6:18 PM shadow from the proposed building to the west would gradually grow to cover most of the space (see Figure 6-12).

On June 21, when shadows are shortest, more than half of the proposed space would experience shadow from 6:57 AM until about noon (see Figures 6-13 and 6-14). From about 12:30 PM to 3:00 PM most of the space would be in sunlight (see Figure 6-15). Between 3:00 PM and 5:00 PM sunlight would still fall on one half to one third of the space (see Figure 6-16). From 5:00 PM to 7:01 PM most of the space would experience shadow.

On December 21, the proposed open space would be nearly or completely in shadow from 8:51 AM until about 1:00 PM. From 1:45 PM until the end of the analysis day the space would be mostly in sun.

700/708 FIRST AVENUE

The proposed open space at the 708 First Avenue and Waterside development parcels would be open to the East River along its eastern side, so most of its area would be in sun during the morning and mid-day hours throughout the year. The proposed Waterside buildings border most of the space on its south side, and the proposed building at 685 First Avenue is located just east across First Avenue, so these buildings would cast shadows on portions of the open space throughout the afternoon. Nevertheless, the proposed open space represents a substantial new public recreation area that would be largely sunlit during the morning and midday hours when project shadows would fall on open spaces to the west, such as St. Vartan Park.

On March 21 and September 21, nearly the entire open space would be in sun until about 11:30 AM (see Figures 6-3, 6-4 and 6-5), and much of it would continue to receive sun until about 12:45 PM. Shadows from the proposed Waterside buildings would then begin to cover more than half the space, and from 2:15 PM to the end of the day all or nearly all the open space is in shadow (see Figure 6-6).

On May 6 and August 6, areas of early morning shadow from the proposed 708 First Avenue and the Waterside buildings would move quickly off the space and between 9:00 AM and about

noon all or most of the space would be in sunlight (see Figures 6-8, 6-9 and 6-10). The shadows from the Waterside buildings would move across most of the space in the afternoon; at 1:00 PM just under half the area of open space would be in shadow (see Figure 6-11) and from about 1:45 PM to the end of the day, most of the open space would be in shadow (see Figure 6-12).

On June 21, similarly to May 6 and August 6, early morning shadows would largely move off the proposed open space by mid-morning, and the space would be almost completely in sun throughout the late morning (see Figures 6-13 and 6-14). June 21 shadows are the shortest of the year, and even in the early afternoon much of the open space would be in sun (see Figure 6-15). After 2:30 PM most of the open space would be in shadow (see Figure 6-16).

On December 21, the start of the analysis day at 8:51 AM would see the open space almost completely in sunlight (see Figure 6-17). More than half of the open space would still be in sunlight at 11:15 AM (see Figure 6-18), with most of the space becoming shadowed by 1:00 PM.

F. FUTURE CONDITIONS WITH THE UNDC PROJECT

In the FGEIS, the proposed UNDC project at East 41st Street and First Avenue was considered as part of the baseline condition in the Future Without the Proposed Actions section. However, because the UNDC project is complex and requires approvals from the New York State Legislature, the New York City Economic Development Corporation, and possibly other public agencies, including its own environmental review, it is uncertain whether the project will be completed by 2014 or, in fact, ever built. Therefore, the analysis above does not include the UNDC as a background project. The following analysis considers whether the presence of the UNDC building as a background project would affect any of the findings described above.

The UNDC project would remove Robert Moses Playground west of the ventilation structure. With the UNDC project assumed in the no-build, fewer shadows attributable to the Proposed Actions would fall on Ralphe J. Bunche Park and Trygve Lie Plaza during the March/September and December analysis days, and, as it would be located on the Robert Moses Playground, it would greatly reduce the size of the park and the shadows cast on the park by the proposed buildings on all four analysis days. Incremental shadows on all other open spaces and historic resources would not be changed.

This section considers the potential effects of the proposed buildings and the UNDC building on the three open spaces that would experience different incremental shadows. Table 6-3 shows the extent and duration of the proposed buildings' shadows.

RALPH J. BUNCHE PARK

On the March 21st analysis day, the UNDC building would cast shadows on the Ralph J. Bunche Park from 11:15 AM to 1:30 PM. At 12:30 PM the UNDC building would completely cast the park in shadow. Due to the shadows from the UNDC building, the 708 First Avenue building would only cast an incremental shadow on Ralph J. Bunche Park for 30 minutes, from 1:15 PM to 1:45 PM. Due to the short duration, this incremental shadow would not be a significant adverse impact.

On December 21, the UNDC building would cast shadow on the park from 9:00 AM until 12:30 PM. Incremental shadow from 708 First Avenue would enter the park at 12:00 PM and remove remaining sunlight until 12:30 PM. The incremental shadow would move off at 1:30 PM. Due to the short duration, this incremental shadow would not be a significant adverse impact.

TRYGVE LIE PLAZA

On the March/September analysis day, the UNDC building would cast shadows on Trygve Lie Plaza from the start of the analysis day until 12:30 PM. Starting at 10:30 AM the 708 First Avenue building would begin to cast an incremental shadow on the plaza and would remove the last of the sunlight from the plaza at this time (see Figure 6-22). It would continue to remove the remaining sunlight from the plaza until 12:30 PM, when the incremental shadow cast by the UNDC building would move off the plaza. The incremental shadow cast by 708 First Avenue would exit the plaza at 1:30 PM, and the northernmost proposed building on the Waterside parcel would cast a very small incremental shadow from 1:30 PM to 1:45 PM. Incremental shadow from 685 First Avenue would pass across the plaza from 2:30 PM to 2:45 PM. Since the usability of this plaza is already limited due its lack of amenities and proximity to traffic, and since the vegetation is tolerant of partial-shade conditions and in any case March and September are not within the principal growing season, this loss of sunlight would not have a significant adverse impact on the plaza.

On December 21, the UNDC building would cast shadow on the plaza from the start of the analysis day until 11:15 AM, blocking portions of project-generated incremental shadow during this time. Project-generated incremental shadow duration on the plaza would be the same as without the UNDC building. From 8:51 AM until 11:15 AM the area of the plaza covered by incremental shadow would be smaller than it would without the UNDC building, but it would remove remaining sunlight during this time. Due to the fact that the plaza is not well-used, and that December does not fall within the growing season, this loss of sunlight would not have a significant adverse impact on the plaza.

ROBERT MOSES PLAYGROUND

With the UNDC project the Robert Moses Playground would be smaller and therefore the duration of the incremental shadows on the playground would be shorter than without the UNDC. As described above, many activities at the playground already occur in shade. The dog run where owners often sit on benches is already generally in shadow as it is immediately north of the ventilation structure. The handball and basketball courts are east of the ventilation structure and receive its shadow in the afternoon. With active uses already in shadow in the afternoon and passive uses in shadow all day, the additional shadows cast by the UNDC project would not be considered a significant adverse impact.

MARCH 21ST/SEPTEMBER 21ST

With the UNDC project on the western portion of Robert Moses Playground, the 708 First Avenue building would cast incremental shadows on the playground from 2:30 PM to 5:15 PM (see Figure 6-22). With the UNDC project the duration of the incremental shadow from 708 First Avenue would be greatly reduced, from six hours and 15 minutes to two hours and 45 minutes. The eastern end of the playground would experience the same incremental shadow coverage with and without the UNDC building. Given the short duration of the incremental shadow and the active nature of the handball and basketball courts, there would be no significant adverse impact.

Table 6-3
Potential Extent and Duration of New Shadows:
Proposed Development Program with UNDC Building as a Background Project

	March 21 (8:36 AM – 5:29 PM EDT)[1]			May 6 (7:27 AM – 6:18 PM EDT)[2]			June 21 (6:57 AM – 7:01 EDT)			December 21 (8:51 AM – 2:53 PM EST)		
Open Space Name	**Enters**	**Exits**	**Total Duration[4]**	**Enters**	**Exits**	**Total Duration[4]**	**Enters**	**Exits**	**Total Duration[4]**	**Enters**	**Exits**	**Total Duration[4]**
Rivergate (Joseph Slifka Park)	—	—	—	7:27 AM	8:30 AM	1h 3m	6:57 AM	8:45 AM	1h 48m	—	—	—
St. Vartan Park	8:36 AM	12:45 PM	4h 9m	7:27 AM	12:45 PM	5h 18m	6:57 AM	12:30 PM	5h 33m	8:51 AM	9:45 AM	54m
Manhattan Place Plaza	10:45 AM	5:29 PM	6h 44m	11:45 AM	5:30 PM	5h 45m	12:30 PM	5:15 PM	4h 45m	8:51 AM 1:00 PM	12:15 PM 2:53 PM	5h 17m
Corinthian Plaza	8:36 AM 1:00 PM	9:00 AM 1:30 PM	54m	7:27 AM	10:00 AM	2h 33m	6:57 AM	10:30 AM	3h 33m	9:45 AM	1:00 PM	3h 15m
Robert Moses Playground	2:30 PM	5:15 PM	2h 45m	1:45 PM	5:45 PM	4h	1:45 PM	5:45 PM	4h	1:45 PM	2:53 PM	1h 8m
Trygve Lie Plaza	10:30 AM 2:30 PM	1:45 PM 2:45 PM	3h 30m	11:15 AM	1:00 PM	1h 45m	12:00 PM	12:45 PM	45m	8:51 AM	1:15 PM	4h 24m
Ford Foundation	—	—	—	—	—	—	—	—	—	9:45 AM 11:45 AM	11:00 AM 12:30 PM	2h
Tudor City Green (South)/ Tudor Grove Playground	10:15 AM 1:00 PM	12:45 PM 2:00 PM	3h 30m	11:15 AM	11:30 AM	15m	—	—	—	8:51 AM 11:30 AM	10:00 AM 1:30 PM	3h 9m
Tudor City Green (North)/ Mary O'Connor Playground	—	—	—	—	—	—	—	—	—	9:45 AM	1:15 PM	3h 30m
Tudor City Open Spaces[3]	10:15 AM 1:00 PM	12:30 PM 2:00 PM	3h 30m	—	—	—	—	—	—	8:51 AM	1:30 PM	4h 39m
Ralph J. Bunche Park	1:15 PM	1:45 PM	30m	—	—	—	—	—	—	12:00 PM	1:30 PM	1h 30m
U.N. Park	—	—	—	—	—	—	—	—	—	1:15 PM	2:53 PM	1h 38m
Glick Esplanade	3:15 PM	5:29 PM	2h 14m	2:45PM	6:18 PM	3h 33m	3:00 PM	7:01 PM	4h 1m	—	—	—
240 East 38th Street	8:45 AM	9:30 AM	45m	7:45 AM	9:00 AM	1h 15m	—	—	—	8:51 AM	9:30 AM	39m
New York Tower—330 East 39th Street	—	—	—	10:30 AM	11:00 AM	30m	—	—	—	—	—	—
East River	3:30 PM	5:29 PM	1h 59m	3:30 PM	6:18 PM	2h 48m	3:30 PM	7:01 PM	3h 31m	2:30 PM	2:53 PM	23m

Notes:
[1] September 21 corresponds to March 21.
[2] May 6 corresponds to August 6.
[3] "Tudor City Open Spaces" includes Tudor City Green (South)/Tudor Grove Playground and Tudor City Green (North)/Mary O'Connor Playground.
[4] Total Duration reflects time that any part of incremental shadow falls on any portion of open space as it enters, moves across, and exits the space.
EST—Eastern Standard Time
EDT—Eastern Daylight Time

MAY 6TH/AUGUST 6TH

The 708 First Avenue building would cast new shadows on the Robert Moses Playground starting at 1:45 PM and would move across the playground to remove all of the remaining sunlight from the playground by 2:30 PM. The incremental shadow of the 708 First Avenue building would remove the last sun from the eastern end of the playground until the end of the analysis period (see Figure 6-23). With the UNDC project, the incremental shadow from the 708 First Avenue building would be reduced from six hours and 30 minutes to four hours. Most of the incremental shadow from 708 First Avenue would fall on the eastern edge of the park and

this area would experience the same amount of incremental shadow with and without the UNDC project. Given the active uses in the incremental shadow, there would be no significant adverse impact.

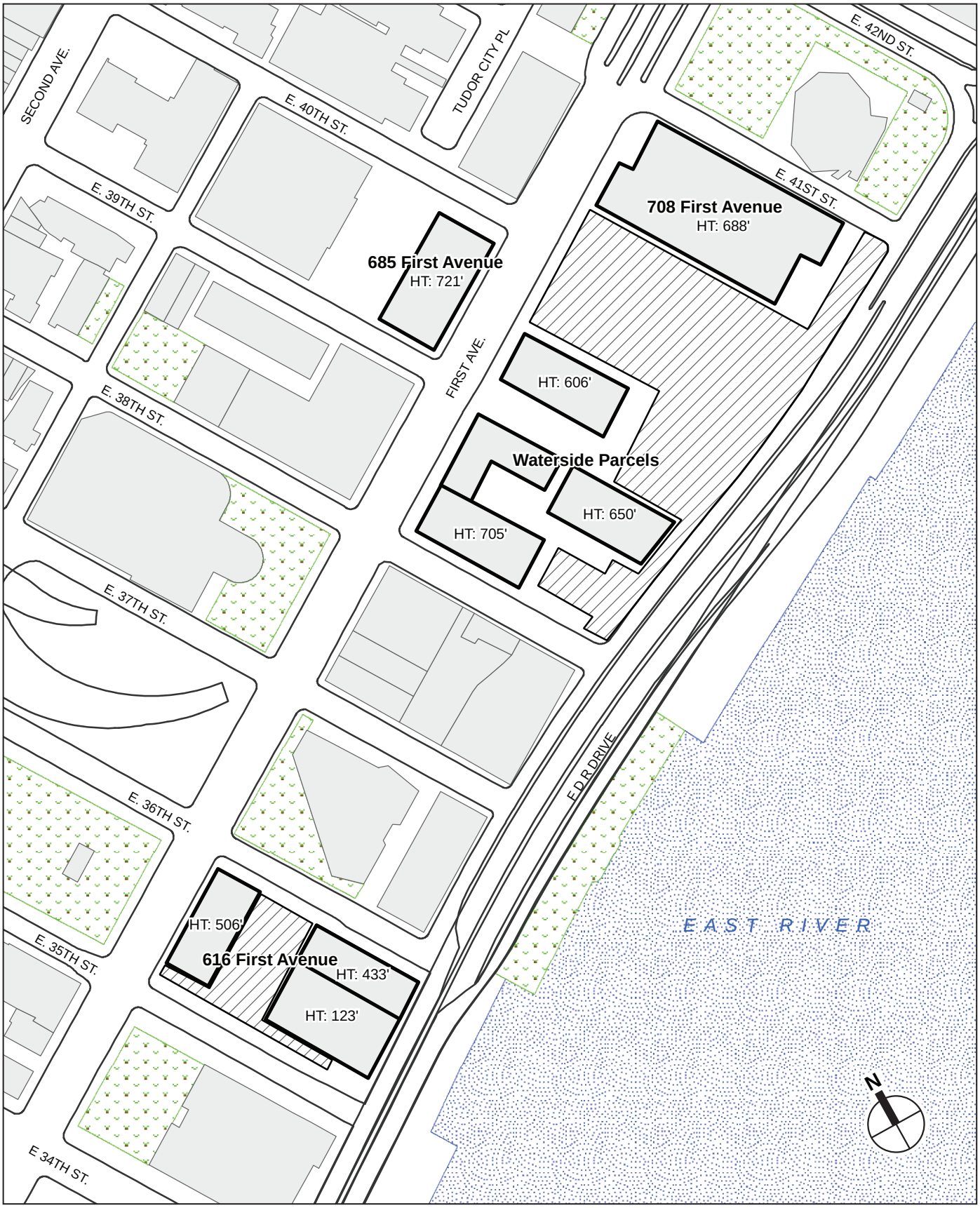
JUNE 21ST

The 708 First Avenue building would begin to cast incremental shadow on the Robert Moses Playground at 1:45 PM. The incremental shadow would move across the open space and from 3:00 PM until 5:45 PM, it would remove all of the remaining sunlight from the playground (see Figure 6-24). With the UNDC building the incremental shadow from the 708 First Avenue building would be limited to the eastern side of the park, and the duration would be reduced from six hours to four hours. Incremental shadows would not have a significant adverse impact on the active recreation uses. Further, the shadows might be appreciated by active users during the hot, summer months. Therefore, there would be no significant adverse impact.

