

REUSING THE ORANGE LINE:

Explorations of Building Associatively Within an Urban Grid

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Bachelor of Environmental Design

Texas A & M Univeristy, 1982

Submitted in Partial Fulfillment of the Requirements for the Degree of

Master of Architecture at the

Massachusetts Institute of Technology

June, 1987

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Abstract

City grid organizations are a contextual reality. Given a dominant, all encompassing urban grid context, such as the South End area of Boston, Massachusetts and the opportunity for a small single-block sized intervention within, how does one deal with it? To what extent can the built environment, while ordering our existence, also allow association with the diversity of forms, uses, and activities around it? Furthermore, can understanding and transferring some of the underlying principles which govern the additive development of small, older, more associative urban centers, begin to provide clues which can aid us in creating richer and more *associative* urban environments? An alternative to methods of uniform alignment of building elements is sought. Greater multiplicity within the urban framework is desired though there are few natural landscape elements to guide the process.

This thesis explores building more associatively *relative* to an urban grid. It attempts first to begin to understand the *given* site using five attributes of associative behavior: **dimension, direction, registration, reciprocity and exchange**. It then proposes an architectural solution which is a dynamic *transformation* of surrounding spatial, structural, formal, and use organizations into an organization of greater flexibility and association.

The site concentrated upon in this work includes a 200 foot long vacant block area along Washington Street southeast of the corner of Massachusetts Avenue, and portions of Washington Street and other streets adjacent to this vacant area. The area was initially built up around 1850. Surviving buildings are composed primarily of masonry partywall buildings. The site is a unique one, however, because of the existence of the Orange Line, a soon to be dismantled elevated rail system. Because of its mass, continuity, and noise, the Orange Line has been a barrier to the development of Washington Street and a major contributor to the decay of the area. Dismantled and introduced as an additional constituent system in a transformation process however, it now has an opportunity to contribute positively to the life of the area. Simultaneously, the Orange Line's relationship to Washington Street provides precedent for building associatively above the *street* zone, beyond the political limits of lotlines and city blocks.

Thesis Supervisor: Maurice Smith
Title: Professor of Architecture

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Love and thanks to my family for their support

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Sorano, Italy



It is of great existential importance to come to terms with the genius of the locality where life takes place. In the past survival depended on a "good" relationship to the place in a physical as well as a psychic sense.

-Christian Norberg-Shulz

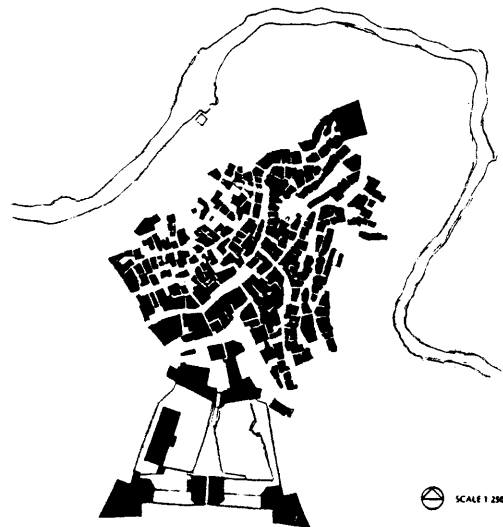
(Genius Loci p. 18.)

Introduction

Christopher Alexander, in *The Timeless Way of Building*, *A Pattern Language*, and other books, as well as Christian Norberg-Shulz in his book *Genius Loci*,² describe mankind's initial interventions of building as being closely related to nature and the natural landscape while supplying an important rhythmic order at the same time. Agrarian villages and small urban townships in Italy, Spain, Greece, Northern Africa and other locations are examples of this kind of crystalline organization. Such places have existed and evolved over centuries. Along the streets of Sorano or Vitorciano, etc., one finds vitality, interaction and multiple interpretations of space, material, and light.

Let us begin with the idea of organic order. Everyone is aware that most of the built environment today lacks a natural order, an order which presents itself very strongly in places that were built centuries ago. This natural organic order emerges when there is perfect balance between the needs of the whole. In an organic environment, every place is unique, and the different places also cooperate, with no parts left over, to create a global whole, a whole which can be identified by everyone who is part of it

*-Christopher Alexander
(The Oregon Experiment p 14)*



Sorano, Italy

Architecture is the first manifestation of man creating his own universe, creating it in the image of nature

*-Le Corbusier
(Towards a New Architecture)*

The relative degree of similarity in a given perceptual pattern makes for a corresponding degree of connection or fusion. Units which resemble each other in shape, size, direction, color, brightness or location will be seen together. The principle of similarity organizes stimulus elements in time as well as in space.

-Rudolph Arnheim

(Gestalt Psychology and Artistic Form)



SCALE 1:2500

Vitorciano, Italy

3



Vitorciano, Italy

4

The most delightful and fruitful of all the intellectual energies is the perception of similarity and agreement, by which rise, from the individual to the general, trace sameness mastered by the multiplicity of nature

-Friedrich Froebel

Underlying the various forms, spaces, colors, and textures, two phenomena exist which need to be understood:

1. Variable formal, directional, and dimensional principles are observable.

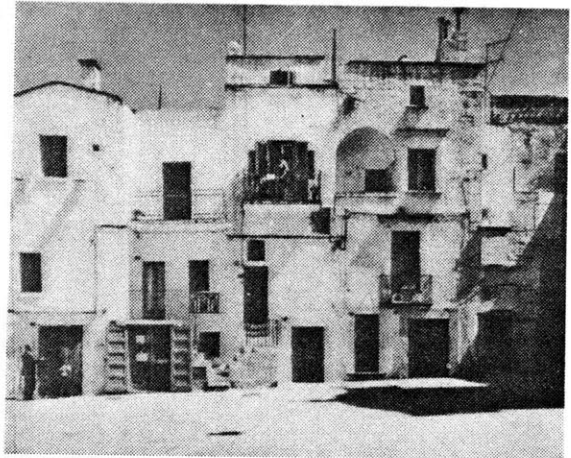
These principles relate building organizations to landscape and also contribute rhythm and understanding to inhabitation and growth at the same time. While the landscape is the progenitor of such building intensifications, equally important is man's psychic need to control and order his collective world within the natural landscape. The effect of this ordering is essential to perceptions of the environment. Collective ordering is achieved in many ways, through the use of specific sizes, directions, forms, use associations, etc.³ These principles reacting with the particular natural landscape generate an associative range of solutions, a continuity of built form.

2. Within the principles mentioned previously there is enough flexibility of association to allow places of habitation to grow and adapt: to exchange meanings, uses, and even physical spaces through time. Beyond issues of longevity and adaptability, multiple layerings of time, use, and material contribute additional vitality and richness to the environment. Such collections of structures, via their interaction with nature and with one another, engenders what Christian Norberg-Schulz calls a *genius loci* or *spirit of the place* ⁴.

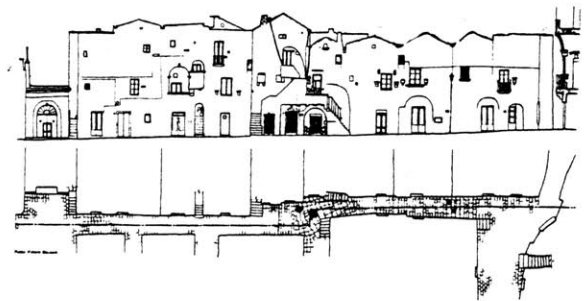
Everyday experience moreover tells us that different actions need different environments to take place in a satisfactory way.

-Christian Norberg-Schulz

(Genius Loci p. 8)



5 Piazza Vittorio Emmanuel Cisternino, Italy



6 Piazza Vittorio Emmanuel elevation diagram

Our urban society is characterized by:
 (1) coexistence and conflict of amazingly heterogeneous institutions and individuals;
 (2) unprecedented rapid and extensive transformations in the physical structure of the society; (3) rapid communications methods, and
 (4) technological progress and its impact upon regional cultures. The force of these contemporary urban characteristics makes it impossible to visualize urban form as did Roman military chiefs, or Renaissance architects Sangallo and Michaelangelo; nor can we easily perceive a hierarchieal order as did the original C.I.A.M. theorists in the quite recent past. We must now see our urban society as a dynamic field of interrelated forces..

-Fumihiko Maki

(Investigations in Collective Form p. 3)



Boston



We have three dominant systems for building cities, and a number of variations of them. They are the rectangular system, the radial system and the triangular system.....From an artistic point of view the whole tribe is worthless, having exhausted the last drop of art's blood from its veins.....They make no appeal to the sense of perception for we can see their features only on a map.

-Camillo Sitte

(The Art of Building Cities p. 59)

Contrast such pastoral places with modern urban centers. Cities of today are large and complex. Greater size and population density add new layers and levels of activity; new means of transportation - automobiles, trains, planes- allow multiple readings of a single environment. We are barraged by multi-media communications such as computers, radio, television, video, telephones, and other telecommunications. There is a vast array of new technologies and materials to pick and choose from in the creation of our environment. All this and more make the planning and maintenance of urban centers a complex task. The overall result of attempts to manage such multiple stimuli has been a retreat into rigid physical urban planning processes in our cities. More specifically, two things have happened:

1. Connections of buildings to the natural landscape have been reduced or lost. Planners and developers have overlaid circular, rectangular, axial, or other rigid geometric organizations upon vast areas of land. In Boston, much of the landscape has been technologically claimed by infilling Boston Harbor. Overlaid on this made land are large expanses of city grid, orthogonal blocks of land divided by hierarchical networks of streets and highways. Of the few historical remnant streets which remain, some display their topographical

origin by slicing across rectangular street organizations while others form a generative line from which grids originate and reach out for long distances. ⁵

2. Flexibility of association between building forms themselves has been lost. Rhythm of building with an interplay of sizes has been replaced by rigid uniformity. Within the South End area of Boston, homogeneous *blocks* are further subdivided into identical lots, orthogonally arranged along each street. On these lots are methodically built up single units made rigidly so by solid lateral partywalls placed on each lotline. Such multiplications ultimately form block-sized units of continuous built. The rigid barriers created by solid rowhouse partywalls leads to a static understanding of spaces for living. Lack of building interaction compounded by an infinite array of building materials, colors, and textures results in the singling out of individual building units.

Modern systems! That, indeed, is the appropriate term! We set up rigid systems and then grow fearful of deviating them by as much as a hairs breadth

*-Camillo Sitte
(The Art of Building Cities p59)*

uniformity . . . is in fact the direct result of the disruption of the natural relationship

*-John Habraken
(Supports p. 21)*



South End area

We have so long accustomed ourselves to conceiving of buildings as separate entities that, today we suffer from an inadequacy of spatial languages to make meaningful environment.

-Fumihiko Maki

(Investigations in Collective Form p.5)



elderly housing building

I would like to think that, with as much disorder as we can manage, we may come closer to freedom - certainly closer than many of the current architectural orders can bring us

P. Prangnell

(Space and Society#24 p. 73)

Locally continuous 19th century building, with its unit by unit repetition of elements, at least achieves a recognizable rhythm of sizes, produces an active edge along the street and generates a virtually continuous landscape at the rear of buildings. Building solutions of the last 60 years have tended to break away from the street edge and to isolate themselves as private single objects in large land areas rather than reinforce public streets. They tend to be larger and taller than the surrounding context and to become a series of discontinuous forms. Association with the street, with the landscape, or with other buildings, is absent. Ironically then, the increased complexity of modern cities has resulted in in the creation of environments which are more simplistic, less continuous, less associative, and far less rich.

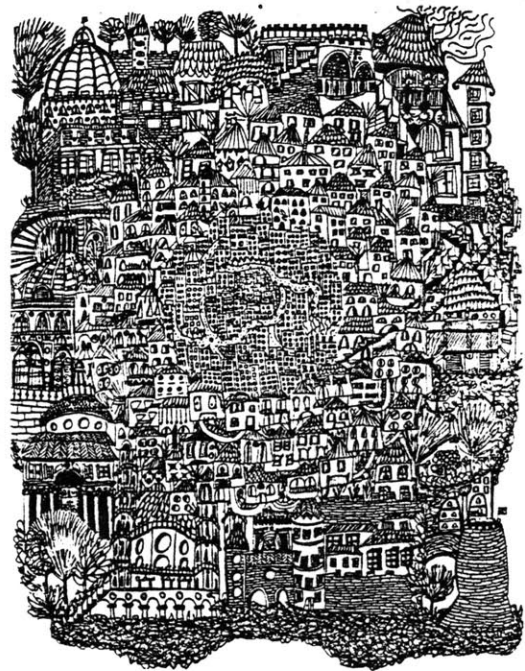
In considering specific urban areas in contemporary Boston, the grid organization is a contextual reality. The grid can be modified by our reactions to it over time. To what extent can the built environment, while ordering our existence, also allow association with the diversity of forms, uses and activities around it? Furthermore, can understanding and transferring some of the underlying principles which govern the additive development of small, older, more associative villages and towns begin

to provide clues which can aid us in creating richer and more supportive urban environments? Given a dominant, all encompassing urban grid context, and given opportunity for a small single-block sized intervention within, what *positive* proposals can be made? We need an *alternative* to methods of uniform aligning of the building elements. We need greater multiplicity within the urban framework, though there are few remaining natural landscape elements in the surroundings to guide us.

At the same time it is important to understand and work **with** the context, to maintain a continuity of direction, dimension, and form relative to the surrounding building fabric. How a design adapts and relates to its surroundings and manages to address the surroundings themselves determines its success at achieving continuity between old and new. One way of working within an orthogonal grid framework might be to ignore it, to build an associative *island* which has little understandable formal relationships to the rigid world around it. One might as well insert a medieval city. Relative to their surroundings, such solutions are fantasy lands at worst and another form of discontinuous building at best. An alternative method, and one prevalent today, perpetuates existent organizations,

Can architects meet society's plural demand? Can they possibly substitute the present loss of vernacular and still build a city that really is a city? - a liveable place for a large multitude of people.

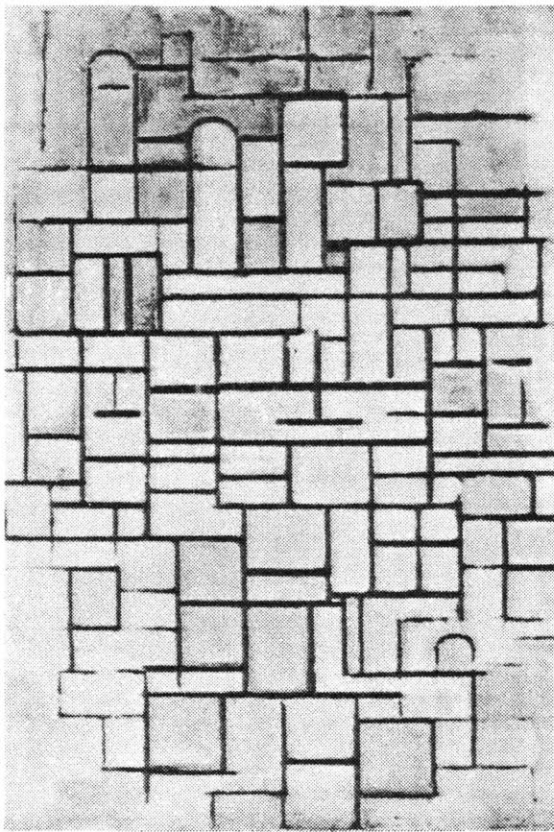
*-Aldo Van Eyck
(Team X Primer p. 7)*



8

One does not achieve a handsome monster either by enlarging or endlessly multiplying the attractive elements of smaller structures
*-Walter M.Whitehill
(Boston: A Topographical History p.209)*

It would be ideal to build architecture without objectives then release it for free use
-Coop Himmelblau



Piet Mondrian Composition #6

9

such as those of the 19th century using forms, materials, and relationships of the past. If, as mentioned previously, our needs and perceptions of use, technology, transportation, technology, etc. have changed, then resurrected systems of bygone eras have little hope of succeeding.

A concentrated effort to analyze and evaluate associative qualities of any ancient village would constitute a thesis in itself and more. This thesis explores building more associatively *within* an urban grid. It attempts to understand associative qualities by investigating a site in the South End of Boston, Massachusetts, then projecting an architectural solution which is a dynamic *transformation* of surrounding spatial, structural, formal, and use organizations. Five attributes of associative behavior are considered: **dimension, direction, registration, reciprocity and exchange.**

Outline

Text Organization

The following text is organized into six additional sections:

II. Site History and Geography

III. Proposed Design

IV. Site Use

V. Associative Site Attributes

VI. Site Transformations

VII. Conclusions

II. Site History/Geography

A brief background section is necessary to provide essential geographical, historical, and cultural information of the site, its development and its present state.

Projections may then be made as to appropriate uses for the area. The site most closely considered in the thesis includes a 200 foot long vacant block section of Washington Street southeast of the corner of Massachusetts Avenue, and portions of Washington Street adjacent to this vacant area. The site was originally built up around 1850 and is composed primarily of masonry partywall buildings. It is unique one of the existence of the Orange Line, a soon to be dismantled elevated rail system. Because of its severe continuity and noise, the Orange Line has been a major contributor to the decay of the area. Dismantled and introduced as an additional constituent system to a transformation

process, however, it now has an opportunity to make a positive contribution to the life of the area.

Proposed for this location is a mixed organization of commercial and retail uses along the street with office and housing uses above. Such mixed arrangements of use are typical of major streets of the area. Designed anew to allow optional interpretation, many of the spaces are potentially convertible to different uses over time. In addition, reinterpretation of the Orange Line system itself not as an access system but as a building allows development (summarily) of a new public *community center* structure on site as well. Such a structure is then a transformation of the Orange Line.

III. The *Proposed Design* section presents drawings and photographs of the proposed site solution.

IV. *Site Use*

Associative behavior applies to use also. Greater potential adaptability of spaces from one use to another is desirable for greater flexibility. A single space cannot be expected to adapt to all needs. Structure, rather, must *support* inhabitation with the ranges or zones of space versus access and appropriate amounts of territorial definition necessary to sustain certain ranges of use. Decisions regarding layout

of access paths and types and sizes of containments necessary for specific ranges of privacy needs are then made easier. This thesis makes broad decisions with respect to use. Greatest effort is made to understand and work with associative principles and to meaningfully transform the structural systems to support this associative behavior. In order to demonstrate the broad *optional* potential of the buildings (and due to time constraints), no effort is made to fully inhabit (finished floor plans) any of the spaces.

V. *Associative Site Attributes*

The *Associative Site Attributes* section specifically defines five attributes of associative behavior and provides detailed information as to how each of them is taken into account in the project area. Briefly they are:

dimension - identification of specific size ranges which support particular behaviors. These sizes range from the *private* size of four to eight feet to *urban* and larger sizes of 600 feet plus,

direction- that which allows us to orient ourselves and perceptually understand where we are going and how to behave,

registration- the recognizable behavior of forms and structures in *displacing* from

specific *lines* or spatial *zones* of directional continuity such as a street,

reciprocity- the interlocking of forms and spaces by their complementary interaction with one another, and

exchange- zones of interaction between different forms. Such zones allow optional interpretations and therefore optional uses.

Through these principles qualitative assessments can be made of the associative potential of how and what we build. Simultaneously, this thesis will examine and evaluate the architectural and structural systems of the site area in light of these principles as well as from a historical perspective in order to uncover contextual relationships vital to the area. Attributes of association, access, materials, sizes, and definition, once understood and used to examine and evaluate a given site, enable designing with greater formal, structural, and use association while maintaining important dimensional, directional, and other parameters. Formal behavior is thus repeated, in variable physical ordering as necessary, without copying, repeatedly *rubberstamping* single complete forms ad infinitum, or building in isolation.

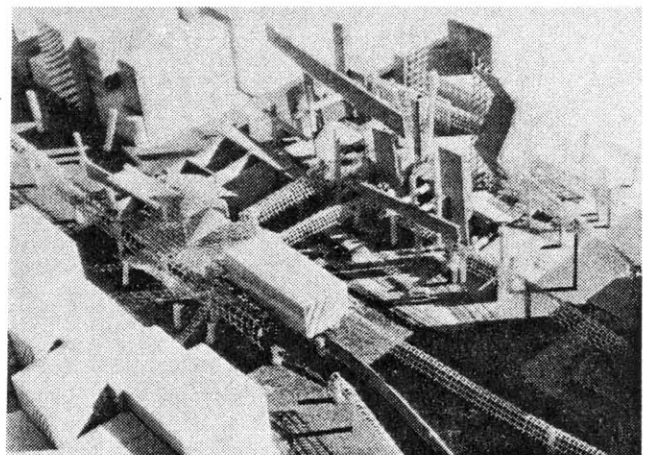
VI. *Site Transformations*

This section describes how the project area would be transformed as a result of implementing the procedures addressed in the foregoing text. Because considerable effort made is to understand and relate to existing context, the architectural projection proposed develops a coherent and understandable design transformation sequence; a graduated dynamic change from an architecture which relates closely to the surrounding structures, to a freer, more associative understanding of space, forms, structure, and use made possible by current materials and construction methods. Thus, the design projects an understandable *updating* of the organization and meaning of the building in 1987 as opposed to an isolated contemporary unit which maintains no relationships to surrounding structures. It is important to make explicit that this thesis is not an exercise in the jumbling of various systems into some new form of architectural granola. The site and its various systems have directional, spatial, and use characteristics associated with them which are important to maintain.

VII. *Conclusions*

The *Conclusions* section very briefly considers the nature and potential effectiveness of the site design proposed in the thesis. It questions the associative potential beyond pre-ordained block-sized pieces of land. A series of questions are posed in an effort to ponder *limits* to which such transformation interventions might go spatially and structurally while maintaining ties to surrounding context.

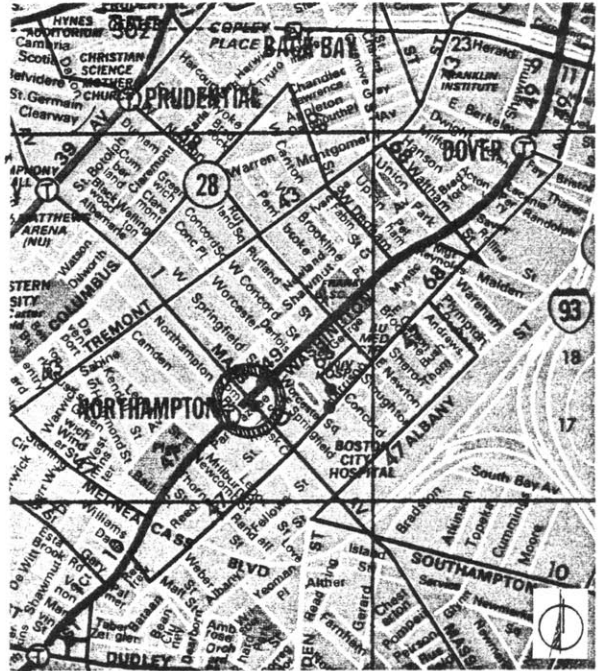
This thesis exploration deals primarily with form, dimension, structure, and use. It ignores or makes implicit decisions about a great many factors important to successful architectural formulation. Sociological, economic, political, and numerous other concerns are slighted in order to focus on issues of architectural form alone.



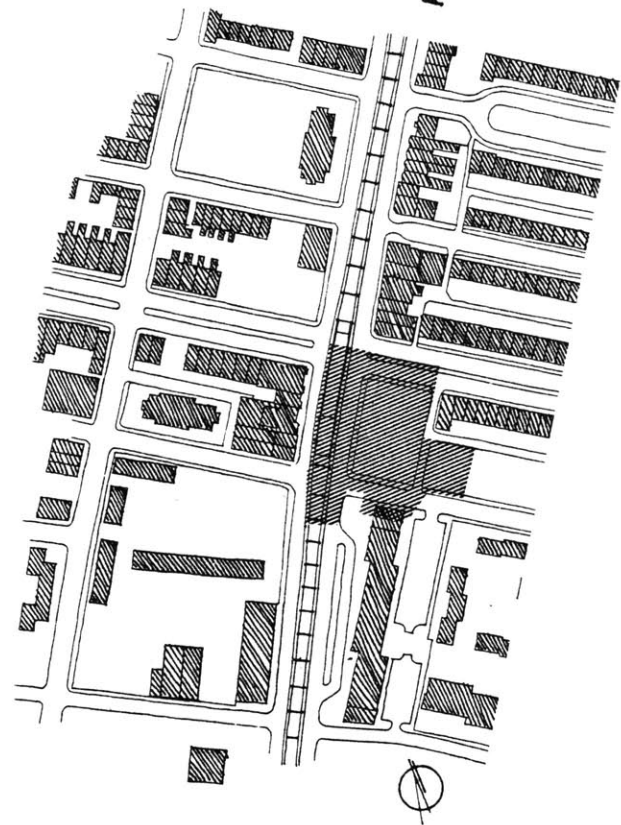
1" = 40' scale study model

Site History/Geography

The project site is located at the intersection of Washington street and Massachusetts Avenue in the South End area of Boston, approximately one and a half miles south and west of present downtown Boston. It is a borderline area of great economic and demographic variation. To the north of the site is more of the South End area with zones of continuous 19th century residential building fabric and vacant areas. Two blocks away to the east of the site is Boston City Hospital, beyond it industrial areas and Interstate 93, portions of South Boston, and Dorchester. To the south is Roxbury, an area of discontinuous building, mass housing projects and some decay. To the west is more continuous 19th century residential building fabric and the Massachusetts Turnpike, with the Back Bay area of Boston, the Charles River, and Cambridge beyond.

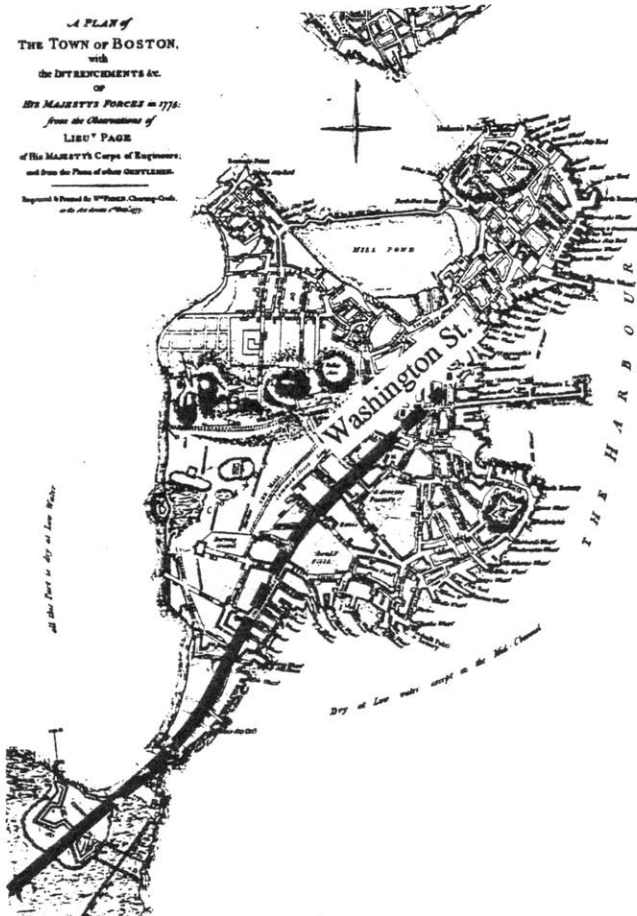


1 site area map

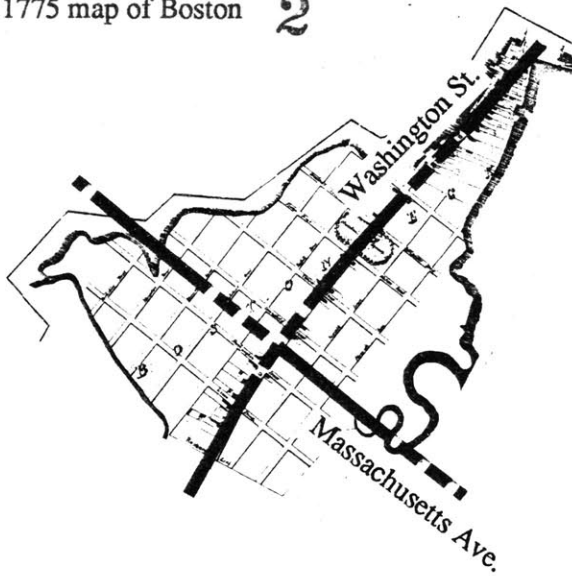


1" = 40' scale site model

A PLAN of
THE TOWN of BOSTON,
with
the DISTRICTS &c.
of
HIS MAJESTY'S FORCES in 1776:
from the Observations of
LIEUT' PAGE
of His MAJESTY'S Corps of Engineers:
and from the Plans of other OFFICERS.
Engraved & Printed by W. PETERS, Copper-Plate,
in the Strand at the Sign of the Ship.



