PARKING ANALYSIS

UNION SQUARE REDEVELOPMENT

SOMERVILLE, MA

Prepared for:
CITY OF SOMERVILLE

3 JUNE 2010

WALKER
PARKING CONSULTANTS

TABLE OF CONTENTS

EXECUTIVE SUMMARY ii

PROJECT UNDERSTANDING 1
Study Area 1

CURRENT CONDITIONS 3
Parking Supply 3
Parking Occupancy 3
Optimized Demand Factor 4

FUTURE PARKING CONDITIONS 5
Future Parking Supply 5
Projected Parking Demand 6
Shared Parking Methodology 7
Future Parking Demand 8
Transit-Oriented Development (TOD) Demand 10
Summary – Parking Demand Analysis 10

PARKING DEVELOPMENT OPTIONS 11
Cost Comparison 12

APPENDIX A – Supply .....
APPENDIX B – Occupancy .....
APPENDIX C – Adequacy .....
APPENDIX D – Site Development Options .....

LIST OF TABLES AND FIGURES

Table 1: Parking Supply Summary 3
Table 2: Parking Occupancy Summary – Weekday Afternoon 4
Table 3: Weekday Peak Parking Adequacy Summary 5
Table 4: Proposed Future Parking Supply 6
Table 5: Current and Future Drive Ratios 7
Table 6: Future Parking Demand 8
Table 7: Future Adequacy 9
Talbe 8: Projected Parking for New Residential Development 9
Table 9: TOD Parking Requirements 10
Table 10: Cost Comparison - Parking Development Options 12

Figure 1: Study Area 2

EXECUTIVE SUMMARY

Walker Parking Consultants was retained to provide the City of Somerville with a planning analysis of parking in the Union Square area. The goal of the study is to aid the City in planning for future development in the area by providing projections of future parking demand and evaluating sites for potential parking structure development.

Future development in the area will include CCD, NB and TOD developments. TOD developments will provide parking on site to accommodate their anticipated demand. CCD and NB developments will likely be part of a shared parking solution in the district, using a pool of public parking. The current study thus focuses on the demand generated by these developments.

Walker conducted a parking occupancy study and determined that there is a small surplus of public parking under current conditions. Using build-out projections provided by the City, Walker created a shared parking model for possible CCD and NB developments, and combined the projected demand with existing conditions in the area. Our analysis found that the study area will experience a deficit of approximately 825± spaces if build-out occurs as outlined. Residential development would add a demand for 485± spaces. TOD developments within the study area will require an additional 3,965± spaces to meet zoning regulations.

To help the City begin to plan for parking development to accommodate the anticipated growth, Walker evaluated five possible development sites. The locations are shown in Appendix D. Of the five, one cannot accommodate any parking facility and one can accommodate only a small surface lot (a negligible gain in spaces). A third site is a TOD block that could accommodate a sizable garage that could be shared between private and public uses. However, it is estimated that once the private uses are accommodated, the site would provide only about 82 spaces to the general public, and thus won't contribute enough to offset projected deficits.

The final two sites (sites 3 and 5 in the appendix) are the best options. The number of spaces provided in these garages would depend on financial and aesthetic decisions regarding the number of levels above- and below-grade the City wanted to build. Assuming one below-grade level and five above-grade levels, each of these sites could accommodate over 550 stalls.

PROJECT UNDERSTANDING

The City of Somerville is anticipating significant redevelopment of the area around Union Square, and has retained Walker to help plan for the parking needs the new development will generate. To that end, the goal of this study is to project future parking demand in the Union Square area, and to provide a preliminary assessment of possible sites for parking construction.

Current plans suggest three types of development in the area. Two of these – designated CCD and NB – are expected to integrate their parking to the public supply. The third type of development (TOD) will be privately owned and will accommodate all parking on site. Because the TOD developments are anticipated to neither contribute to the public parking supply nor add to the demand on public facilities, they are excluded from this study (though a zoning calculation is provided for reference). The study projects the impact of CCD and NB development on the parking supply, and projects the amount of additional parking that will be needed to serve the projected growth.

STUDY AREA

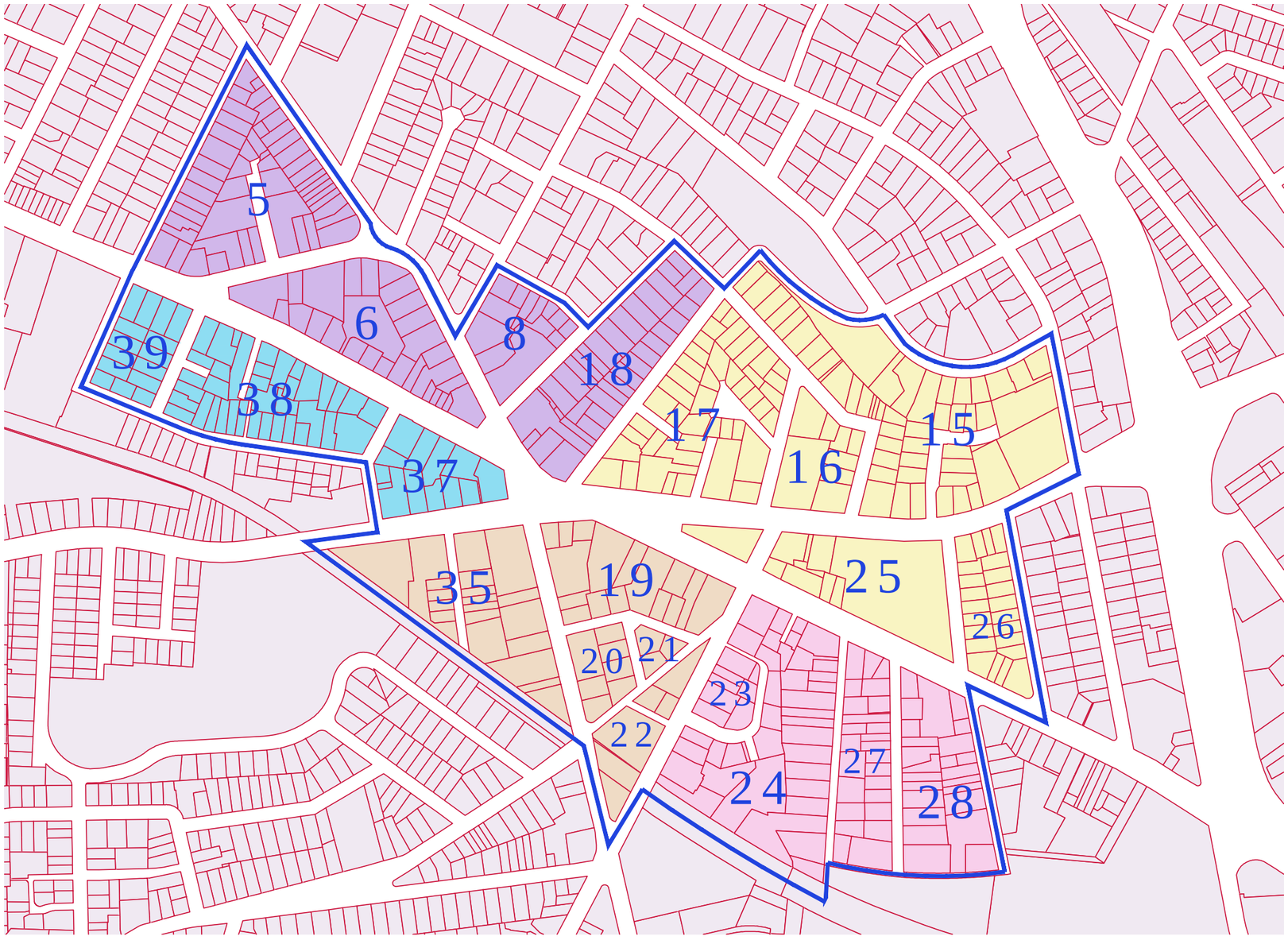
The study area, defined by the City and Howard/Stein-Hudson, consists of 21 city blocks located around Union Square. A map of the study area, divided up into subareas used throughout our analysis, is provided in the following figure.

Please note that a few of the blocks included in the study area are designated for TOD projects. We have not projected demand for these TOD developments. However, insofar as these blocks either (a) contribute to the public parking supply and/or (b) are part of our calculation of CCD or NB demand[1], they are included in the area.

[1] Because CCD and NB boundaries do not correspond exactly with Walker's block numbers, demands for these developments were distributed across several blocks.

UNION SQUARE
SOMERVILLE, MA
Page 2

WALKER
PARKING CONSULTANTS



AREA PLAN - GROUND
1" = 200'-0"

- AREA: A
- AREA: B
- AREA: C
- AREA: D
- AREA: F

LEGEND

September 12, 2009

NORTH

CURRENT CONDITIONS

PARKING SUPPLY

Parking in the study area is available in several forms. There is on-street parking available to visitors (referred to here as "on-street public" parking), as well as on-street parking that is restricted to residents with permits ("on-street permit"). Off-street parking is also a mix of public and private spaces; private spaces are associated with a particular business and are restricted to use by that business's visitors and employees. Public off-street parking is provided in two City-owned lots, and is referred to here as "off-street commercial" parking.

Walker's inventory survey found a total of 1,231± spaces in the study area, comprised of 616± on-street spaces and 615± off-street spaces. The combined on- and off-street inventory available to the public is 318± spaces. The table below summarizes the parking supply by zone. A complete block-by-block listing of the parking supply is provided in Appendix A.