DECEMBER 21ST

On the December 21st analysis day, the 708 First Avenue building would begin to cast shadow on the Robert Moses Playground at 1:45 PM. By 2:15 PM the Playground would be completely cast in shadow, mostly from existing buildings, and would remain without sunlight until the end of the analysis period (see Figure 6-25). The presence of the UNDC project would eliminate the morning incremental shadow from the 708 First Avenue building and the incremental shadow duration would be greatly reduced from 6 hours and 2 minutes to 1 hour and 8 minutes. Given the active recreation uses, there would not be a significant adverse impact. ✷

7.30.07



Zoning Envelopes for Proposed Buildings

Proposed Open Space

Existing Buildings

Open Space

0 200 400 FEET

SCALE

Proposed Building Heights
(heights include rooftop mechanical space)

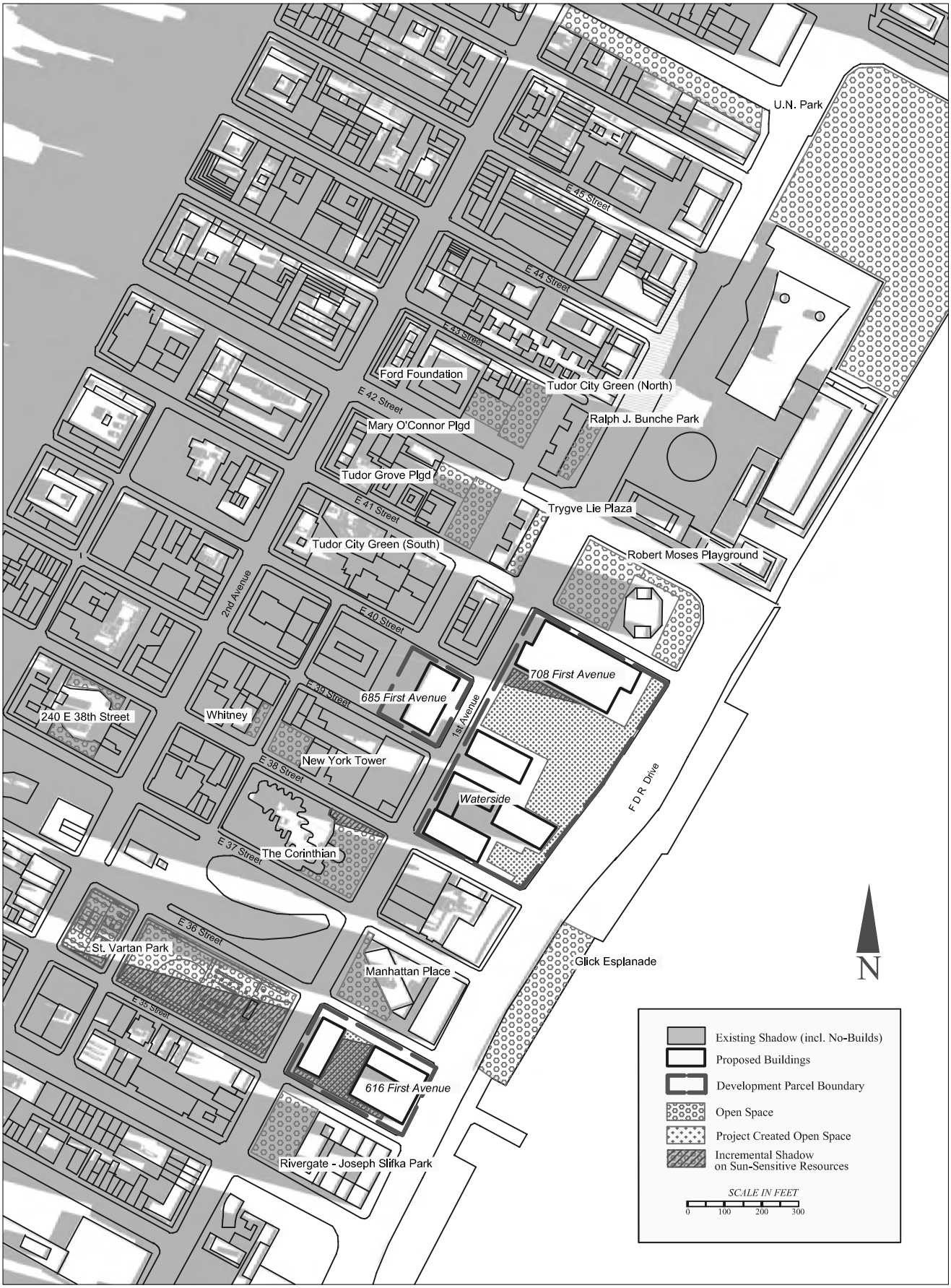
FIRST AVENUE PROPERTIES REZONING

Figure 6-1

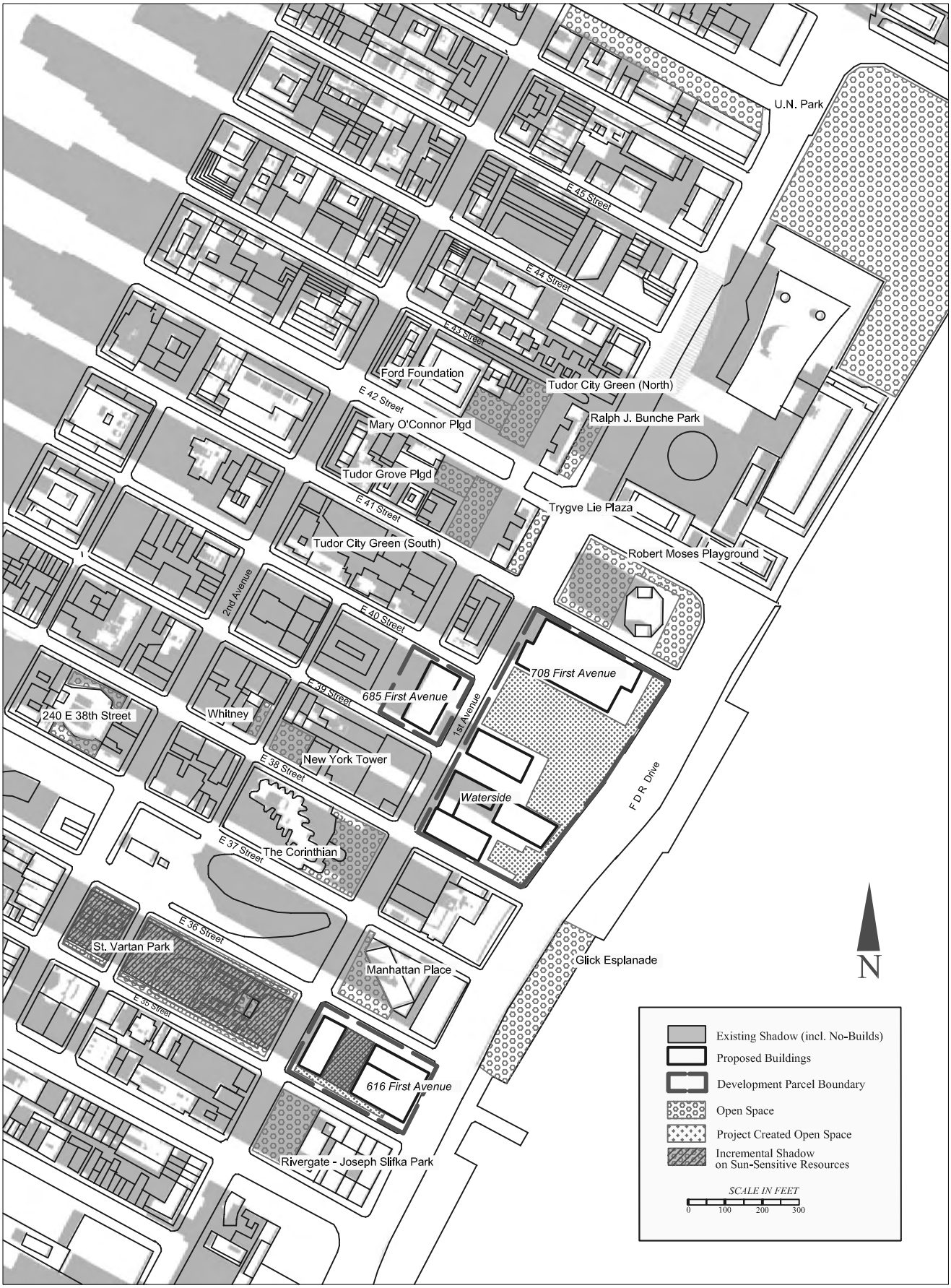
5.11.07

Open Spaces within Proposed Buildings' Shadow Sweeps

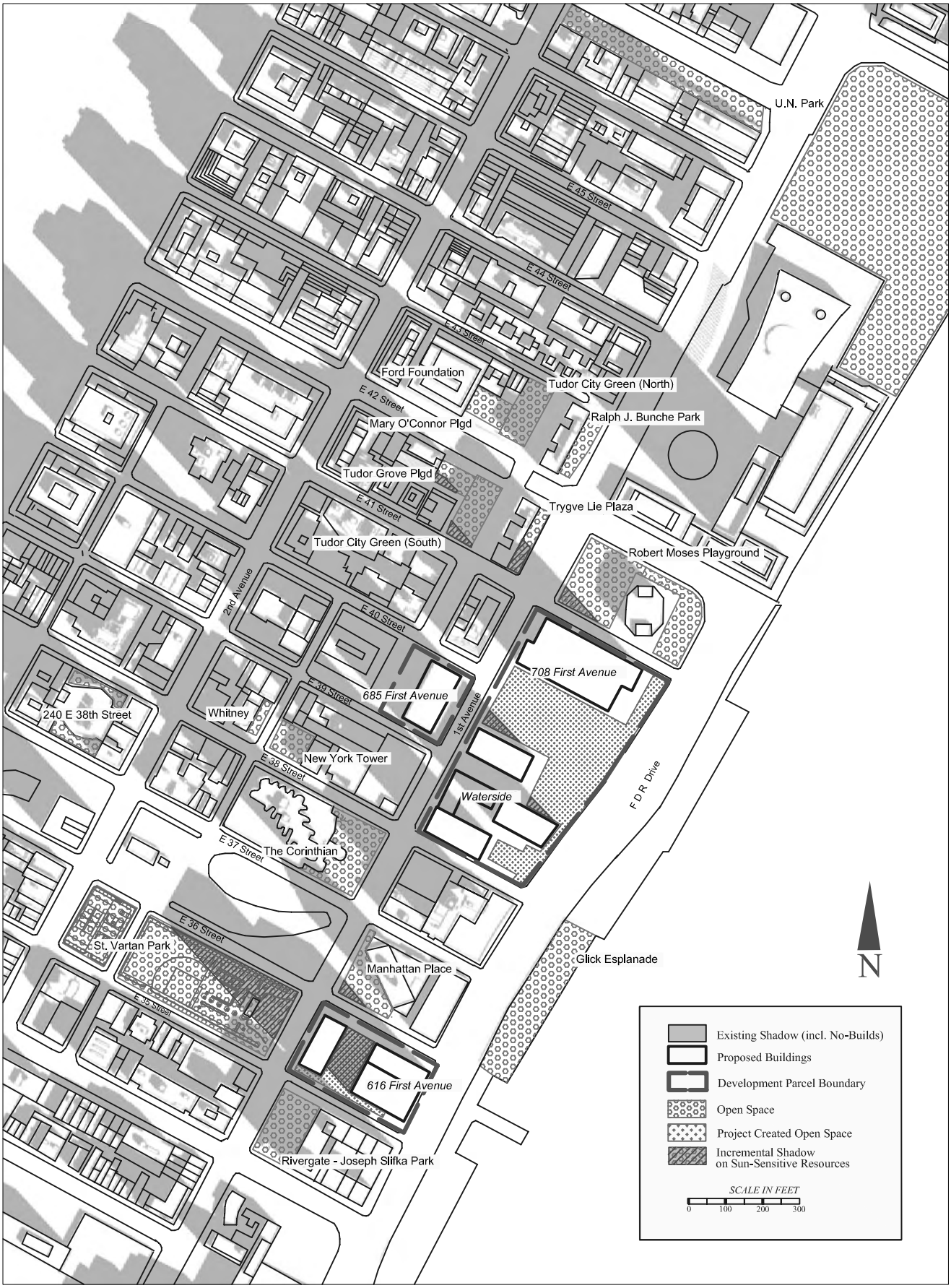
Figure 6-2



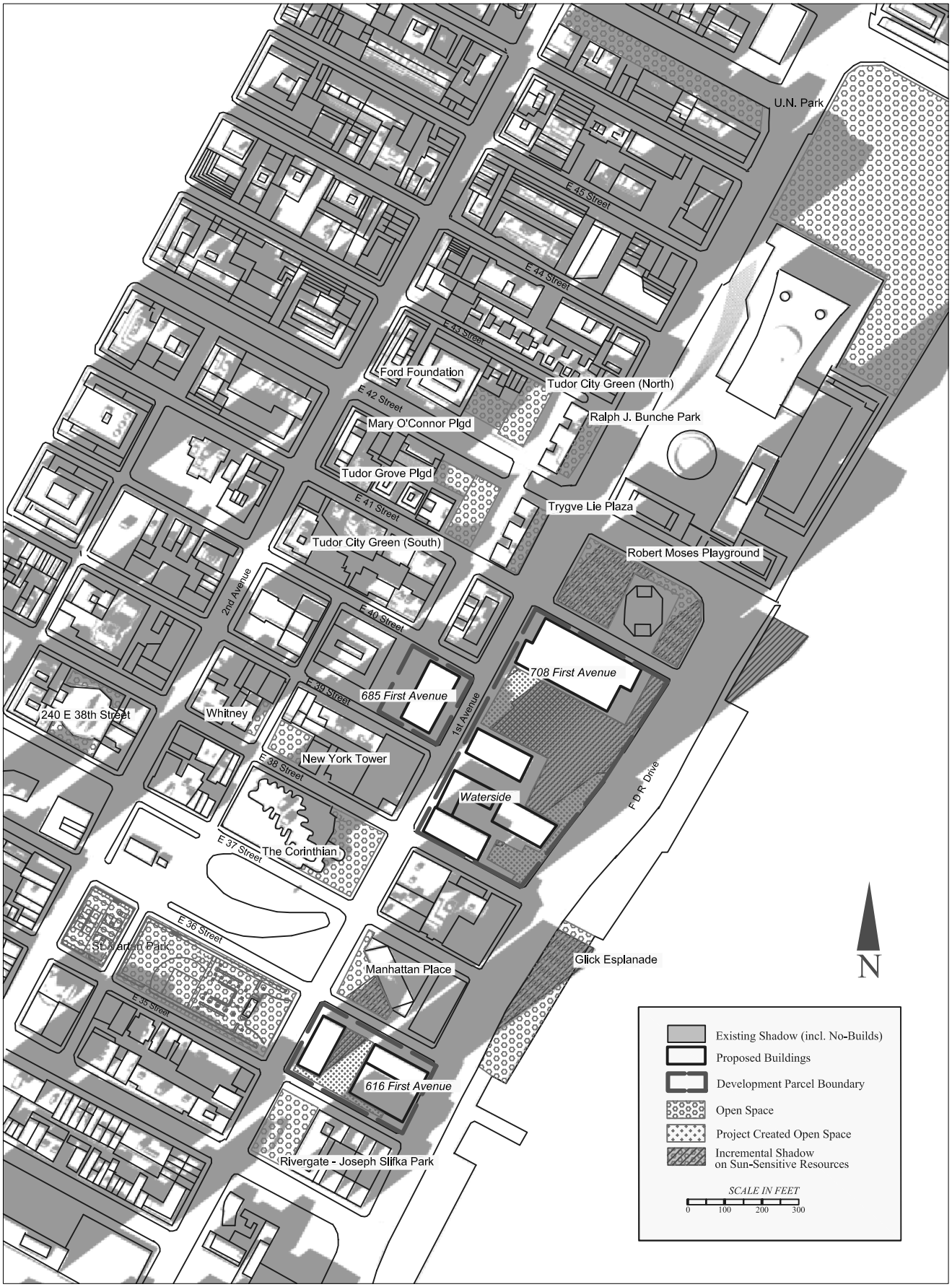
Shadow Diagram
March 21 - 8:36 AM EDT



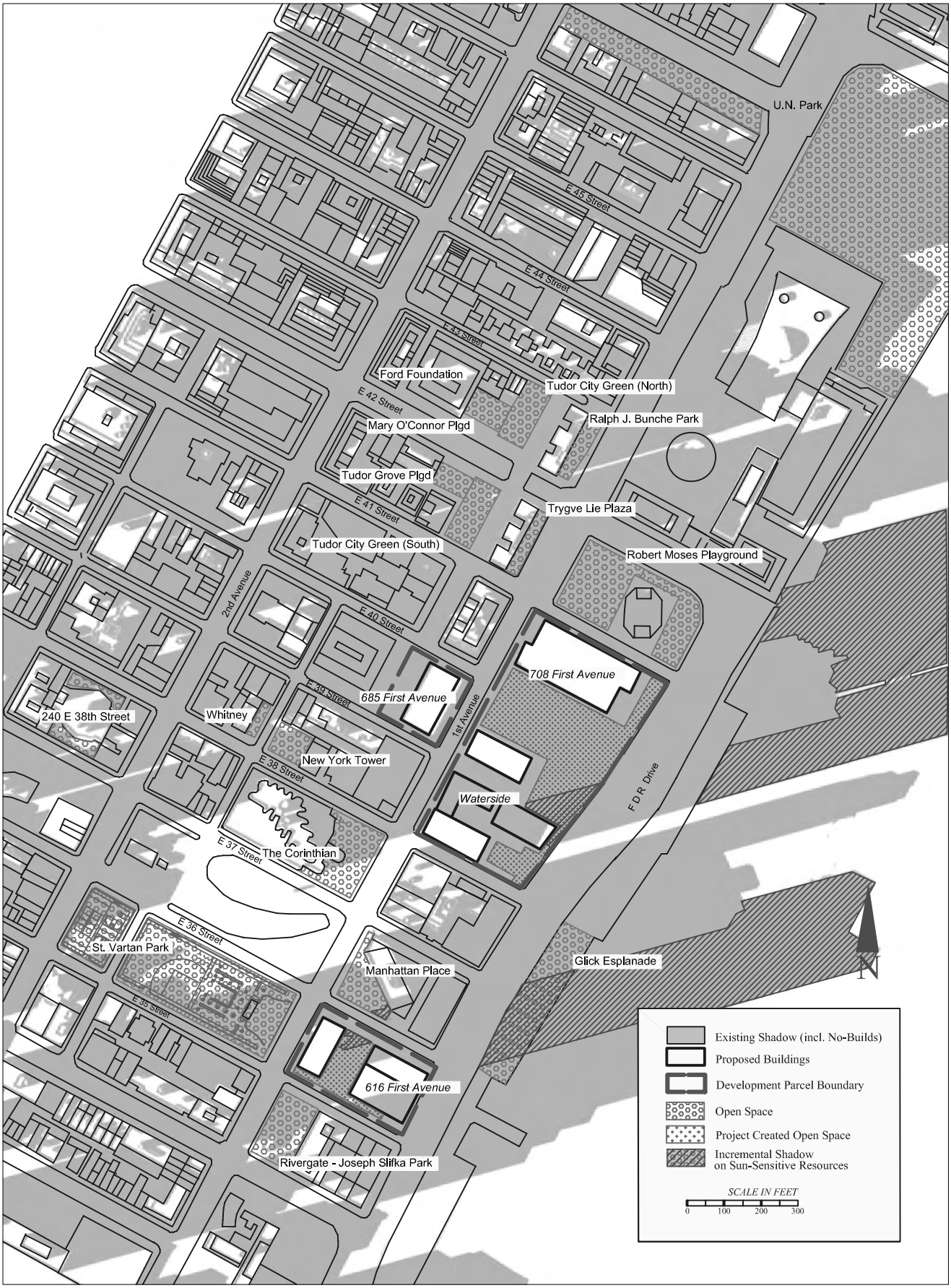
Shadow Diagram
March 21 - 9:45 AM EDT



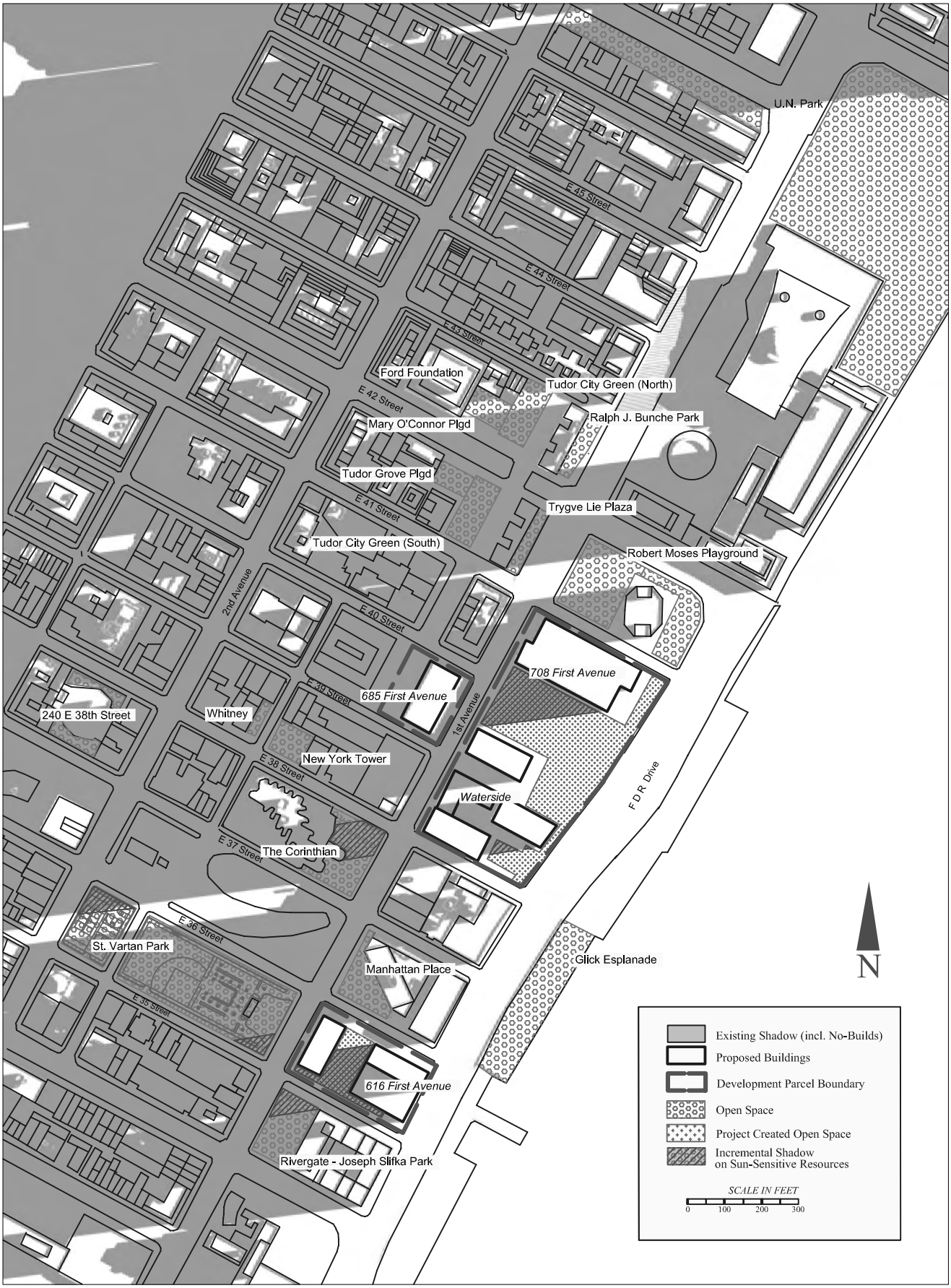
Shadow Diagram
March 21 - 11:00 AM EDT



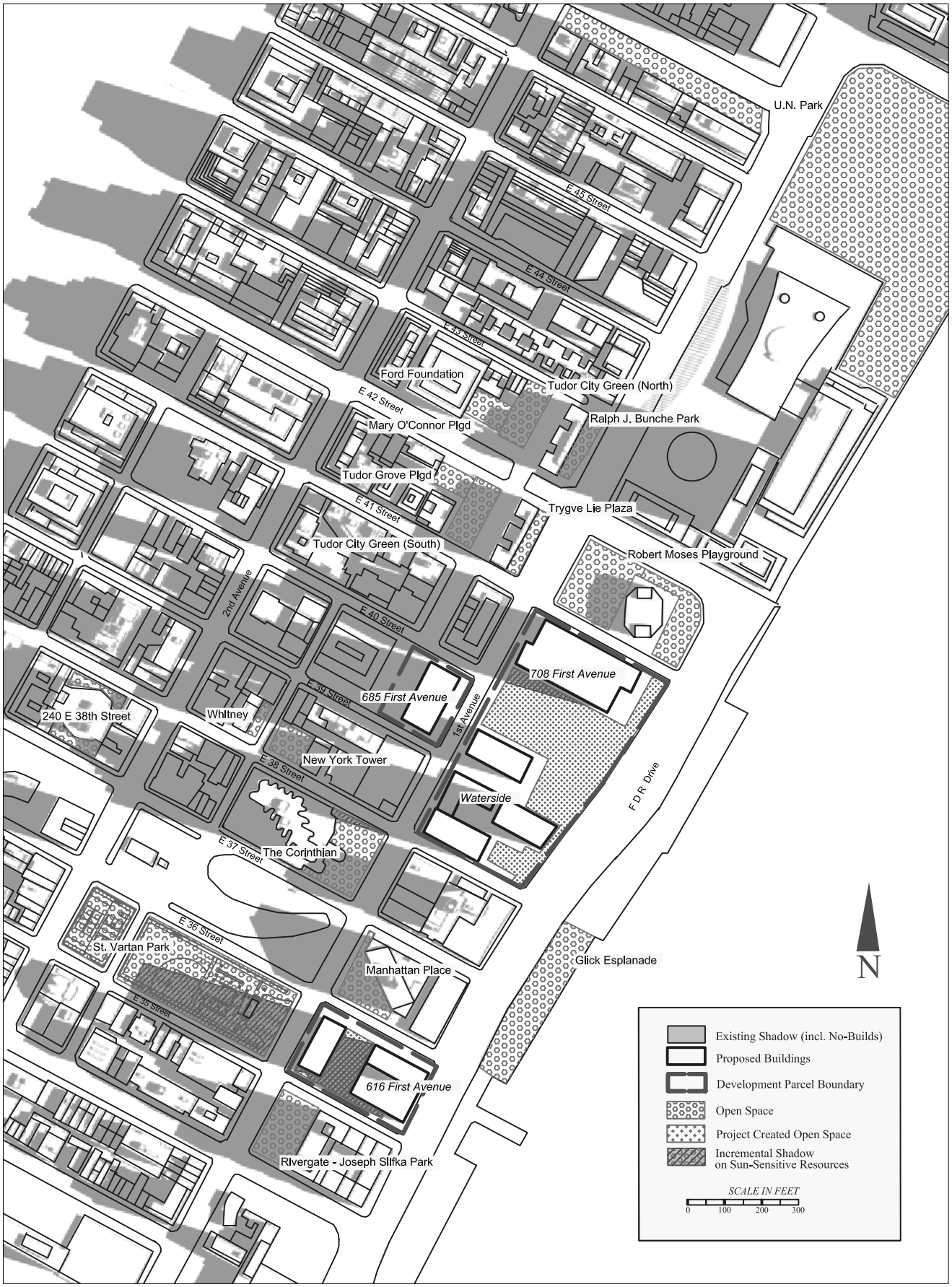