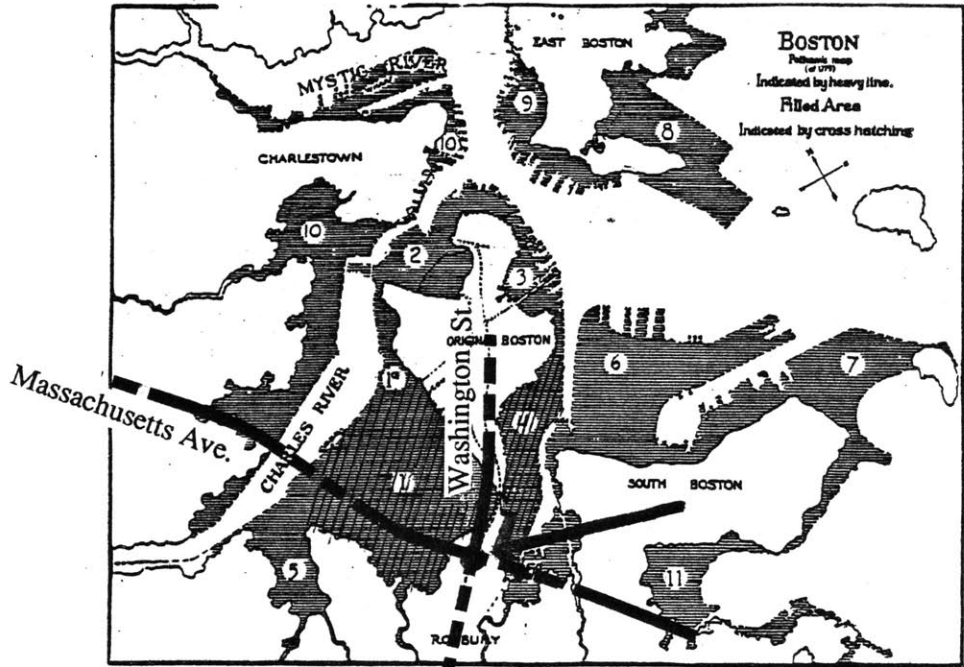
1775 map of Boston 2



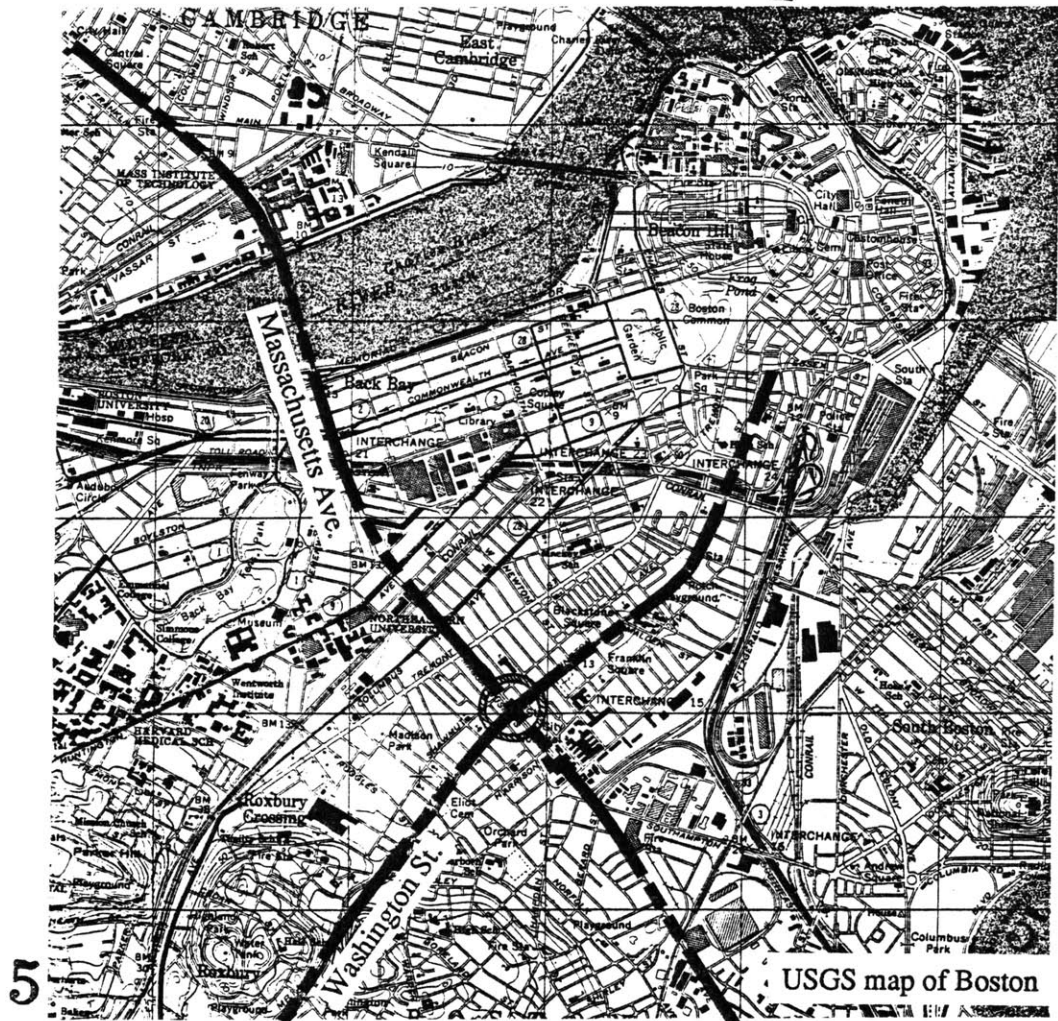
J.G. Hales map of Boston Neck - 1814 3

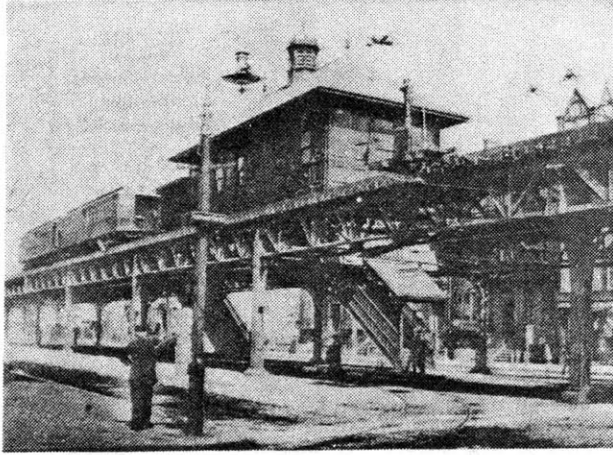
Washington Street was one of the original streets of the city of Boston and was initially called Orange Street. It ran down the natural center spine of the Boston Neck, a thin isthmus of land linking the more bulbous promontory of land on which original Boston was constructed with Roxbury, Massachusetts. Orange Street was the only land connection to Boston.¹ The project site lies along this street at a point about half a mile southwest from the narrowest point or "tip" of the original neck in the area of Roxbury.²

Washington Street became the reference line for the grids which were to overspread the area. Over a period of almost 200 years, vast amounts of Boston Harbor and the Charles River Basin were filled in by scraping surrounding hills. Between the years of 1806 and 1843 the South Cove water area, which surrounded Boston Neck, was filled in. Orthogonal street patterns were laid out and the area built up.³ Most of the area buildings date from around the 1840's. Massachusetts Avenue, then called Chester Street, was squeezed in between Northampton and Springfield Streets, two streets of the original city grid. With the construction of the Harvard bridge over the Charles River in 1891 the street became a prominent connector road. Chester Street stretched from Edward Everett square in Dorchester to the town of Arlington. It was renamed Massachusetts Avenue in 1894.⁴



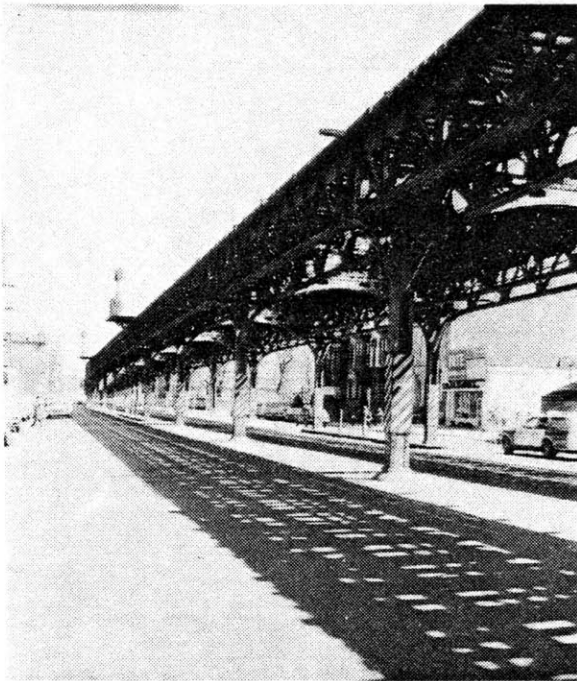
4 filled areas of Boston





1901 photo of Northampton stop 6

The Orange Line, Boston's first true rapid transit system, opened in 1900. It linked Sullivan Square in Charlestown with Dudley station in Roxbury.⁵ The Orange Line is composed of large trusses, girders, and tracks, elevated about 20 feet above the center of Washington Street. The *Northampton* stop along this line is composed of a platform and an ornate copper-clad building perched above the street directly adjacent to the site and near the intersection of Washington Street with Massachusetts Avenue. This building is a focal point of the area and the site is frequently referred to as the Northampton site throughout the thesis.



view North along Washington St.

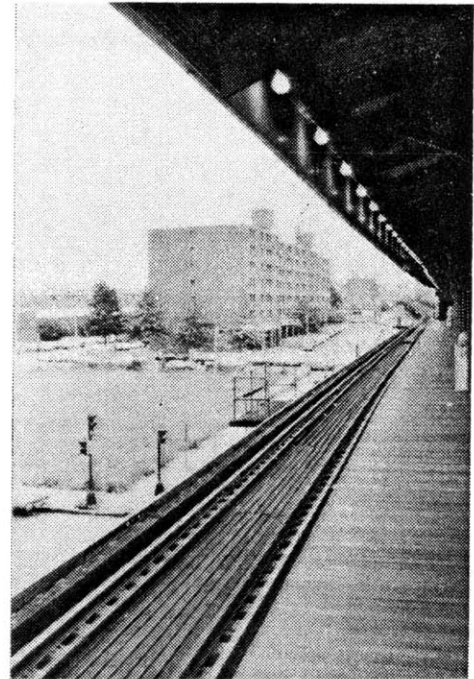
Since the construction of the Orange Line, Washington Street has declined economically and physically. Orange Line riders, elevated 20 feet above the street level, totally bypass the streets and businesses of Roxbury and the South End. The elevated track structure itself serves as a visual barrier between opposite sides of Washington Street, an already difficult relationship for pedestrians due to the six lanes of traffic and 110+ feet distances from one side of Washington Street to the other. The large orange trusses create a dark shadowed area along the center or one side of the street, and add noise to the street as trains pass overhead.

Due to decades of continued decay, many area buildings have fallen into ruin. Some have collapsed and have been cleared. Others remain in various states of ruin. Gaps of all sizes exist in the once continuous building fabric of Washington Street. Entire block-size areas have been cleared and mass housing projects, ranging from two to eight stories, have been sited in recent years. The larger of these buildings are typically set back from the street edge and surrounded by parking.



Washington St. buildings

The Orange Line is slated to be dismantled in early 1987. The Massachusetts Bay Transit Authority has built a new Orange Line system, placing the track underground about four blocks west of Washington Street. With the removal of the Orange Line the area is expected to rejuvenate quickly. Commercial establishments are expected to flourish along Washington Street again and the residential community will begin to knit back together, filling in size gaps. Many nearby areas have been improved already. Though the elevated track has been responsible for decline of the area, there is still sentiment to preserve portions of the track as relics of by gone days and examples of turn of the century craftsmanship. Historians and artists are leaders in the struggle to save something of the old orange line.



view south from Orange Line

30 THE BOSTON GLOBE TUESDAY, DECEMBER 9, 1986
ROXBURY/JAMAICA PLAIN
**The final months
of El being recorded**
Pictures today will be its history tomorrow

... atoms and molecules, numbers and all kinds of "data", are abstractions or tools which are constructed to serve other purposes than those of everyday life. Today it is common to give more importance to the tools than our life-world.

-Christian Norberg-Shulz

(Genius Loci p. 6.)



view east along Massachusetts Ave.
towards the Orange Line

Observations:

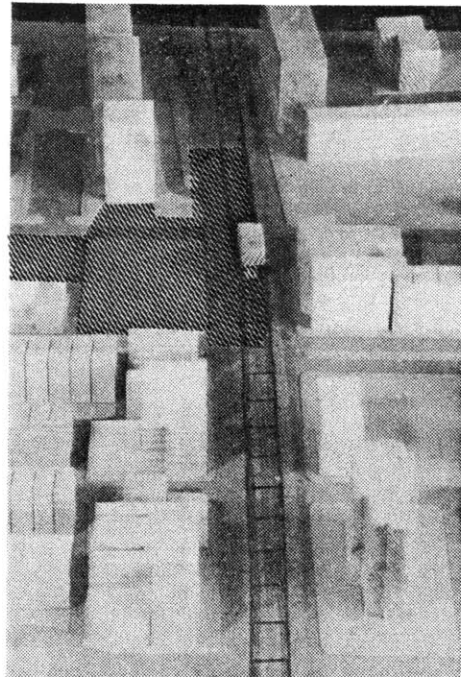
The Washington Street / Massachusetts Avenue site has maintained an important position throughout Boston's history, first by its location on original land of Boston neck and second as the link between the cities of Boston and Roxbury. Today Roxbury is officially a part of Boston but the site is still important in many respects.

It is a true crossroads of traffic:

Washington Street connects areas south with downtown while Massachusetts Avenue links Dorchester across the Charles River to Cambridge and Arlington. The site is also the temporary borderline between gentrified residential neighborhoods to the north and west, and poorer areas to the south and east.

One important characteristic of this site (as with much of Boston) is that it is an urban condition which has not given itself totally over to the automobile. Though many gaps exist in the building fabric, building is relatively continuous and contains a range of sizes which relates to pedestrian movement. The streets and buildings are perceived at multiple speeds today: pedestrian, auto, bus, and train. A variety of sizes and images then are necessary to make the area understandable. Because the area was built prior to automobile traffic, it is the larger high speed sizes which are absent.

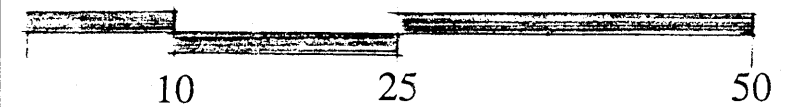
Mass housing projects near the site, though they break with the repetitive rhythm of the street and are discontinuous with respect to other buildings, are indicative of the height and density necessary to make new construction viable in the area. In addition they generate larger (collective) sizes visually (see *Dimension* attribute).

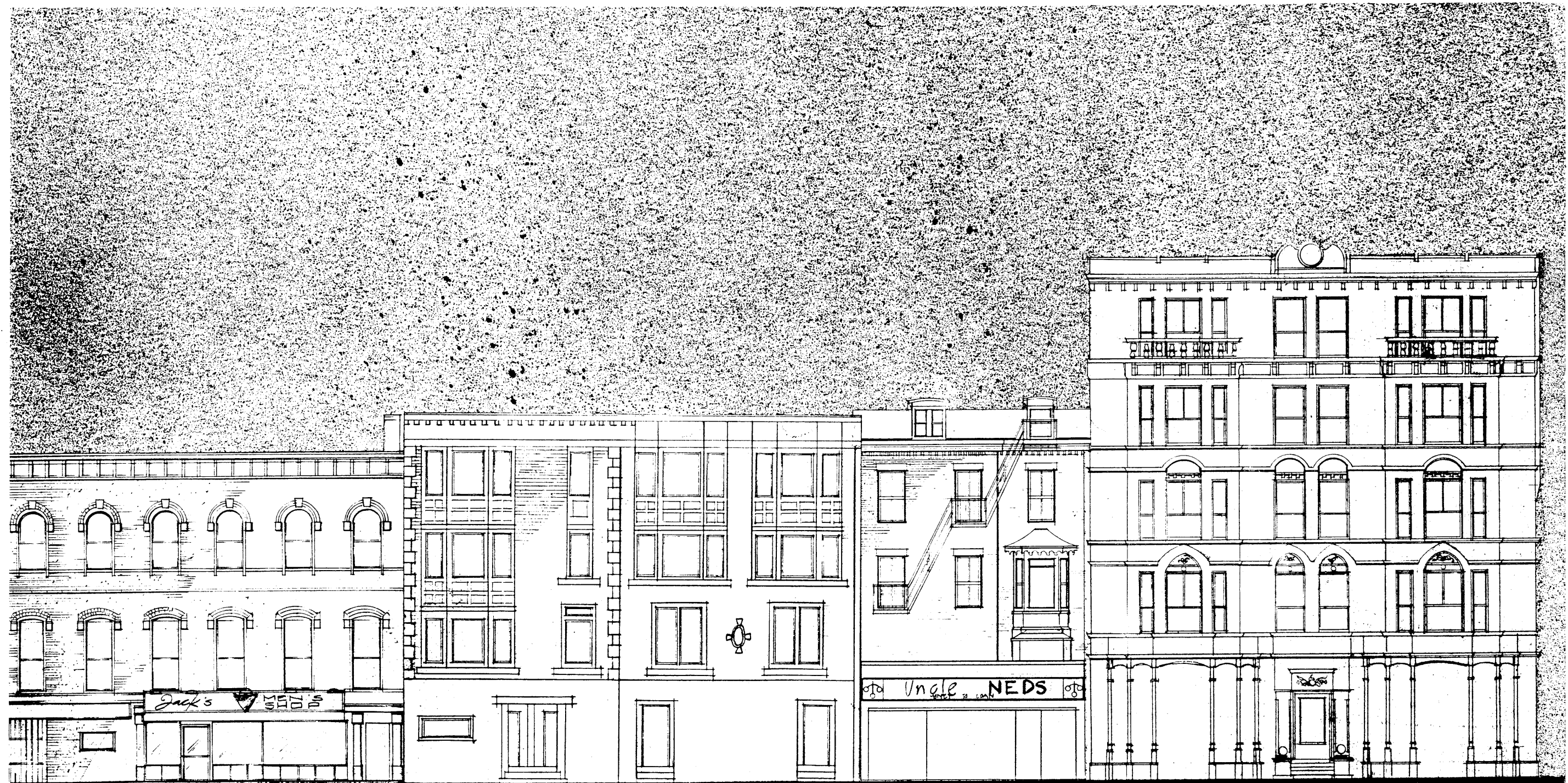


1"= 40' scale site Model

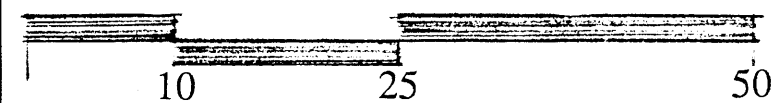


Washington Street Building Elevations

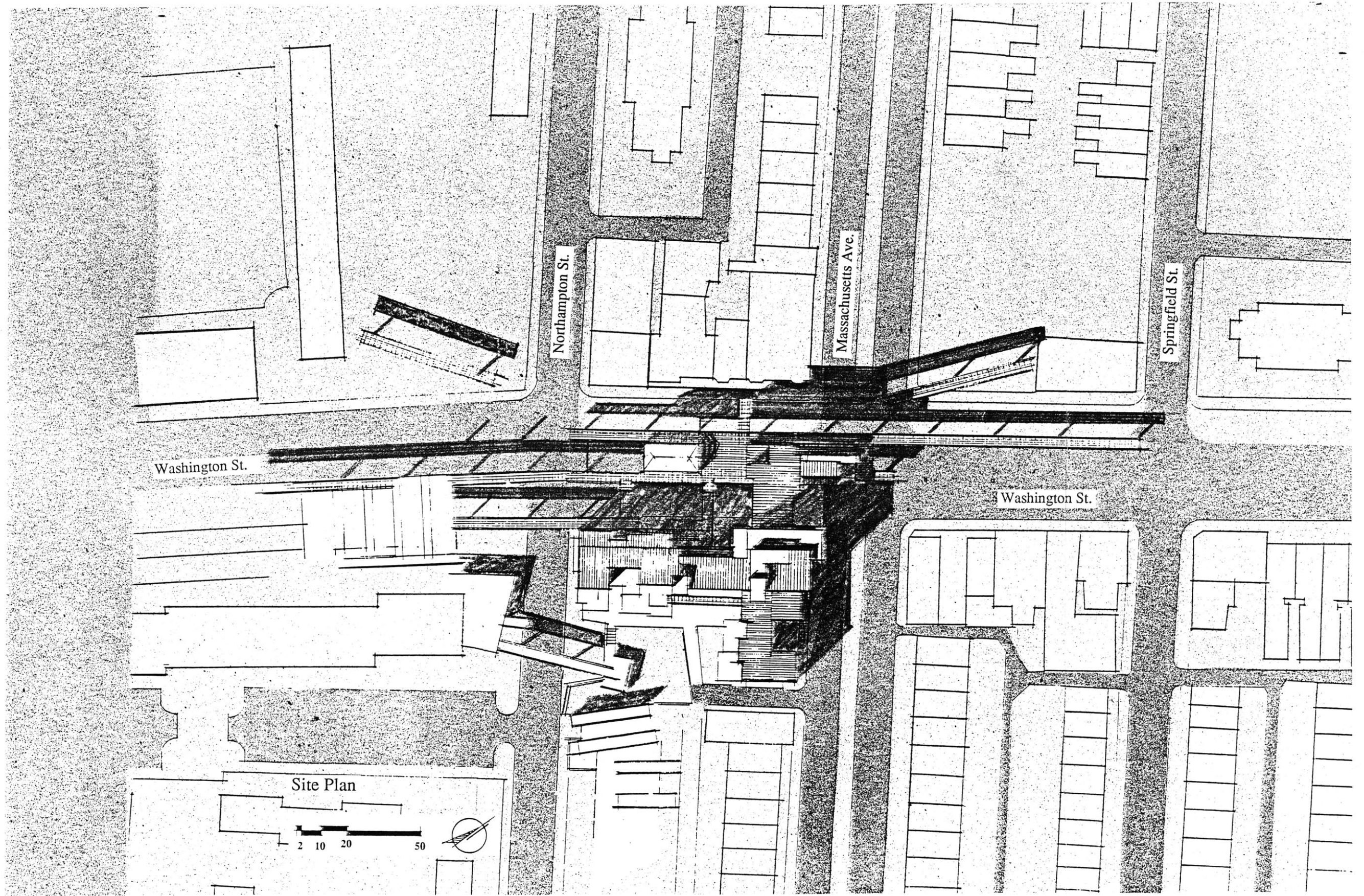




Washington Street Building Elevations



Proposed Design



Washington St.

Northampton St.

Massachusetts Ave.

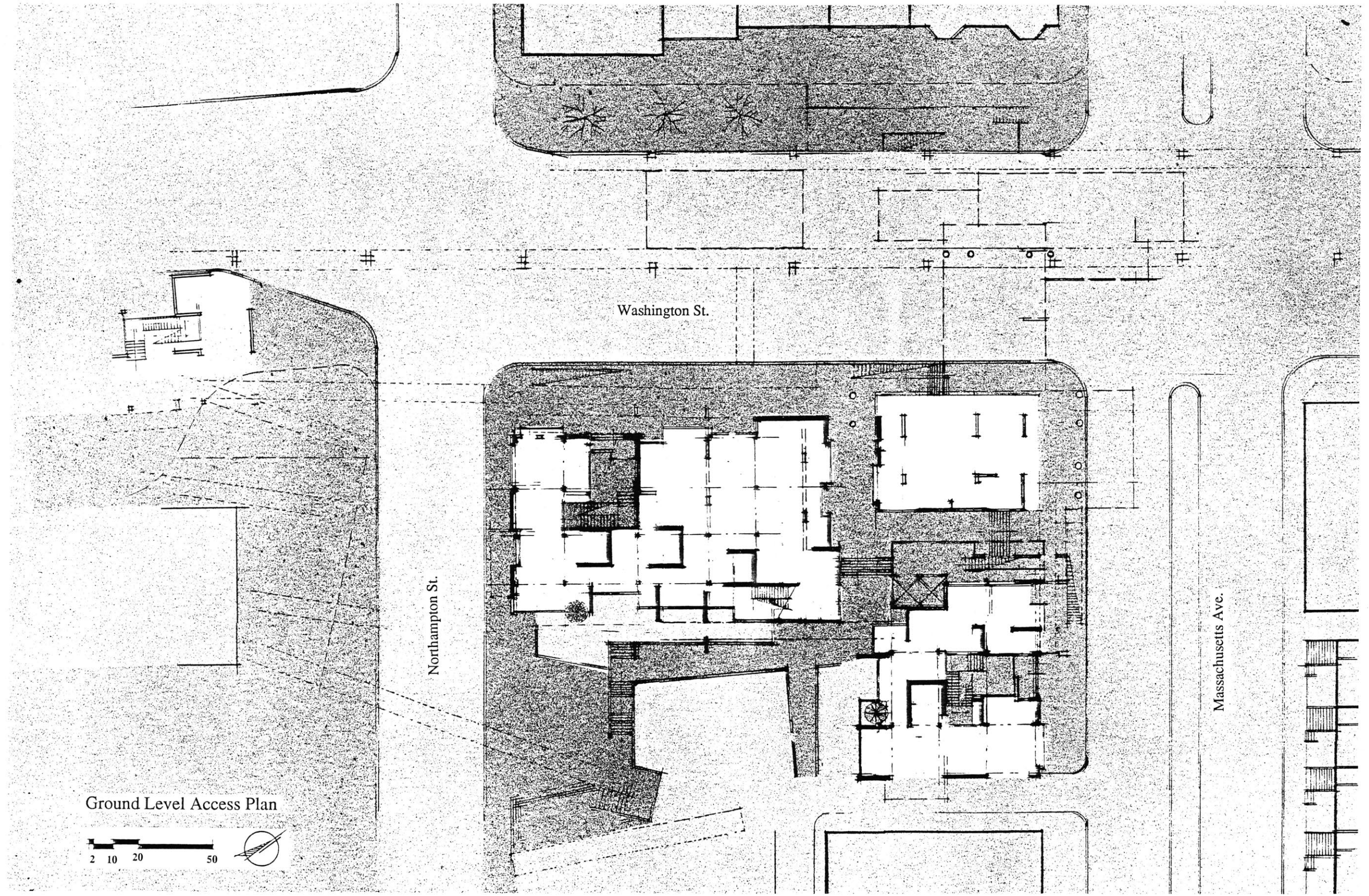
Springfield St.

Washington St.