Table 1: Parking Supply Summary

	Supply				
Zone	**On-Street Public**	**On-Street Permit**	**Off-Street Commercial**	**Off-Street Private**	**Total**
Zone A	108	75	0	170	353
Zone B	39	71	0	55	165
Zone C	78	146	32	112	368
Zone D	10	20	0	113	143
Zone F	51	18	0	133	202
Total	**286**	**330**	**32**	**583**	**1,231**

Source: Walker Parking Consultants, 2009

PARKING OCCUPANCY

To determine the parking patterns of patrons in the study area, the usage of the parking facilities in the area was evaluated. Occupancy counts were taken for all on- and off-street parking spaces on Thursday, February 19th, 2009 and Saturday, February 21st, 2009. Three counts were taken between 10:00 a.m. and 9:00 p.m. The peak level of demand occurred during the 3:00 p.m. weekday count, and thus this count is used as the basis of our analysis. We project that weekdays will continue to be the peak as future development occurs, due to the large amount of office space that is anticipated to be added in the area. The counts are summarized by subarea in Table 2.

Table 2: Parking Occupancy Summary – Weekday Afternoon

	Supply					Peak Occupancy				
Zone	On-Street Public	On-Street Permit	Off-Street Commercial	Off-Street Private	Total	On-Street Public	On-Street Permit	Off-Street Commercial	Off-Street Private	Total
Zone A	108	75	0	170	353	81	59	0	108	248
Zone B	39	71	0	55	165	28	42	0	30	100
Zone C	78	146	32	112	368	46	91	25	100	262
Zone D	10	20	0	113	143	7	14	0	67	88
Zone F	51	18	0	133	202	35	18	0	59	112
Total	**286**	**330**	**32**	**583**	**1,231**	**197**	**224**	**25**	**364**	**810**

Source: Walker Parking Consultants, 2009

OPTIMIZED DEMAND FACTOR

A parking supply cannot operate efficiently when every space in the system is full. Above occupancy levels of 85 percent to 95 percent (depending on the type of supply and typical user), patrons are likely to experience delays and frustration while searching for a space, and to create congestion on streets and in the aisles of off-street facilities as they circle around looking for a space. The parking supply may be perceived as inadequate even though there are some spaces available. In addition, misparked vehicles, debris and minor construction may reduce the available inventory, such that it is impossible to use all the spaces in the supply.

With that in mind, we adjust our occupancy counts upward to incorporate a circulation cushion of empty spaces above the actual number of cars. This adjustment, or "optimum utilization factor," allows us to gauge more accurately the adequacy of the parking system to meet patron demand while maintaining an appropriate circulation cushion.

The adjustment varies depending on the user type and parking supply. Since on-street spaces require more circulation cushion and tend to be used by high-turnover cars and by people less familiar with the ins and outs of the local parking system, we add a 15 percent cushion to on-street parking. Because off-street lots have less congestion impact, typically lower turnover and more familiar users, we assign a 5 percent cushion to those areas.

The adjusted occupancy counts are compared to supply, along with the resulting adequacy in Table 3. Details by block are located in Appendix B.

Table 3: Weekday Peak Parking Adequacy Summary

	Supply					Optimized Peak Occupancy					Adequacy					
Zone	On-Street Public	On-Street Permit	Off-Street Comm-ercial	Off-Street Private	Total	On-Street Public	On-Street Private	Off-Street Comm-ercial	Off-Street Private	Total	On-Street Public	On-Street Private	Off-Street Comm-ercial	Off-Street Private	Total	Total -- Public Only
Zone A	108	75	0	170	353	93	68	0	113	274	15	7	0	57	79	15
Zone B	39	71	0	55	165	32	48	0	32	112	7	23	0	24	53	7
Zone C	78	146	32	112	368	53	105	28	105	290	25	41	5	7	78	30
Zone D	10	20	0	113	143	8	16	0	70	95	2	4	0	43	49	2
Zone F	51	18	0	133	202	40	21	0	62	123	11	(3)	0	71	79	11
Total	**286**	**330**	**32**	**583**	**1,231**	**227**	**258**	**28**	**382**	**894**	**59**	**72**	**5**	**201**	**337**	**64**

Source: Walker Parking Consultants, 2009

Occupancy rates as a whole do not indicate a shortage of parking. Overall, a surplus of approximately 64 public spaces (and 337 overall) was recorded in the 21-block study area, and no single area showed a deficit. Zones B and D, with the smallest inventories, had almost negligible surpluses; however, parking was available on nearby blocks.

FUTURE PARKING CONDITIONS

There are basically two different methods for projecting future parking volumes. One method involves the use of historical growth rates. The other method involves the collection of information regarding the proposed development that is likely to occur in terms of land use and square footage changes. This information regarding future developments allows the projecting of vehicular volumes and parking demands for these new uses. For the purposes of this analysis, we utilize the second methodology; build-out scenarios have been developed by Howard/Stein-Hudson and used for projecting parking demand by land use type and area.

FUTURE PARKING SUPPLY

Howard/Stein-Hudson provided Walker with information on proposed changes to the existing parking supply within the study area.[2] Two blocks are expected to experience changes in the on- and off-street parking supply. Block 17 is anticipated to decrease its current inventory by 44 spaces, but add 19 on-street spaces. On Block 19, 6 on-street spaces will be removed due to development.

[2] It should be noted that street reconfiguration scenarios are still in the planning stages, and there is not yet a definite plan. We have used the scenario that Howard/Stein-Hudson assumes is most likely.

Table 4: Proposed Future Parking Supply

	Supply					Future Supply					Change in Supply				
Zone	On-Street Public	On-Street Permit	Off-Street Comm-ercial	Off-Street Private	Total	On-Street Public	On-Street Private	Off-Street Comm-ercial	Off-Street Private	Total	On-Street Public	On-Street Private	Off-Street Comm-ercial	Off-Street Private	Total
Zone A	108	75	0	170	353	108	75	0	170	353	0	0	0	0	0
Zone B	39	71	0	55	165	39	71	0	55	165	0	0	0	0	0
Zone C	78	146	32	112	368	85	146	0	112	343	7	0	(32)	0	(25)
Zone D	10	20	0	113	143	10	20	0	113	143	0	0	0	0	0
Zone F	51	18	0	133	202	45	18	0	133	196	(6)	0	0	0	(6)
Total	**286**	**330**	**32**	**583**	**1,231**	**287**	**330**	**0**	**583**	**1,200**	**1**	**0**	**(32)**	**0**	**(31)**

Source: Howard/Stein-Hudson, Walker Parking Consultants, 2009

PROJECTED PARKING DEMAND

There are several proposed urban renewal and new downtown development projects that may directly impact public parking in downtown Somerville. Per discussion with City staff, Howard/Stein-Hudson provided Walker with existing and future land use data for the downtown Somerville area. The development will add significant retail, dining, office and residential square footage to the area.

In addition to new downtown development, transit options in the area are expected to improve with the extension of the Green Line.

There are two primary variables applied to the calculation of peak accumulation for new developments: 1) the total gross floor area (GFA), number of hotel rooms, seating capacity, etc. for each type of proposed land use (i.e. office, retail, restaurant, etc.), and 2) the appropriate parking demand ratio. The following section provides a discussion on the use of shared parking methodology when calculating the appropriate demand ratio to use for each type of land use in this analysis.

SHARED PARKING METHODOLOGY

Shared parking is defined as parking spaces that can be used to serve two or more individual land uses without conflict or encroachment. One of the fundamental principles of downtown planning from the earliest days of the automobile has always been to share parking resources rather than to have each use or building have its own parking. The resurgence of many central cities resulting from the addition of vibrant residential, retail, restaurant and entertainment developments continues to rely heavily on shared parking for economic viability. In addition, mixed-use projects in many different settings have benefited from shared parking. There are numerous benefits of shared parking to a community at large, not the least of which is the environmental benefit of significantly reducing the square feet of parking provided to serve commercial development.

Shared parking results in lower parking demand than "cornfield" (i.e., stand-alone) parking for two reasons. One is the different peak hours of operation for different land uses in many mixed-use environments. The clearest example of this kind of sharing is when an office building and a cinema are in close proximity. The office will require its maximum parking during the day on a weekday, while the cinema will require its maximum parking on a weekend evening. Thus a large number of the spaces needed by each of these uses can be shared between the two. Other combinations of land uses may not have as high a level of sharing potential, but generally a mixed-use area will see some benefit from the mix of different uses.

Calculation of Project Ratio
Base Ratio
X
Non-Captive Ratio
X
Monthly Adjustment Factor
X
Peak Hourly Adjustment Factor
X
Drive Ratio
=
Project Ratio

Shared parking opportunities also take the form of "captive markets." Where there is a mix of land use types in close proximity, the synergy between them produces a reduction in overall parking demand. For example, a substantial percentage of patrons at a restaurant at noon are likely to work in a nearby office building. Since these patrons are already parked in the neighborhood for the day, they can create business for the restaurant without generating parking demand.

The shared parking methodology starts with "base" parking demand ratios (spaces generated per 1,000 square feet of development) that have been established through research for the Institute for Transportation Engineers, Urban Land Institute and other industry research organizations. These ratios describe stand-alone "cornfield" land uses. To adjust the ratios to local area conditions, the ratios are adjusted for shared parking synergy as outlined above. An additional local adjustment is made for alternative transportation usage (public transit, walking, biking, etc.) in the specific project location. Walker assumed two different drive ratios in the analysis, both of which were provided by Howard/Stein-Hudson per discussion with MBTA. The demand associated with the existing retail, restaurant and office space was calculated using a drive ratio of 62%, representing the mode split prior to the extension of the green line. As new development replaced the existing land uses, and the green line became operational, a reduction in the drive ratio was expected. The demand associated with the planned retail, restaurant, office and residential space within the study area was calculated with a 52% drive ratio. The table below summarizes the drive ratios Walker utilized in projecting future demand in Somerville.