Shadow Diagram
March 21 - 3:45 PM EDT



Shadow Diagram
March 21 - 5:29 PM EDT
Figure 6 - 7

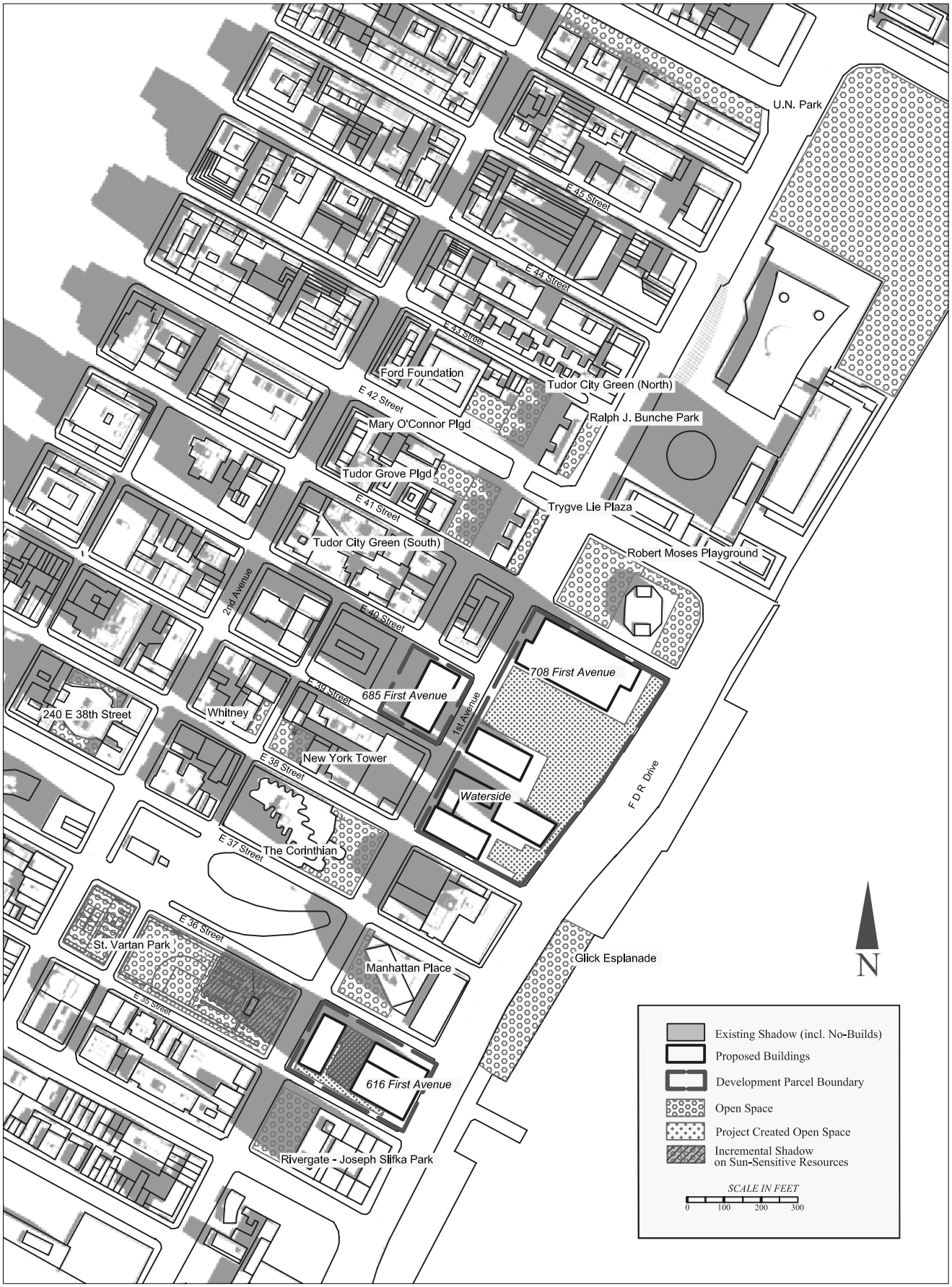


Shadow Diagram
May 6 - 7:27 AM EDT



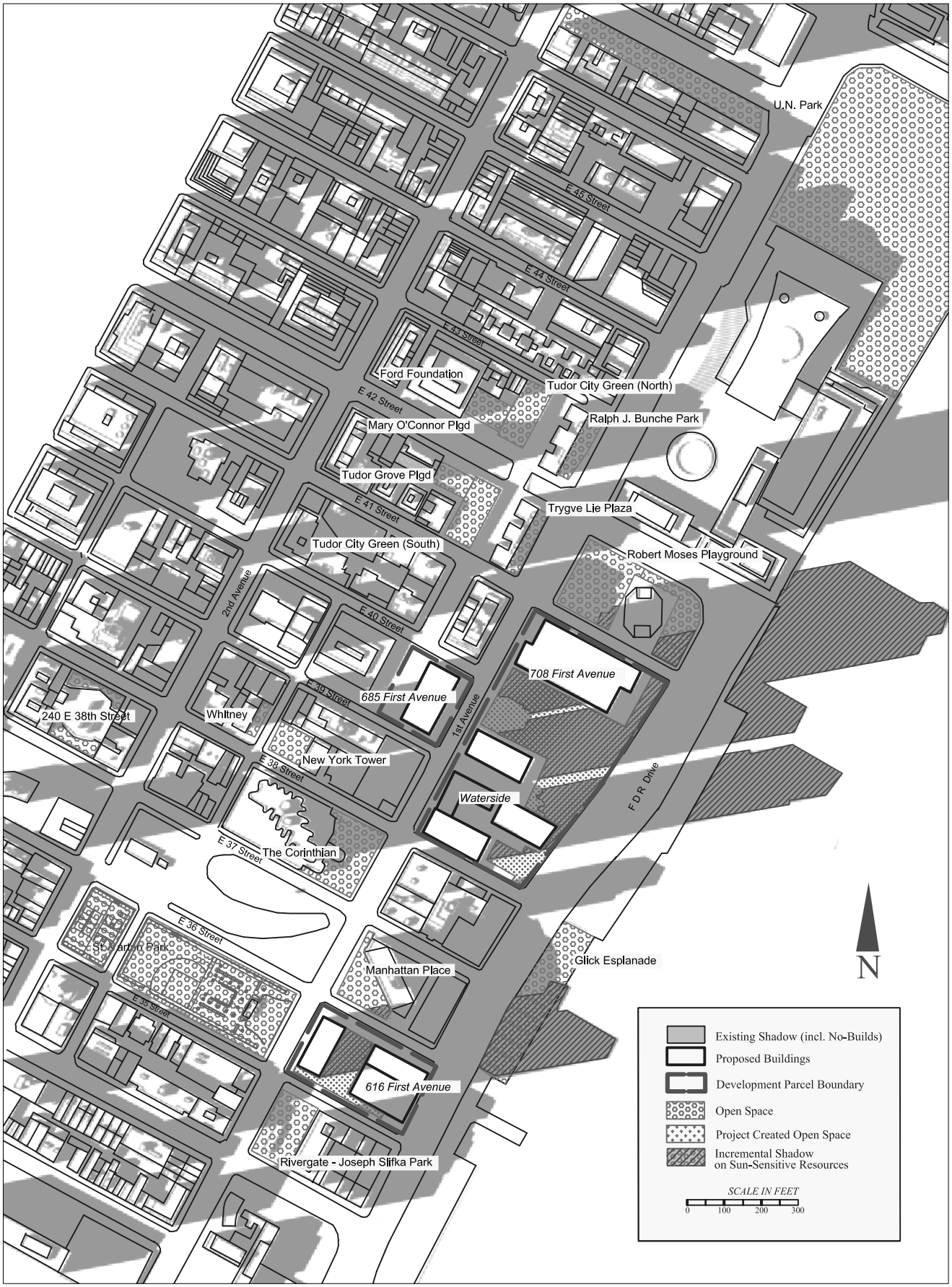
Shadow Diagram
May 6 - 9:45 AM EDT

Figure 6 - 9



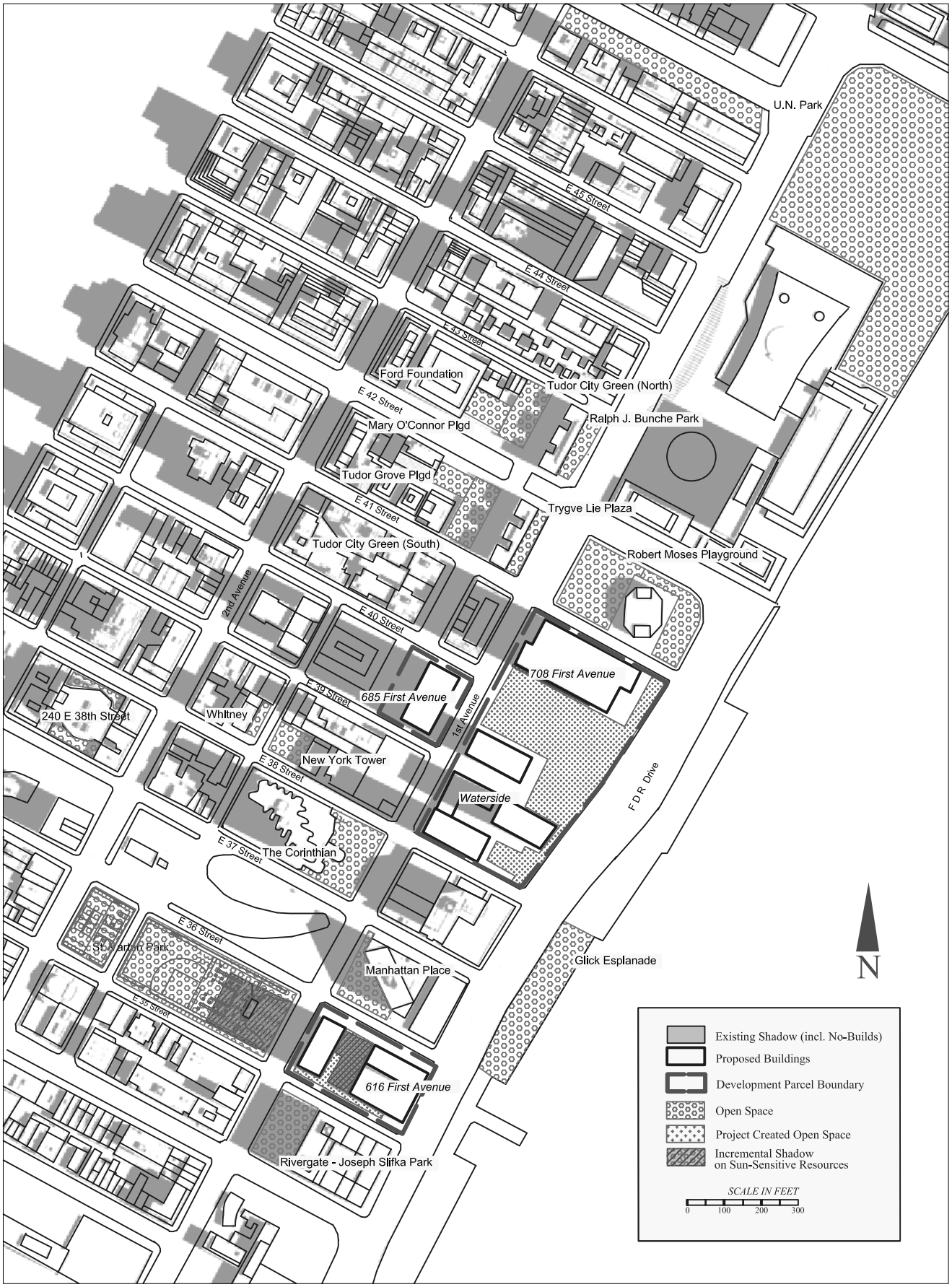
Shadow Diagram
May 6 - 11:00 AM EDT

Shadow Diagram
May 6 - 1:00 PM EDT

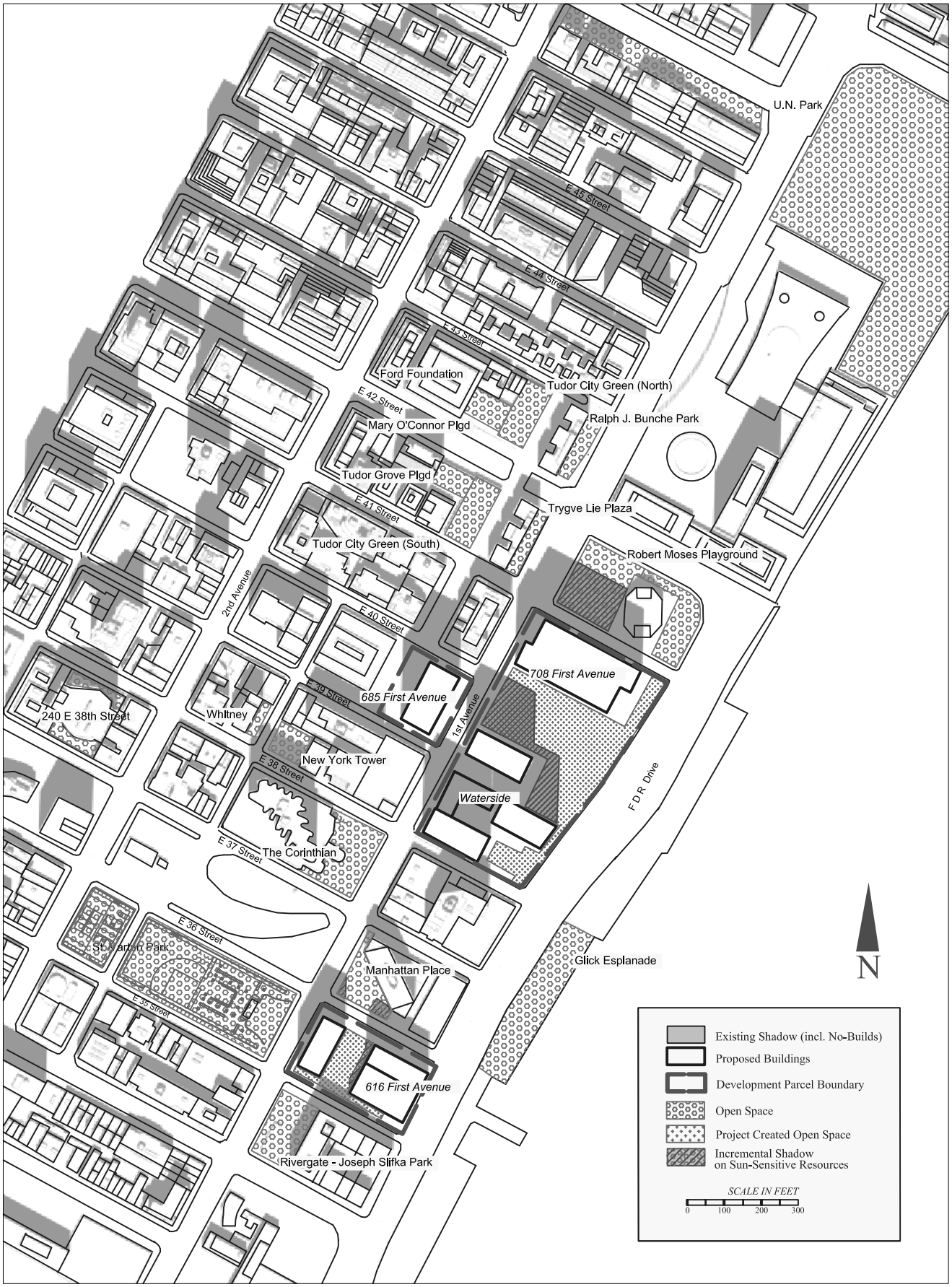


Shadow Diagram
May 6 - 4:30 PM EDT
Figure 6 - 12

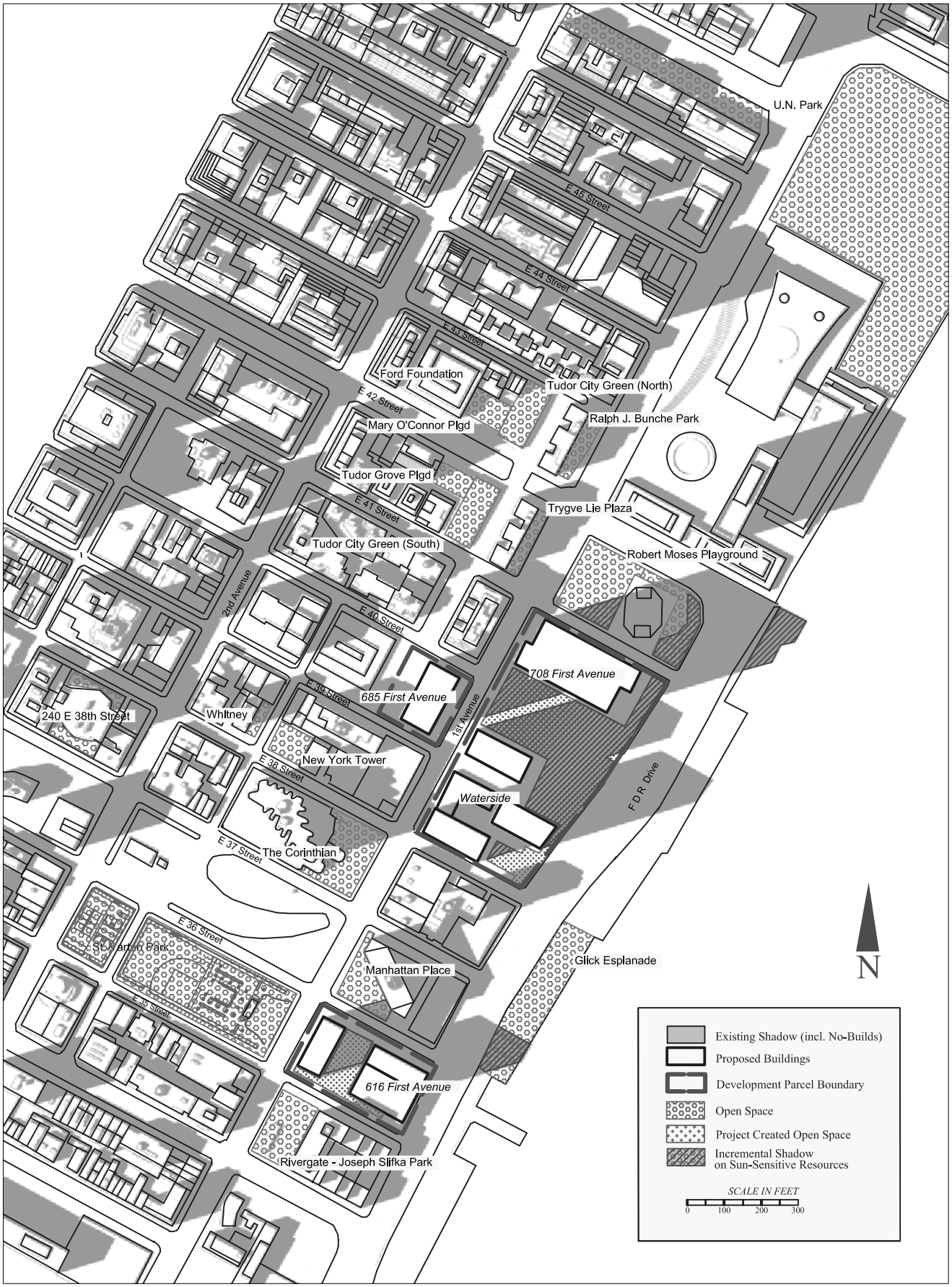
Shadow Diagram
June 21 - 6:57 AM EDT



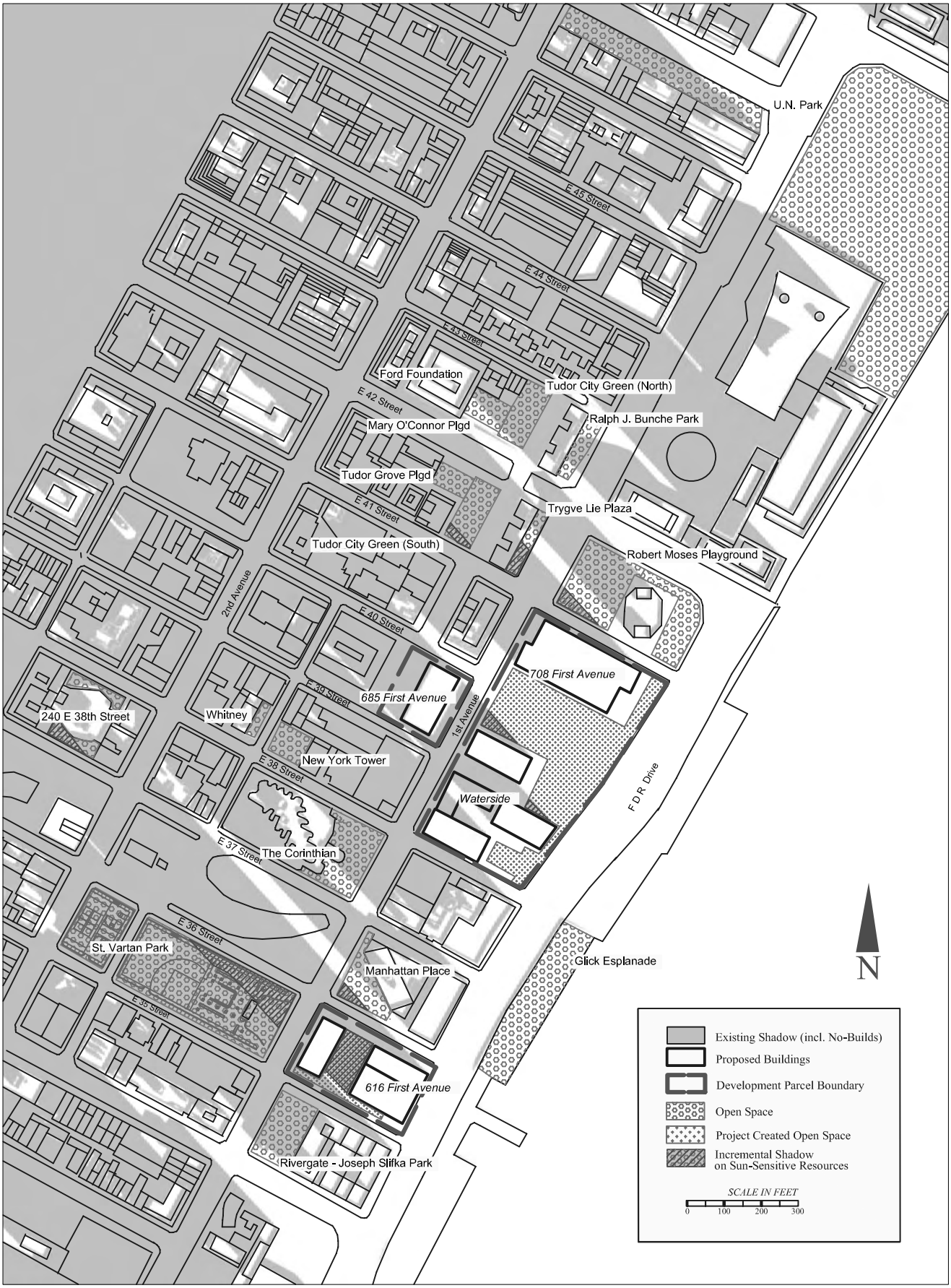
Shadow Diagram
June 21 - 11:00 AM EDT



Shadow Diagram
June 21 - 1:00 PM EDT