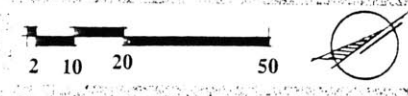
Site Plan

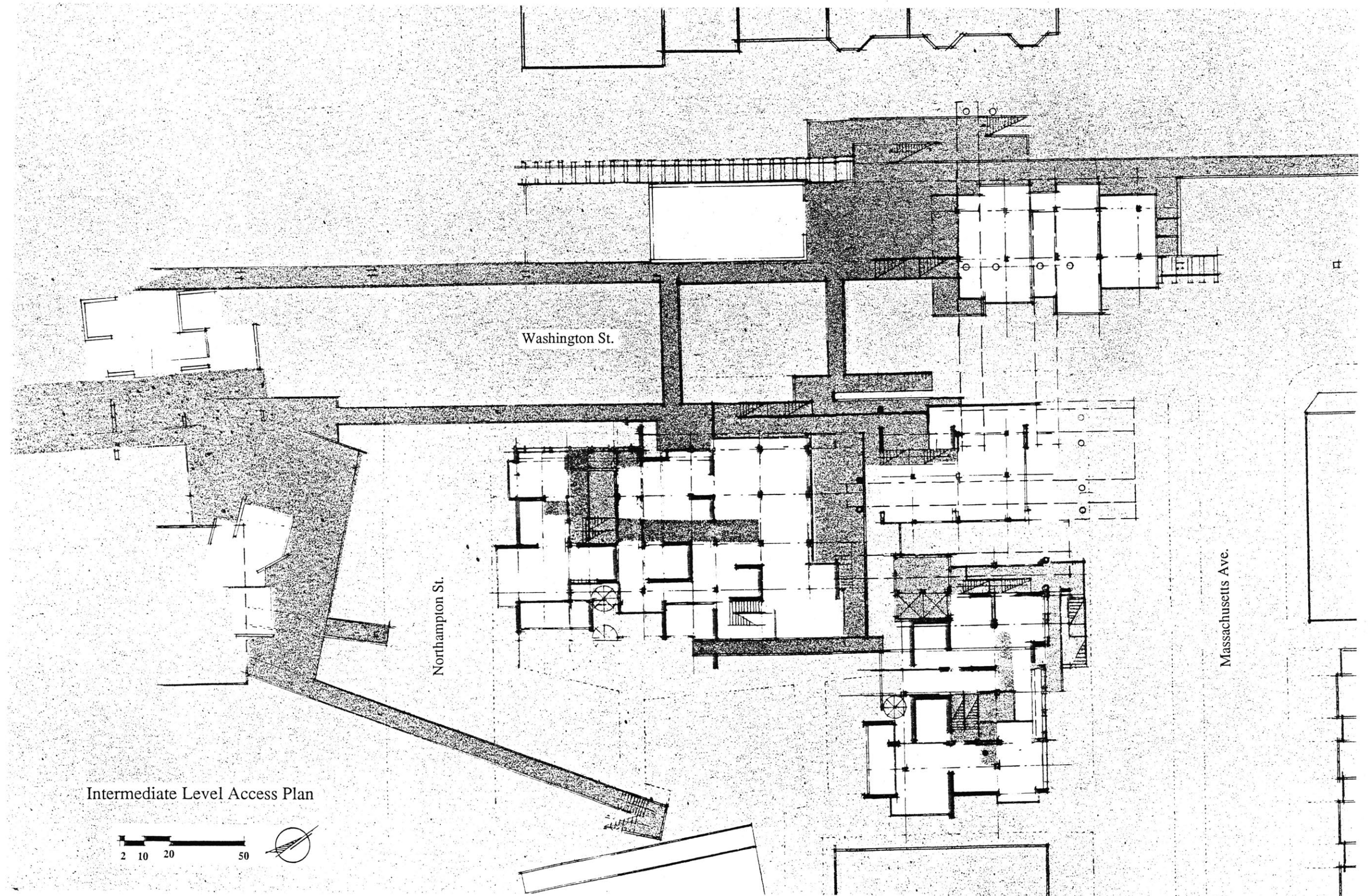
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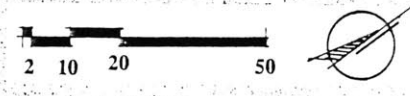


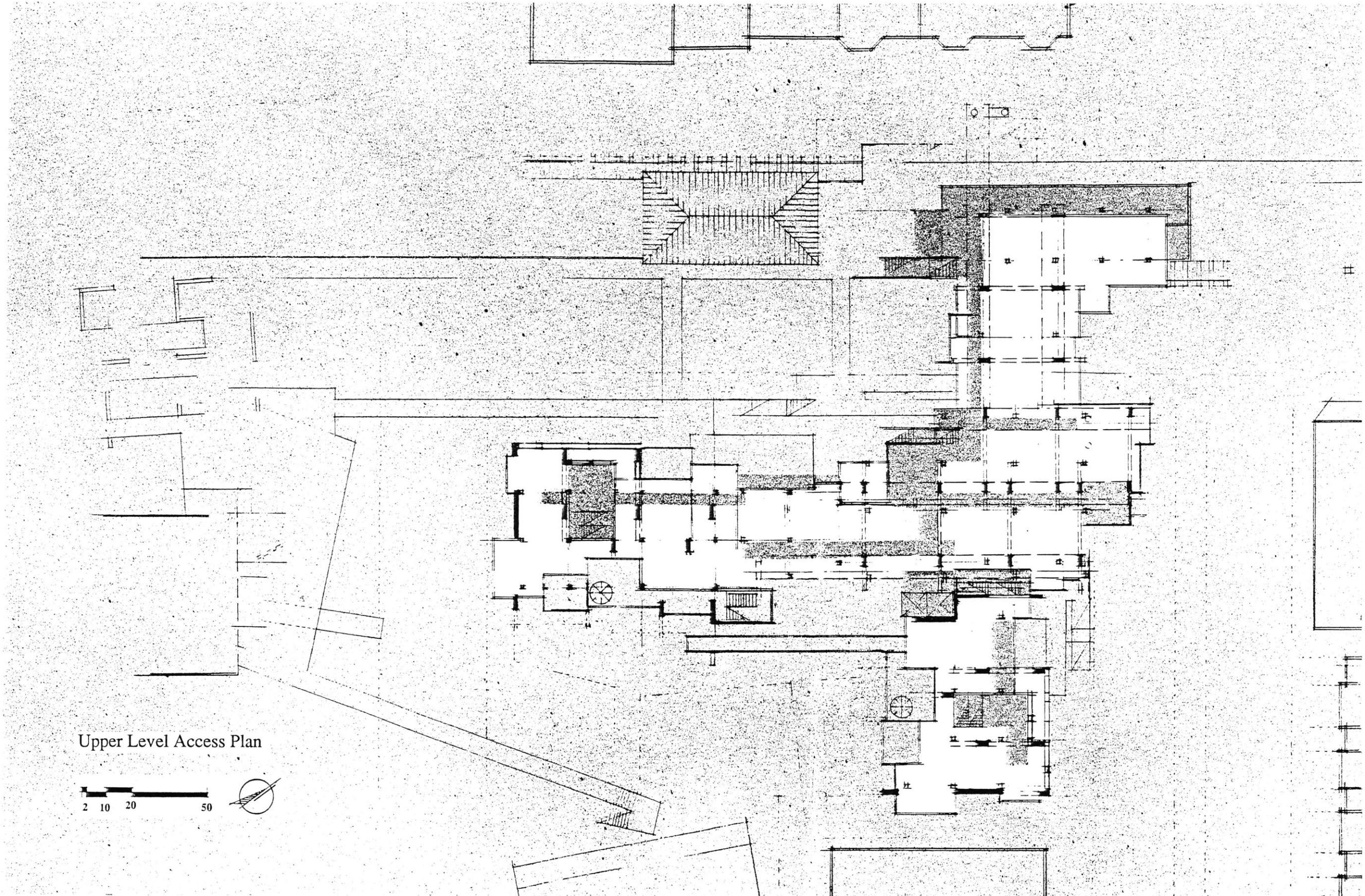
Ground Level Access Plan



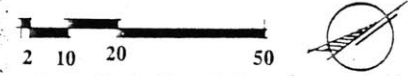


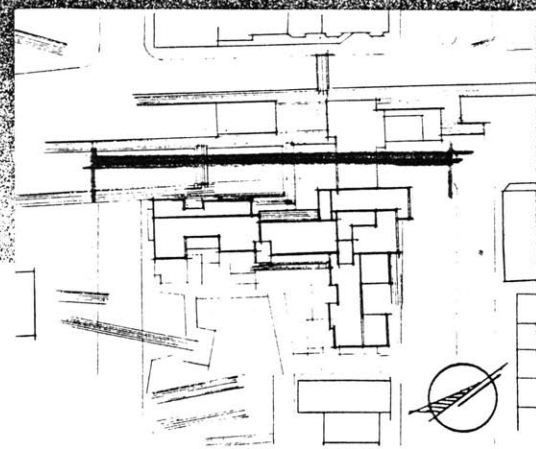
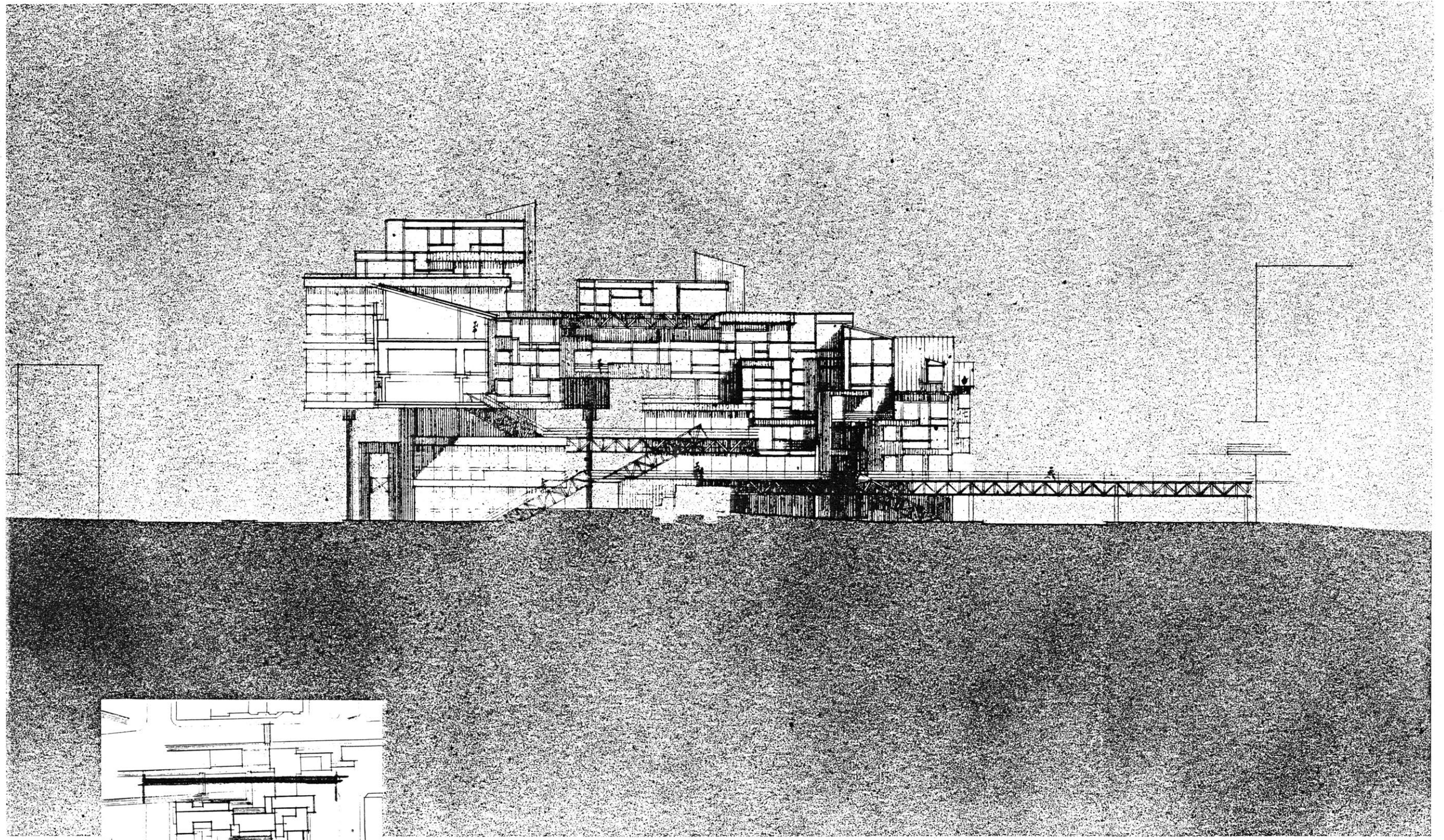
Intermediate Level Access Plan



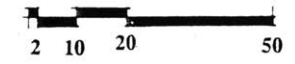


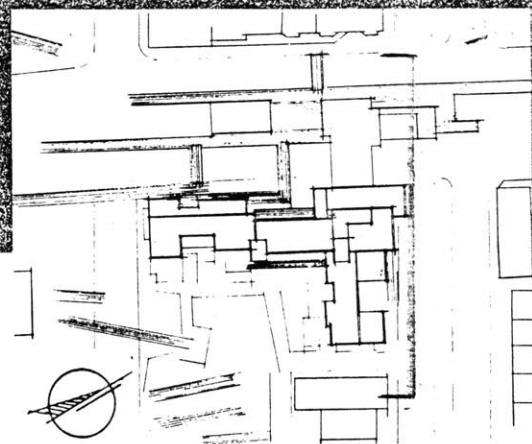
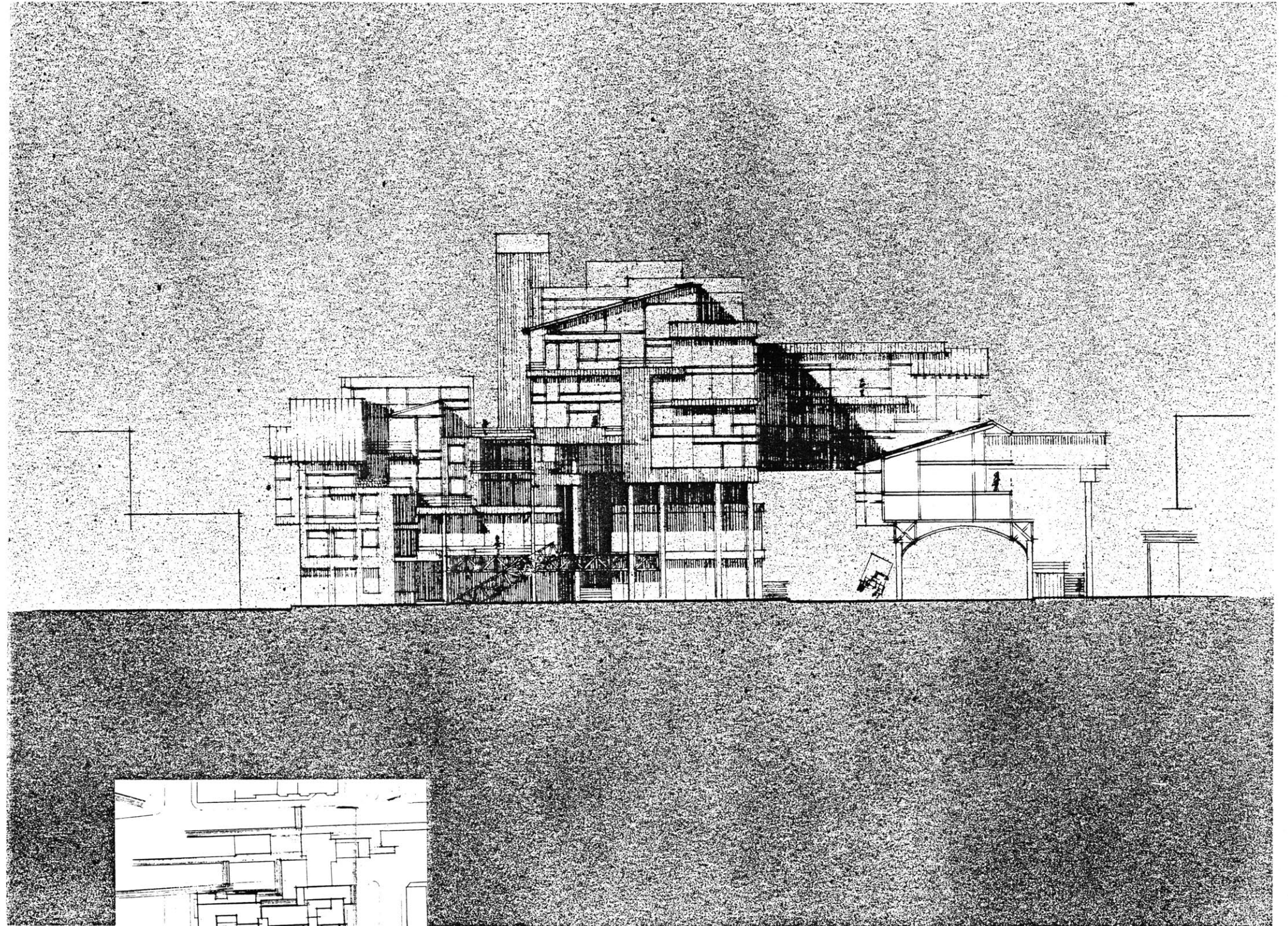
Upper Level Access Plan



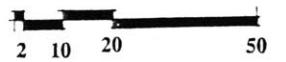


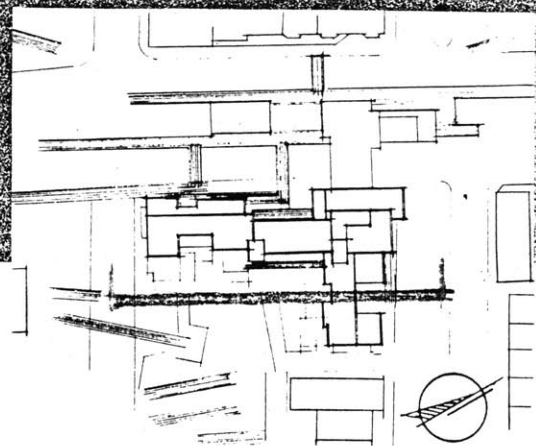
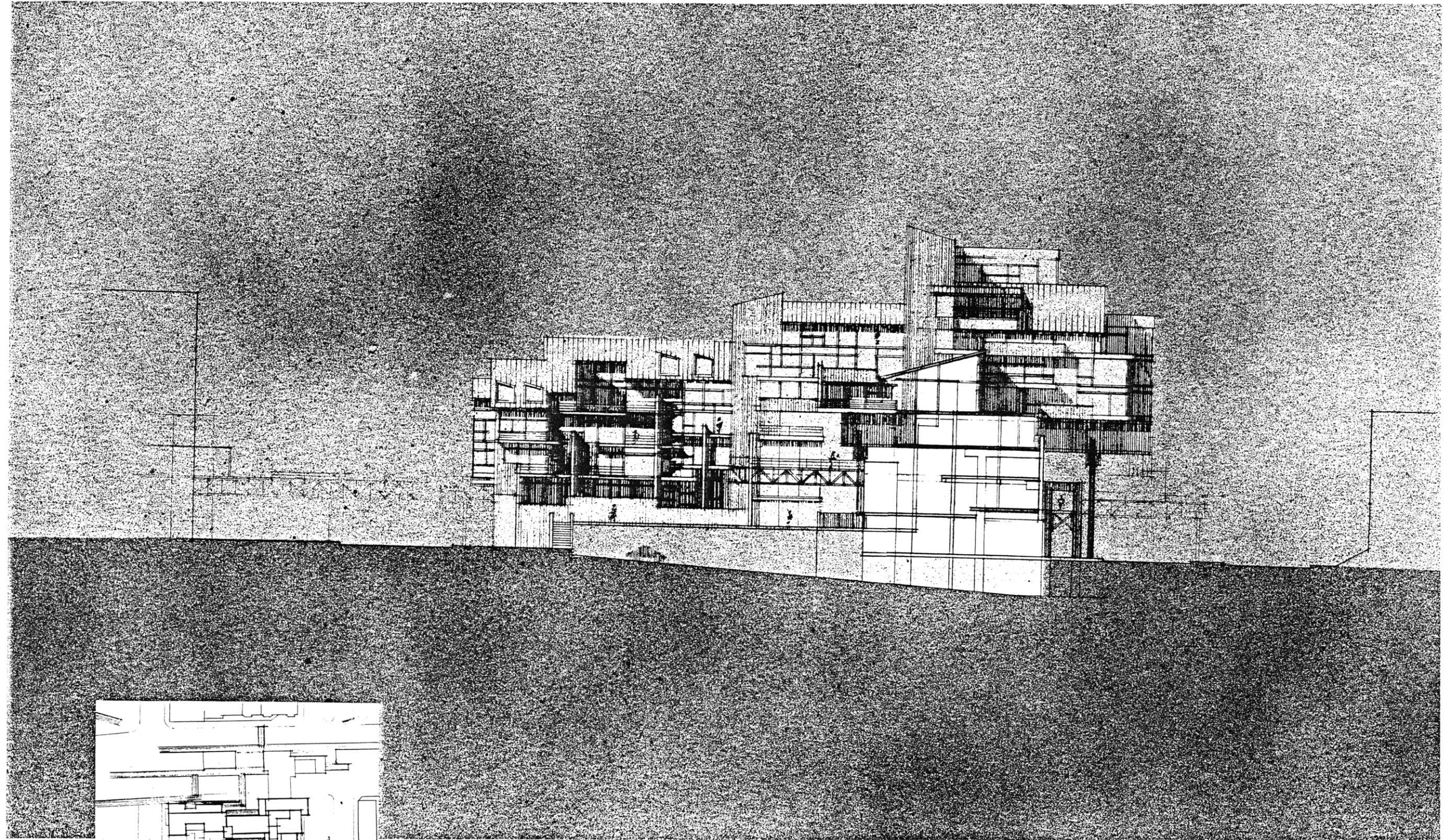
Northwest (Washington St.) Elevation



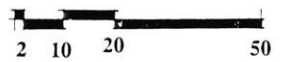


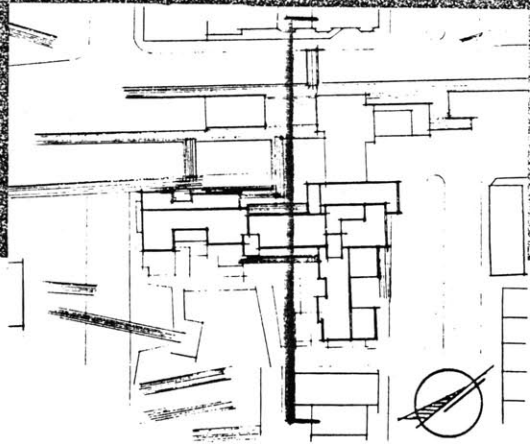
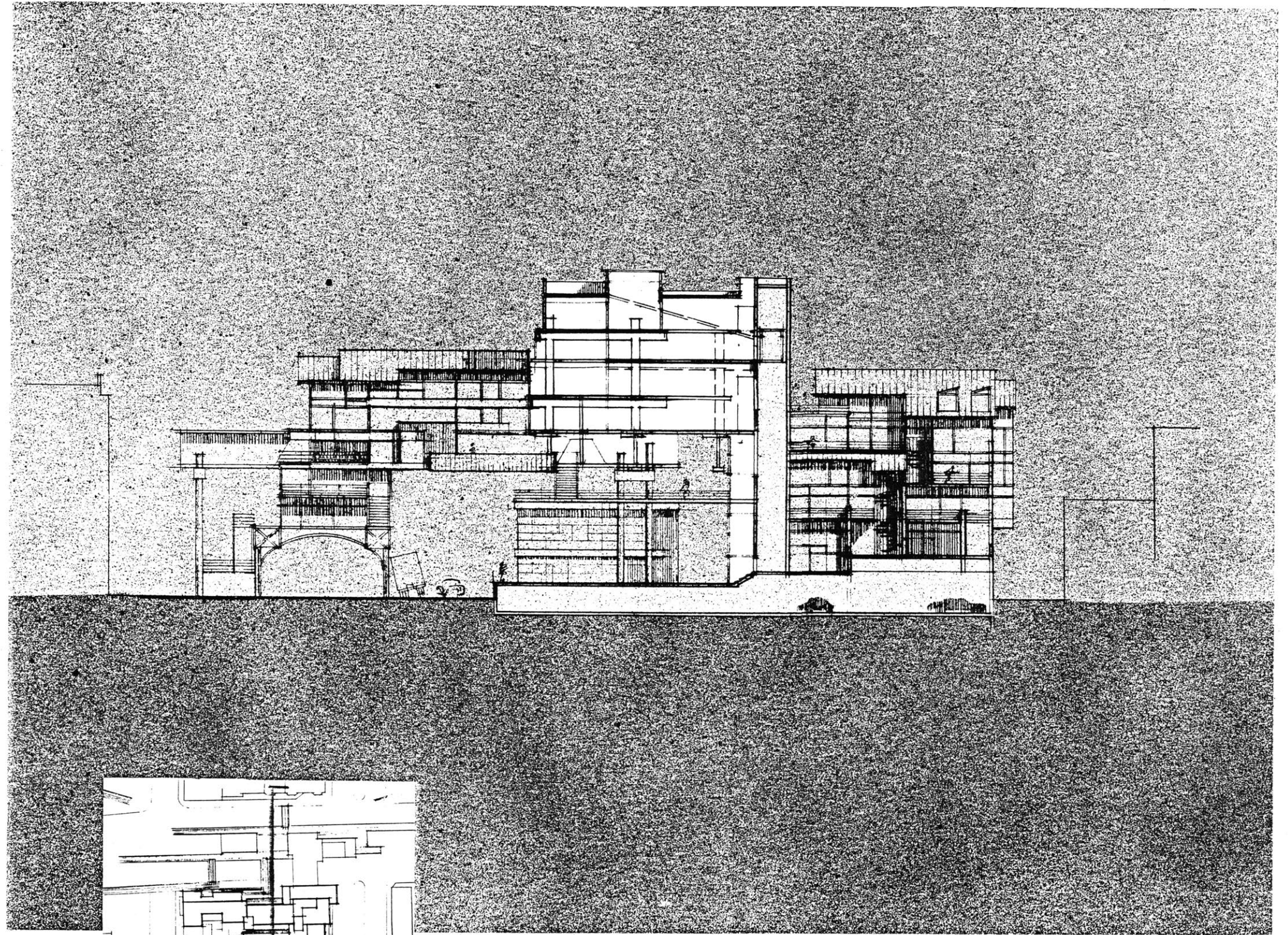
Northeast (Massachusetts Ave.) Elevation





Southeast (Rear) Elevation

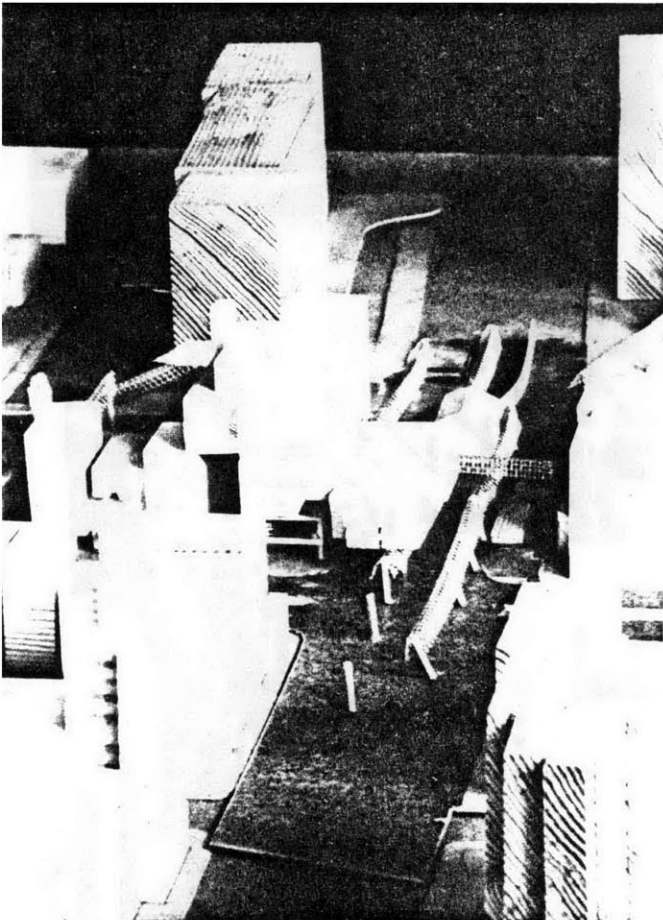
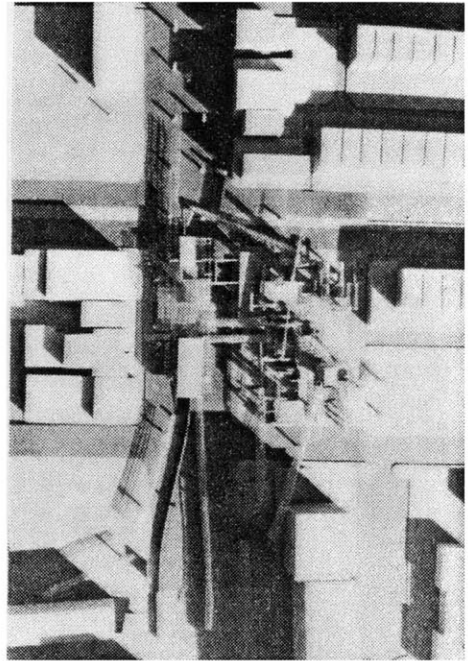
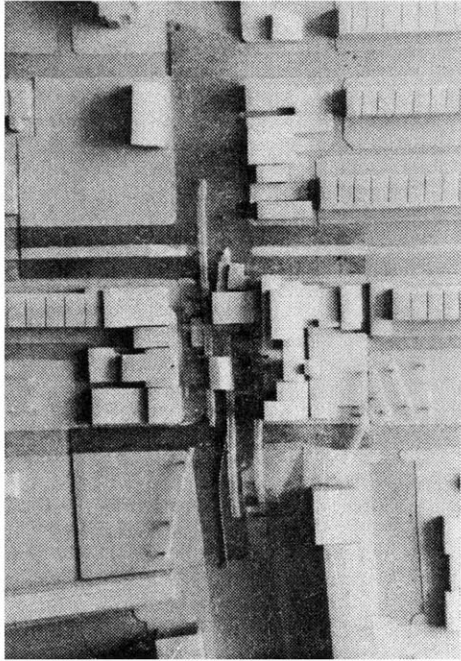