Table 5: Current and Future Drive Ratios

	Weekday		Weekend	
	Daytime	**Evening**	**Daytime**	**Evening**
Current	62%	67%	67%	72%
Future	52%	57%	57%	62%

Source: Walker Parking Consultants, Howard/Stein-Hudson, 2009

FUTURE PARKING DEMAND

Summarized in the following table is the projected peak parking demand during typical weekday conditions for the study area. Walker assumed that some parking for the planned residential uses in the downtown area would be reserved. Parking demand within the study area is expected to increase by approximately 1,350 spaces once the Green Line is operational and the future developments are fully absorbed into the community.

Table 6: Future Parking Demand

	Current Optimized Peak Occupancy					Changes in Peak Occupancy					Future Peak Occupancy					
Zone	On-Street Public	On-Street Private	Off-Street Commercial	Off-Street Private	Total	On-Street Public	On-Street Private	Off-Street Commercial	Off-Street Residential	Total	On-Street Public	On-Street Private	Off-Street Commercial	Off-Street Private	Off-Street Residential	Total
Zone A	93	68	0	113	274	0	0	201	133	333	93	68	201	113	133	607
Zone B	32	48	0	32	112	0	0	76	102	178	32	48	76	32	102	290
Zone C	53	105	28	105	290	0	0	212	152	364	53	105	239	105	152	654
Zone D	8	16	0	70	95	0	0	75	10	84	8	16	75	70	10	179
Zone F	40	21	0	62	123	0	0	298	88	387	40	21	298	62	88	510
Total	**227**	**258**	**28**	**382**	**894**	**0**	**0**	**860**	**485**	**1,345**	**227**	**258**	**888**	**382**	**485**	**2,239**

Source: Walker Parking Consultants, 2010

Table 7 on the next page summarizes the adequacy of the downtown parking system, should all the planned developments in the area come to fruition. Currently minimal changes to the future parking supply are expected, while future parking demand is expected to increase significantly. A peak deficit of approximately 830± spaces is expected to occur in the downtown area. In addition, we project a need for 485± spaces to accommodate planned residential development, as outlined in Table 8.

Table 7: Future Adequacy

Zone	Future Peak Occupancy						Future Supply					Future Adequacy					
	On-Street Public	On-Street Private	Off-Street Public	Off-Street Private	Off-Street Residential	Total	On-Street Public	On-Street Private	Off-Street Public	Off-Street Private	Total	On-Street Public	On-Street Private	Off-Street Commercial	Off-Street Private	Total	Adequacy - Public/ Commercial
Zone A	93	68	201	113	133	607	108	75	0	170	353	15	7	(201)	57	(122)	(186)
Zone B	32	48	76	32	102	290	39	71	0	55	165	7	23	(76)	24	(23)	(69)
Zone C	53	105	239	105	152	654	85	146	0	112	343	32	41	(239)	7	(159)	(207)
Zone D	8	16	75	70	10	179	10	20	0	113	143	2	4	(75)	43	(26)	(73)
Zone F	40	21	298	62	88	510	45	18	0	133	196	5	(3)	(298)	71	(225)	(293)
Total	**227**	**258**	**888**	**382**	**485**	**2,239**	**287**	**330**	**0**	**583**	**1,200**	**60**	**72**	**(888)**	**201**	**(554)**	**(827)**

Source: Walker Parking Consultants, 2010

Table 8: Projected Parking for New Residential Development

Zone	Off-Street Residential
Zone A	133
Zone B	102
Zone C	152
Zone D	10
Zone F	88
Total	**485**

Source: Walker Parking Consultants, 2010.

TRANSIT ORIENTED DEVELOPMENT (TOD) DEMAND

Private TOD projects are anticipated within (blocks 23, 24, 25) and beyond Walker's study area. These developments will be located along the rail line in what is currently an industrial area. Per discussion with City staff, our analysis has assumed that these developments will provide their own parking on site. For the purposes of providing a preliminary projection of the parking these developments will likely need to provide, we used City code to calculate requirements for these developments. Again, it is important to note that these projects will build parking to accommodate their demand on site. It is worth noting, too, that with the exception of TOD 55-1, 85-1 and 100-1-1, the developments will be outside the study area.

The new land uses associated with the TOD developments are expected to provide nearly 4,000 spaces to meet code requirements.

Table 9: TOD Parking Requirements

	Development Zone	Parking Required by Code*
In Study Area:	TOD 55-1	354
	TOD 85-1	442
	TOD 100-1-1	583
	Subtotal	**1,379**
Outside Study Area:	TOD 100-1-2	539
	TOD 85-2	330
	TOD 135-1	865
	TOD 135-2	218
	TOD 55-2	131
	TOD 135-5	28
	TOD 100-2	161
	TOD 135-3	36
	TOD 135-4	278
	Subtotal	**2,586**
	Total	**3,965**

**Section 9.17.1, Ordinance No. 2009-03*

Source: Walker Parking Consultants, 2010

SUMMARY – PARKING DEMAND ANALYSIS

Assuming build-out occurs as projected, we project that the five subareas in our study area will experience an 827± space deficit at peak times. Another 485± spaces will be needed to accommodate residential development. TOD developments in and around our study area are projected to generate a demand for 3,965± spaces.

PARKING DEVELOPMENT OPTIONS

In order to help the City evaluate the value of potential garage sites, Walker created preliminary layouts to project the number of stalls and cost of different parking options. Based on conversation with City staff, Howard/Stein-Hudson provided Walker with five possible sites for additional parking development. An overview of the sites is provided in Appendix D, along with preliminary layouts for each garage.

Site 1
At its widest, Site 1 is only 42 feet wide, which is not wide enough to allow for the ramping needed to build a multi-story structure. A single-loaded module of angled parking could be striped along the length of the site, resulting in approximately 14 surface spaces.

Site 2
Site 2 is not wide enough to allow for any ramping to get above the train tracks, and thus cannot be used for a parking facility.

Site 3
Site 3 is currently used for surface parking and also has buildings on the site. Buildings fronting Somerville Avenue will only allow for two bays above grade, on the Washington Street side. Shallower retail would increase the parking count. Since an underground facility would have no retail frontage, it allows for more spaces – most of the block can be used for underground parking. However, below-grade parking is generally less efficient on a square foot per stall basis, because short span construction is generally used and the floors must be mechanically ventilated and sprinkled. This leads to additional loss of parking efficiency when compared to the above-grade parking typical parking floor, and thus the space gain is mitigated. Furthermore, the per-space cost of below-grade parking is extremely high. Costs will be compared in Table 10.

Site 4
Site 4 includes Bennett Street within its boundaries. Most of this site will be a TOD development, with buildings fronting Prospect Street. A garage located here would thus be shared between public and private uses. The garage could be located behind (south of) the buildings, with access via Prospect Street. At- and above-grade levels could accommodate two bays. Below grade the garage could be extended under the buildings, allowing for a larger, three-bay floorplate. Because this site needs to accommodate TOD parking, its value for public parking may be limited – the garage would need to go many levels above or below grade to accommodate all of the private demand plus public spaces.

Site 5
Site 5 currently has retail fronting on Bow Street with surface parking behind the retail. Per discussion with Howard-Stein/Hudson and the city, we understand that a preferred option would be to keep the current configuration at grade, and have the garage extend over the retail on upper levels. Our proposed configuration would allow grade-level retail, though it would probably not be feasible to leave the existing buildings – generally such buildings are rebuilt as part of the garage structure. It should be noted that the City would likely have to purchase a small piece of property on the east side of the garage.

COST COMPARISON

Cost comparisons are provided in the table below. The following should be noted:

- These are order-of-magnitude projections for the purposes of comparison and budget planning only.
- The first table projects cost and space count for five-level, above-grade facilities. The second table projects cost and space count for six-level facilities with one level below grade.
- Projections for Site 3, 4 and 5 deduct existing surface spaces to arrive at a cost per net stall.
- Sites 3, 4 and 5 can provide more parking if retail is omitted.
- The "adjusted stalls" column in the table below adjusted the conceptual stall count to adjust for ADA stalls, elevator and stair towers, parking equipment, mechanical rooms and other items that are not included in a conceptual parking layout.

Table 10: Cost Comparison - Parking Development Options

	Five-level Structure - All Above Grade						
Site	Sq. Ft.	Stalls	Adj. Stalls	Cost/SF[1]	Cost	Cost/Net Stall	SF/Net Stall
1	6,800	14	14	10	68,000	4,857	486
2	8,200	Parking Not Feasible on This Site					
3	130,629	382	337	85	11,103,465	32,948	388
4 - All[2]	137,940	459	410	85	11,724,900	28,597	336
4 - City[2]			82		0		
5	166,266	524	467	85	14,132,610	30,263	356

	Six-level Structure Including One Level Below Grade						
Site	Sq. Ft.	Stalls	Adj. Stalls	Cost/SF[1]	Cost	Cost/Net Stall	SF/Net Stall
1	6,800	14	14	10	68,000	4,857	486
2	8,200	Parking Not Feasible on This Site					
3	221,302	646	574	132	29,238,065	50,937	386
4 - All[2]	246,568	714	639	136	33,450,500	52,348	386
4 - City[2]			82		0		
5	217,195	632	564	104	22,489,565	39,875	385

Notes:

(1) Costs exclude demolition, site preparation, soft costs, land acquisition.

(2) "All" includes overall development for the site. "City" refers to spaces for public use within the facility. The site is zoned TOD. Full build-out of the parking would accommodate the TOD's code requirements plus an additional 82 spaces. We assume these spaces would be made available for City use.