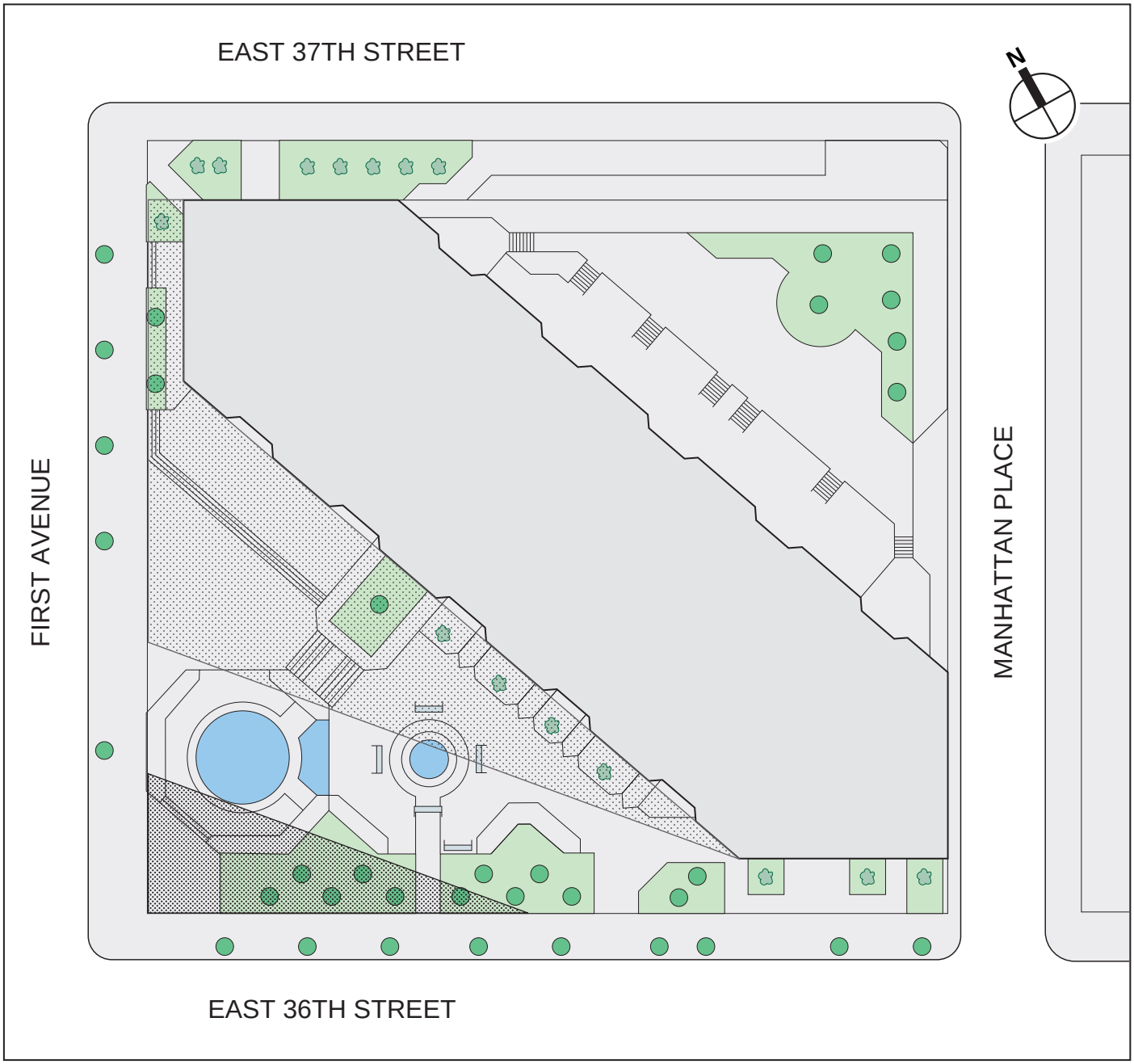


Shadow Diagram
June 21 - 3:30 PM EDT



Shadow Diagram
December 21 - 8:51 AM EST
Figure 6 - 17

6.4.07



0 40 FEET
SCALE

Existing Shadow

Increment Shadow

Open Space

Trees

Bushes

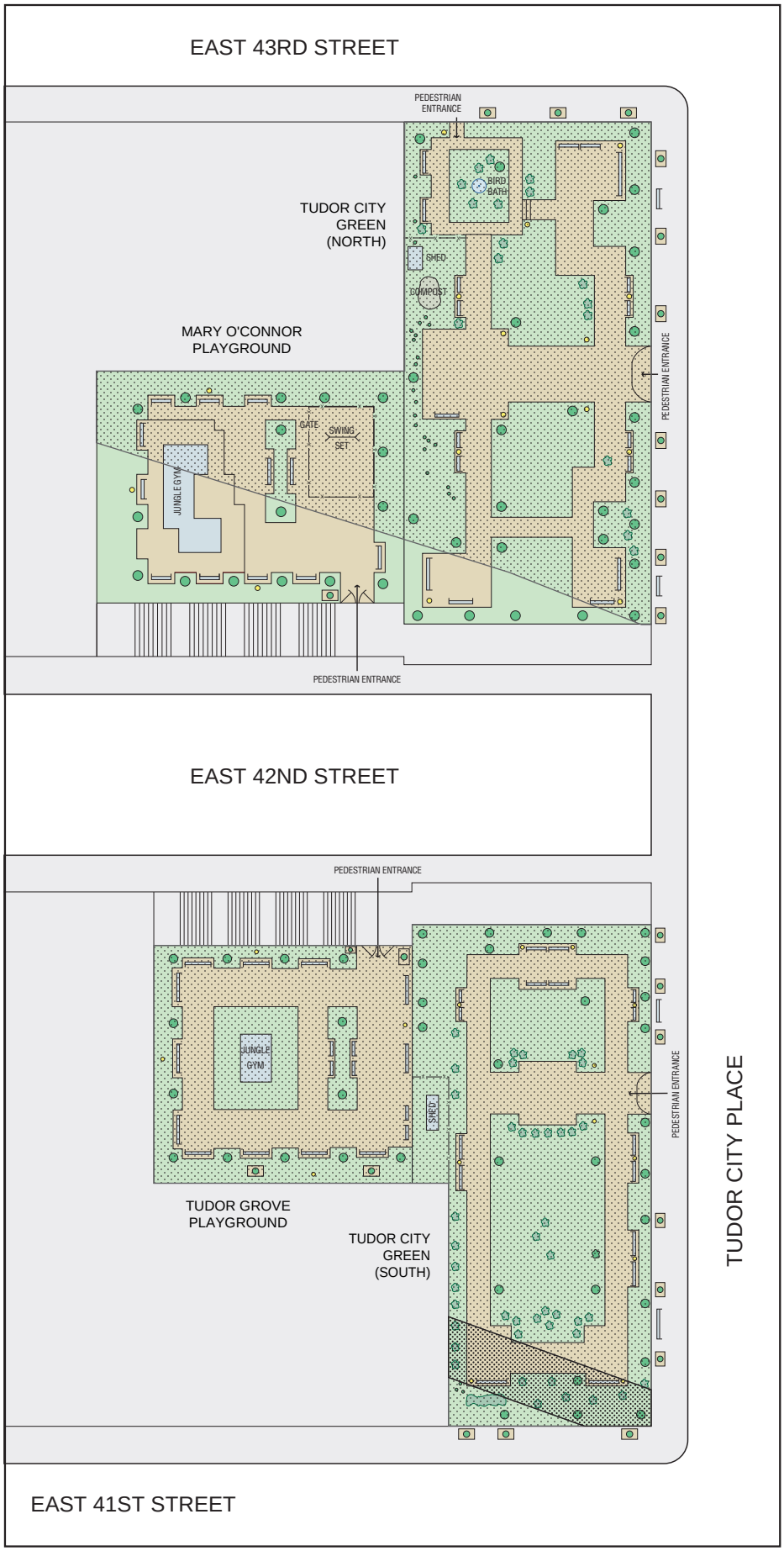
Bench

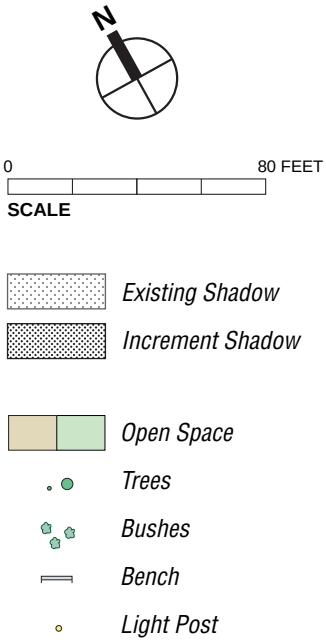
Pool of Water

Shadow Diagram
Manhattan Place Open Space
December 21 – 8:51 AM EST

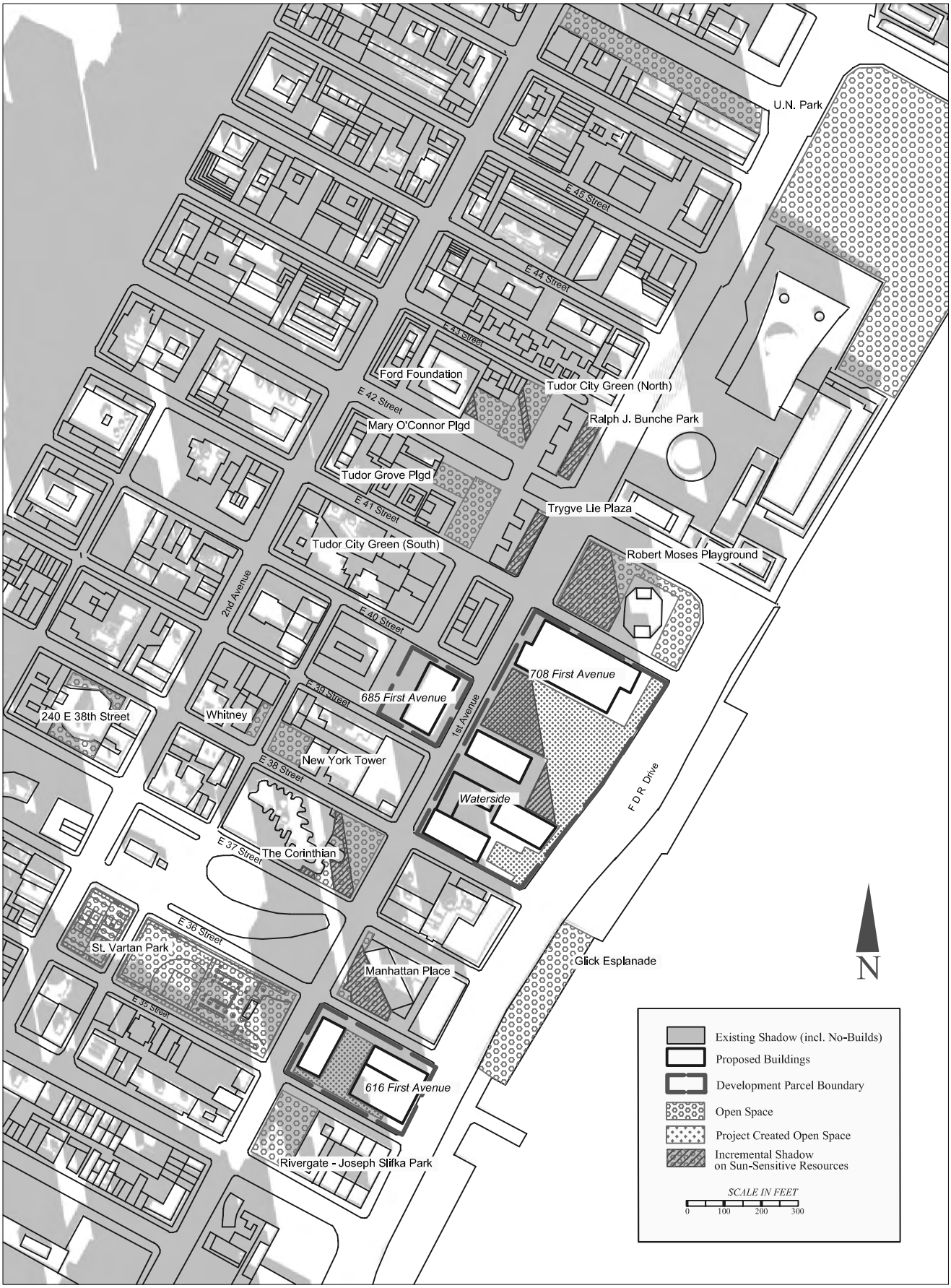
Figure 6-17a

6.1.07



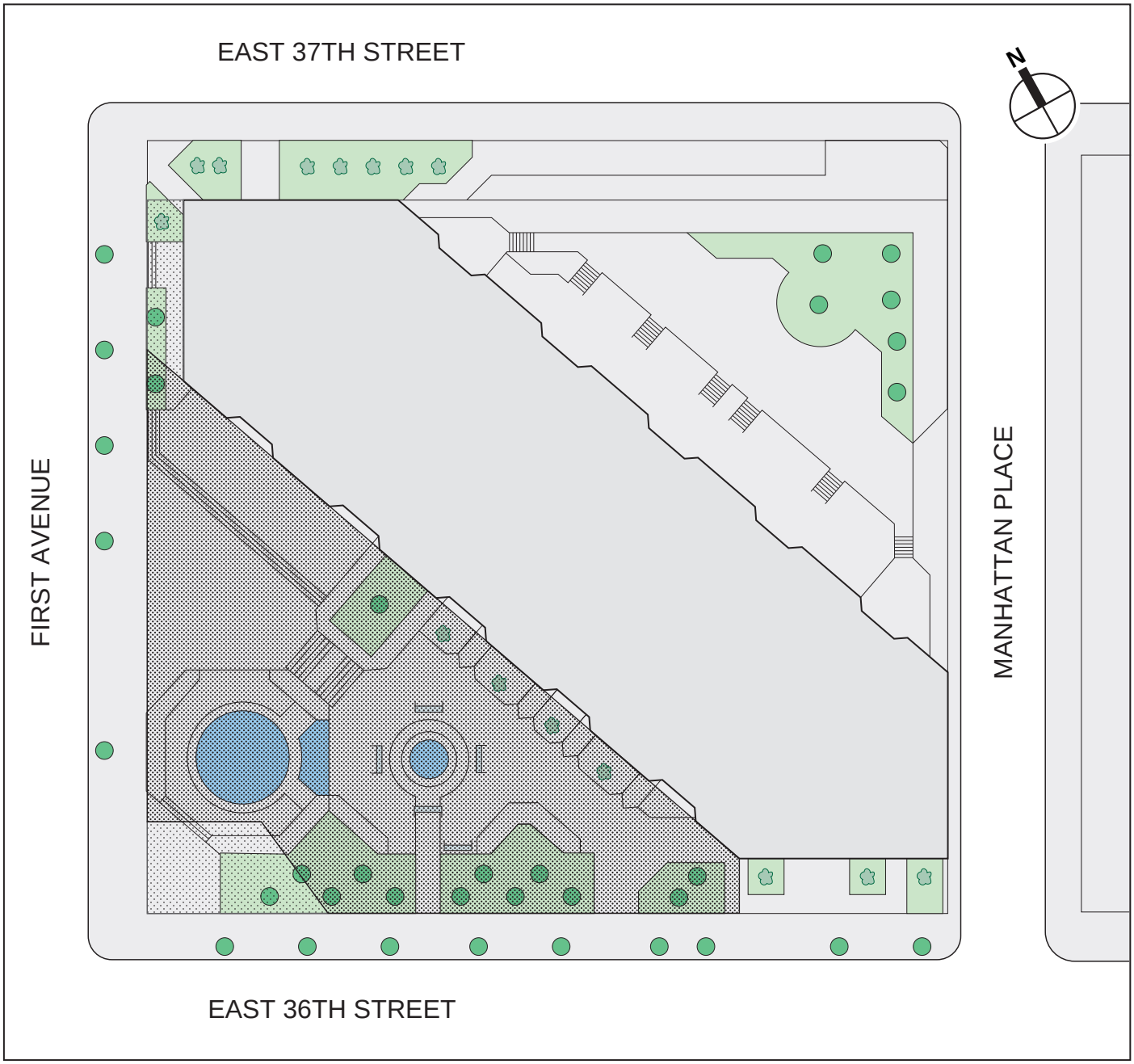


Shadow Diagram
Tudor City Open Space
December 21 – 8:51 AM EST
Figure 6-17b



Shadow Diagram
December 21 - 11:15 AM EST

6.4.07



0 40 FEET
SCALE

Existing Shadow

Increment Shadow