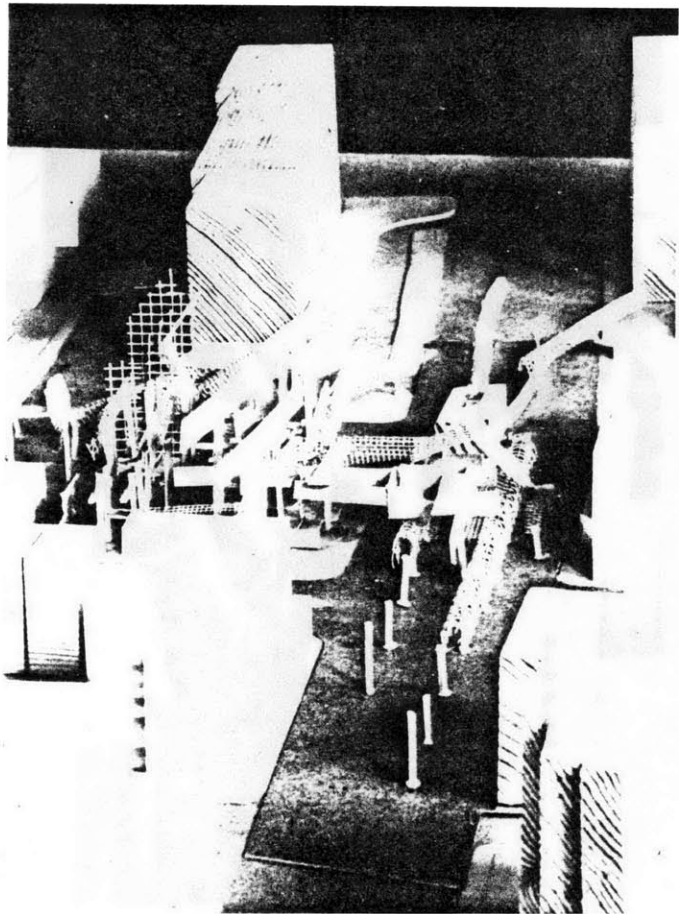
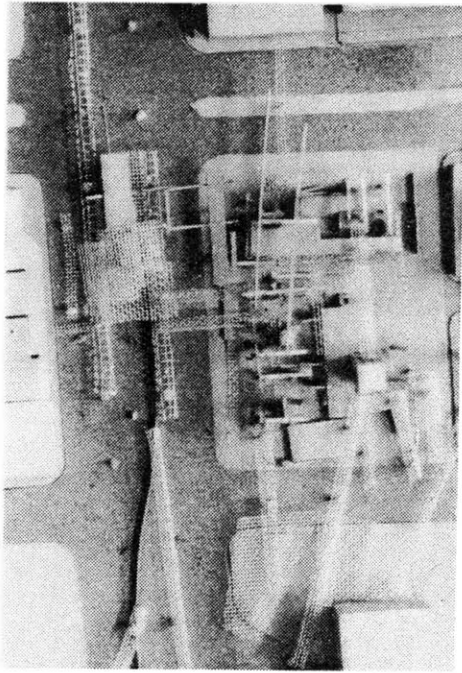
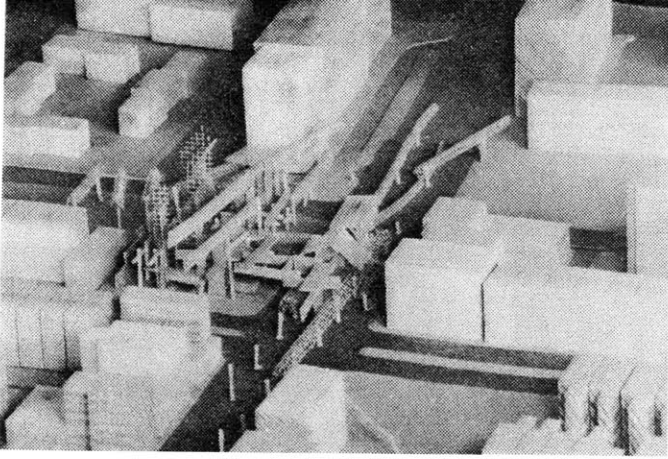
Section / Elevation

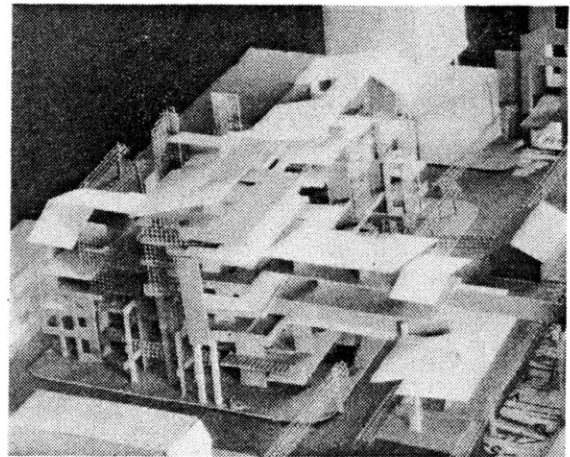
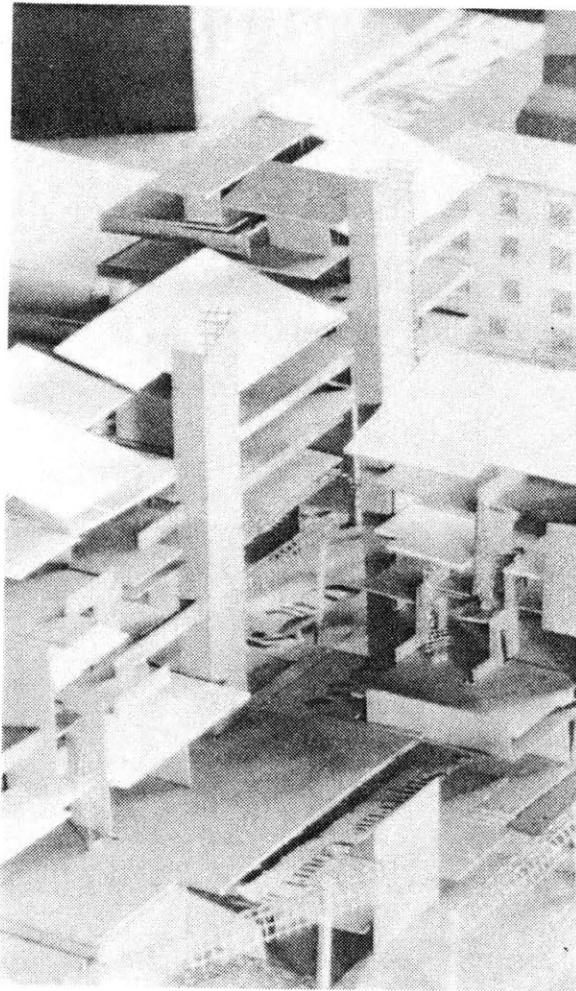
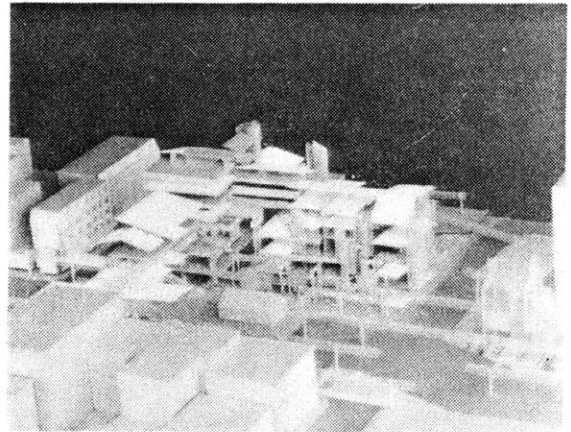
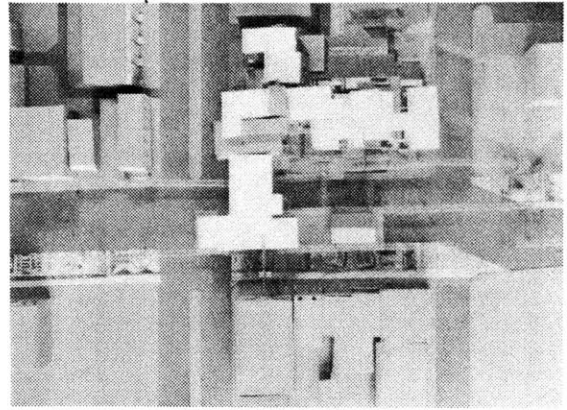


Models

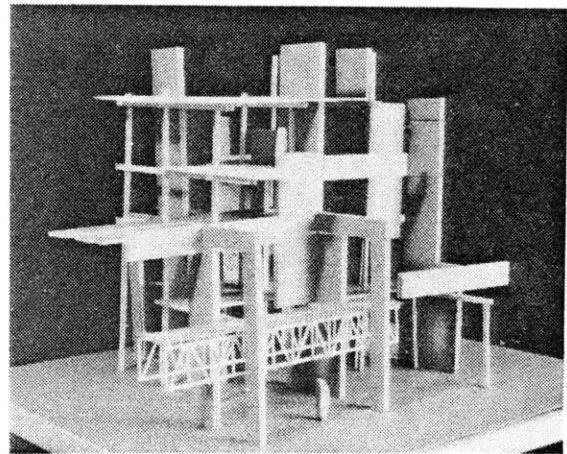
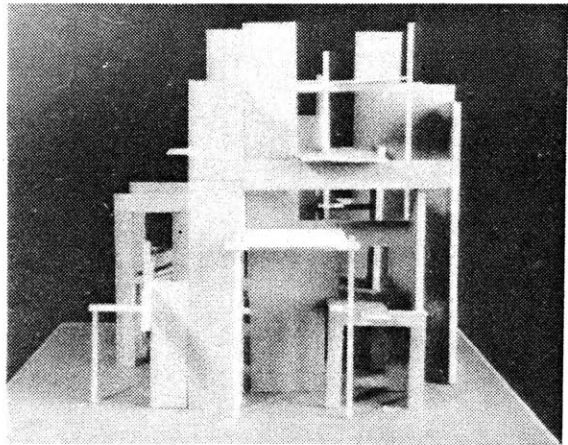
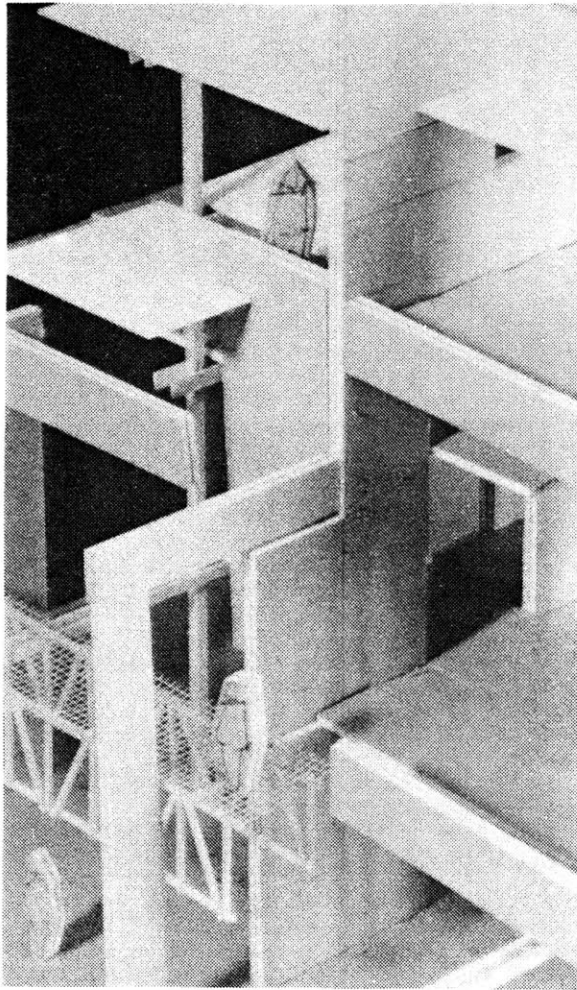
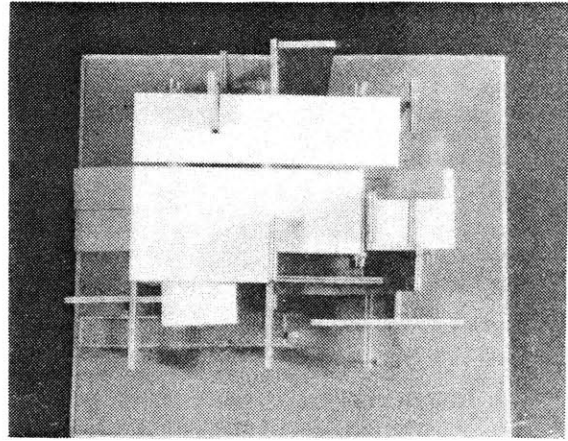
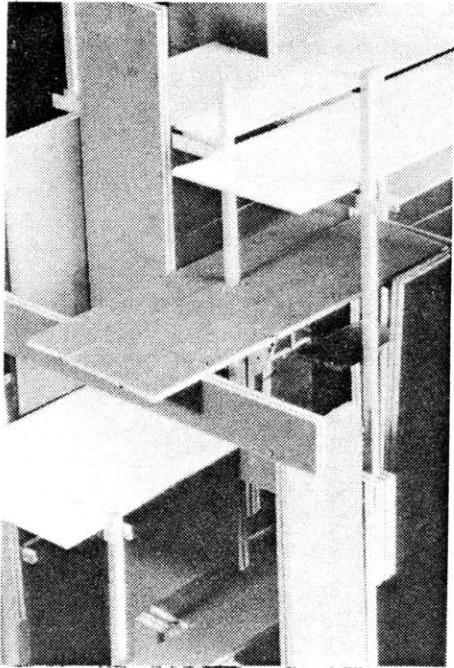


1"= 40' scale mass and study models





1/16th" scale schematic model



1/4" scale structural study model

Use

Use of space is a factor that needs to be considered throughout the process of designing of any structure or locale. Although building use frequently is stressed as the governor of architectural form, such is not the case in this thesis. Too often when use is singled out as the primary consideration, the result is a singular and *stamped* solution. Singular readings are suitable for a special purpose such as a museum or concert hall. In dealing with mixed use structures in an urban fabric, however, stamped solutions are what associative understanding attempts to combat. If instead we also understand *behavior of forms and spaces* with respect to different uses, and we concentrate design efforts on structurally and materially supporting *ranges* of use, then the actual inhabitation process is much freer and adaptable to varying needs. Thus the primary emphasis is on understanding formal and associative behavior.

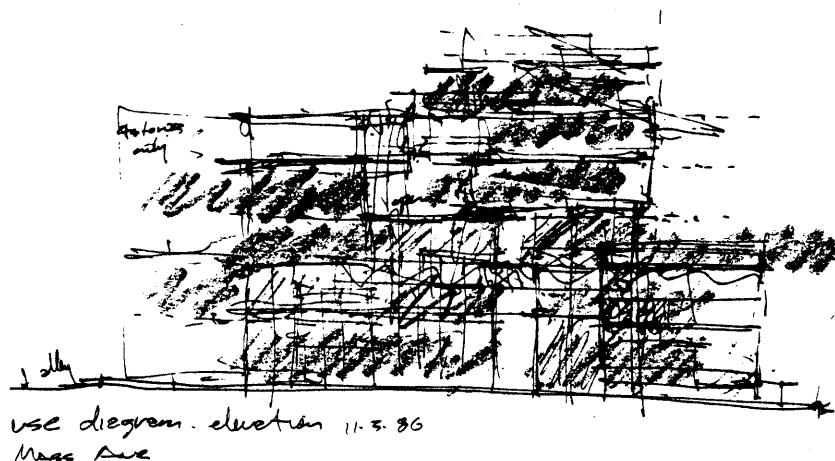
In this thesis use is considered mainly for two reasons:

1. For determination of appropriate *structural and territorial definition* (openness/closedness) with associated materials and closure, and
2. To establish continuity, discontinuity, and location of *access*.

Building is an impulse which much prefers the act to the finished product.

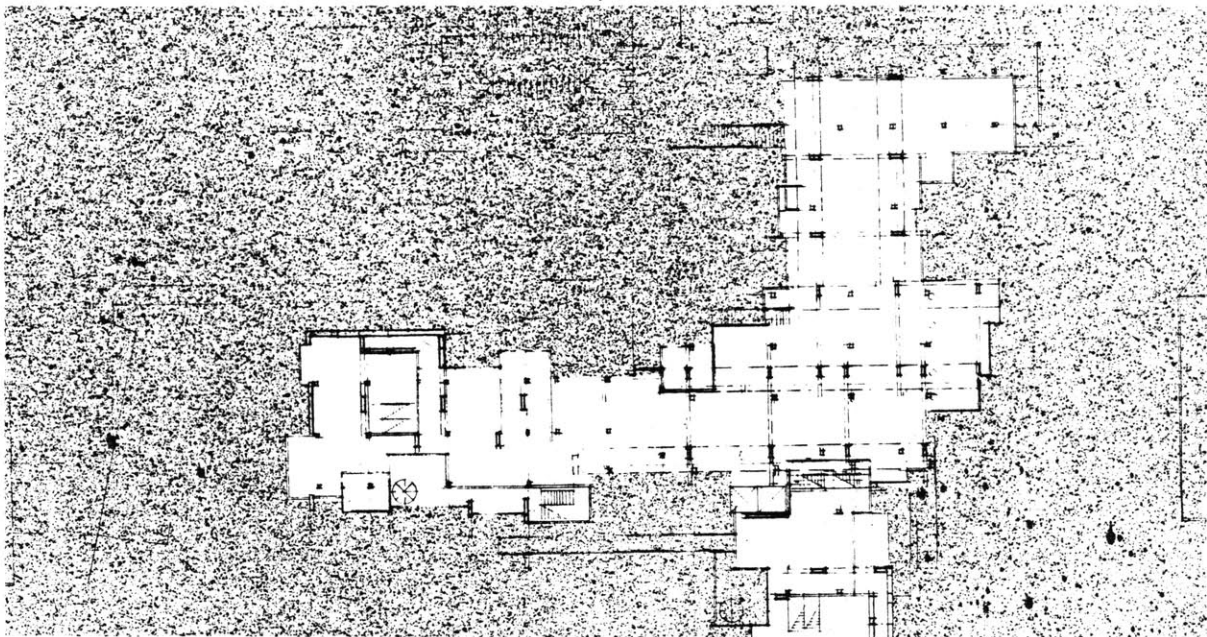
-John Habraken

(Supports p. 15)



Building associatively does not mean building generically. Design of spaces which can be interpreted for any use is a concept best left to warehouses and speculative office buildings. Totally open layouts of space seldom associate with surroundings such as those in the South End. More importantly, such structures provide no clues as to direction, access or inhabitation. Different uses have different territorial needs and such needs should inform the design of structure and closure. Retail and commercial uses vary greatly in terms of layout, size, and support needs. Long-term successful commercial layouts over time are ones which have little structural definition, transparent closure systems in display areas, and closed areas for storage.

The building acts as a framework to be filled in by everyone according to his own predilection
-Herman Hertzberger
(Harvard Educational Review p. 67)



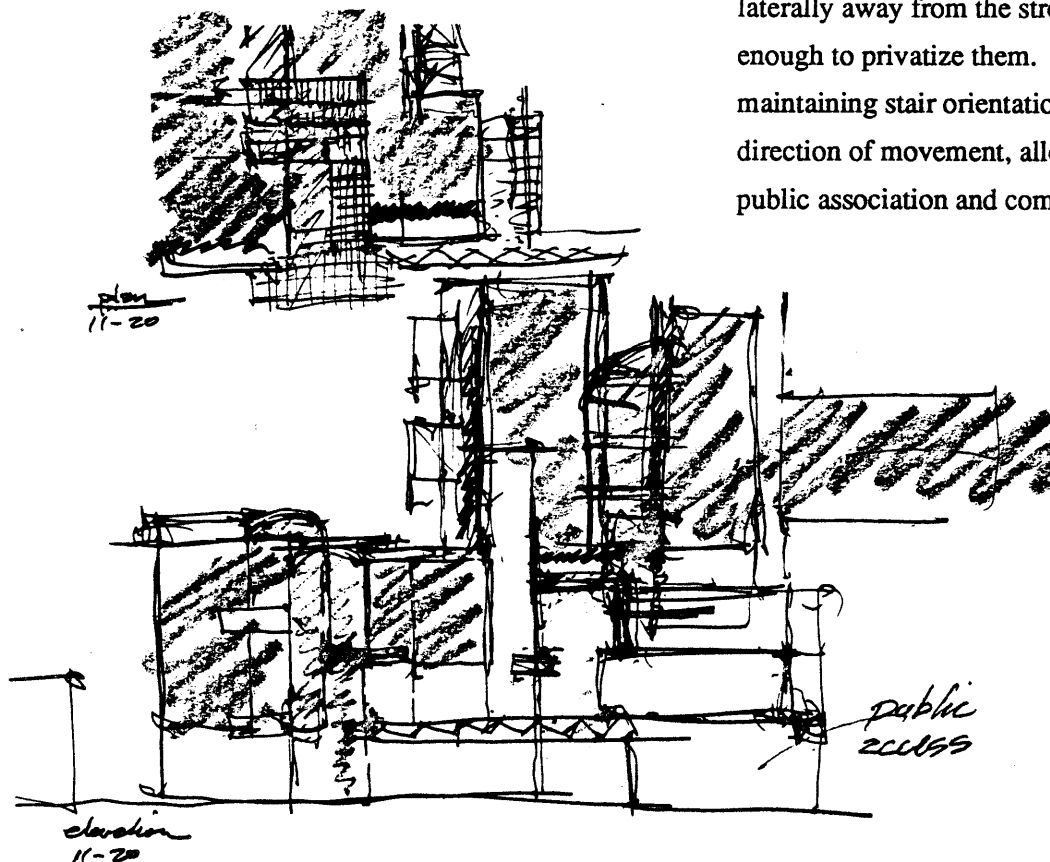
partial plan at public uses

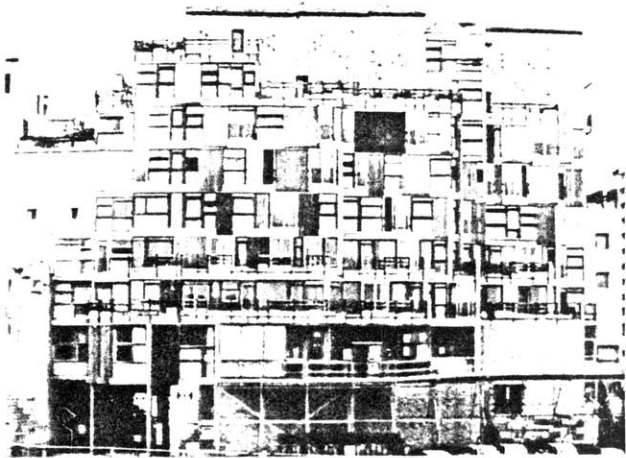
Beyond structure and closure, *access* is another important use/meaning component. Access and movement is not a simple matter of public movement in one direction and private in another.

Directional understanding in an urban grid setting is dependent upon one's position along any given block. Access requirements vary according to different uses and different expectations as to *who* should access. For example, entries to residential units are public but for reasons of privacy and security, *public* means a specific subset of people. The words *public* and *private* then have degrees of meaning.

The most public of uses have the clearest most continuous pathways. Typically they are larger in dimension, more visible, and

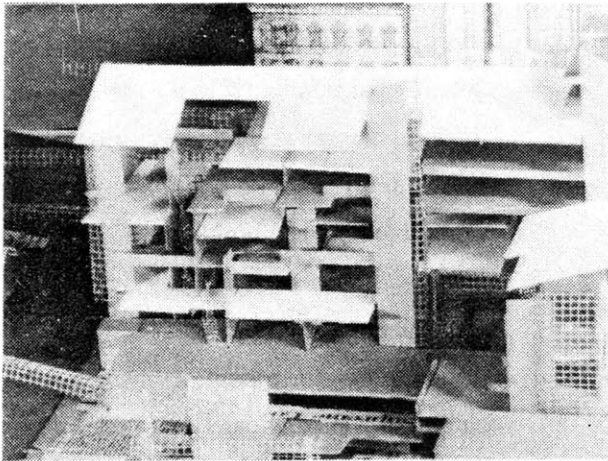
reinforce the stronger direction of the landscape, in this case Washington Street. Less public uses, in the case of a café for example, might maintain this public direction and dimension but in less visible locations away from the street. More discontinuous access is required as floors rise further above street level or as needs for privacy increase. Immediately privatizing access by changing directions to 90° with the street insures singular use. Stairs in typical rowhouses of the area, for example, run along the private-sized access zones at the sides of each building in a direction perpendicular to the street. This direction change immediately signals the change in privacy; no optional association is possible between buildings. Simply shifting common residential stairways laterally away from the street edge is enough to privatize them. However, maintaining stair orientation to *public* direction of movement, allows retention of public association and communality.



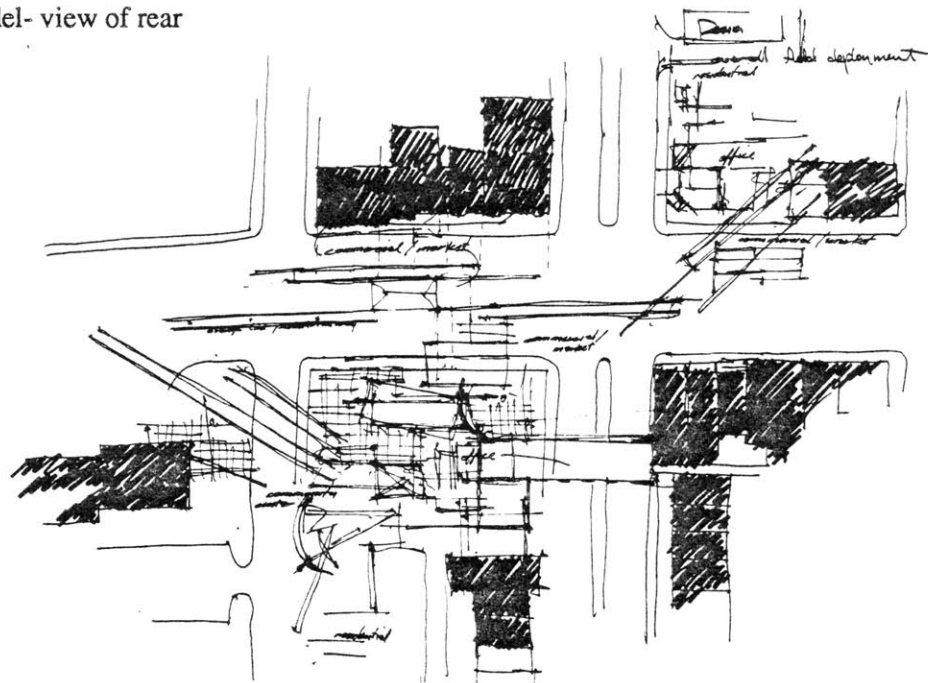


Lucien Kroll Eccumenical Center -
Catholic University at Louvain, Belgium 1

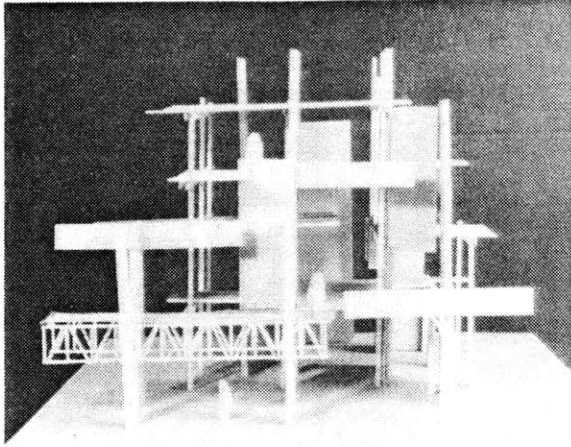
Continuity or rather *discontinuity* of access, horizontal vs. vertical, becomes more important as uses become more private. Residential uses can have unbuilt zones or territories associated with them such as backyards, porches, and decks. Relationships of front/back territorial control becomes extremely important. In a *backyard* zone, access tends to be more vertical, more discontinuous, in order to isolate individual unit territories.