Source: Walker Parking Consultants, 2010

APPENDICES

WALKER
PARKING CONSULTANTS

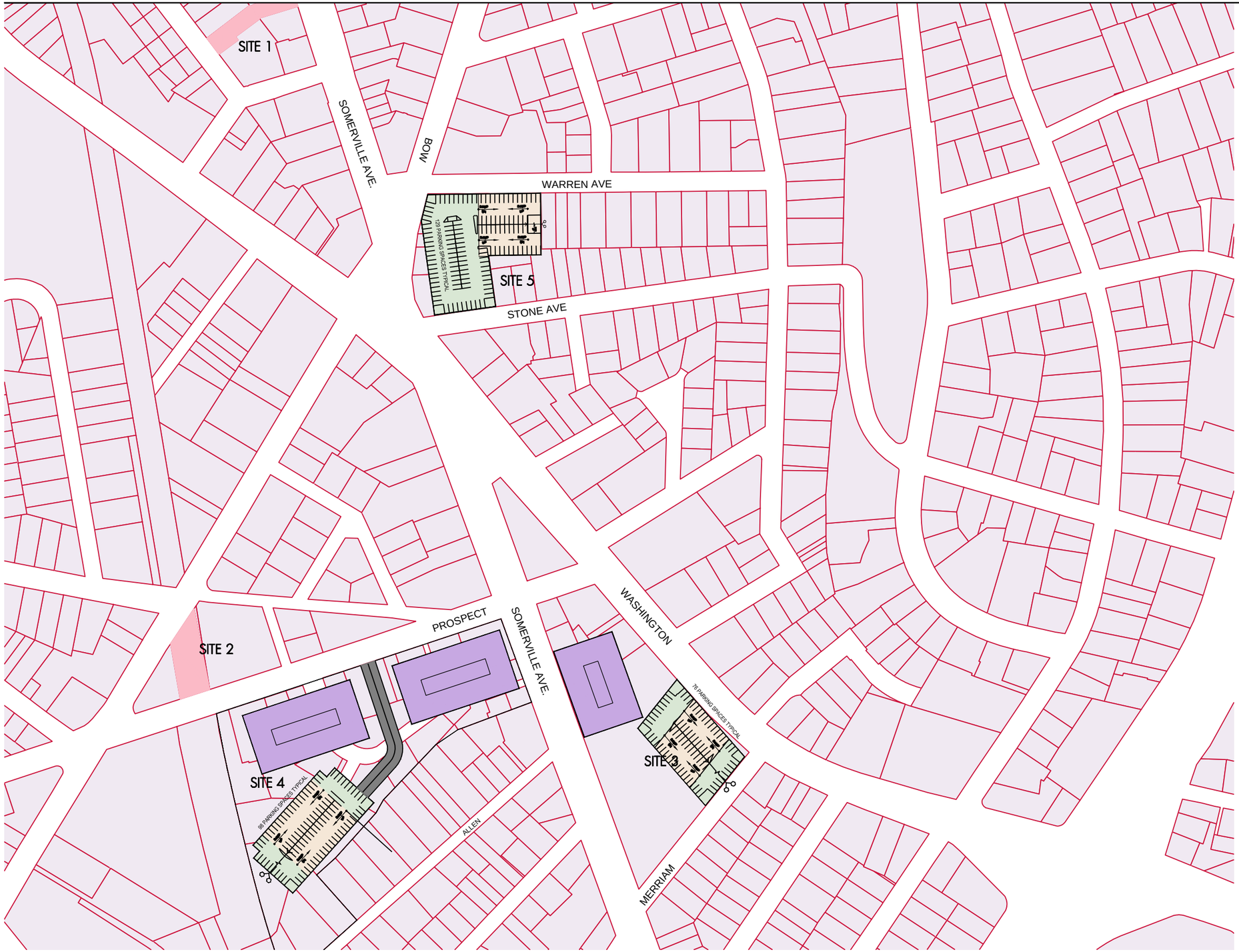
Block	Supply				
	On-Street Public	On-Street Permit	Off-Street Public	Off-Street Private	Total
5	34	29	0	12	75
6	57	0	0	16	73
8	17	14	0	45	76
15	0	44	0	34	78
16	14	12	0	0	26
17	43	50	32	8	133
18	0	32	0	97	129
19	20	6	0	48	74
20	11	0	0	0	11
21	0	12	0	0	12
22	0	0	0	0	0
23	0	0	0	0	0
24	6	0	0	36	42
25	12	12	0	70	94
26	9	28	0	0	37
27	1	0	0	8	9
28	3	20	0	69	92
35	20	0	0	85	105
37	16	12	0	0	28
38	19	37	0	55	111
39	4	22	0	0	26
Total	**286**	**330**	**32**	**583**	**1,231**

	Peak Occupancy					Optimized Peak Occupancy				
Block	**On-Street Public**	**On-Street Permit**	**Off-Street Public**	**Off-Street Private**	**Total**	**On-Street Public**	**On-Street Private**	**Off-Street Public**	**Off-Street Private**	**Total**
5	19	26	0	8	53	22	30	0	8	60
6	45	0	0	16	61	52	0	0	17	69
8	17	6	0	29	52	20	7	0	30	57
15	0	20	0	25	45	0	23	0	26	49
16	11	4	0	0	15	13	5	0	0	17
17	20	36	25	5	86	23	41	28	5	97
18	0	27	0	55	82	0	31	0	58	89
19	20	6	0	27	53	23	7	0	28	58
20	7	0	0	0	7	8	0	0	0	8
21	0	12	0	0	12	0	14	0	0	14
22	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0
24	3	0	0	23	26	3	0	0	24	28
25	9	12	0	70	91	10	14	0	74	98
26	6	19	0	0	25	7	22	0	0	29
27	1	0	0	3	4	1	0	0	3	4
28	3	14	0	41	58	3	16	0	43	63
35	8	0	0	32	40	9	0	0	34	43
37	13	10	0	0	23	15	12	0	0	26
38	14	21	0	30	65	16	24	0	32	72
39	1	11	0	0	12	1	13	0	0	14
Total	**197**	**224**	**25**	**364**	**810**	**227**	**258**	**28**	**382**	**894**

	Supply					Optimized Peak Occupancy					Adequacy					
Block	On-Street Public	On-Street Permit	Off-Street Public	Off-Street Private	Total	On-Street Public	On-Street Private	Off-Street Public	Off-Street Private	Total	On-Street Public	On-Street Private	Off-Street Public	Off-Street Private	Total	Total Public Only
5	34	29	0	12	75	22	30	0	8	60	12	(1)	0	4	15	12
6	57	0	0	16	73	52	0	0	17	69	5	0	0	(1)	4	5
8	17	14	0	45	76	20	7	0	30	57	(3)	7	0	15	19	(3)
15	0	44	0	34	78	0	23	0	26	49	0	21	0	8	29	0
16	14	12	0	0	26	13	5	0	0	17	1	7	0	0	9	1
17	43	50	32	8	133	23	41	28	5	97	20	9	5	3	36	25
18	0	32	0	97	129	0	31	0	58	89	0	1	0	39	40	0
19	20	6	0	48	74	23	7	0	28	58	(3)	(1)	0	20	16	(3)
20	11	0	0	0	11	8	0	0	0	8	3	0	0	0	3	3
21	0	12	0	0	12	0	14	0	0	14	0	(2)	0	0	(2)	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	6	0	0	36	42	3	0	0	24	28	3	0	0	12	14	3
25	12	12	0	70	94	10	14	0	74	98	2	(2)	0	(4)	(4)	2
26	9	28	0	0	37	7	22	0	0	29	2	6	0	0	8	2
27	1	0	0	8	9	1	0	0	3	4	(0)	0	0	5	5	(0)
28	3	20	0	69	92	3	16	0	43	63	(0)	4	0	26	29	(0)
35	20	0	0	85	105	9	0	0	34	43	11	0	0	51	62	11
37	16	12	0	0	28	15	12	0	0	26	1	1	0	0	2	1
38	19	37	0	55	111	16	24	0	32	72	3	13	0	24	39	3
39	4	22	0	0	26	1	13	0	0	14	3	9	0	0	12	3
Total	**286**	**330**	**32**	**583**	**1,231**	**227**	**258**	**28**	**382**	**894**	**59**	**72**	**5**	**201**	**337**	**64**

UNION SQUARE
SOMERVILLE, MA

WALKER PARKING CONSULTANTS



AREA PLAN - AERIAL

1" = 200'-0"