Open Space

Trees

Bushes

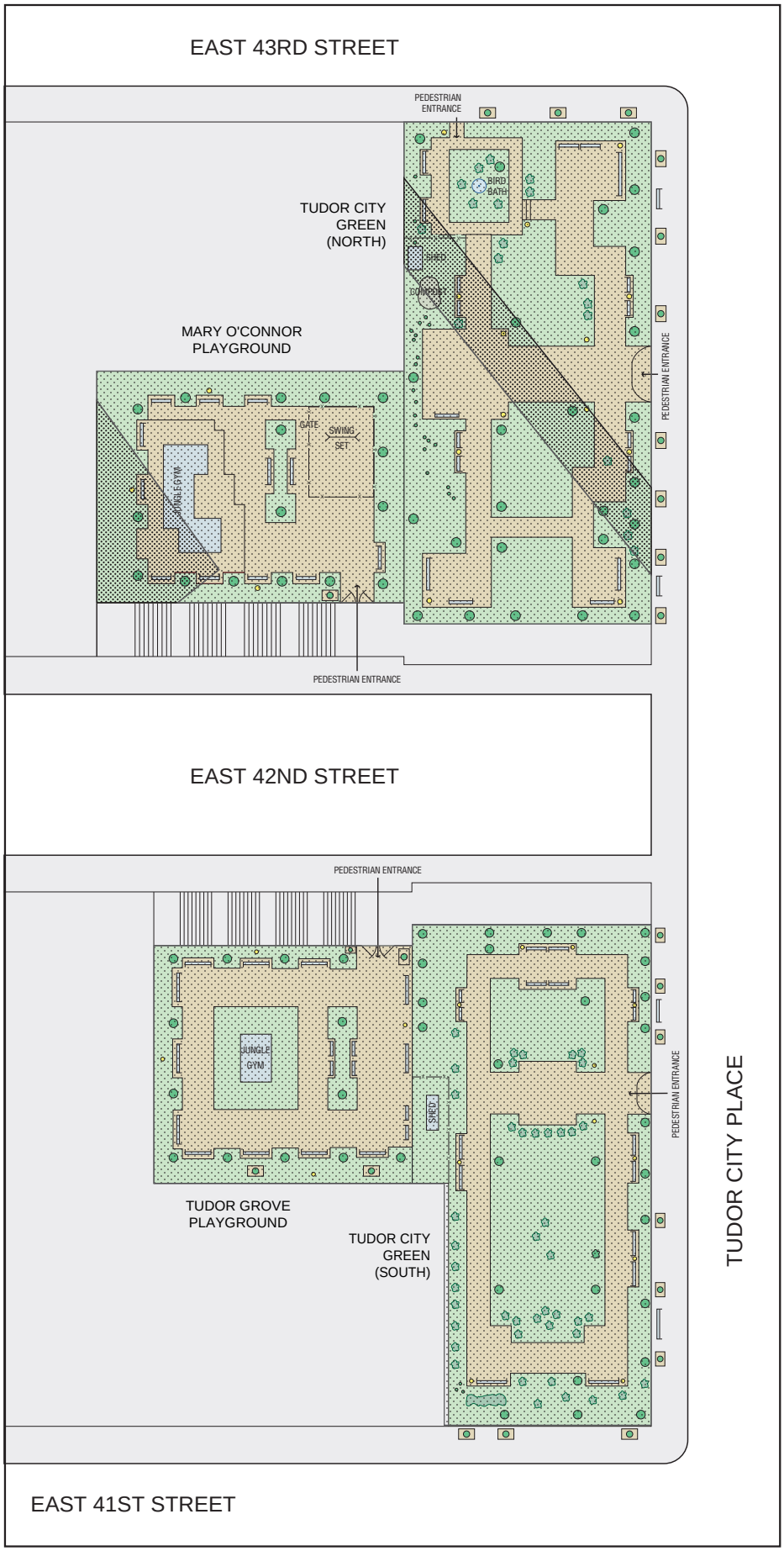
Bench

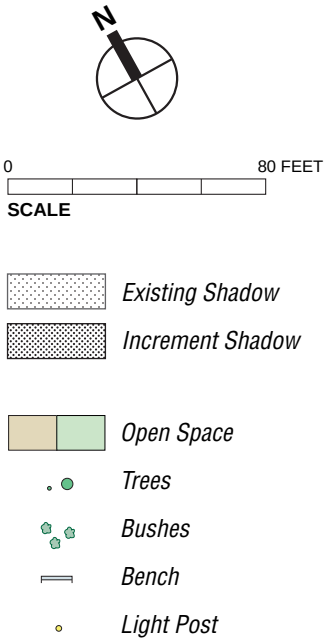
Pool of Water

Shadow Diagram
Manhattan Place Open Space
December 21 – 11:15 AM EST

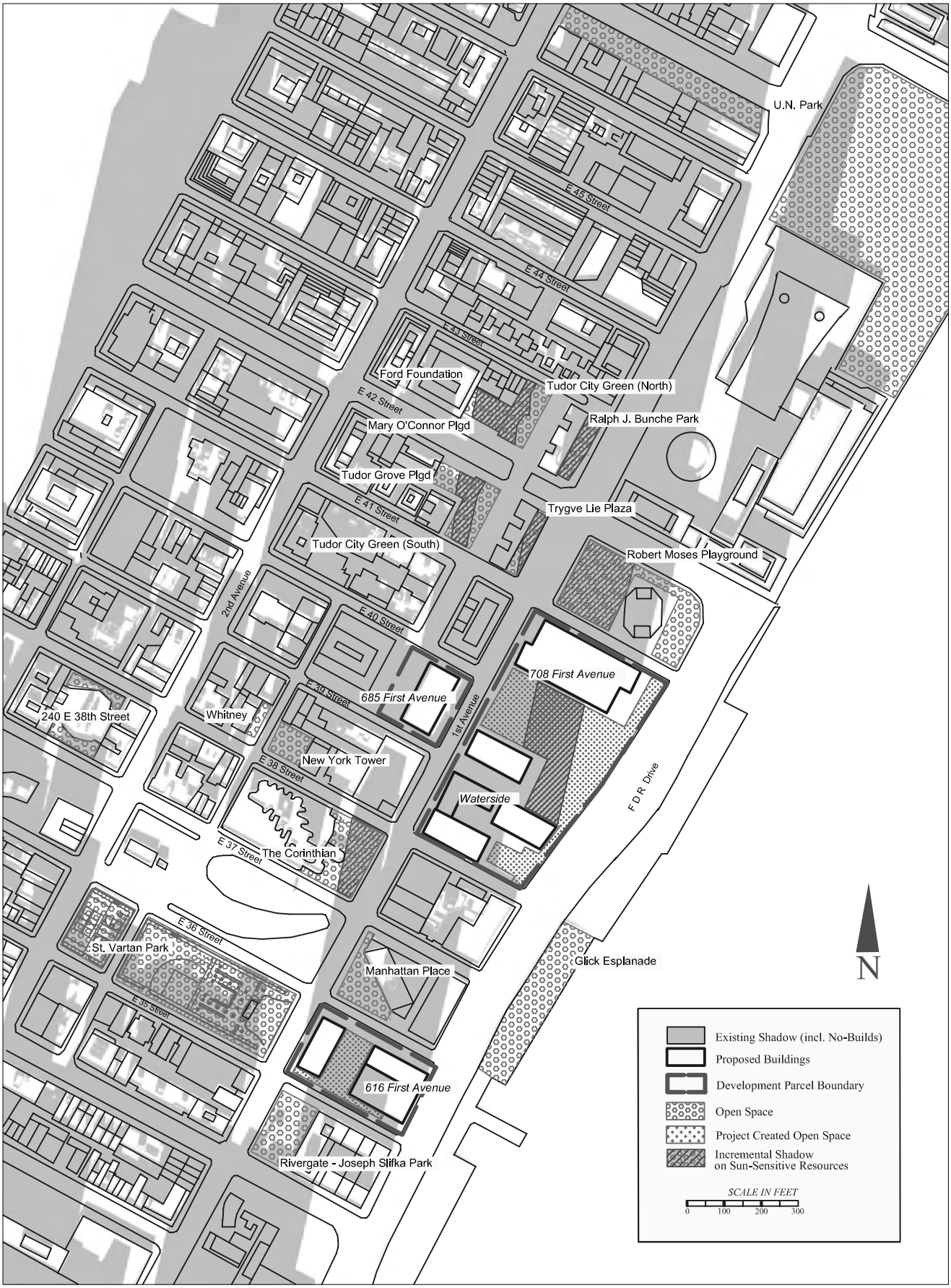
Figure 6-18a

6.1.07



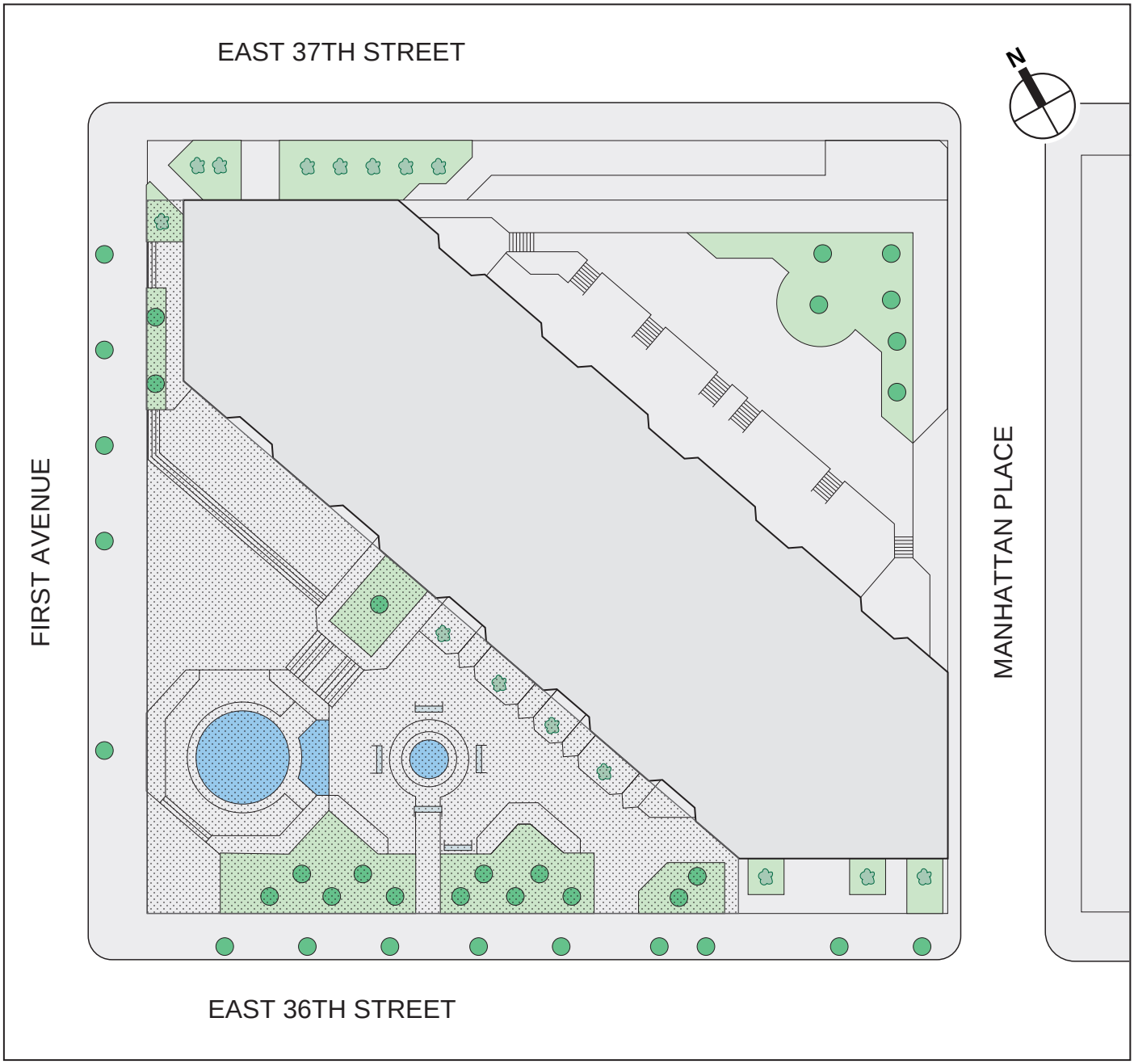


Shadow Diagram
Tudor City Open Space
December 21 – 11:15 AM EST
Figure 6-18b



Shadow Diagram
December 21 - 12:45 PM EST

6.1.07



Existing Shadow

0 40 FEET
SCALE

Open Space

Trees

Bushes

Bench

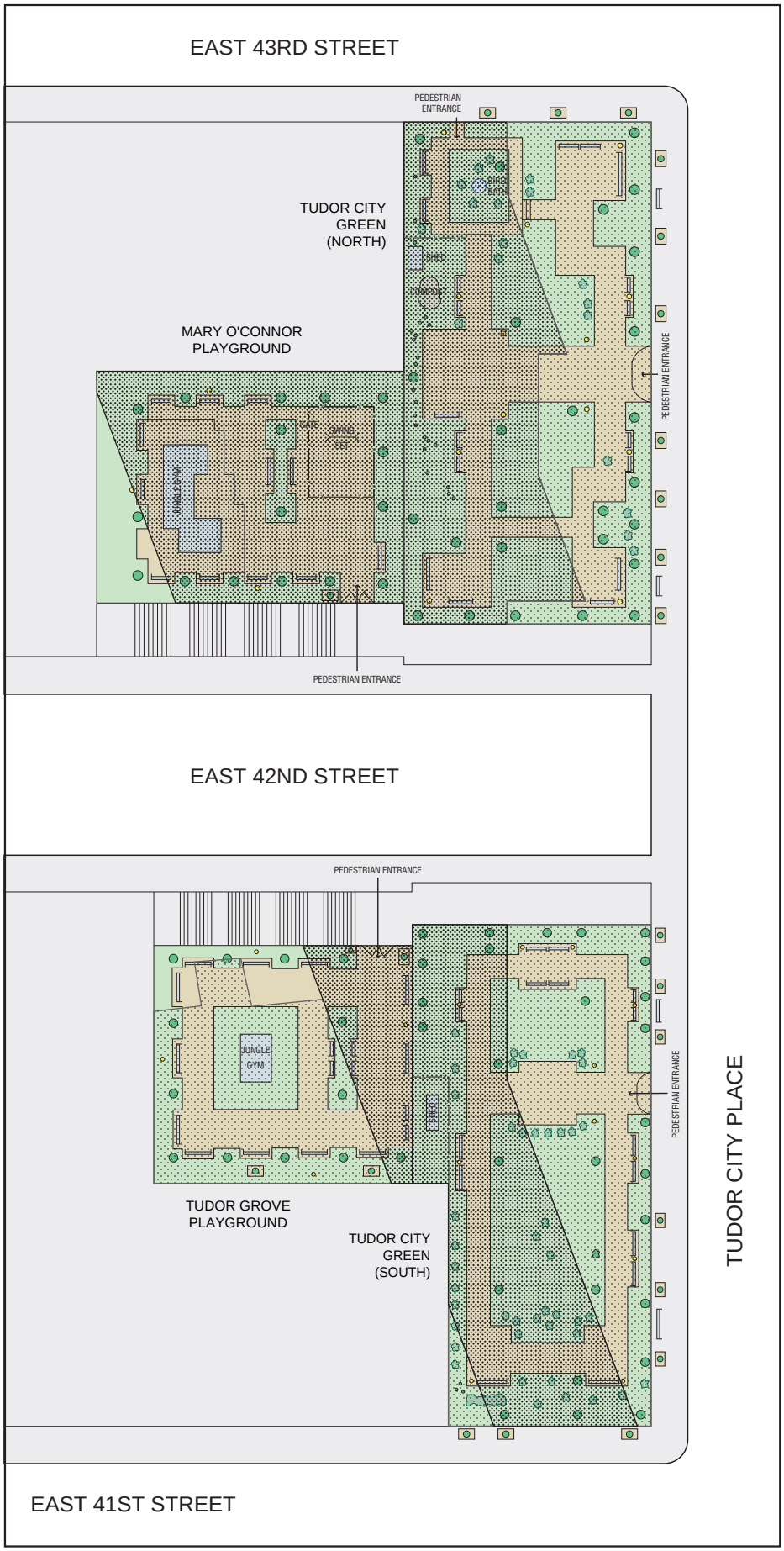
Pool of Water

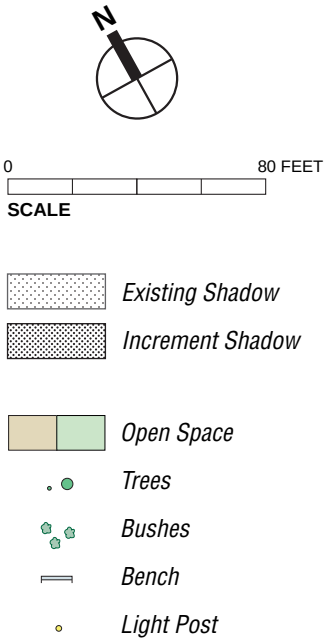
Shadow Diagram
Manhattan Place Open Space
December 21 – 12:45 PM EST