1/16th" schematic model- view of rear

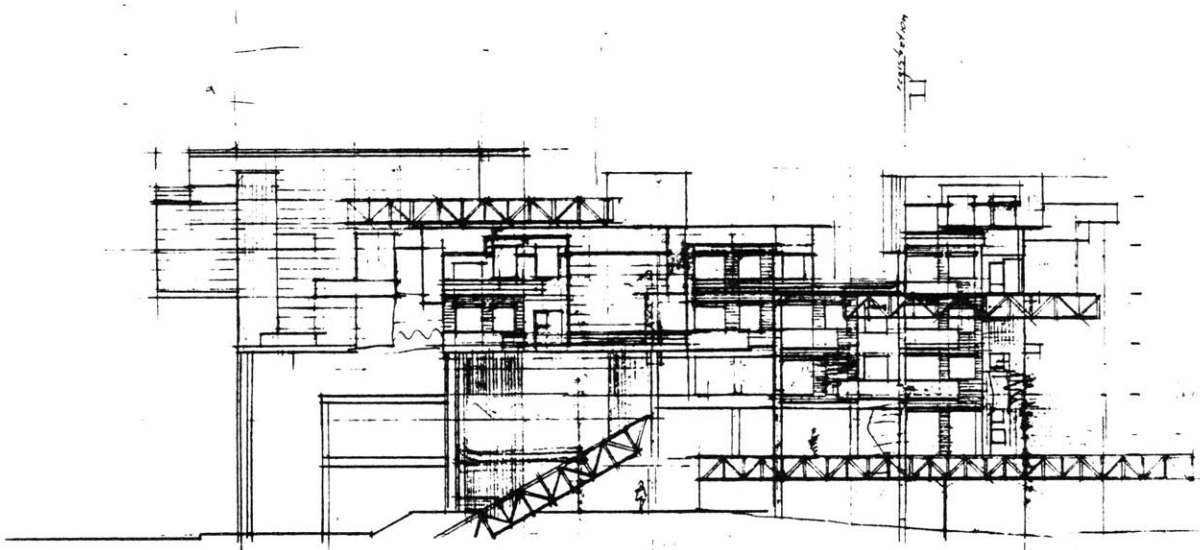


early site use plan



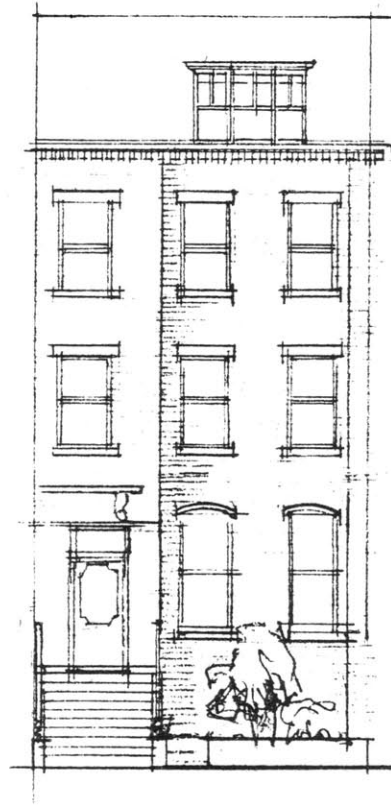
1/4" scale structural study model

Variation of office sizes and types in a urban location is so great that they are adaptable for most structural organizations. Both open and closed territorial systems are suitable for different office needs. More flexible organizations, those large enough and open enough to allow a range of interpretations, are most desirable for large office conditions. Spatial definition is less important to office uses than having a potential for levels of light higher than those typical of residential uses. A panel system is advantageous as a closure system.

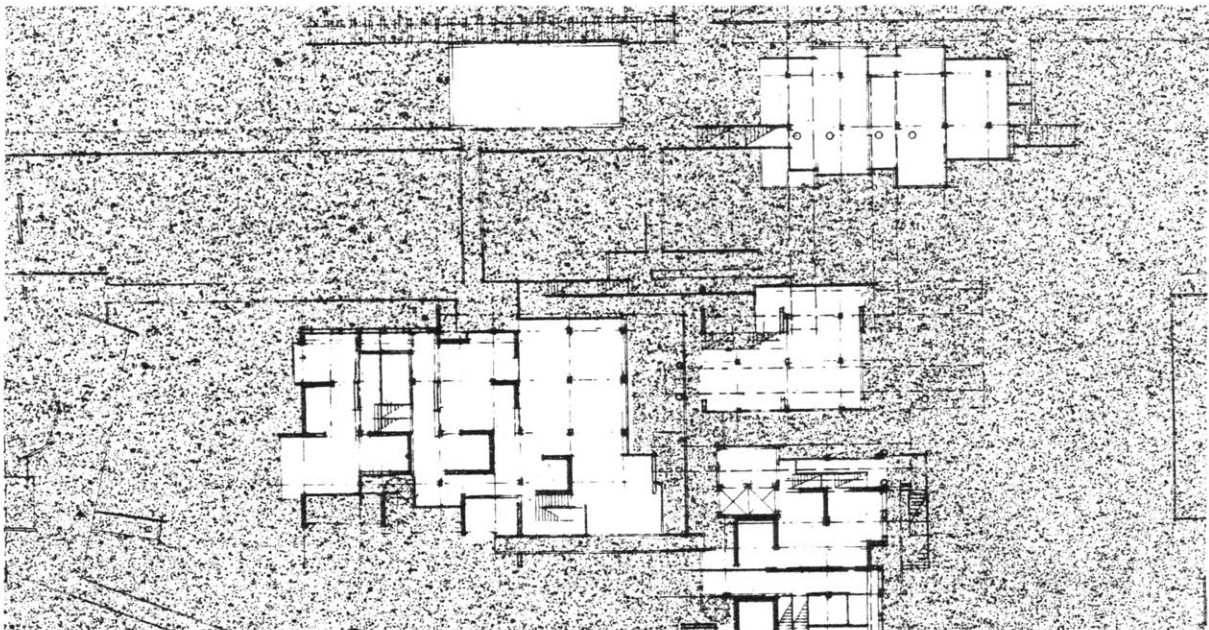


early elevation study - open and closed territorial systems

In contrast, housing deals with issues of privacy, territorial control, and expression. This requires greater definition and *closedness* to make boundaries and meanings clear. Residential needs are more uniform than commercial. Room sizes and ways of access are more standard from place to place, unit to unit. These sizes form the constituent blocks which build continuous environments. Definition and representation of sizes then becomes important. Unit sizes, when evident, are responsible for generating the rhythm we experience when we walk down a street. Residential uses are of a more private nature than commercial and office ones, and require more solid definition between the various rooms of a single unit, as well as between neighbors. Materials are more opaque, with smaller openings for light.



typical residential rowhouse



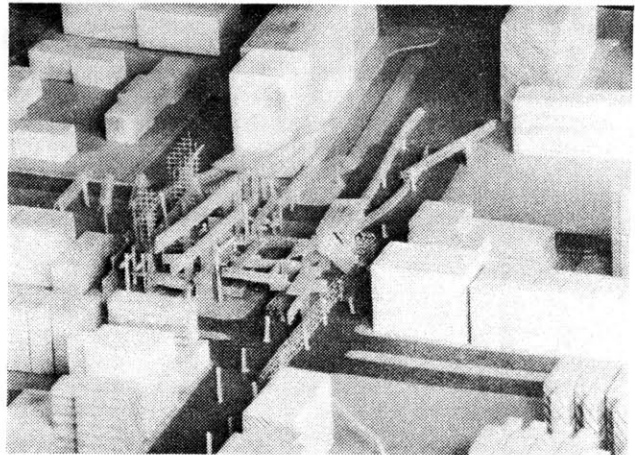
partial upper plan at private uses

While use considerations are essential to any design, determination and projection of singular uses is not. In fact, such efforts return us to the one-to-one relationships we are trying to avoid. There are certain ranges of use that one logically expects to find in certain places. In this thesis, diagrams of use ranges are as specific as the design projection gets. Plans and elevations are zoned for specific uses; structure and access understandings are associated with them.

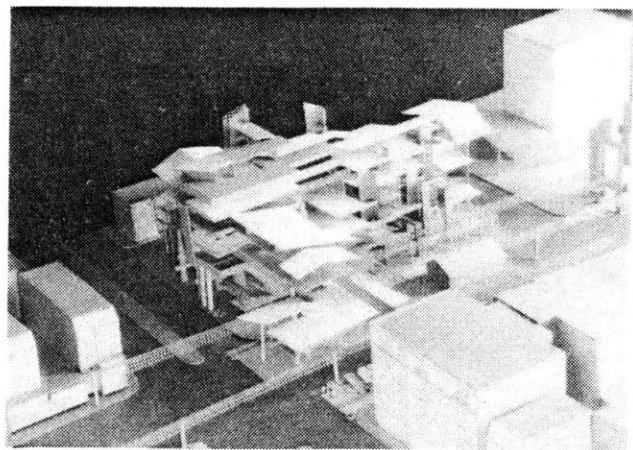
Commercial/retail uses naturally reside at the lower levels where public access is greatest and vehicular access is most convenient. Building multiple levels of public access allows generation of a larger zone for these open uses. Built sections which project out into the zone of Washington Street carry these uses and meanings into the street zone.

Upper levels become more discontinuous and therefore more private in terms of use. Upper locations at the southwest and east ends of the proposed design are developed as residential primarily because public access need not pass by these areas. Such positions have greatest structural definition. The most visible portion of the site, near the corner of Massachusetts Avenue and Washington Street, becomes a more open office organization. Clad mainly with a panel system, it is adaptable to apartment housing types as required.

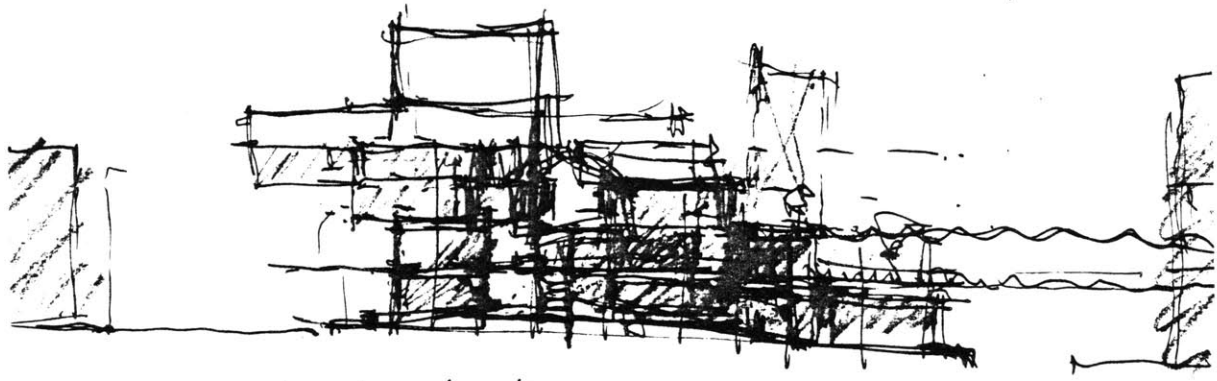
The Orange Line is very large and open in terms of structure. Because it is a highly recognizable image, its use needs to be something very public oriented. Ultimately transformed into a building, it might perhaps function as a *community center* or museum.



1"= 40' scale study model-
view along Washington St



1/16th" schematic model-
view along Washington St

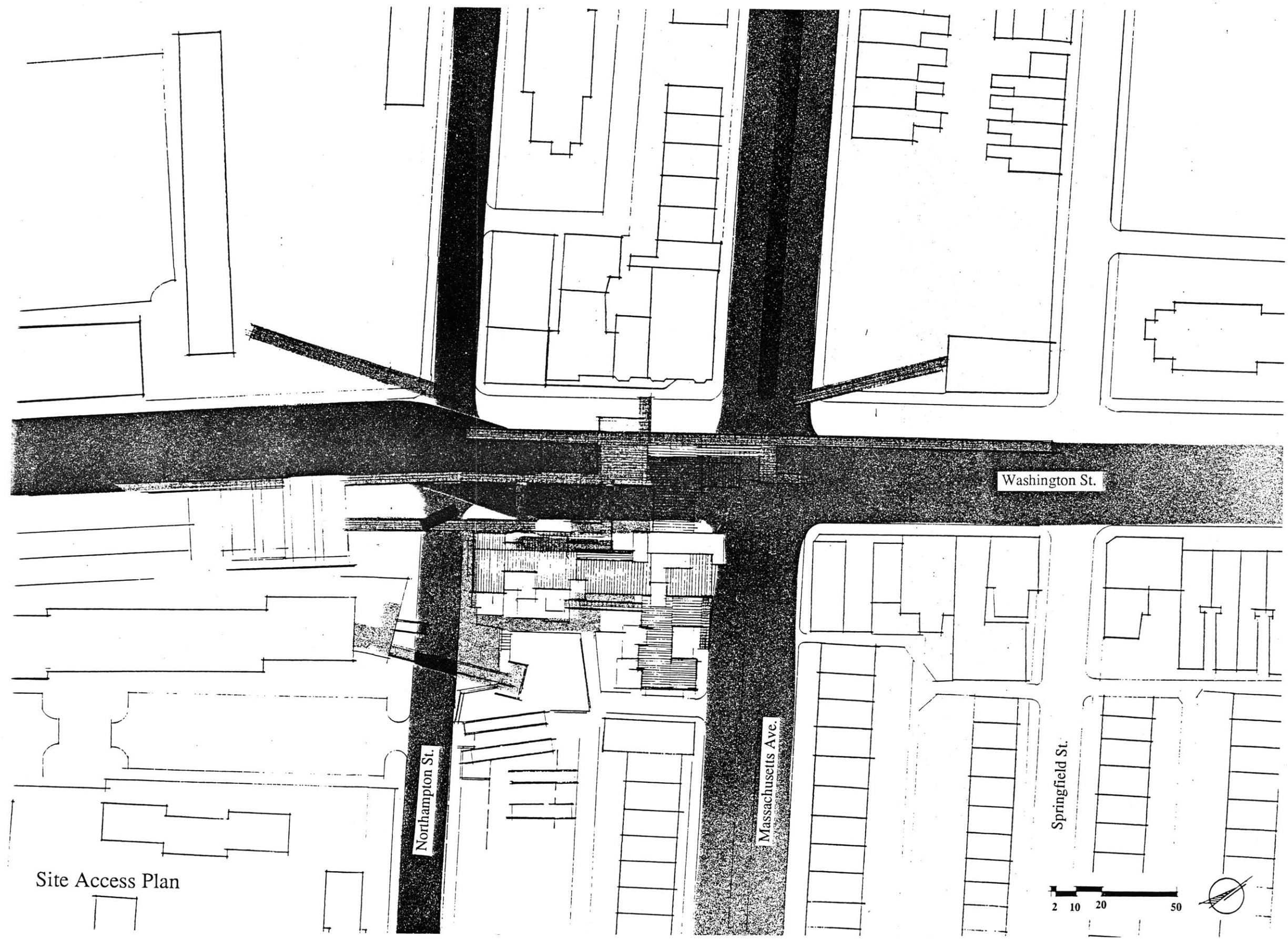


north elev. schematic



west elev. schematic

early use diagrams



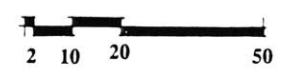
Site Access Plan

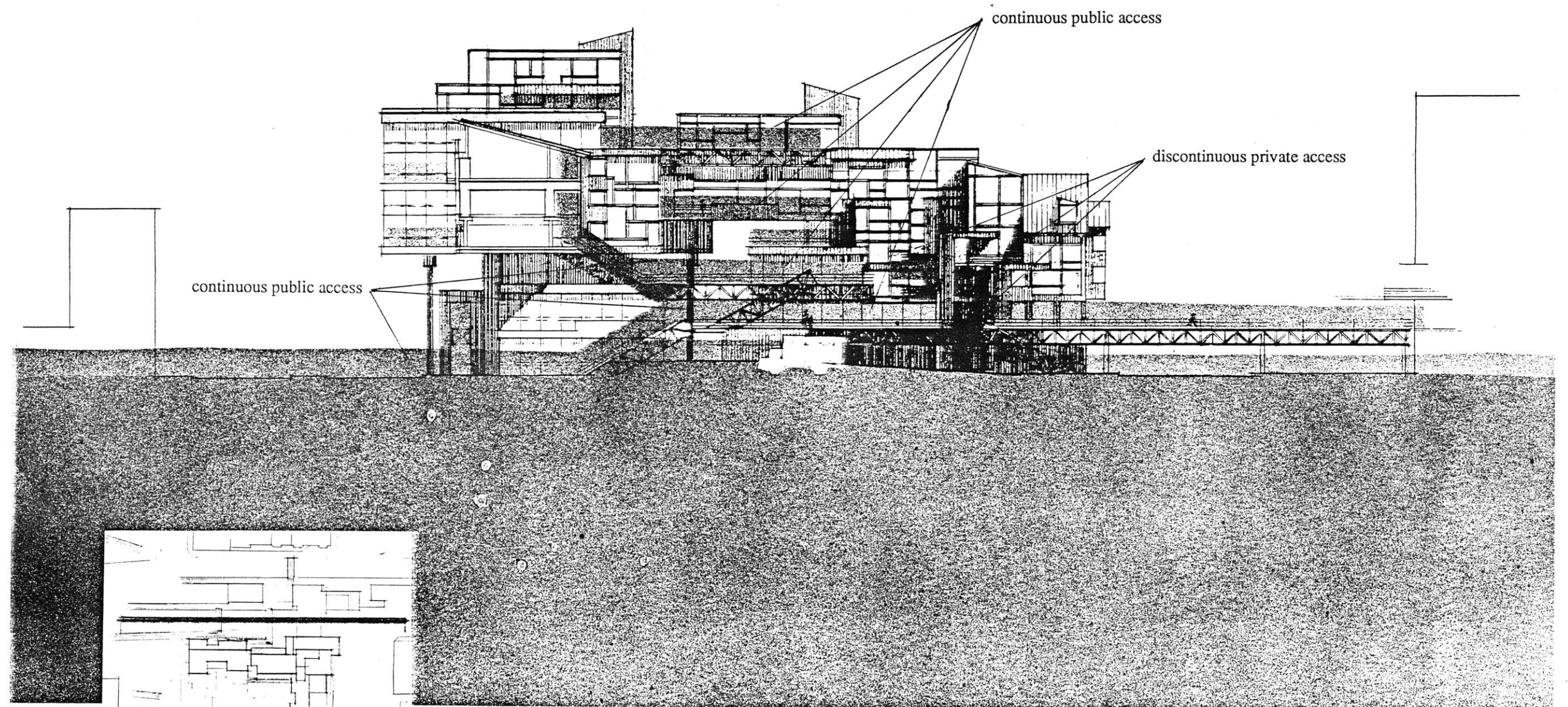
Northampton St.

Massachusetts Ave.

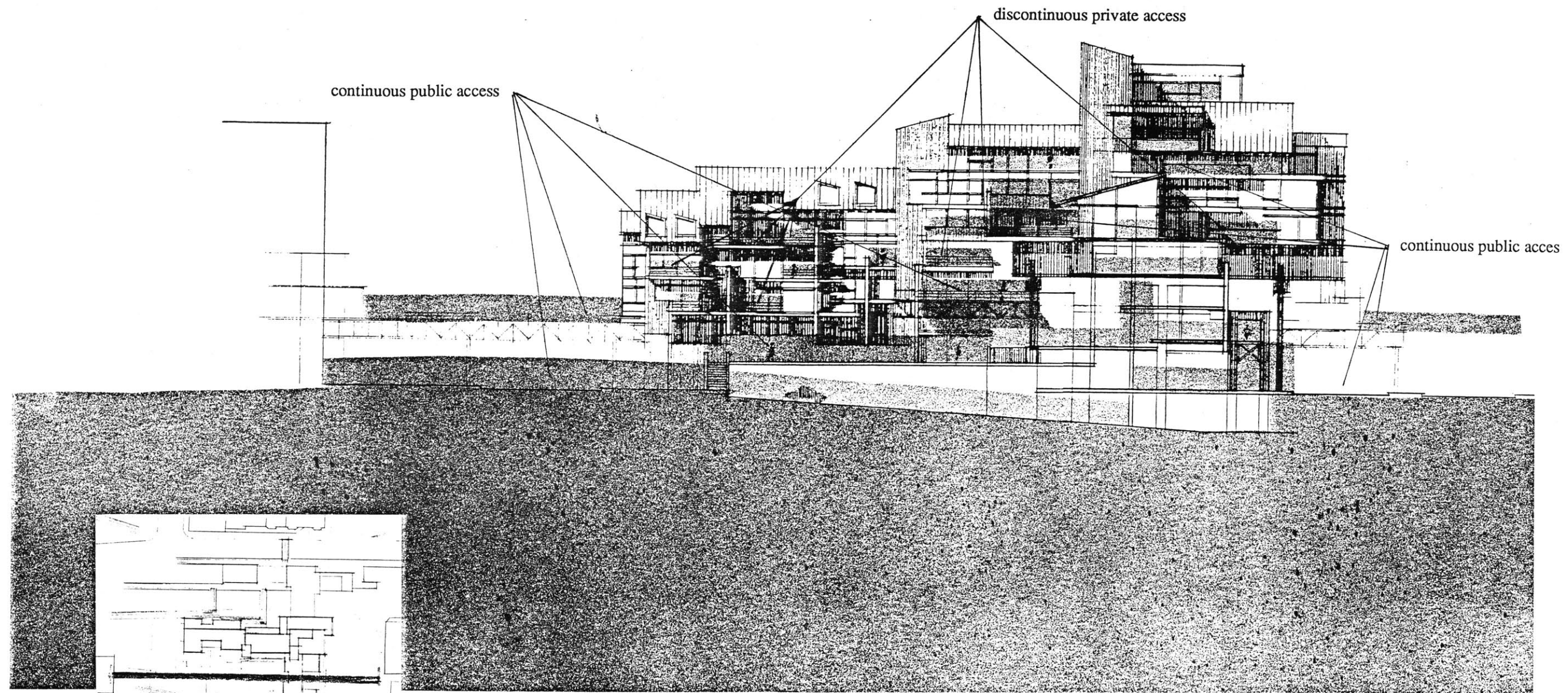
Washington St.

Springfield St.





Northwest (Washington St.) Elevation/Access Diagram



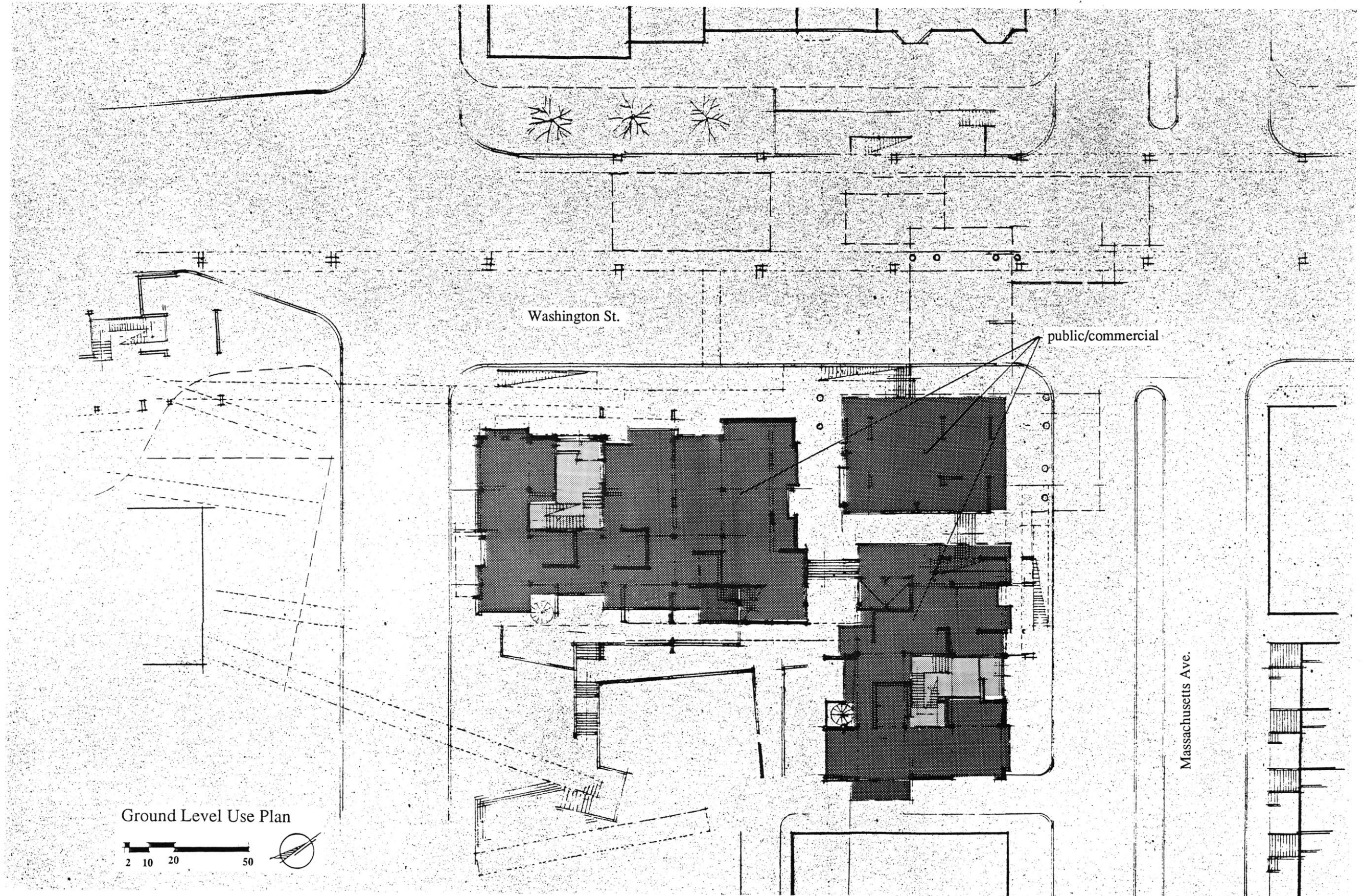
continuous public access

discontinuous private access

continuous public access

Southeast (Rear) Elevation/Access Diagram

2 10 20 50

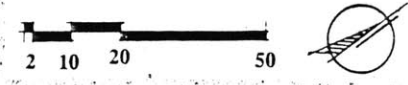


Washington St.

public/commercial

Massachusetts Ave.