LEGEND

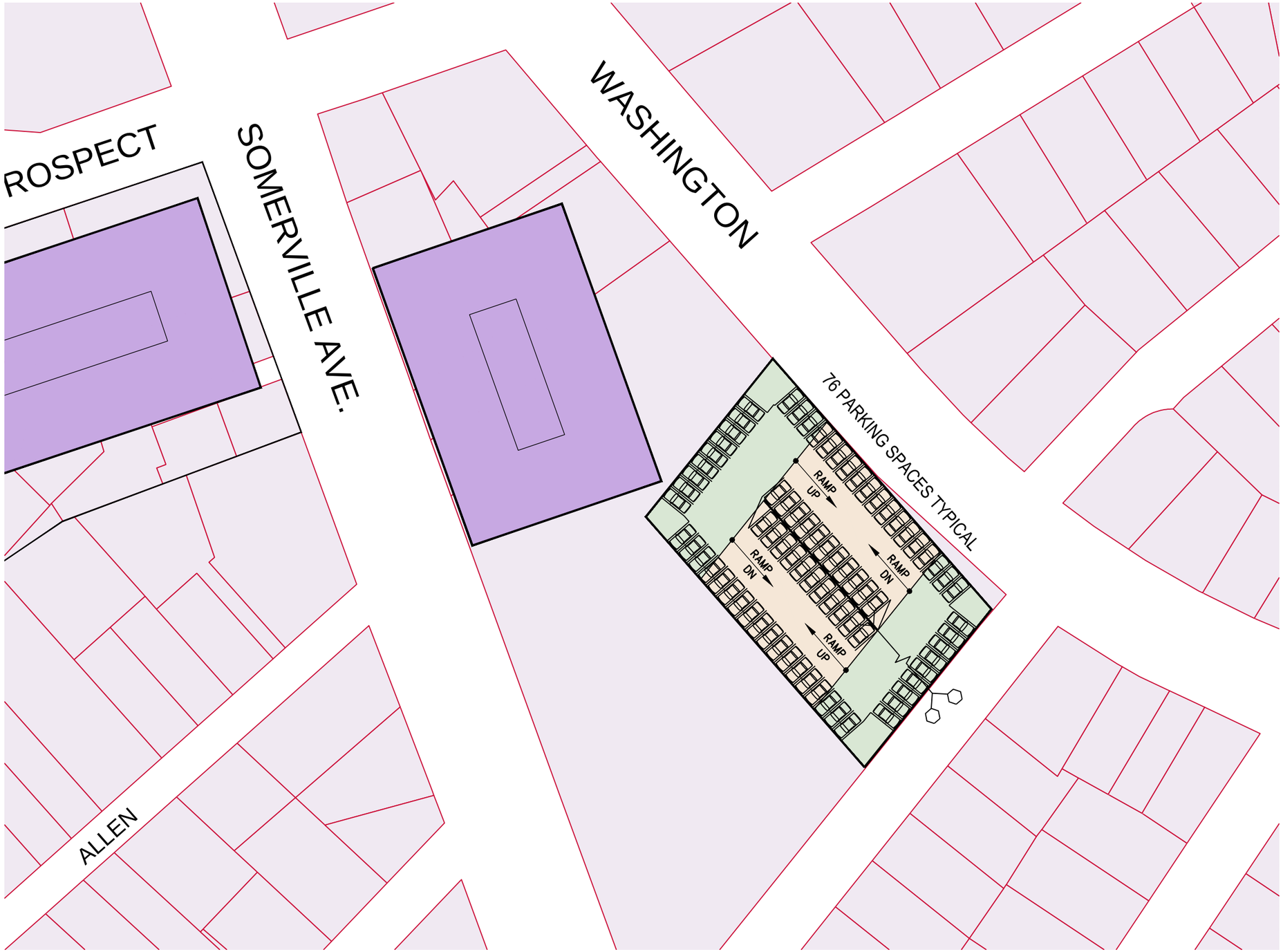
February 9, 2010

NORTH

Appendix D-1

UNION SQUARE
SOMERVILLE, MA

WALKER
PARKING CONSULTANTS



SITE 3 - TYPICAL FLOOR

1" = 64'-0"

LEGEND

February 9, 2010

NORTH

Appendix D-2

UNION SQUARE
SOMERVILLE, MA

WALKER
PARKING CONSULTANTS

SITE 4 - TYPICAL FLOOR
1" = 64'-0"

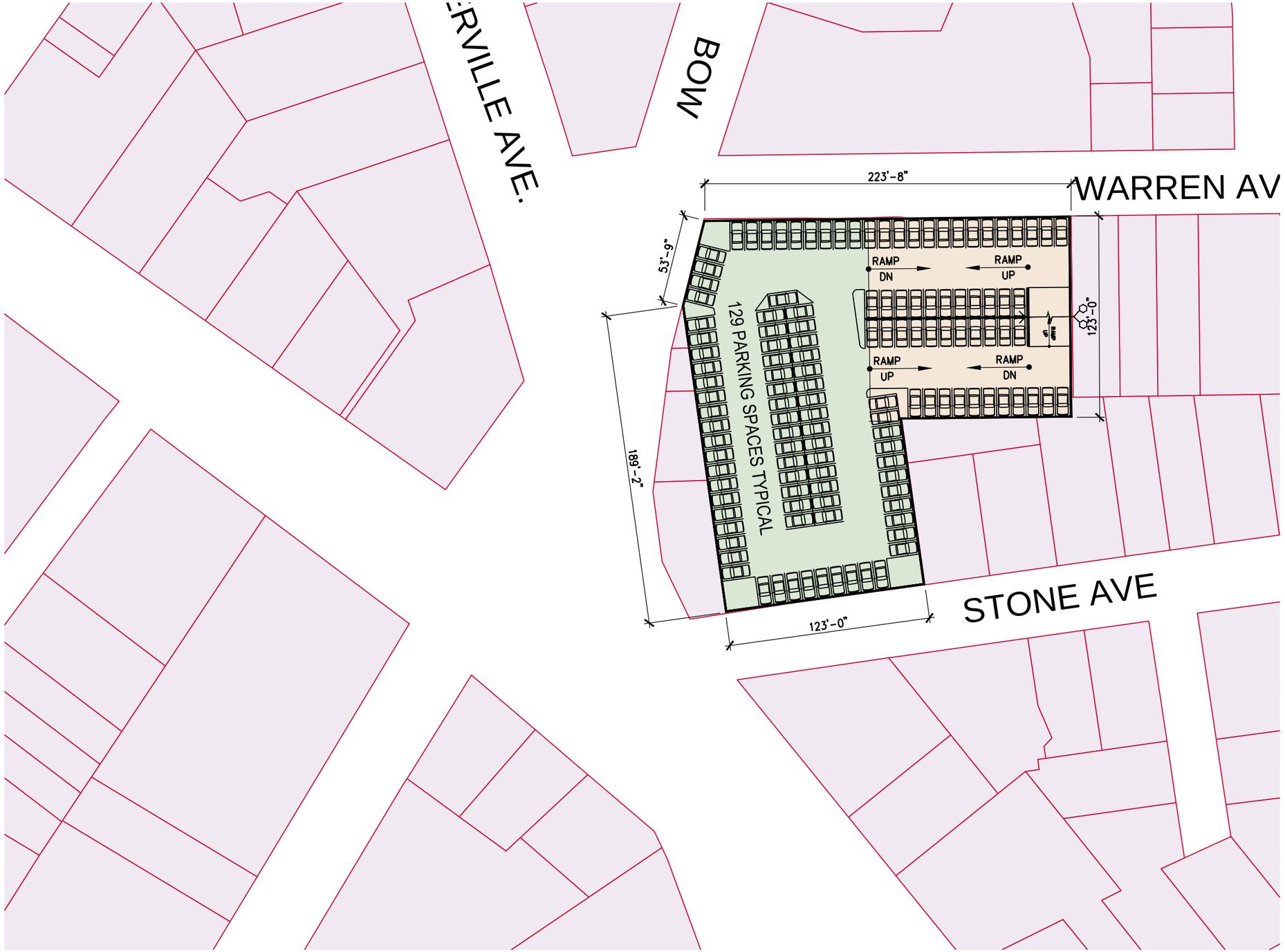
LEGEND

February 9, 2010

NORTH

UNION SQUARE
SOMERVILLE, MA

WALKER
PARKING CONSULTANTS



SITE 5 - TYPICAL FLOOR

1" = 64'-0"

LEGEND

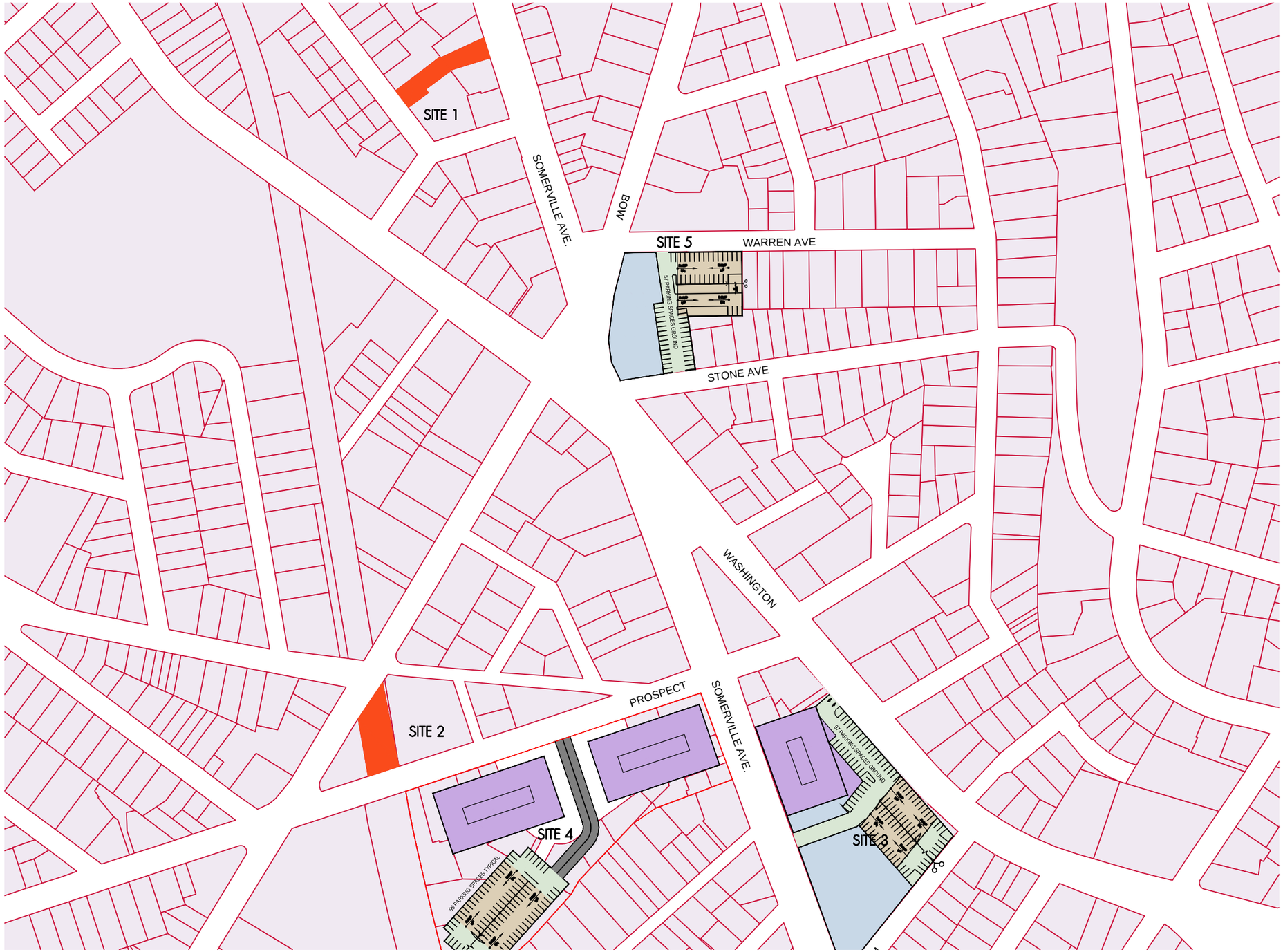
February 9, 2010

NORTH

UNION SQUARE
SOMERVILLE, MA

WALKER PARKING CONSULTANTS

AREA PLAN - GROUND
1" = 200'-0"