FIRST AVENUE PROPERTIES REZONING

Figure 6-19a

6.4.07





Shadow Diagram
Tudor City Open Space
December 21 – 12:45 PM EST
Figure 6-19b

Shadow Diagram
December 21 - 1:30 PM EST

6.1.07

0 40 FEET
SCALE

Existing Shadow

Increment Shadow

Open Space

Trees

Bushes

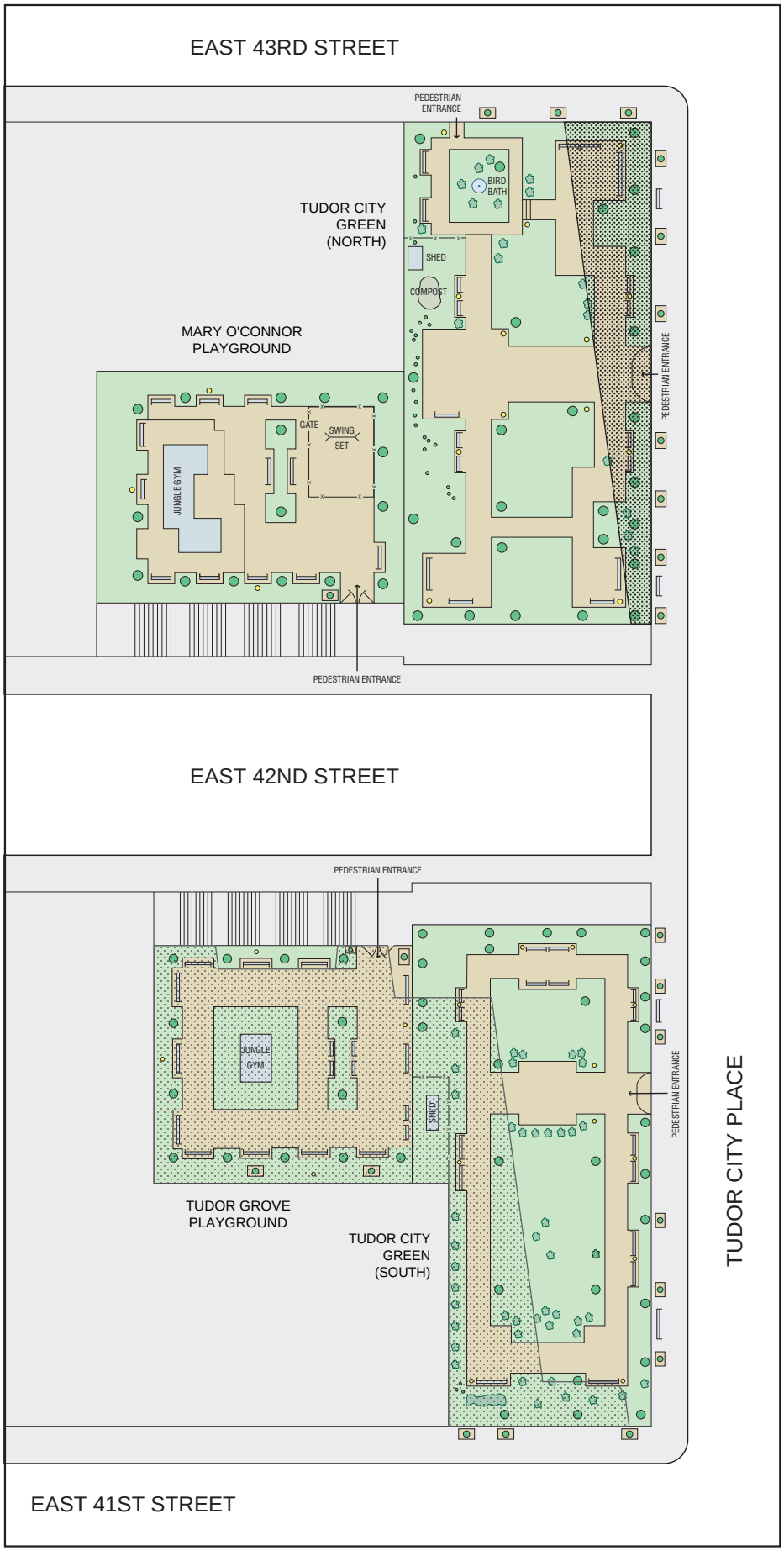
Bench

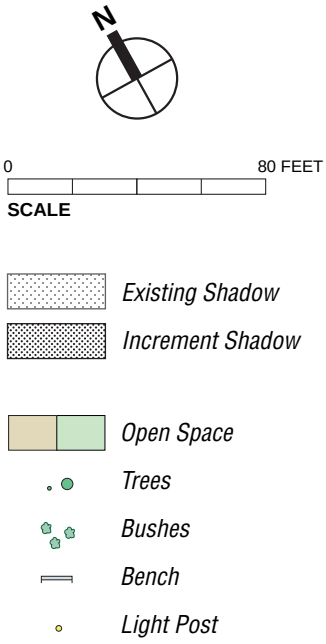
Pool of Water

Shadow Diagram
Manhattan Place Open Space
December 21 – 1:30 PM EST

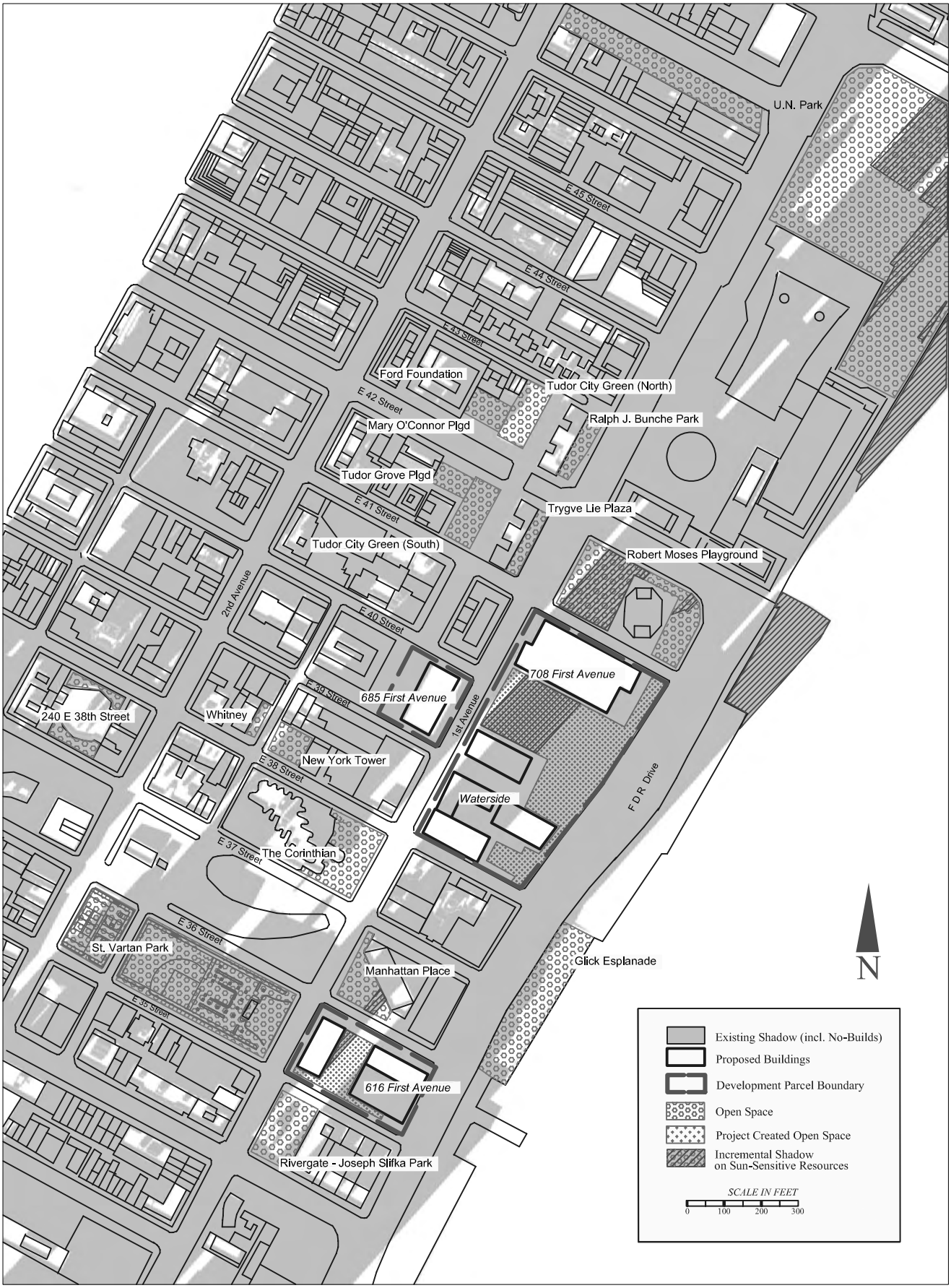
Figure 6-20a

6.4.07





Shadow Diagram
Tudor City Open Space
December 21 – 1:30 PM EST
Figure 6-20b



Shadow Diagram
December 21 - 2:53 PM EST

6.4.07

Existing Shadow

Increment Shadow

Open Space

Trees

Bushes

Bench

Pool of Water

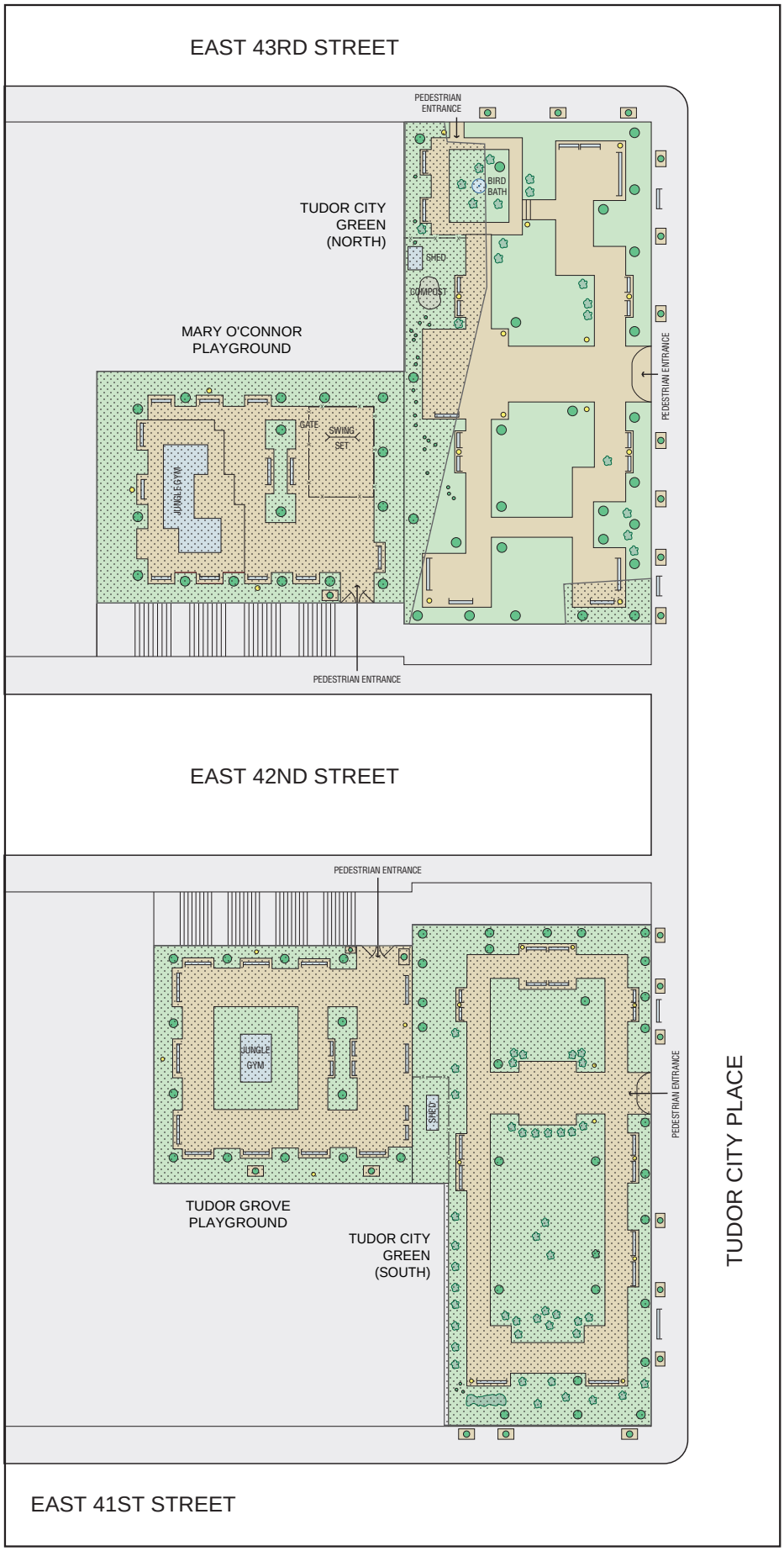