Ground Level Use Plan





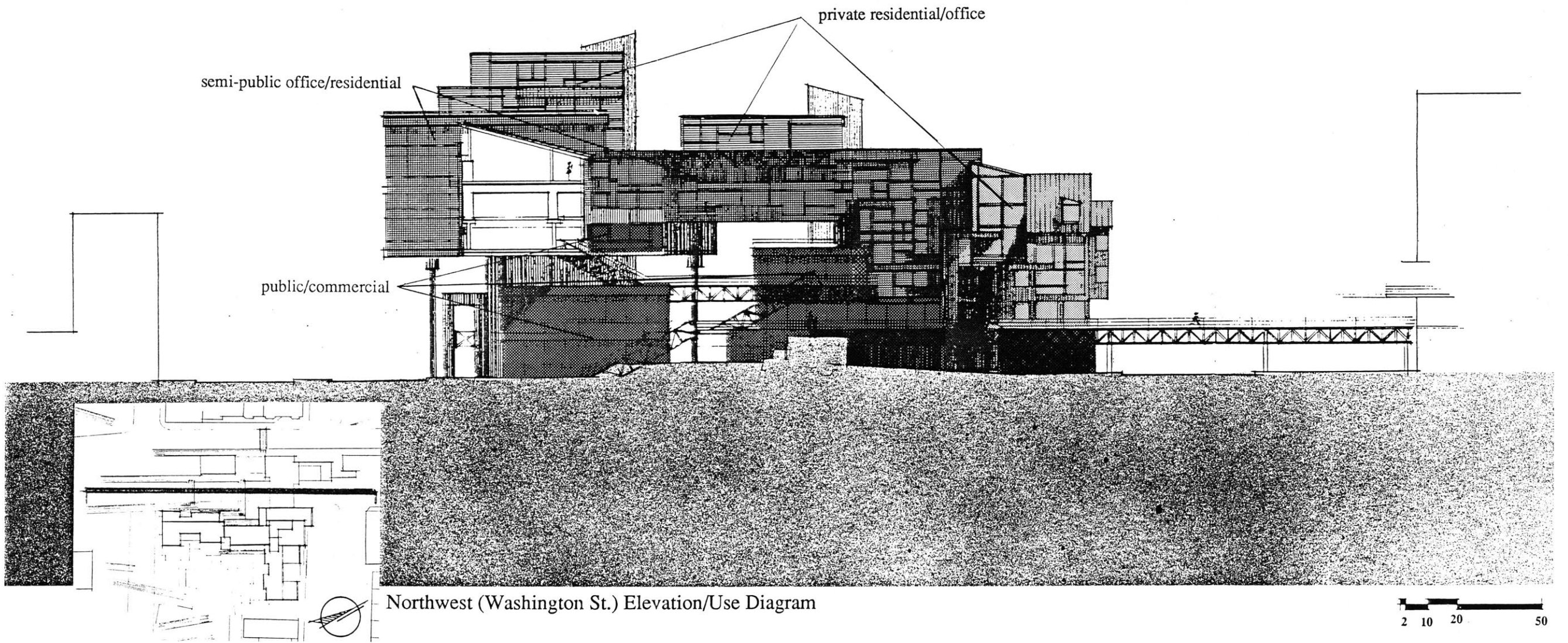
Intermediate Level Use Plan

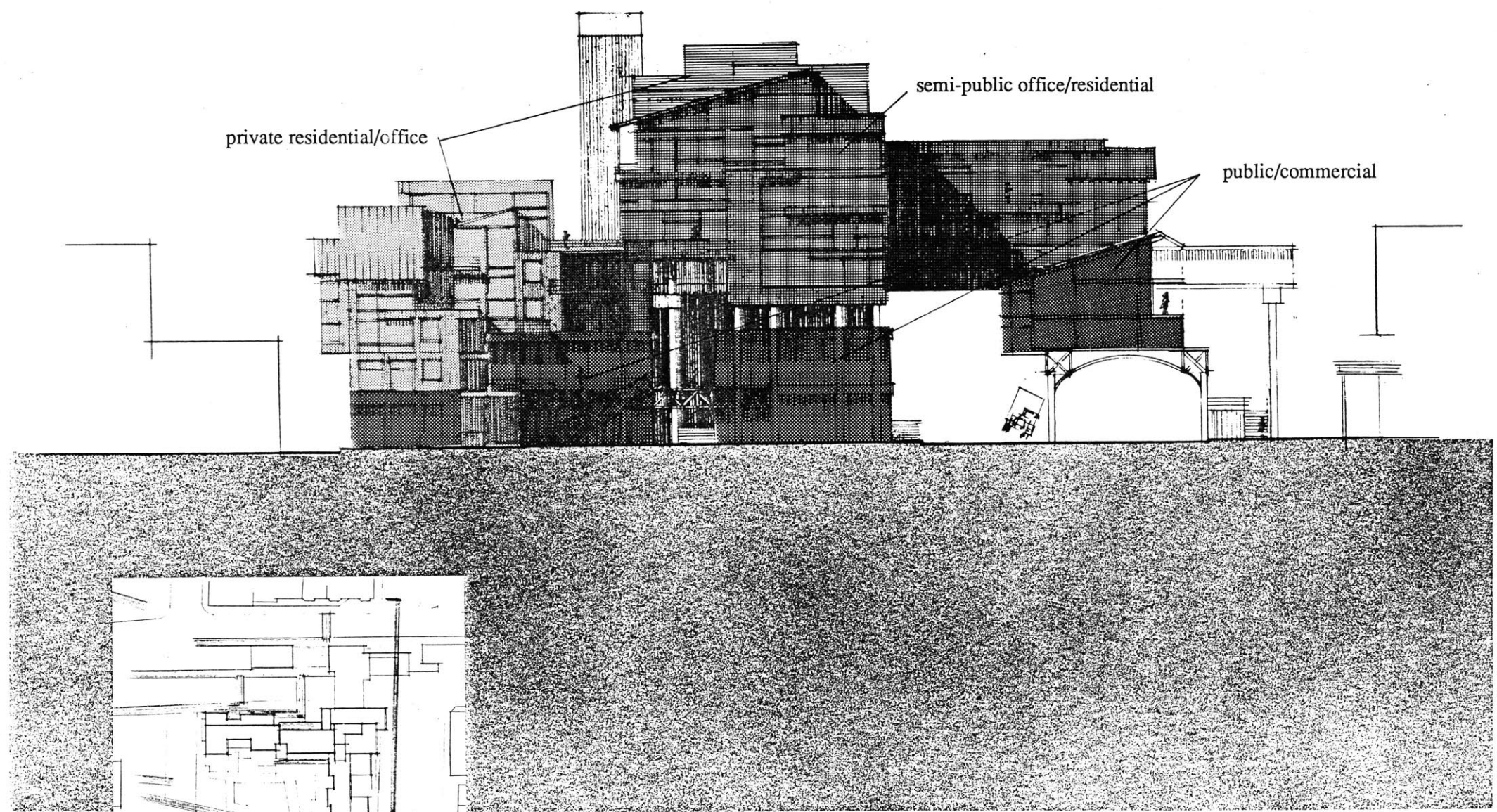




Upper Level Use Plan







Northeast (Massachusetts Ave.) Elevation/Use Diagram

2 10 20 50

Dimension

Most environments built over time can be broken down into smaller units of inhabitation and growth. Identifiable ranges of sizes may be observed which build from small to large in a continuity of sizes. Once recognized, these sizes, built and unbuilt, can be used repetitively to generate a continuum of space and building. They constitute a flexible set of pieces required to build a rhythmic and coherent urban environment such as the one around Washington Street and Massachusetts Avenue. The rhythm established by multiple additions of similar parts is essential to our perception of movement through space. Just as direction is important in the definition of paths, dimensional similarity is important to generating sequences of events along that path. Speeds at which we comprehend an environment may vary greatly. Technology and new transportation systems require multiple readings of a single location based upon the speed at which one is moving¹. Collective, block, urban, and larger size families have increased importance at higher speeds. These sizes are initially based on use requirements.



Procida

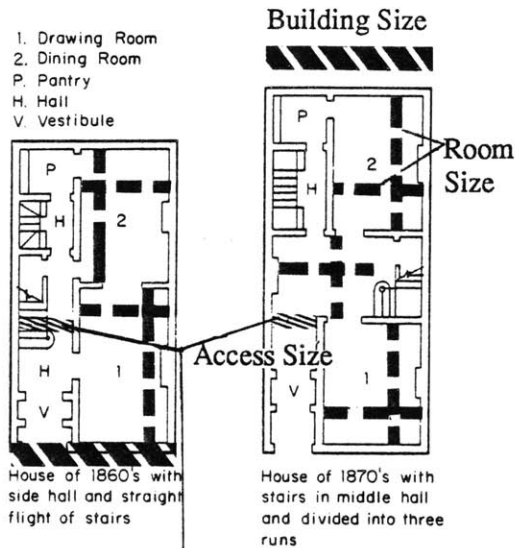
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We have a glimpse, then, of the fact that our world has a structure, in the simple fact that certain patterns of events - both human and nonhuman - keep repeating, and account, essentially, for the much greater part of events which happen there

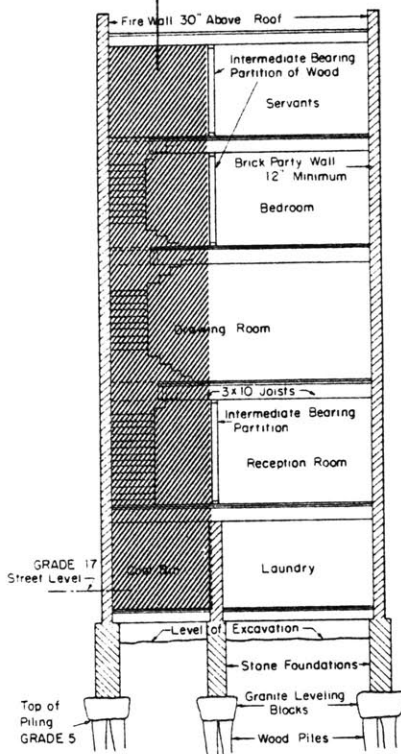
*-Christopher Alexander
(The Timeless Way of Building p. 69)*

A good environmental image gives its possessor an important sense of emotional security

*-Kevin Lynch
(The Image of the City p. 4)*



19th century rowhouse plans 2



19th century rowhouse section 3

Sizes identified here are:

private four to eight feet
dimension of personal places, closets, bathrooms, single offices as well as corridors and other ways of access or path.

room 12-16 feet
dimension of typical living, dining rooms, and multi-person offices

building 20-30 feet
dimension of individual buildings or residential dwellings. Typical buildings in this area are generated in modules of 22- 26 feet

collective 40'-90'
dimension of multiple blocks of single units. Dimension of civic, religious and other important buildings

block 200-300 feet
dimension between cross streets. The largest recognizable size in typical urban grids.

urban 600 feet +
dimension of multiple blocks of cross streets and, in the case of the South End, the lengths of large east-west blocks perpendicular to Washington Street.

Often, as is the case of this site, the recognizable size families are built from different material systems as per varying structural and privacy needs. The recognizable sizes at this *Northampton* site are composed of three distinct structure systems:

Private and *room* sizes are generated by a

wood frame construction within masonry party walls. Such small sizes are evident at the exterior of the buildings in the form of awnings, bay windows, dormers, and in added back porch structures at the rear of buildings. In addition some punched masonry openings for windows and doors are of personal size.

Because of their commercial/office/residential combination nature (and due to physical deterioration over time) the masonry buildings along Washington Street have much greater size range than surrounding residential districts.

Building and collective sizes are composed of a brick partywall system. The majority of the buildings along Massachusetts Avenue and streets parallel to it are of 1860's vintage, residential in character, and of rowhouse organization. At least some recognizable rhythm is apparent. Sizes range from 20 to 25 feet in width and three to five stories (36-60 feet) in height. Building widths are generally composed of a six to eight foot access dimension along one side of the unit, plus a 12 to 19 foot room size. Partywalls are not actually visible in the facades. The visual rhythm is established by windows, entries, stairs, and other facade elements occurring at building size intervals.

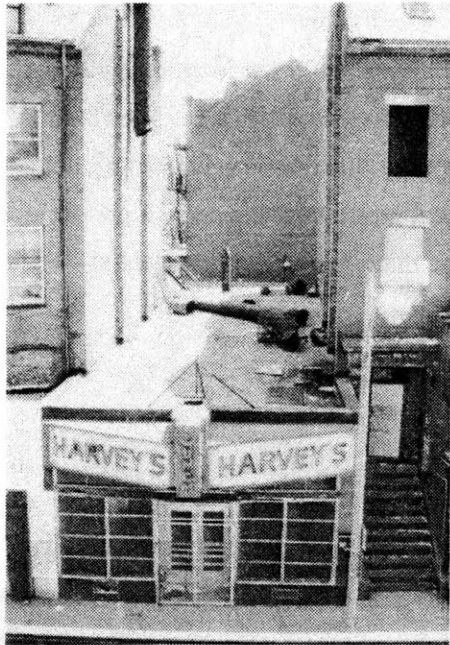


vacant site with area buildings in background

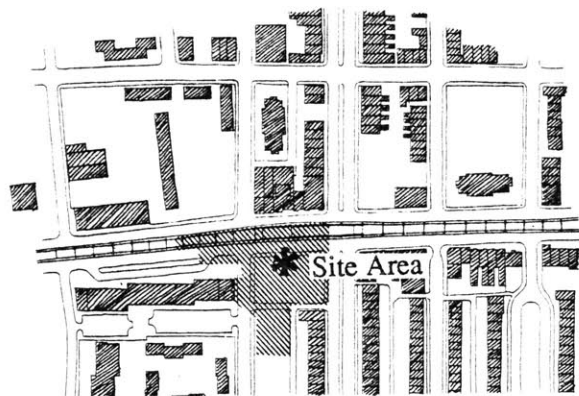
- ■ ■ Building Size
- ▨ ▨ ▨ Collective Size



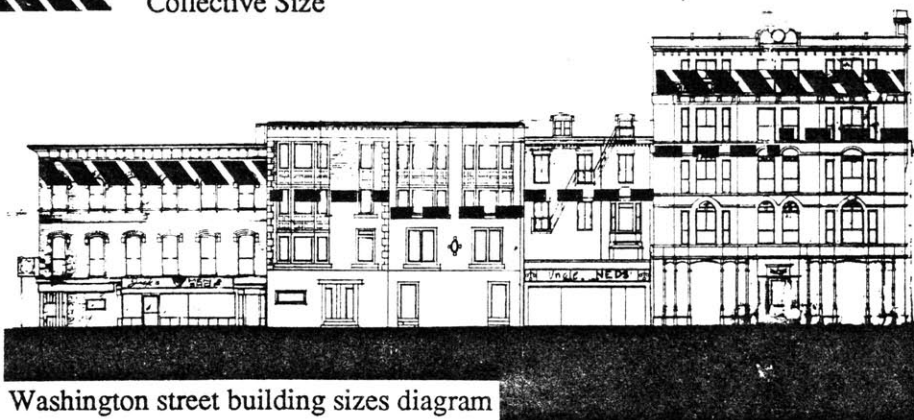
Washington Street building sizes diagram



Washington St. buildings



- Building Size
- ▨ Collective Size



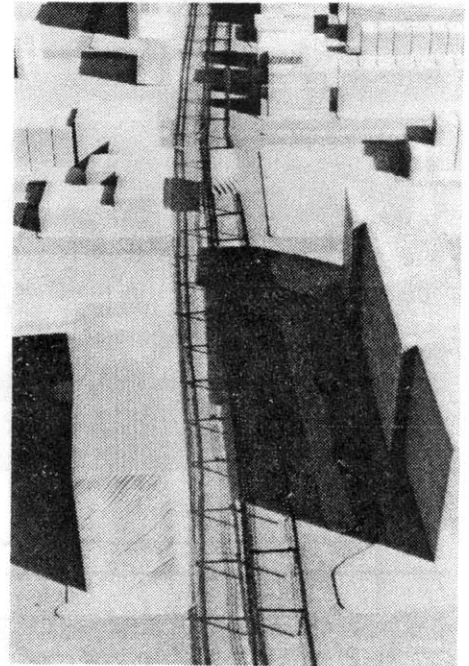
Washington street building sizes diagram

Twenty to 25 foot sizes are doubled to 50 foot widths in some buildings and tripled in the case of one. These are some of the few collective sizes which are built. Sides of buildings facing Washington Street which are visible on Massachusetts Avenue and similar cross-streets are also collective in size (50 to 70 foot range). Building heights of Washington Street partywall buildings vary from one to five stories (15-65 feet). Distances *between* buildings, the unbuilt dimensions of the streets, fall into the *collective* size range. The layout of the South End area is a piecemeal grid system. Although generally orthogonal, and particularly so at the site, bends do occur in some streets and block sizes vary greatly in length. Streets are hierarchical in size ranging from 15 foot alleys in between cross streets to 90 foot wide Massachusetts Avenue and 115 foot Washington Street. In addition, single spans of the Orange Line truss structure system (though never appearing singly) are of collective size.

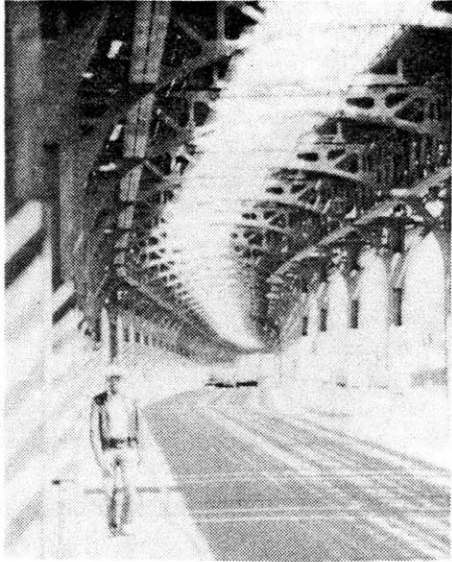
The *block* size presently exists in the masonry system only. Multiplications of buildings simply cease at the junctions of streets. This size is missing in the Orange Line.



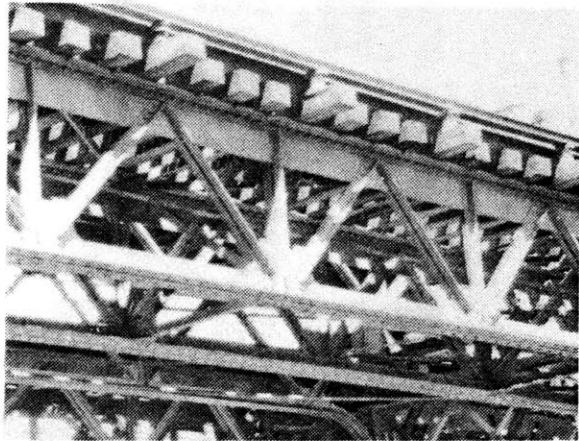
urban sizes view along Massachusetts Ave.



1"= 40' scale site model

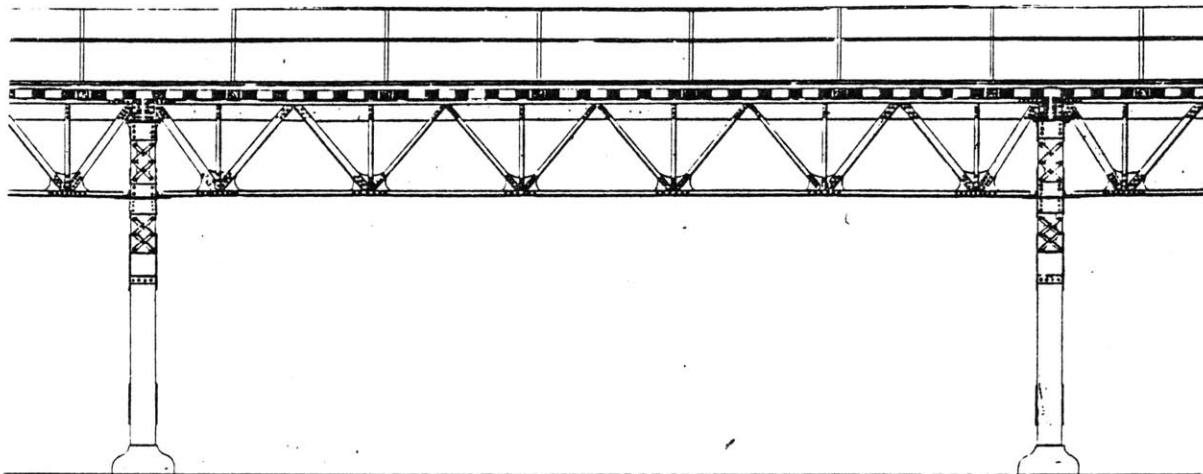


urban sizes - the Orange Line



the Orange Line

Urban and larger sizes are visible in the long blocks running east and west along Massachusetts Avenue and streets parallel to it, as well as in the continuous and lineal steel truss structure of the Orange Line elevated rail system. The Orange Line is composed of a large open system of trusses and columns. Typical bay sizes range from 45 to 55 feet in length and 30-40 feet in width. Platform height is approximately 20 feet in height and is supported by five foot deep trusses. By virtue of the linear continuity necessary to carry elevated trains, the Orange Line structure reaches urban sizes and larger. The system then has a gap between *collective* and *urban* size families.



LONGITUDINAL ELEVATION

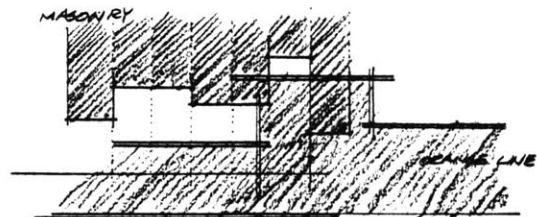
original Mass. Transit Authority elevation

4

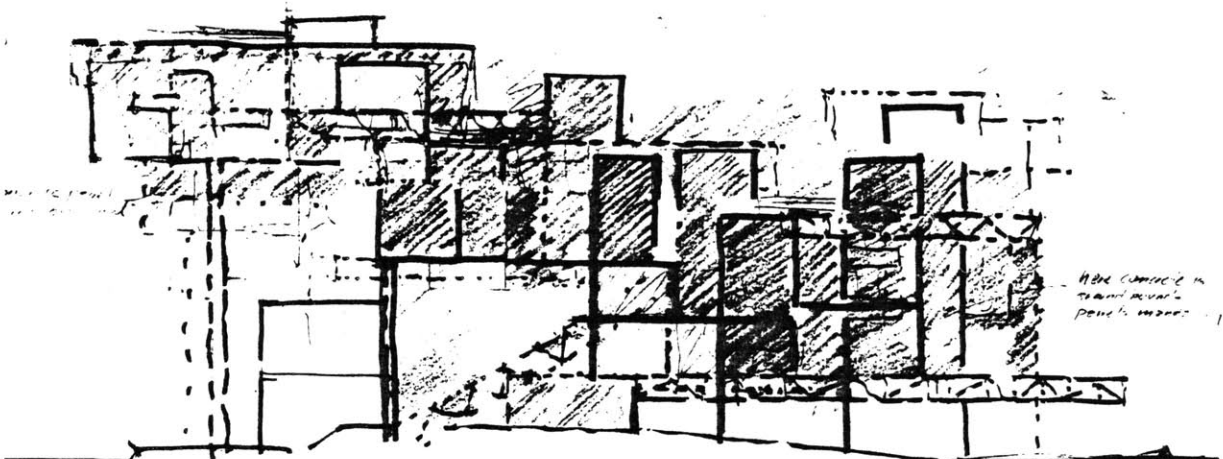
Though composed of different materials, the relationships between these size families should not be static.

Interrelationships of parts and systems allows greater interaction and exchange between places. Structures are more adaptable if various sizes can associate laterally or *slip* as needed. A more continuous range of sizes then connects private sizes and activities (optionally) to public urban activities. If structural systems are changed in relation to changes in size, this further implies that interrelationship between structural systems is also necessary in order to provide for recognizable and freer association of size families from small to large, from personal to urban. The various structural/spatial systems have specific sizes and territorial qualities, use and other associations inherent in them. A compromising of separate systems into integral systems then alters structural properties, spatial understandings, and cultural meaning.

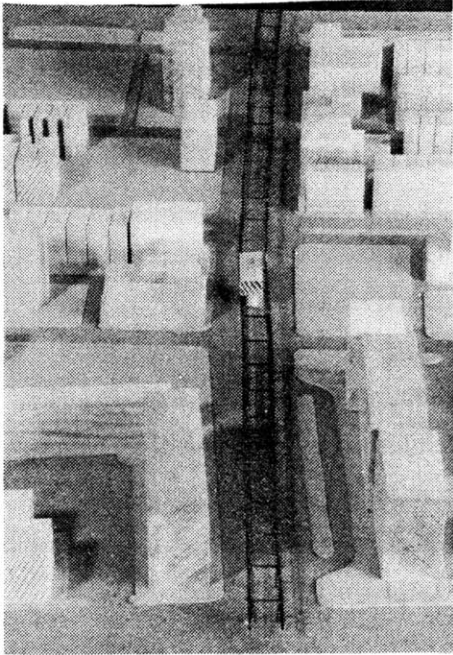
While this may be a desirable quality in the generation of new types of space for instance, the decision to alter the systems with respect to one another by integrating them then must be a carefully considered and conscious one. Attempts to rigidly combine structural systems into a single comprehensive equation, capable of generating all necessary sizes and uses, often results in confusion of meanings, incomprehensible complexity, wasted materials and excessively rigid (therefore unsuccessful) application. So while interrelationships between systems is essential for size continuum, individual system autonomy at some point is an equally important behavior to maintain.



INTERRELATIONSHIPS

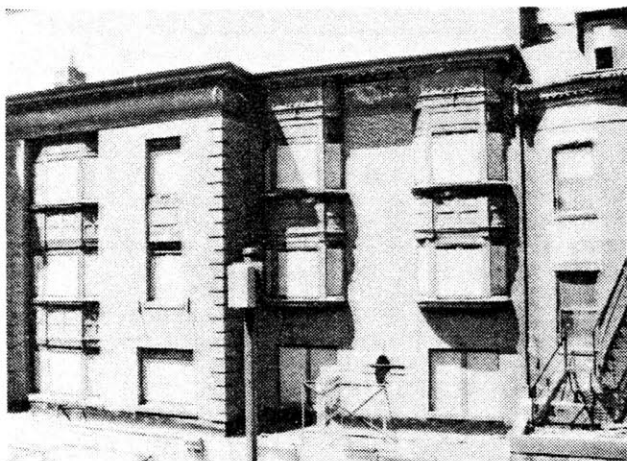


slip of sizes - elevation study



1"= 40' scale site model

Architects have always been concerned with single buildings or a complex of single buildings
-Aldo Van Eyck
(Team X Primer p. 7)



frame sizes - existing buildings

A major problem with the Northampton site is that various building systems remain distinct and independent with respect to one another and therefore do not add up to any continuum of sizes. *Interaction* between systems is non-existent. Relationships within the systems are serial and sequential. Individual buildings remain so because of rigid partywall organizations. Partywall sizes, determined by one or a few prototypical building organizations, are then multiplied almost unchanged throughout the entire grid area. Masonry units build up serially and reinforce the lineal street directions only. They do not move laterally to create places or break up the streets' directional vectors, nor do they interact with other systems like the Orange Line truss structure or the wood frame structures to produce a more coherent gradation of sizes. Organizations of wood frame elements are also singular and serial. Aggregations of frame elements halt with each occurrence of a masonry partywall. The only places where the frame system visibly reaches building size is at single story open timber frame commercial storefronts along the street.

While excessive repetition of sizes is a characteristic problem of the older masonry building bordering the Northampton site, newer large residential project buildings at the southern edge of the site and dotted elsewhere along Washington Street also have troubles. These project buildings have *no* typical sizes. They range from 70 feet to 350+ feet in width and from two to eight stories (25 - 90 feet) in height.

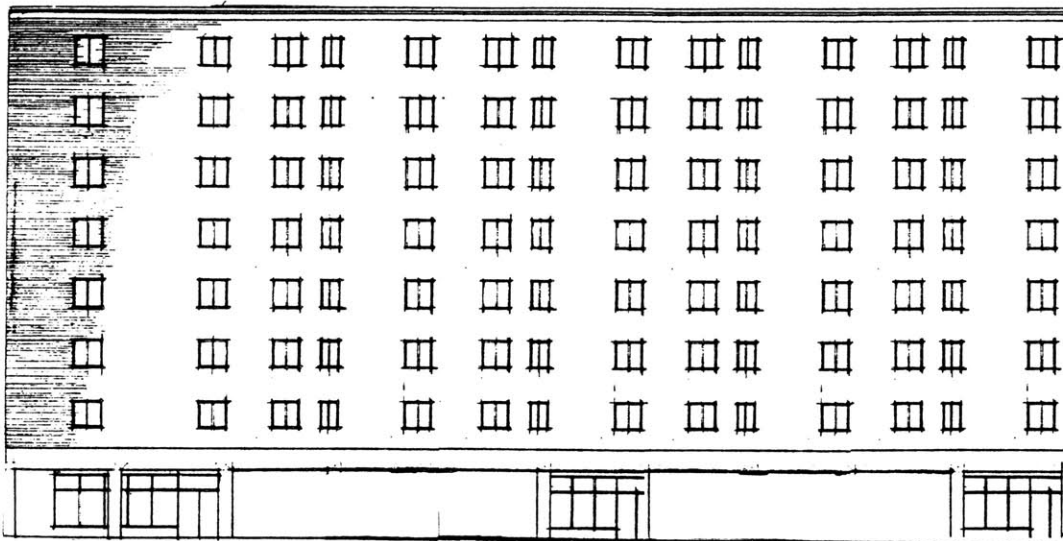


Cities today tend to be visually and physically confused. They are monotonous patterns of static elements. They lack visual and physical character consonant with the functions and technology which compose them. They also lack elasticity and flexibility.