LEGEND

September 12, 2009

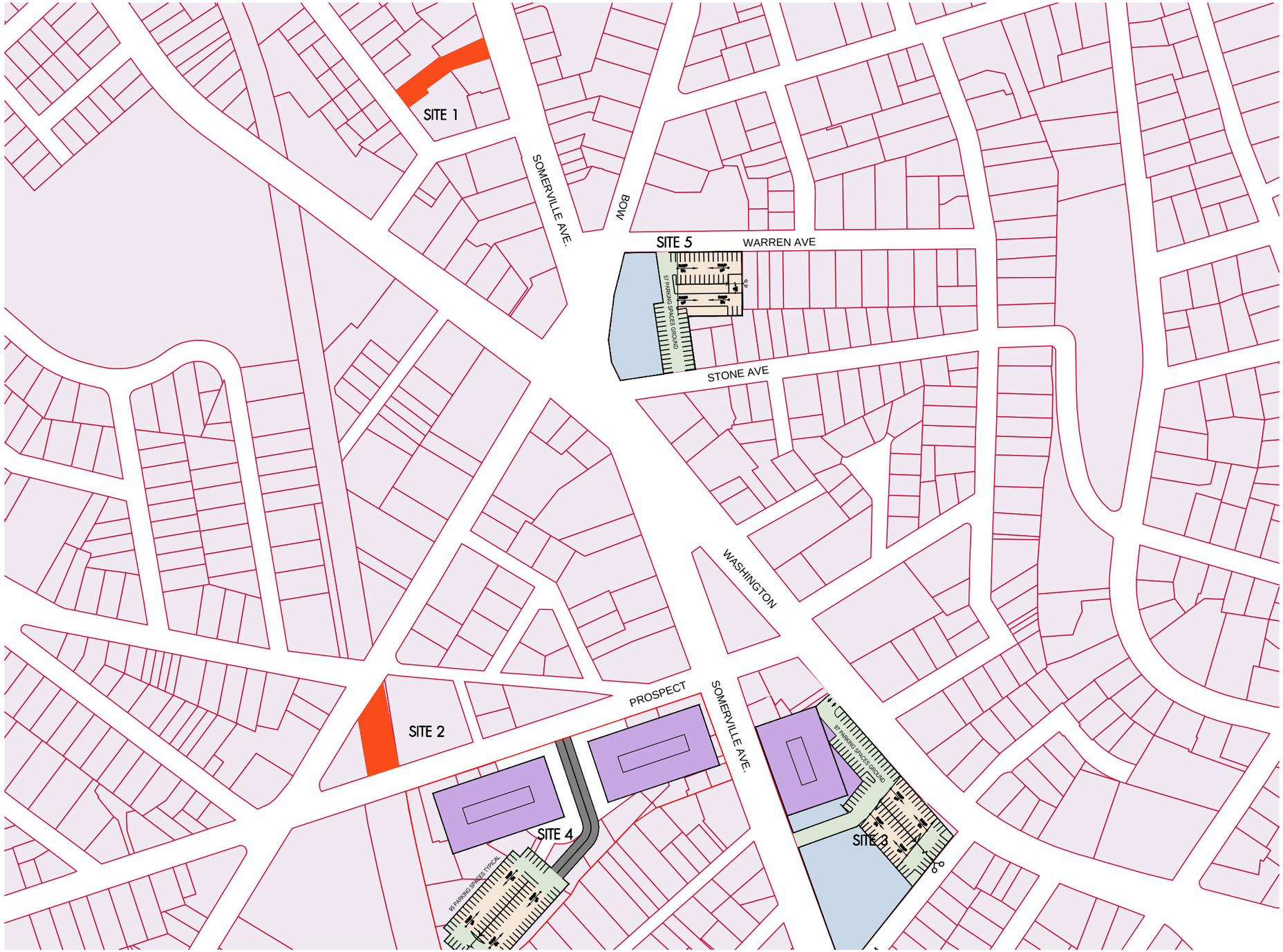
NORTH

Appendix D-5

UNION SQUARE
SOMERVILLE, MA

WALKER PARKING CONSULTANTS

AREA PLAN - GROUND
1" = 200'-0"



LEGEND

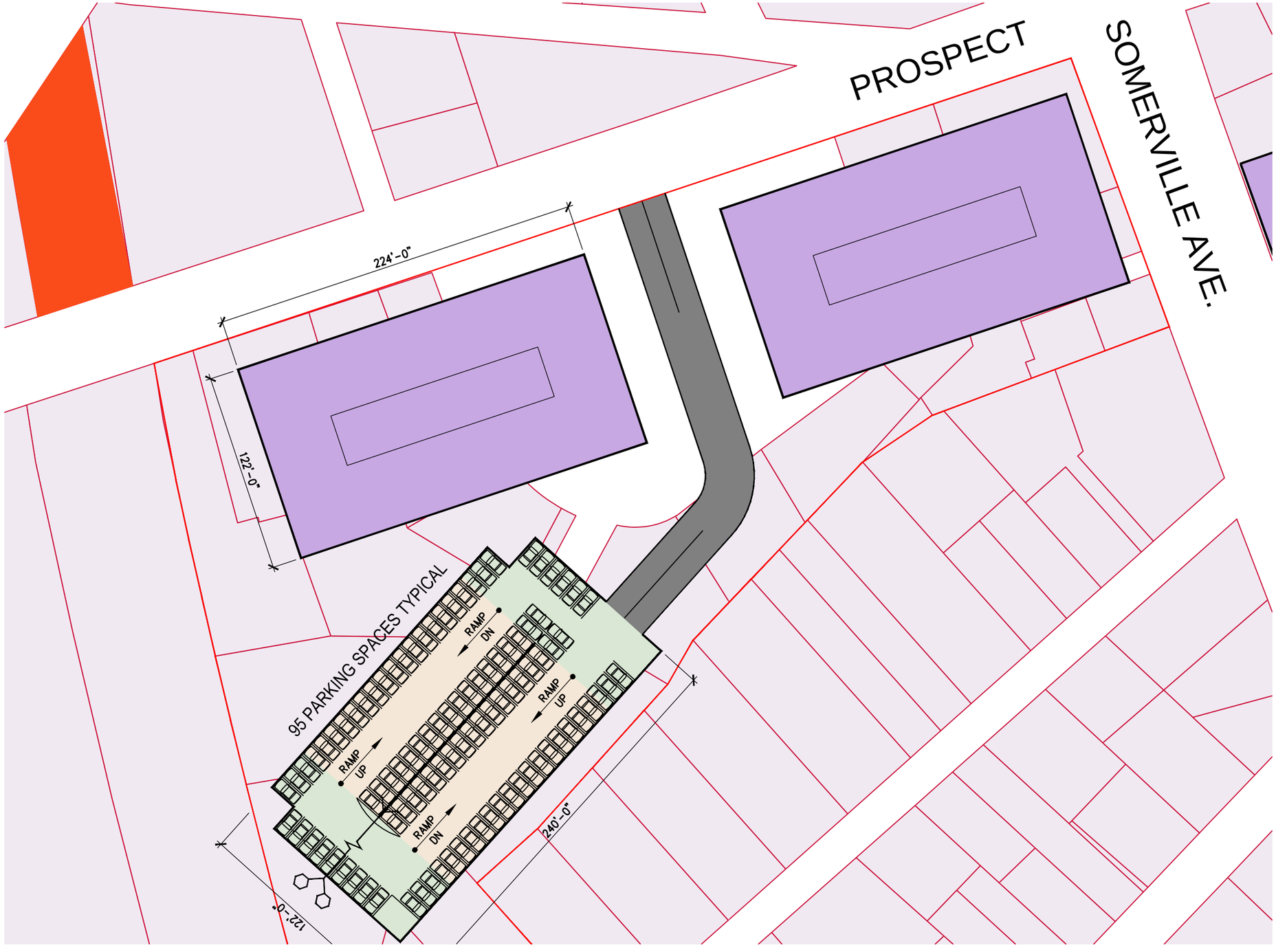
February 9, 2010

NORTH

Appendix D-5

UNION SQUARE
SOMERVILLE, MA

WALKER
PARKING CONSULTANTS



SITE 4 - GROUND FLOOR
1" = 64'-0"