0 40 FEET

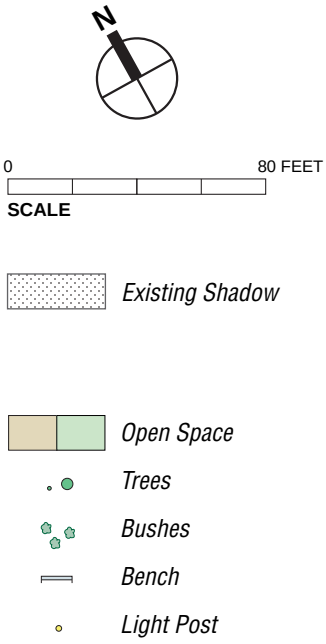
SCALE

Shadow Diagram
Manhattan Place Open Space
December 21 – 2:53 PM EST

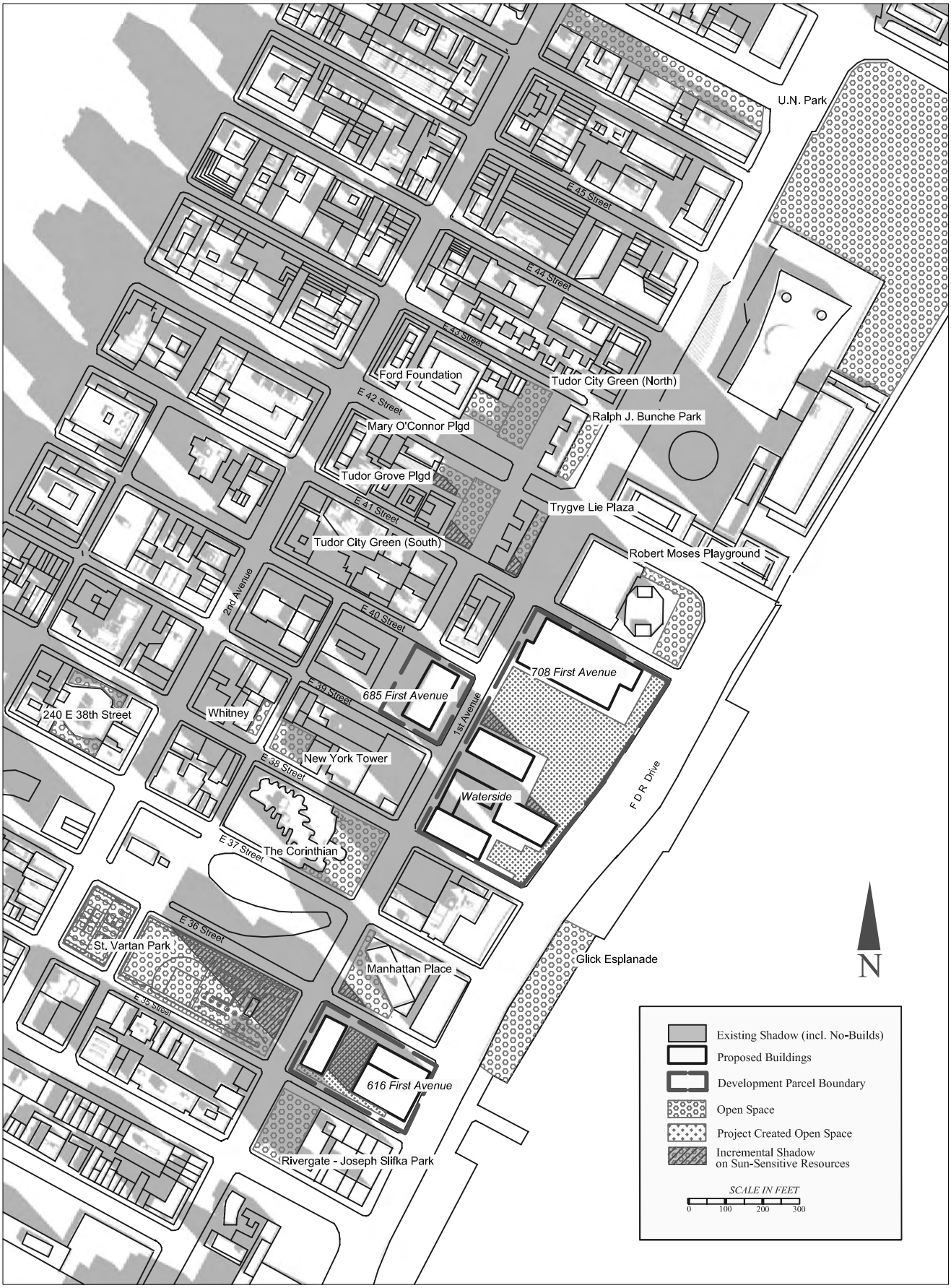
Figure 6-21a

6.1.07

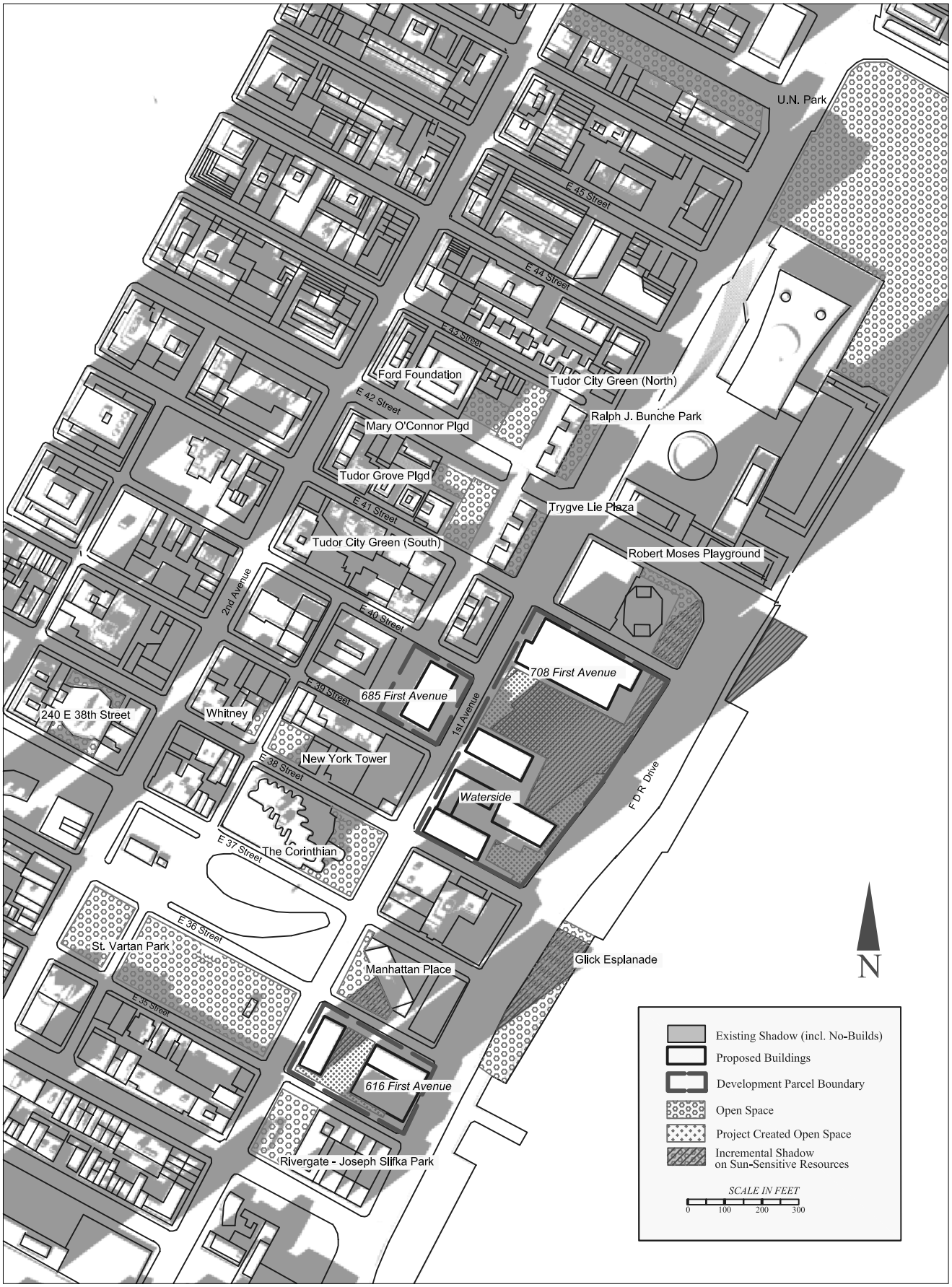




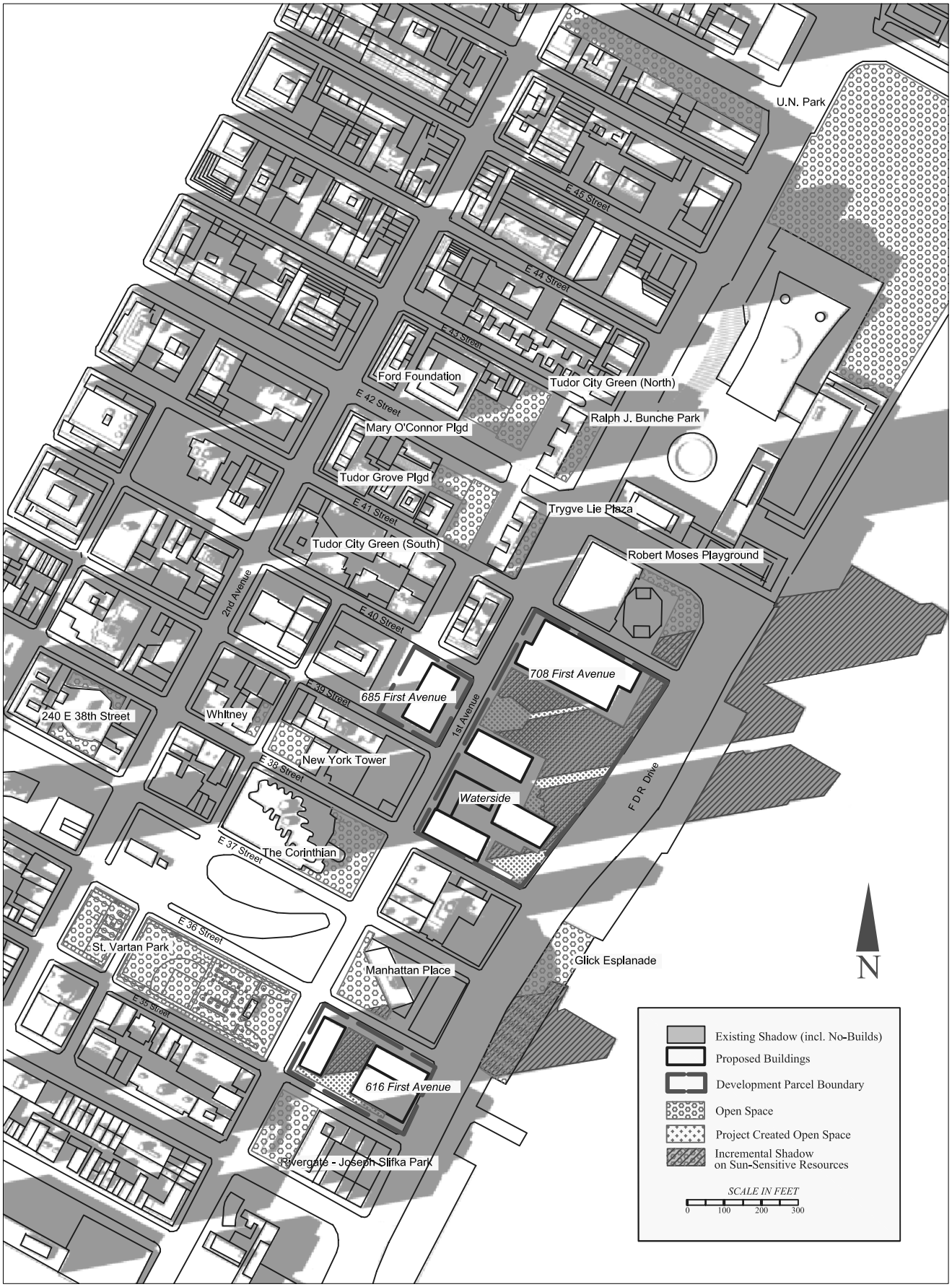
Shadow Diagram
Tudor City Open Space
December 21 – 2:53 PM EST
Figure 6-21b



Shadow Diagram with UNDC
March 21 - 11:00 AM EDT
Figure 6 - 22

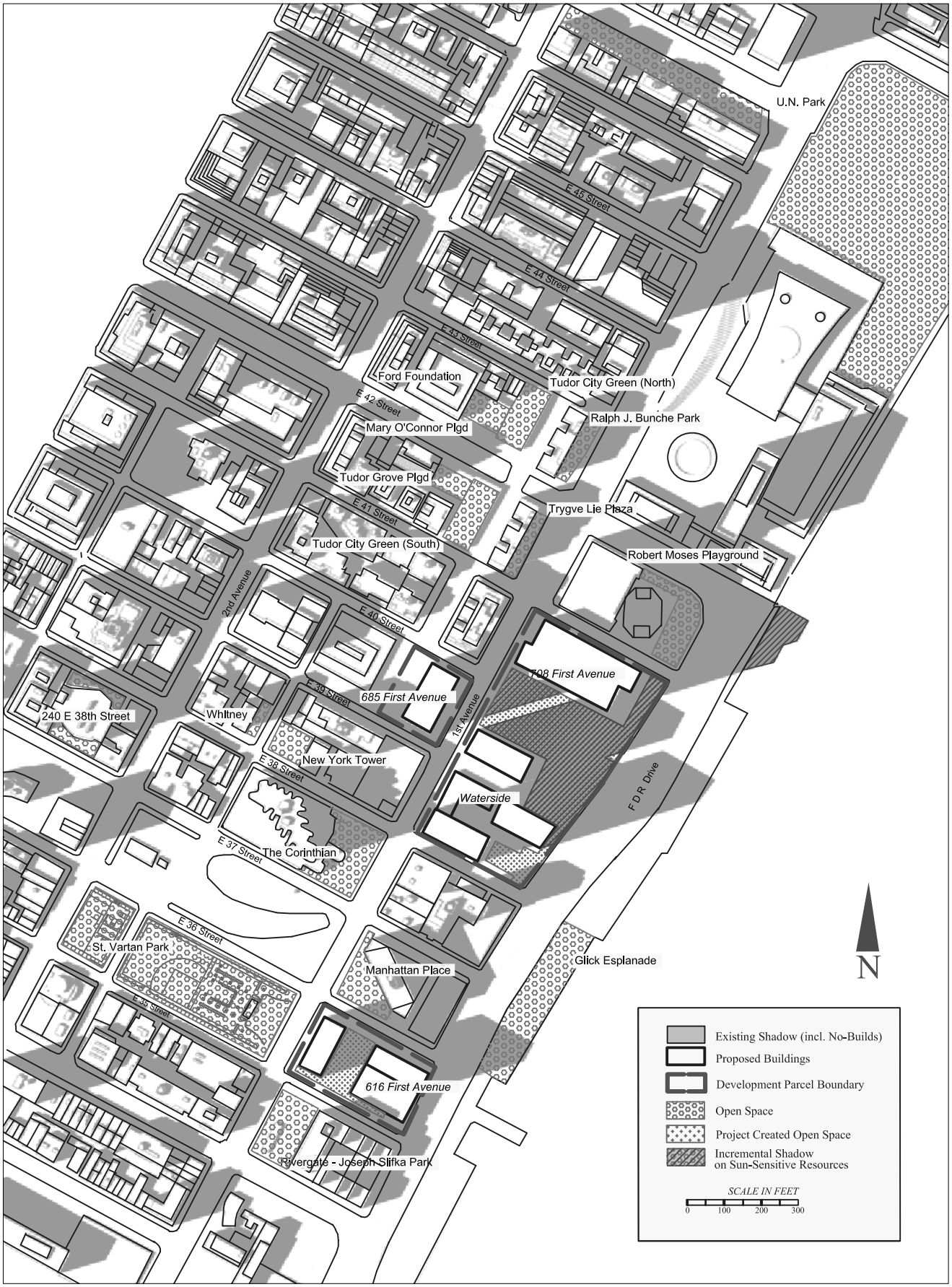


Shadow Diagram with UNDC
March 21 - 3:45 PM EDT
Figure 6 - 23



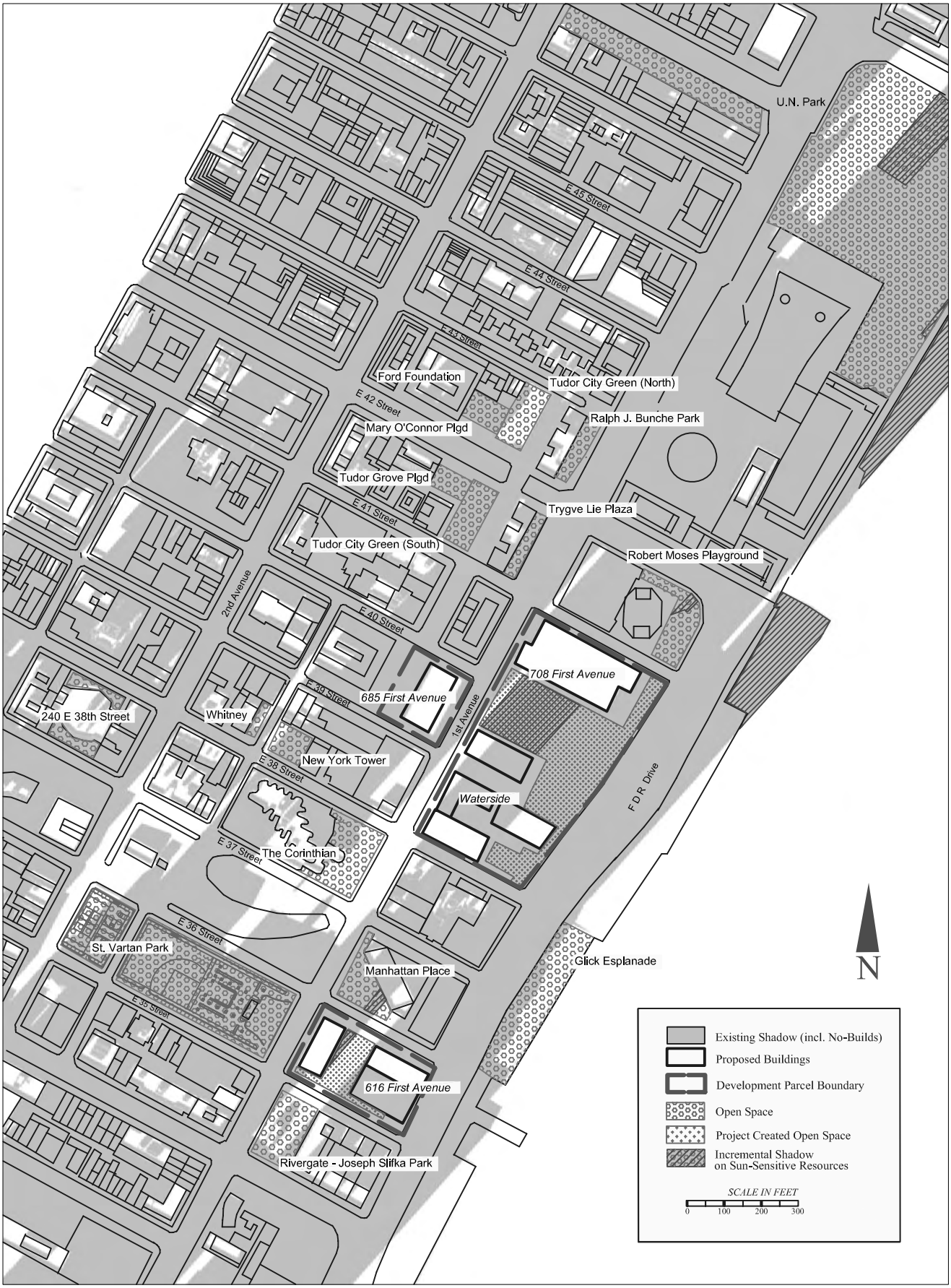
Shadow Diagram with UNDC
May 6 - 4:30 PM EDT

Figure 6 - 24



Shadow Diagram with UNDC
June 21 - 3:30 PM EDT

Figure 6 - 25



Shadow Diagram with UNDC
December 21 - 2:53 PM EST