-Fumihiko Maki

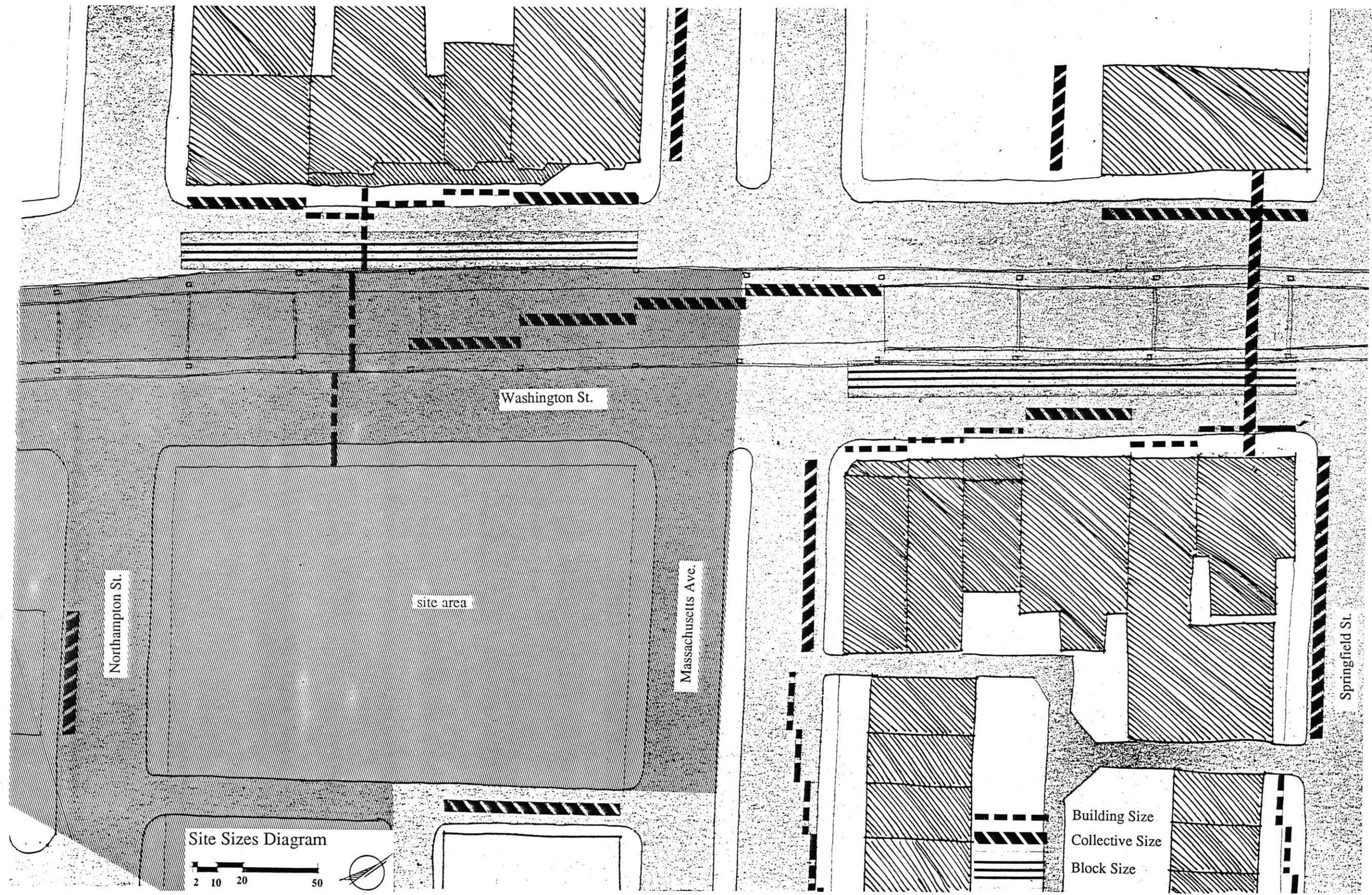
(Investigations in Collective Form p.5)

project building



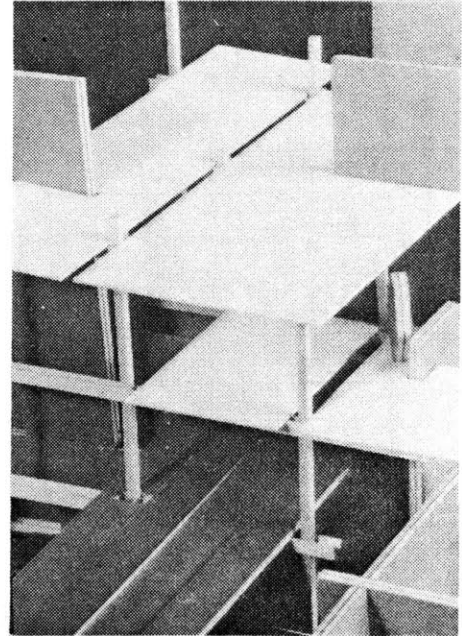
housing project building





Design Proposal

The proposed design projection works closely with the 19th century partywall buildings in an attempt to reestablish a lively street edge and a recognizable rhythm. The masonry partywall system in the design is replaced by a more versatile concrete and steel system (for more complete description, see section on Transformation). Groundbound and at some points similar dimensionally to surrounding buildings, it also changes to a more massive post and beam configuration near the corner of Massachusetts Avenue and Washington Street. Building weight shifts upward into the air. Such a lifting of the building with the giant concrete system allows not only the building of larger sizes, but the potential of larger *unbuilt* dimensions. In locations where the concrete system is ground supported it reinforces and even exaggerates the 25 foot building sized rhythm of surrounding buildings. Also, by addition of multiple 25 foot dimensions, the system develops collective sizes. Unlike masonry partywalls in surrounding structures, a combination of various concrete elements- walls, vanes, U's, and frames- are utilized throughout the design. Such a combination of structural configurations allows definition of private and room sizes with varying amounts of containment as required by different use needs.

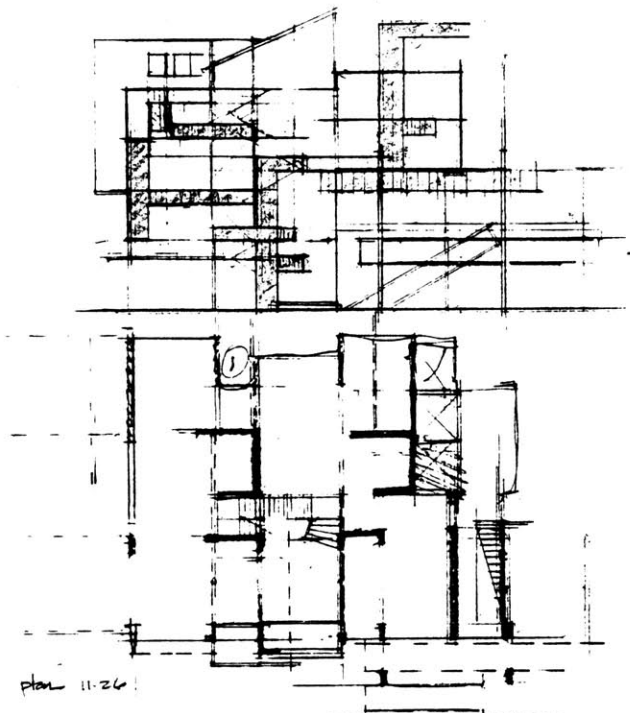


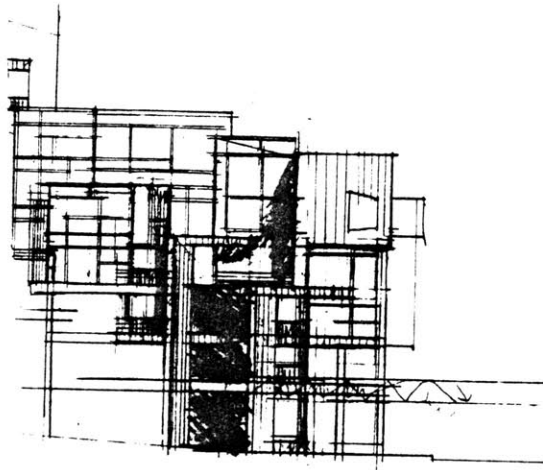
1/4" scale structural study model

Given the context of most projects there's a major need for an additive growth form way of working, because most often the size-zone is already over-restrictive and negatively over-formalized

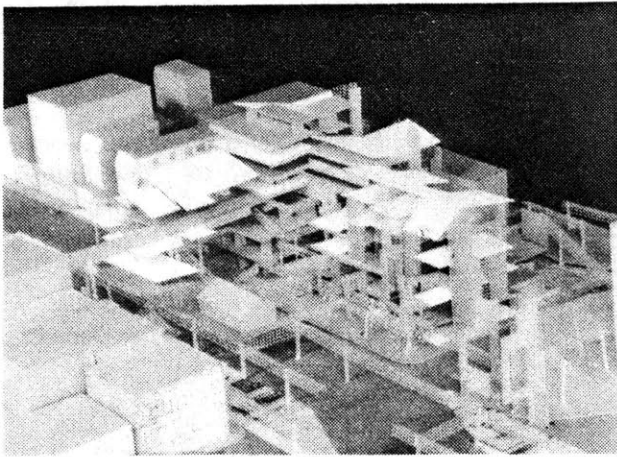
-Maurice Smith

(Plan 1980: Perspective on Two Decades p. 37)

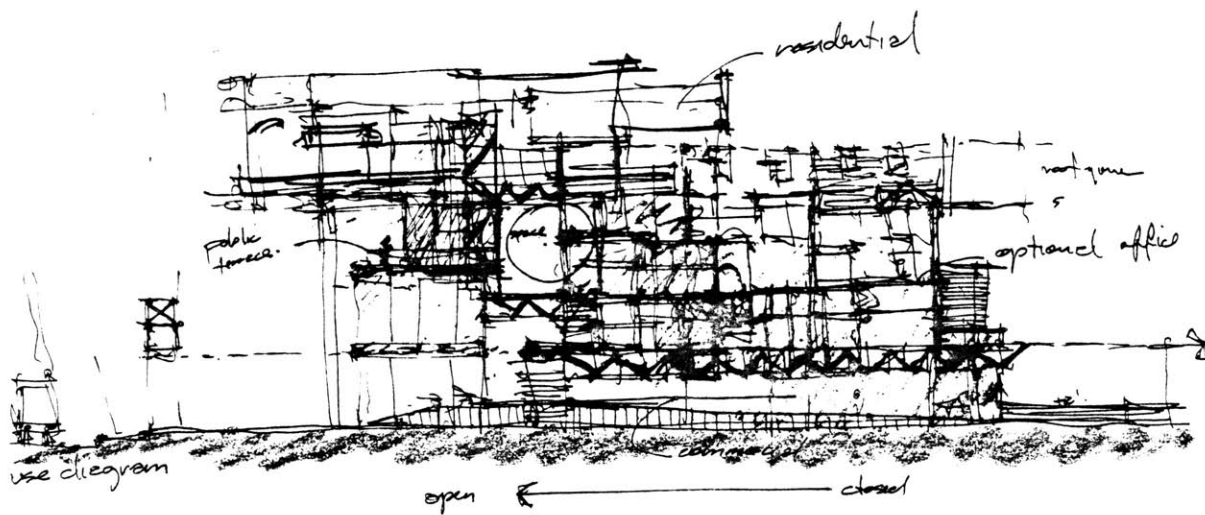




concrete and steel systems



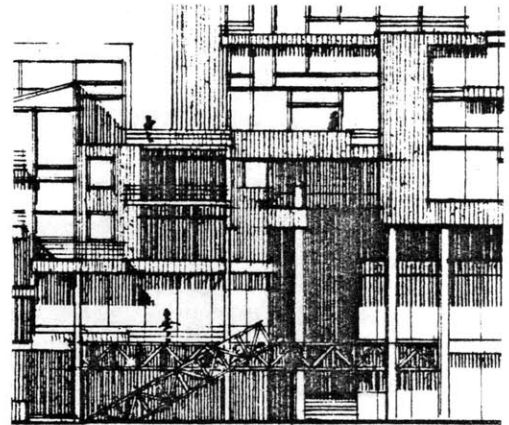
1/16th" schematic model



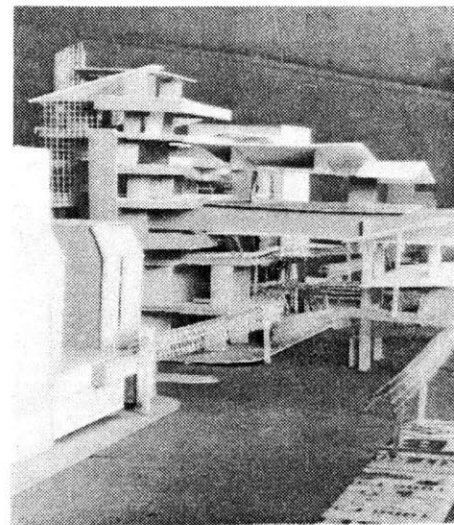
In addition the system is less continuous, less plane-like. This allows steel and wood frame systems to interassociate, thus permitting larger sizes in these systems as well.

The steel system is used as a compliment to the concrete system. In upper sections of the building the concrete structure becomes less prevalent as steel is substituted, thereby defining a lighter roof zone for the building. The steel system also functions independently in commercial and office areas to develop room, building and even collective sizes of minimal definition.

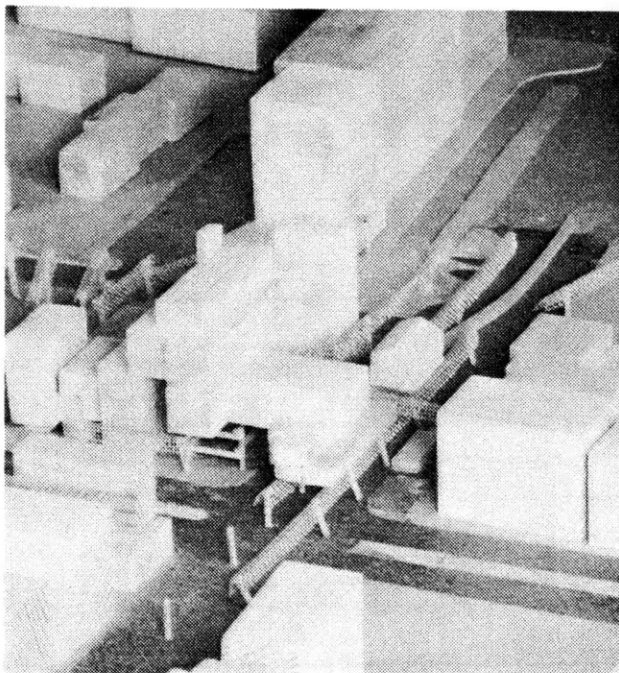
In portions of the design where the giant concrete beam system is employed, emphasis on sizes is altered. Uses in this building area range from office to apartment (see section on Use); territorial definition achieved by the structure is less. This part of the building is not visually perceived by pedestrian or automobile movement which takes place three or more stories below. Building sections are read from farther away where larger sizes are more important. Concrete beams develop collective sizes while minimal concrete frames allow some definition and a subdued reinforcement of the 25 foot building module size. Once up in the air, this large concrete beam system is also able to project outwards over Washington Street to establish private, room, building and collective sizes in the zone of the street.



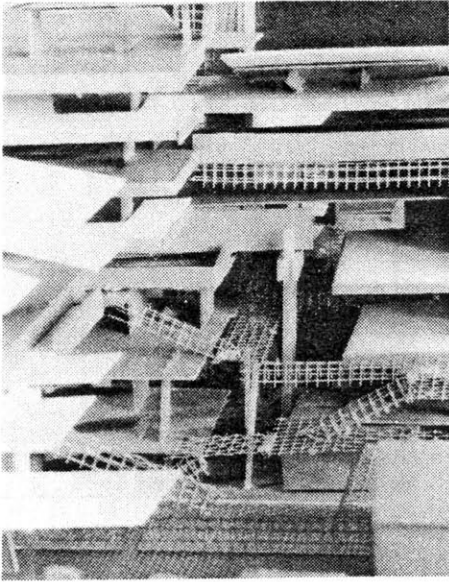
partial elevation - Orange Line as access



1/16th" schematic model-view south along Washington St

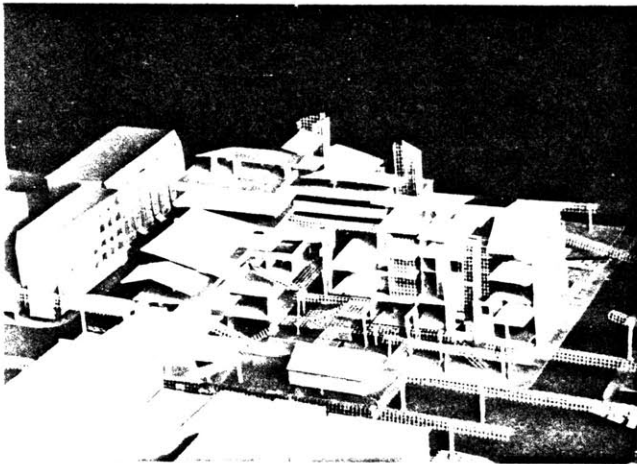


1"= 40' scale mass model-view south

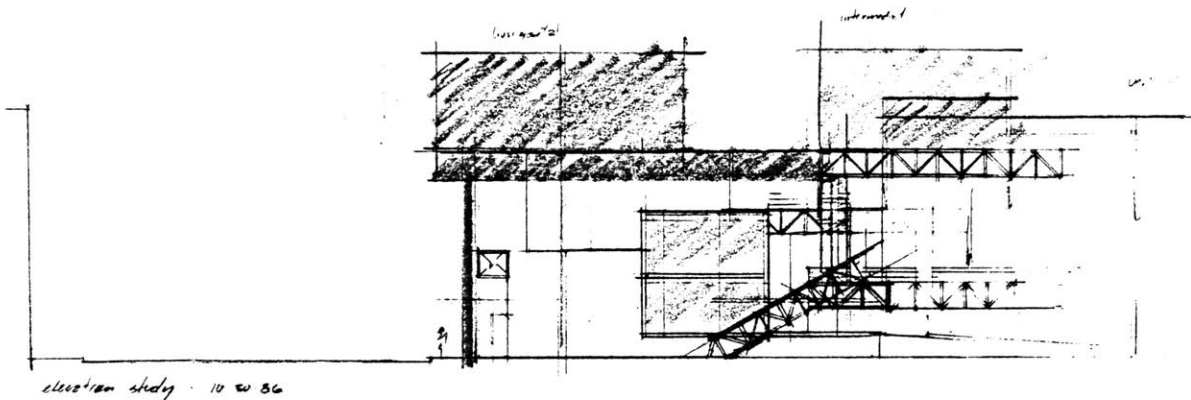


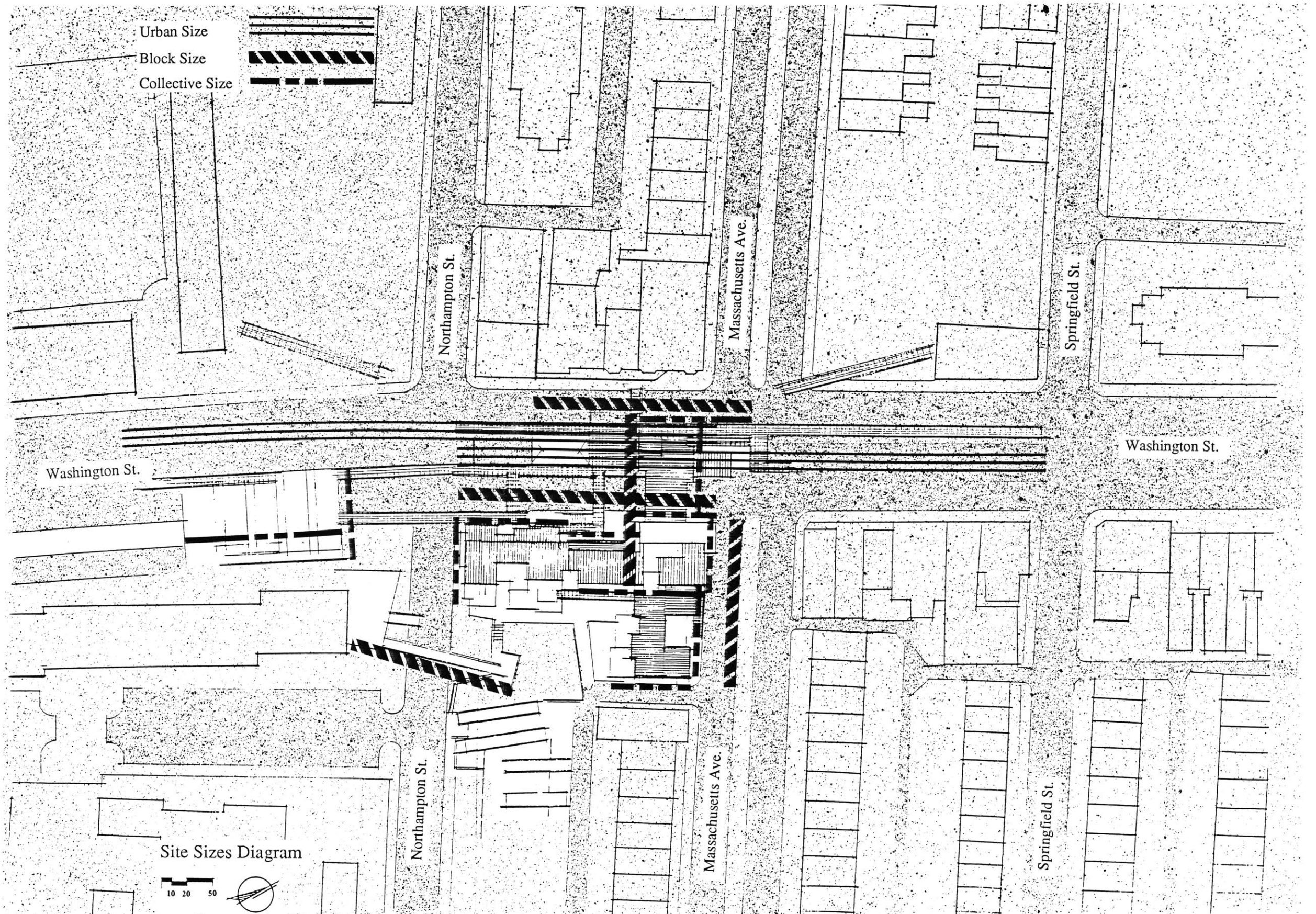
1/16th" schematic model -multiple levels of Orange Line as public access

Treatment of the Orange Line as a structural ruin allows dismantled parts to be relocated, and new associative relationships to be developed between systems (and uses). The Orange Line provides a precedent for building *above* the street, an area not ordinarily utilized. Conversely, by breaking away from the center zone of Washington Street individual sections of Orange Line structure are utilized for multiple levels of access. The large truss system is able to generate collective and larger sizes and to interact with other systems. Lineal in shape and of an access size (six feet wide), it carries a *public* access association with it in its new locations, inviting pedestrians up from the ground to multiple levels of movement.



1/16th" schematic model





Urban Size
Block Size
Collective Size

Northampton St.

Massachusetts Ave.

Springfield St.

Washington St.

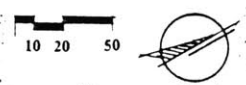
Washington St.

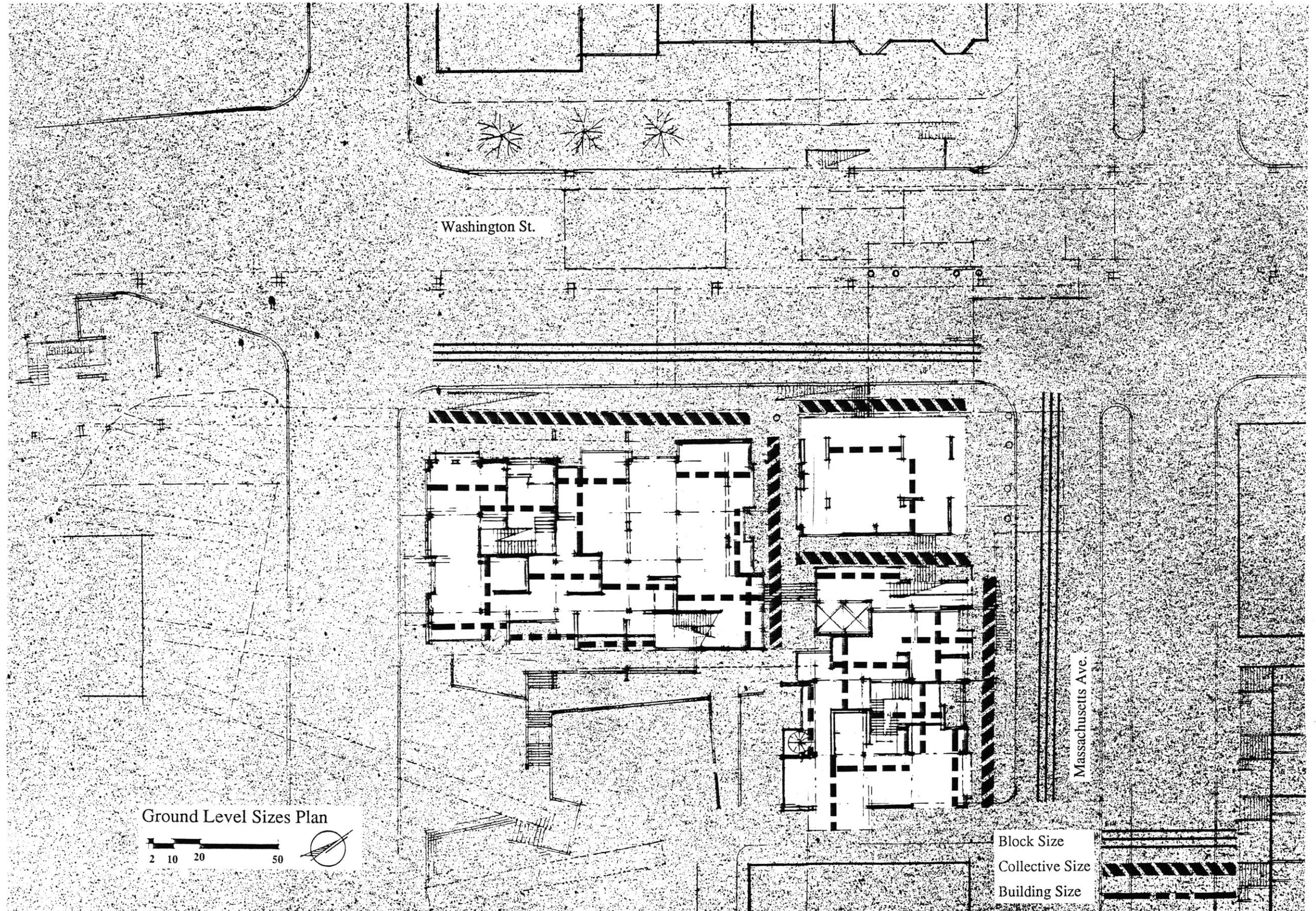
Northampton St.

Massachusetts Ave.

Springfield St.