LEGEND

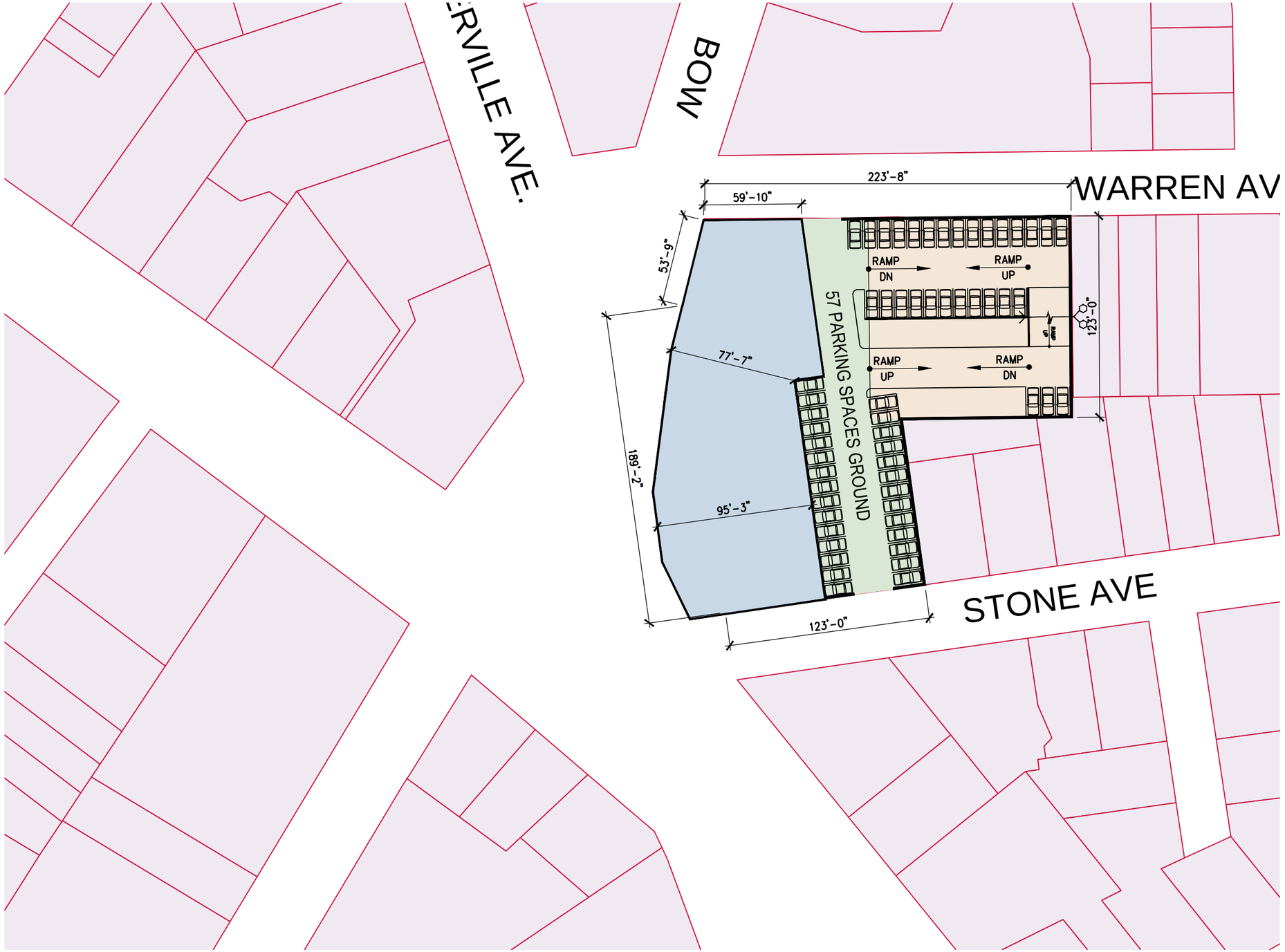
February 9, 2010

NORTH

Appendix D-7

UNION SQUARE
SOMERVILLE, MA

WALKER
PARKING CONSULTANTS



SITE 5 - GROUND FLOOR
1" = 64'-0"

LEGEND

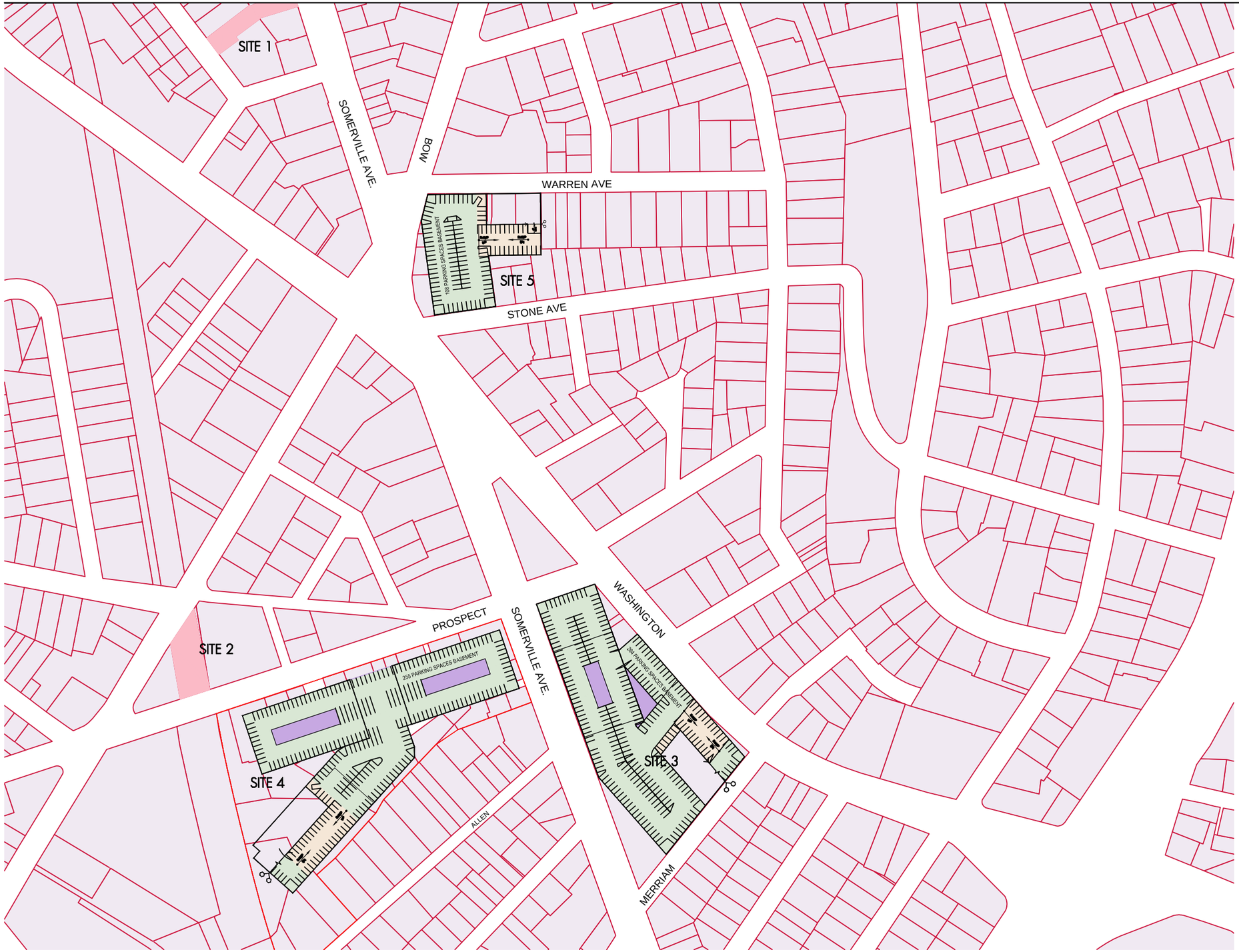
February 9, 2010

NORTH

Appendix D-8

UNION SQUARE
SOMERVILLE, MA

WALKER PARKING CONSULTANTS



AREA PLAN - BASEMENT

1" = 200'-0"

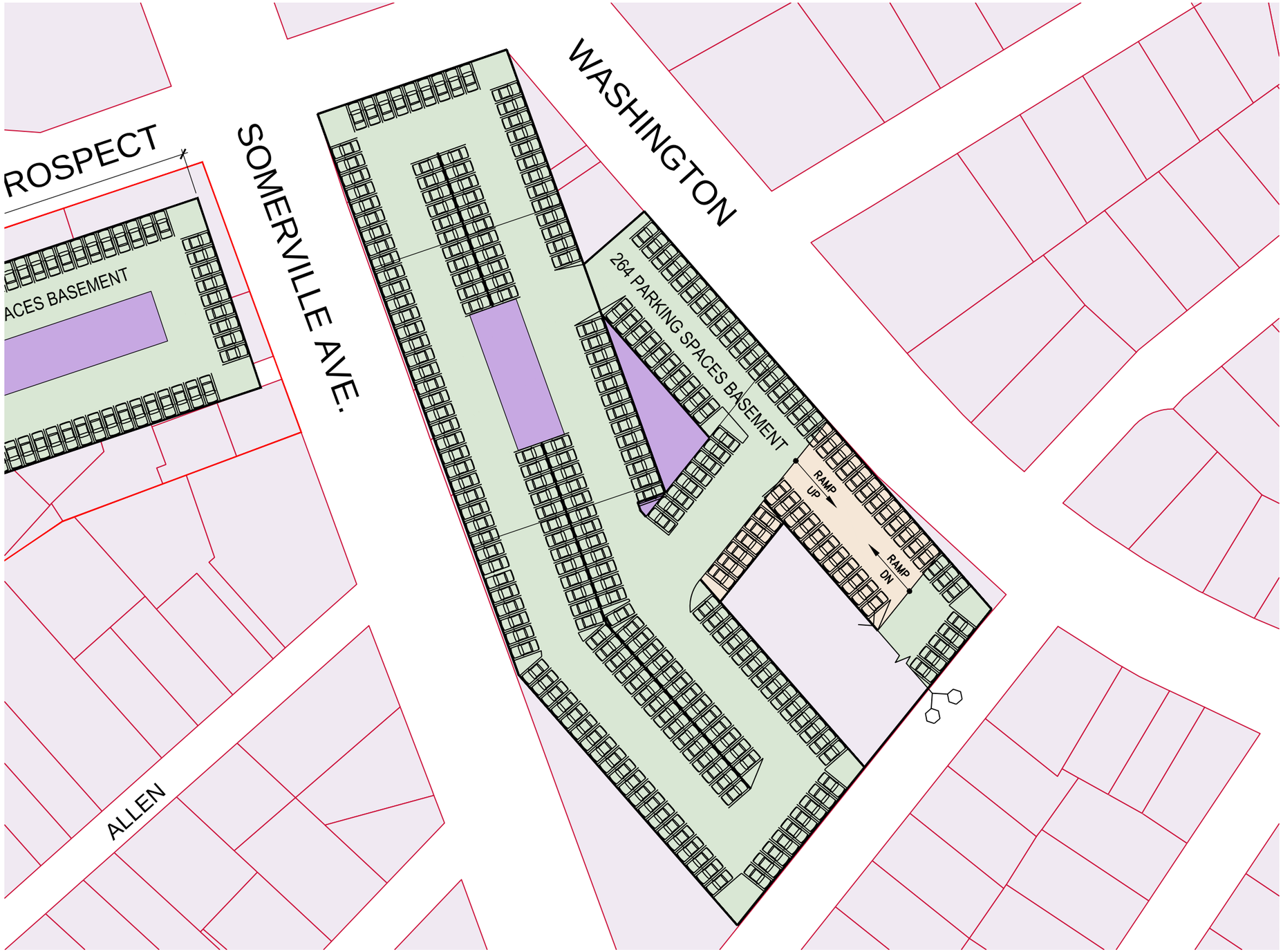
LEGEND

February 9, 2010

NORTH

UNION SQUARE
SOMERVILLE, MA

WALKER
PARKING CONSULTANTS



SITE 3 - BASEMENT

1" = 64'-0"

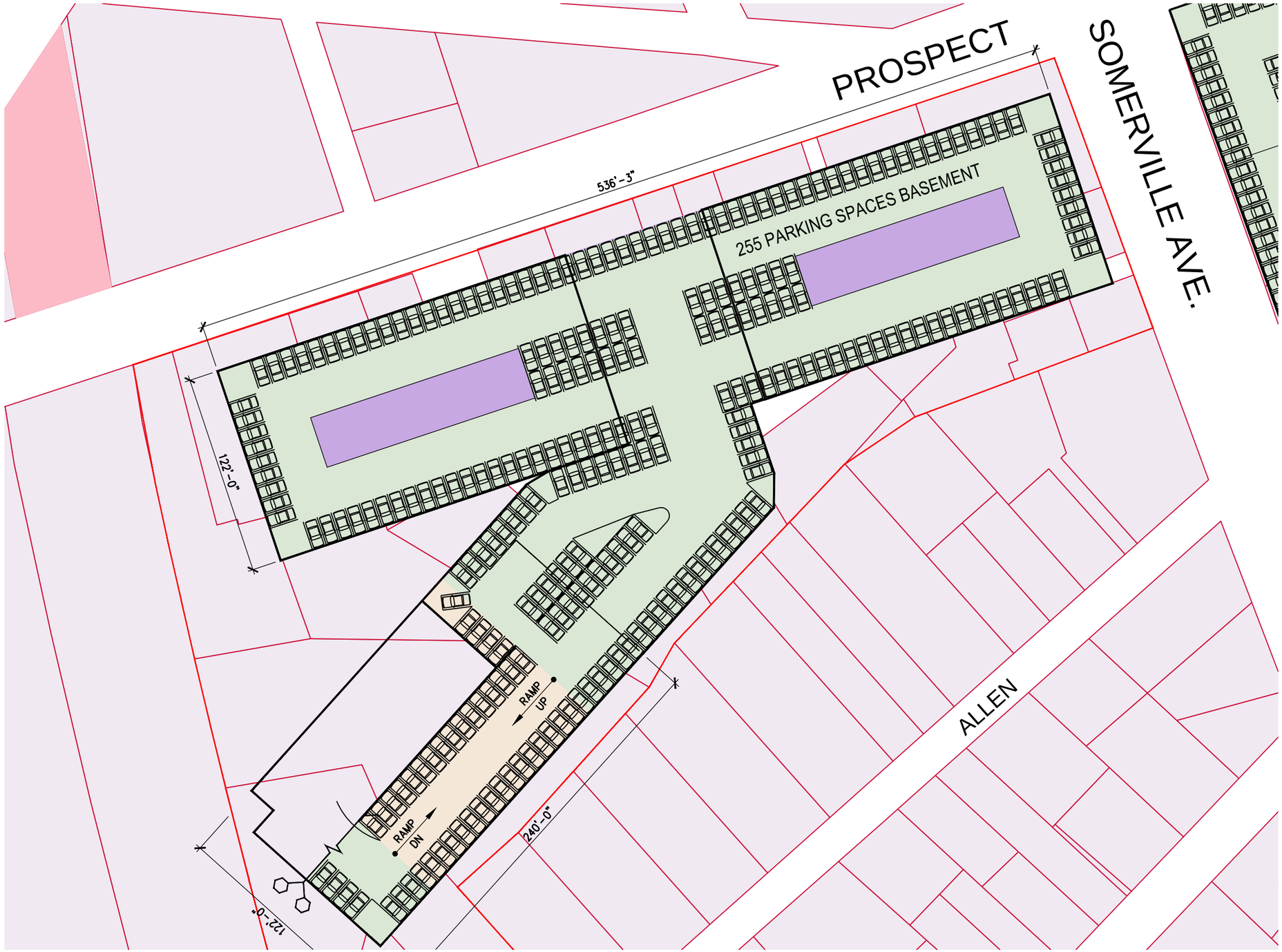
LEGEND

February 9, 2010

NORTH

UNION SQUARE
SOMERVILLE, MA

WALKER
PARKING CONSULTANTS



SITE 4 - BASEMENT

1" = 64'-0"

LEGEND

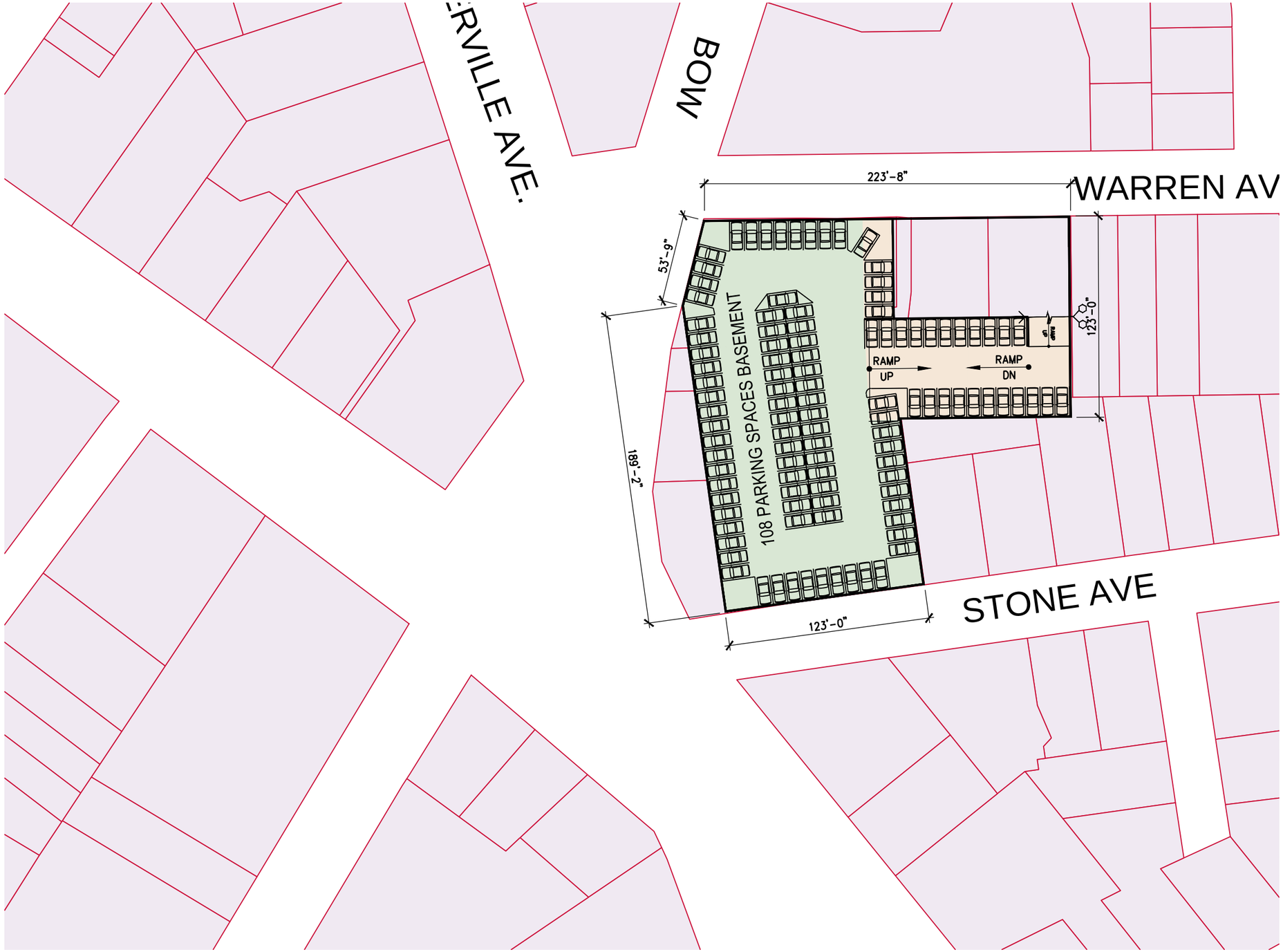
February 9, 2010

NORTH

Appendix D-11

UNION SQUARE
SOMERVILLE, MA

WALKER
PARKING CONSULTANTS



SITE 5 - BASEMENT

1" = 64'-0"

LEGEND

February 9, 2010

NORTH

Appendix D-12