Site Sizes Diagram

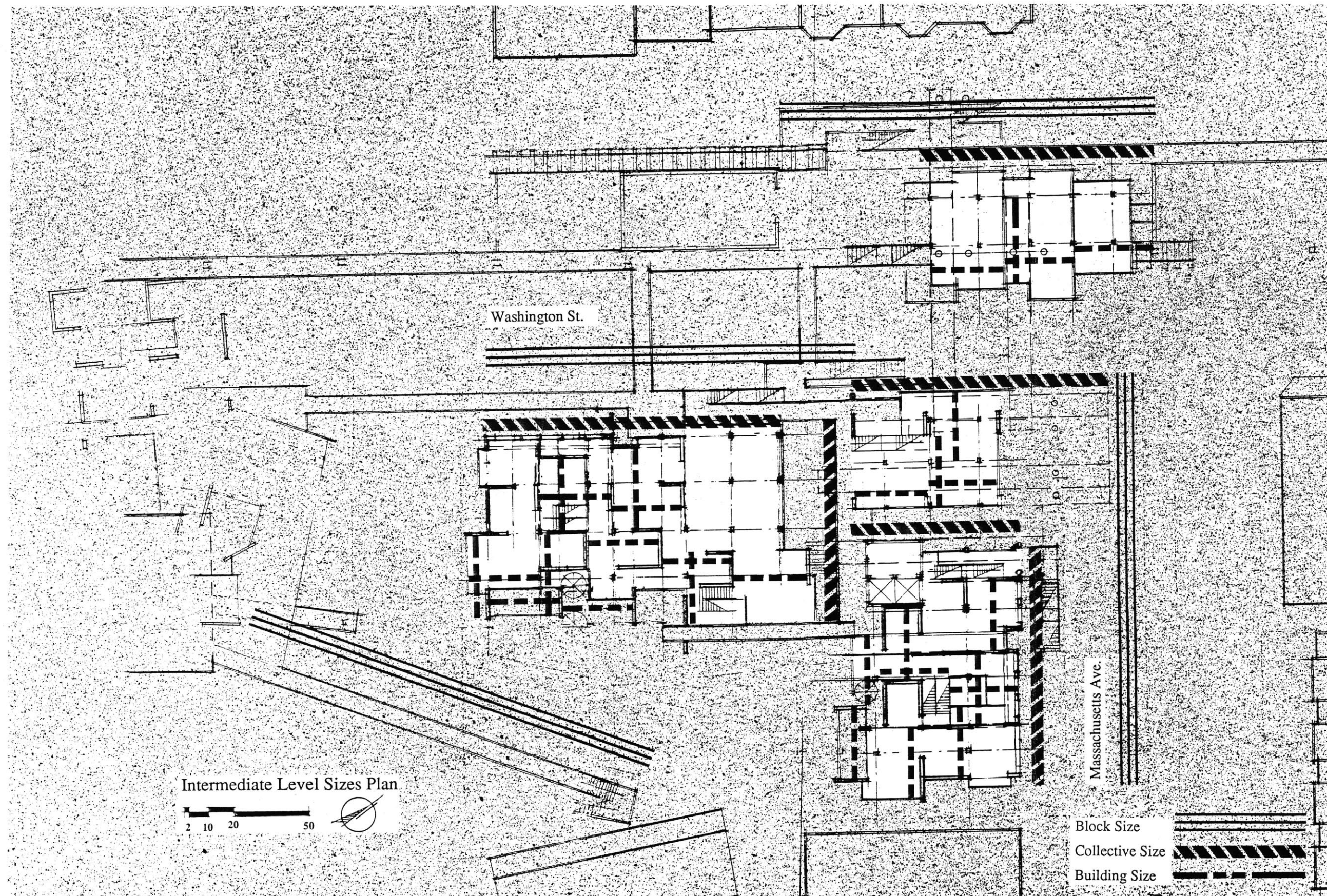




Ground Level Sizes Plan



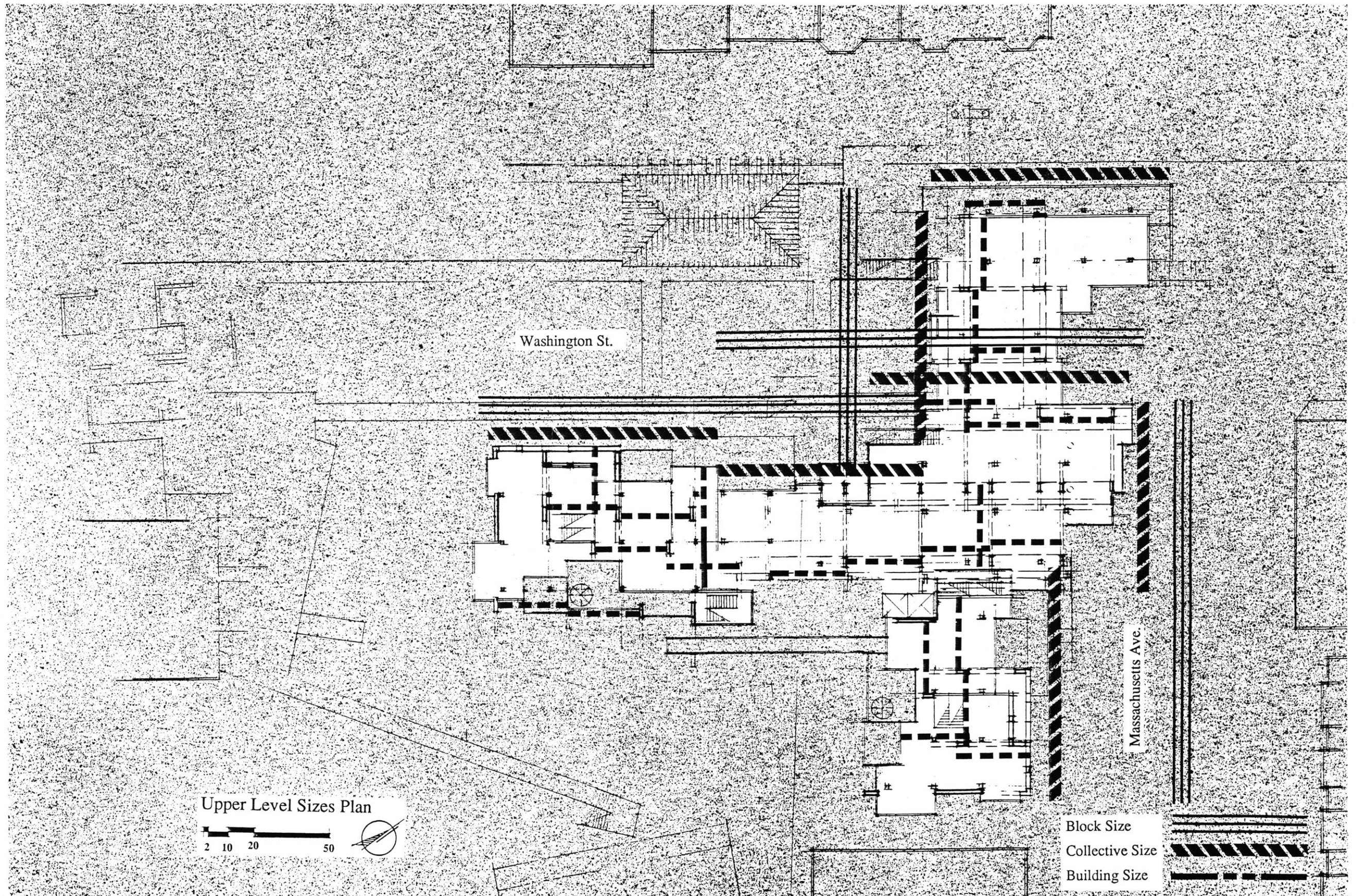
- Block Size
- Collective Size
- Building Size

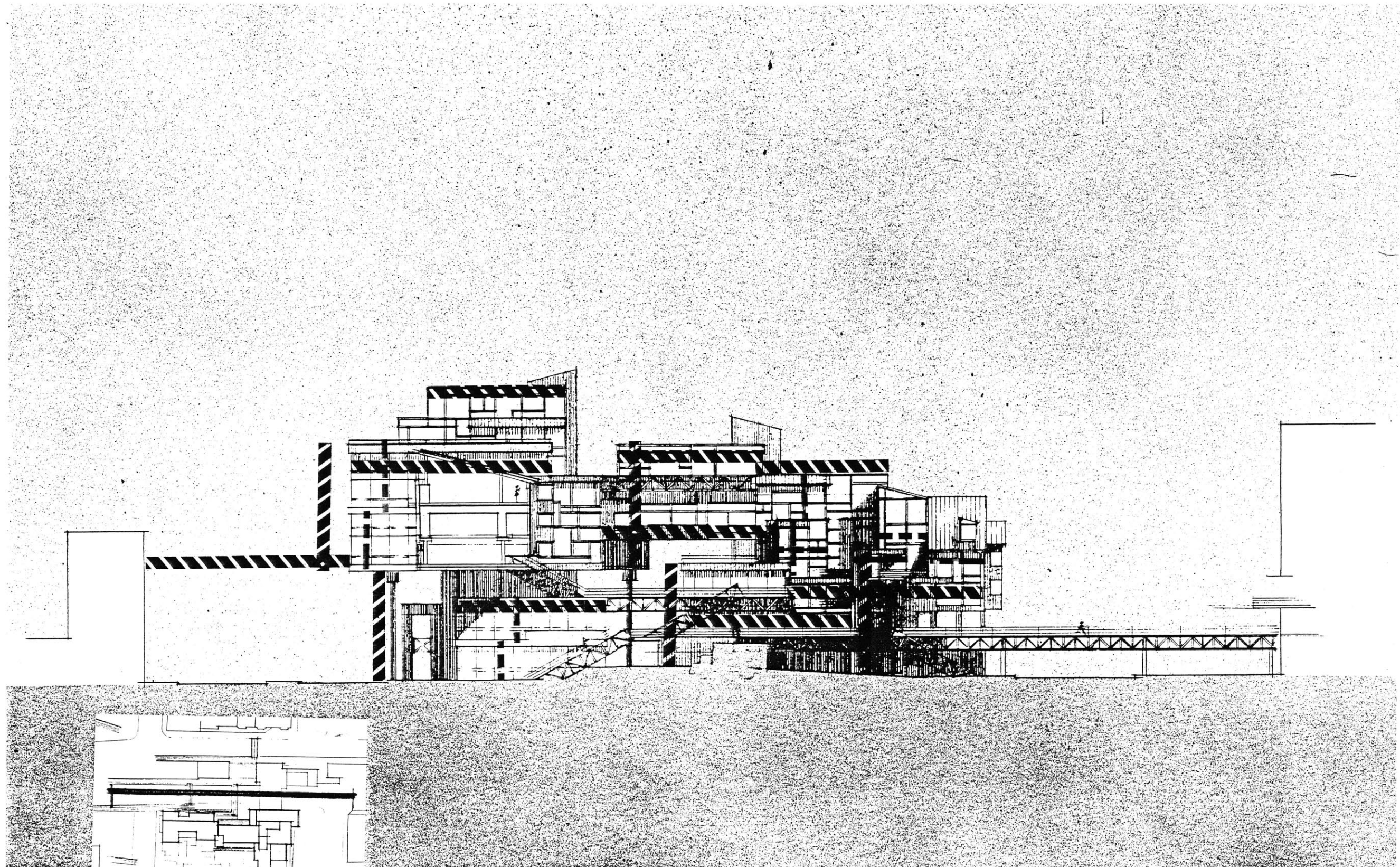


Intermediate Level Sizes Plan





- Block Size
- Collective Size
- Building Size

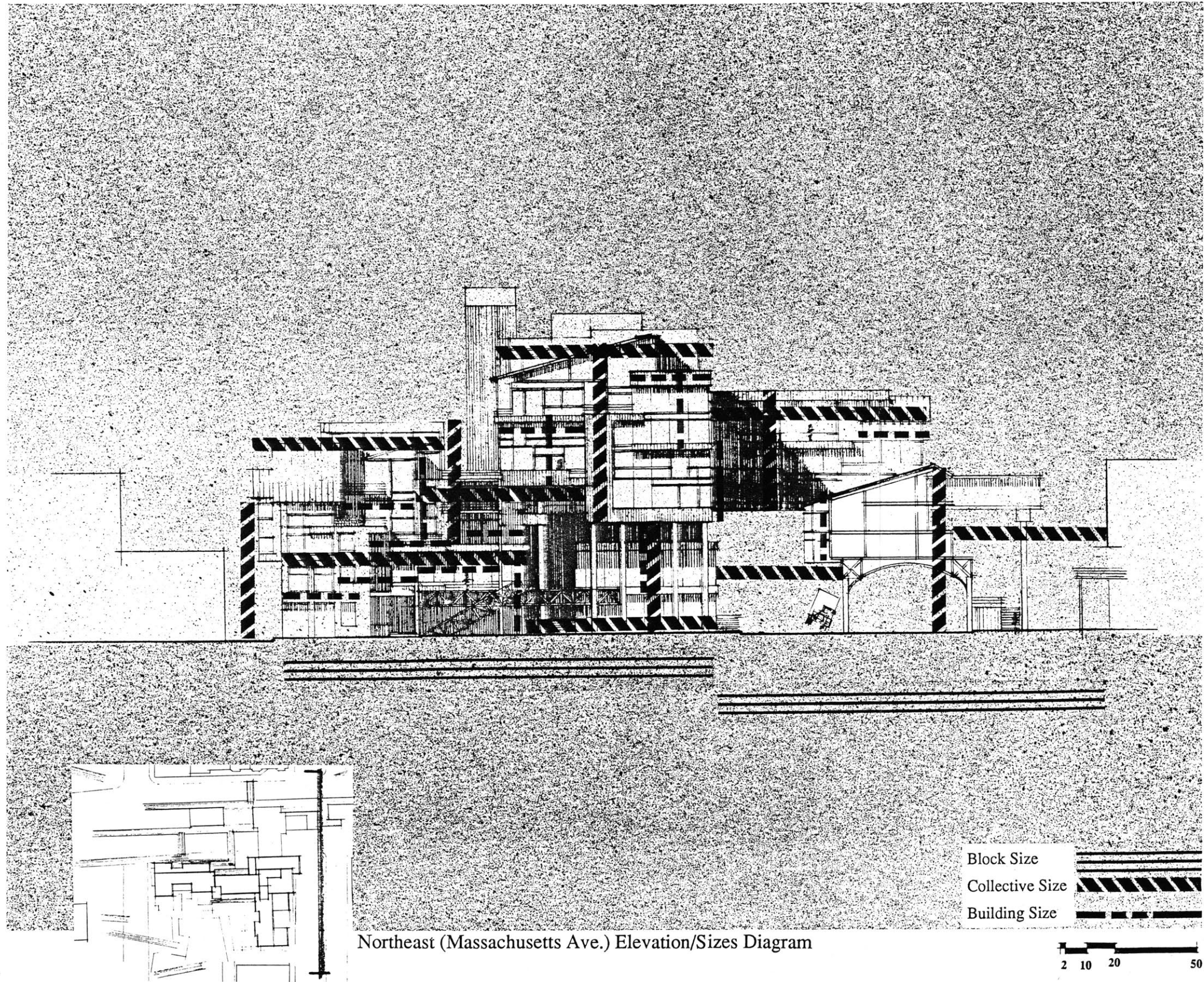




Northwest (Washington St.) Elevation/Sizes Diagram



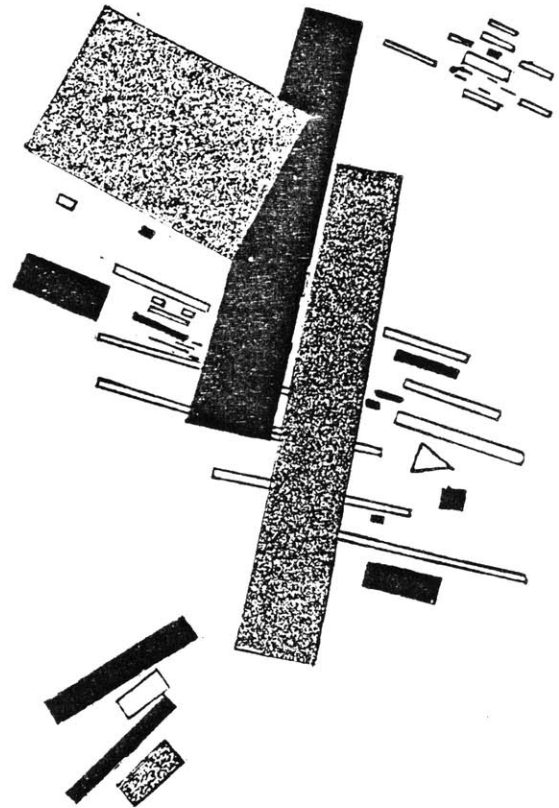
 collective size
 building size



Northeast (Massachusetts Ave.) Elevation/Sizes Diagram

Direction

Direction establishes primary formal, structural, use and other properties and meanings for any given context. A sense of direction is critical to the understanding of our position in space. It allows us to adjust our perceptions to our environment; to determine where we are and where we are going within the landscape. Horizontal direction, once established, serves to define *access* or paths of movement. Various non-directional destinations located approximately normal (90°) to such a direction then become stopping places. Groupings, successions, and repetitions of different elements, both built and unbuilt, along some landscape references further clarifies public and private directions of movement (*path*), privacy (*place*), use, and growth. A simple example of this is a typical residential street. Paving, sidewalks, trees, and other elements delineate a public flow of movement along the street. It is only when we turn 90 degrees and walk up to someone's door that we move into a more private world. The enclosure, structure, and spatial organization of residential dwellings often lies perpendicular to the direction of a street. It is most important that directional understanding does not become confused. One direction or a series of related vectors of movement should dominate in any given location. This dominant orientation typically manifests itself as the most



1 Kasimir Malevich

Despite a few remaining puzzles, it now seems unlikely that there is any mystic "instinct" of way-finding. Rather there is a consistent use and organization of definite sensory cues from the external environment. This organization is fundamental to the efficiency and to the very survival of free-moving life.

-Kevin Lynch

(*The Image of the City* p. 3)



2 direction - sidewalks

The horizontal line When following a horizontal line in instinctive mimicry, man feels a sense of the immanent, the rational, the intellectual. It is parallel to the earth on which man walks and accordingly accompanies his movement; it extends itself at eye level and thus creates no illusions about its length; in following its path, man generally meets some obstacle which emphasizes its limits

-Bruno Zevi

(Architecture as Space p. 188)



Street in Tursi, Italy

3

travelled or most public direction of movement at any given location. It is when two or more directions, equal in strength, collide that directional sense is lost. An environment of crossing or multiple directions is confusing at best, for the directions cancel one another. At worst, conditions may be labyrinthine and disordered.

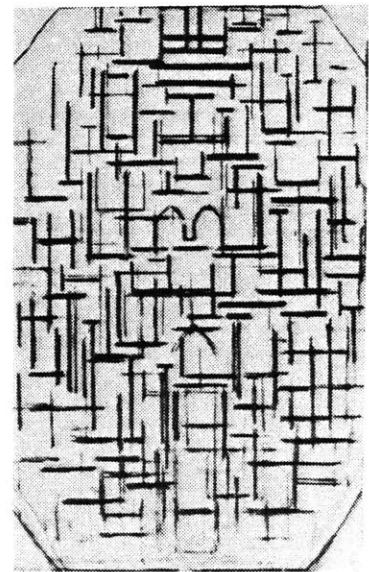
Sense of direction need not be one of straight lines and 90 degree relationships only. Architecture is an environment comprised of directional paths and places built over time to suit a range of human needs. Variation of sizes and places along these pathways is natural and a very important characteristic to maintain. A single ribbon-like street composed of boxes oriented 90 degrees to it then minimally generates recognizable habitable spaces for use by the travellers of the street. It is a lineal (3-dimensional linear) organization, with a minimum of space generated and few options as to movement. Richer spatial environments are often aggregations or assemblages of building which shift their lines of direction laterally thereby creating more *places* while maintaining directional consistency. Consistency of direction is not an invariably straight line stretching for miles. Small angular variations of directions ($15^{\circ}\pm$) are not only allowable but desirable. Deviations of direction are a more responsive reaction to landscape

changes and break up long monotonous vectors of movement into more understandable, coherent and meaningful sequences of sizes. Time becomes a factor as one moves through these segments. Such shifts of directions can occur as compensation for topographic or natural features, in response to demographic or political forces, or simply as a function of time. The result is the formation of a *directional field* of structures, paths, and places in layers of complexity. Directional fields achieve a building of direction through the addition of similar elements behaving similarly. The effect is one of movement, a dynamic multiplicity of events which occur in different places at different times. Beneath many seemingly haphazard collections of structures, directional qualities that serve to tie the environment together may be observed.

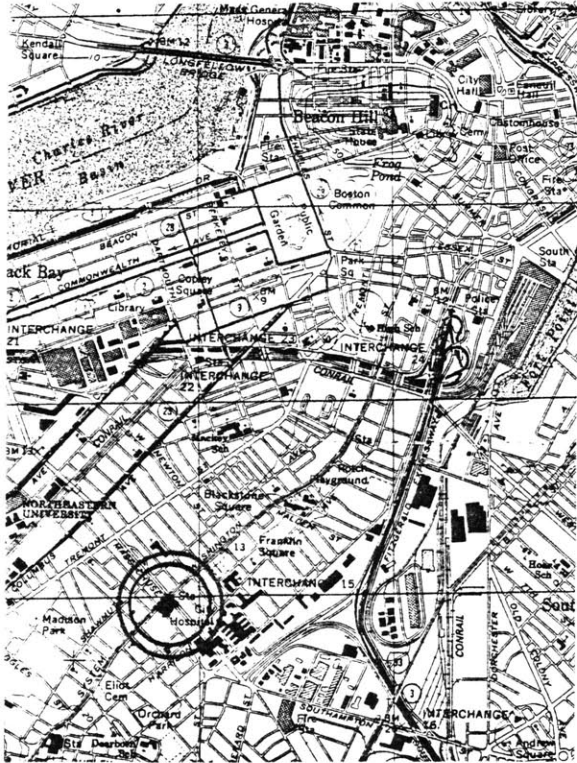
The repetition of like dwelling elements and their organizations thus serves to reinforce the sequential path qualities of street movement. While patterns of sizes and relationships of various places and spaces are often similar, structures should not be rigidly dependent upon one another. The aggregation of elements composing a directional field should be flexible, providing an understanding of a given context while also allowing a range of options as to inhabitation and interpretation.

IV. TO MAKE A SEQUENTIAL PATH: To arrange buildings, or parts of multi-use buildings in a sequence of useful activity. Further, to reinforce such a path by any means necessary to propel persons along a general, designated path. Finally, to design a path, or reinforce a path in the natural landscape which will catalyze and give direction to new development along its course.

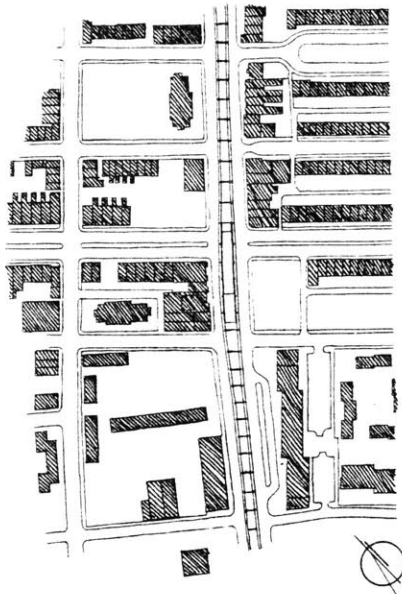
Collective form linkage operations
-Fumihiko Maki
(Investigations in Collective Form p.40)



Piet Mondrian Church Facade



5



Site Area

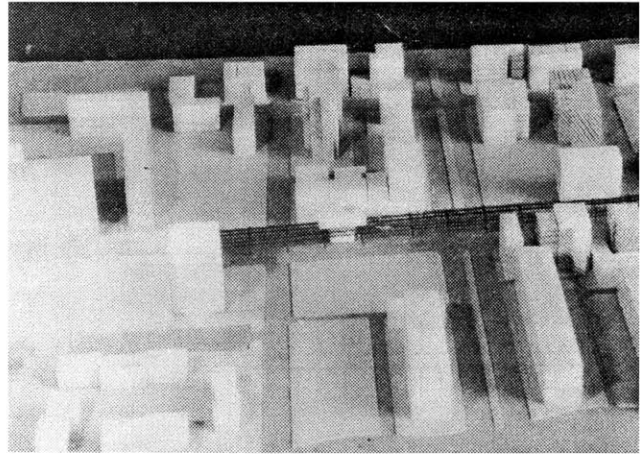
In the case of the Orange Line site, *landscape* has little to do with topographic or natural features. The features are man-made. Direction is established by the preordained layout of blocks comprising the elongated city grid. Small changes in the direction of the streets occur due to the influence of some natural feature such as an inlet, a hill, or a coastline long since destroyed by infilling of the area and overlaying of city grid. In the case of Washington Street, the coastline has physically been moved miles away. Resultant strength of directions in such a grid situation is largely a function of the size of transportation arteries.

Washington Street is by far the widest street in the area (up to 115 feet) and is one of the most continuous. Presence of the Orange Line structure strongly reinforces this direction. The Orange Line has minimal impact given its size, however. The continuous series of steel trusses moves down the center of Washington Street as a singular, linear, and invariable *ribbon*. It makes no gestures to the left or the right, up or down, and claims no territory greater than that which is underneath it (two lanes of auto traffic). There is no *stop* to it. While this is an understandable behavior considering its transportation function, it no longer needs to adhere to this minimal position.

The masonry structures of Washington Street have eroded a great deal. Small clusters of partywall buildings form a very broken street edge and are separated by large areas of vacant space. Larger scale housing project buildings border the southern edge of the site and are oriented independent of the street direction in some cases.

The nature of the city grid seldom allows one street to govern direction to any great extent, however. The corner of Washington Street and Massachusetts Avenue represents a crossroads condition directionally as well as historically.

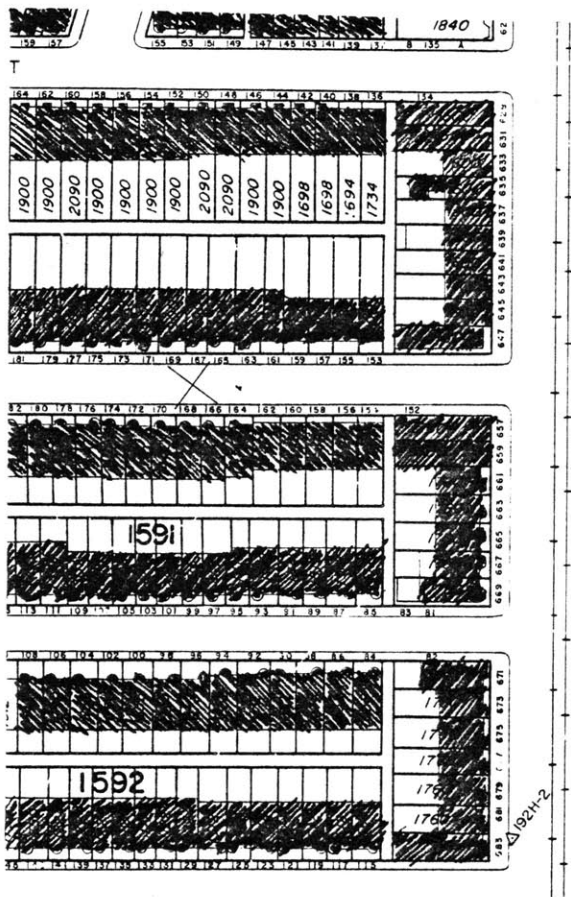
Massachusetts Avenue is the widest cross street in the area and an important link to the Charles River and Cambridge as well as to Dorchester and Interstate Highway 93. Massachusetts Avenue is made formally less important by the organization of corner buildings which face Washington Street, by the comparatively greater width of Washington Street and by the presence of the trusswork of the Orange Line. One hundred fifty feet or so away from Washington Street, however, the Massachusetts Avenue direction dominates and masonry bearing walls turn 90 degrees to reinforce its direction. Masonry partywalls lie at 90 degrees to all streets, however, and further intensify all directions architecturally. The actual bearing walls are not evident since front facades are closed masonry faces as well.



1" = 40' scale site model-
view west along Massachusetts Ave.



view east along Massachusetts Ave.



typical residential street organizations

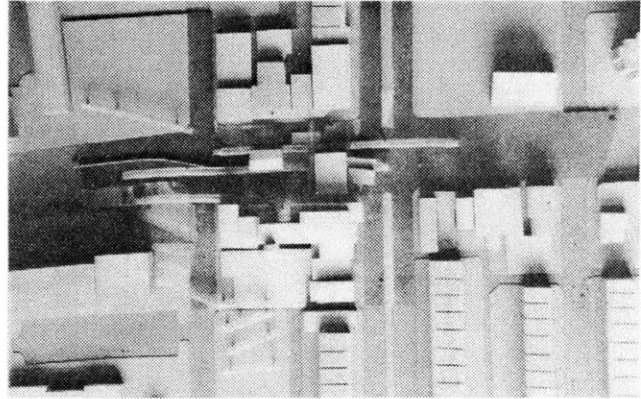
Visually, the street direction is built-up by the repetition of facade elements in a recognizable range and rhythm of windows, entries, and stairs. The partywall structures are more complete and more directional along the streets parallel to Massachusetts Avenue than along those parallel to Washington Street. As with the Orange Line, the organization of party walls and masonry box buildings in unwavering lines parallel to the streets severely restricts the individual buildings' abilities to generate territory or establish a directional field. The elements are simple multiplications of partywalls and closed fronts so tied to each other and to the street edge that they set up a continuous *line* of elements, with no spatial flexibility. Access occurs at front and back only. No optional lateral movement between buildings which would reinforce street direction is allowed. Vertical access within single buildings is typically normal to street direction; this immediately privatizes events every 25 feet along the street.



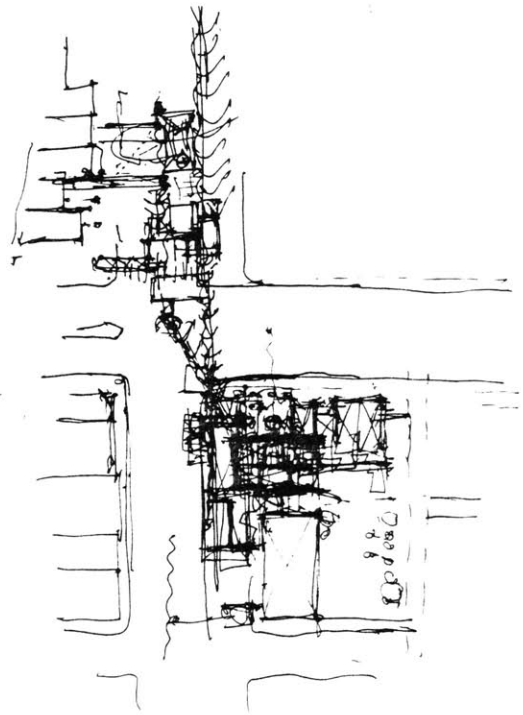
view east along Massachusetts Ave.

Design Proposal

Because of its large size, the Orange Line has great potential as a direction and access indicator. Fifty-plus foot sections of Orange Line track are immediately understandable in terms of direction and access. With trains removed, these sections become raised public walkways. Direction and size becomes independent of the city grid organization. Sizes and uses escape from preordained block divisions. Displacement of Orange Line track sections away from the center of the street reinforces the size of the area in which the Washington Street direction dominates. Instead of continuous access, the lateral shifting of elements, both horizontally and vertically, allows development of a directional field. Other structural systems and uses join with the Orange Line in creating three-dimensional organization of path and place. The crossing of multiple vertical elements of the concrete structure systems further breaks their vertical understanding and stresses *horizontal* access. The longer potential horizontal access remains, the longer optional interpretation between spaces remains.



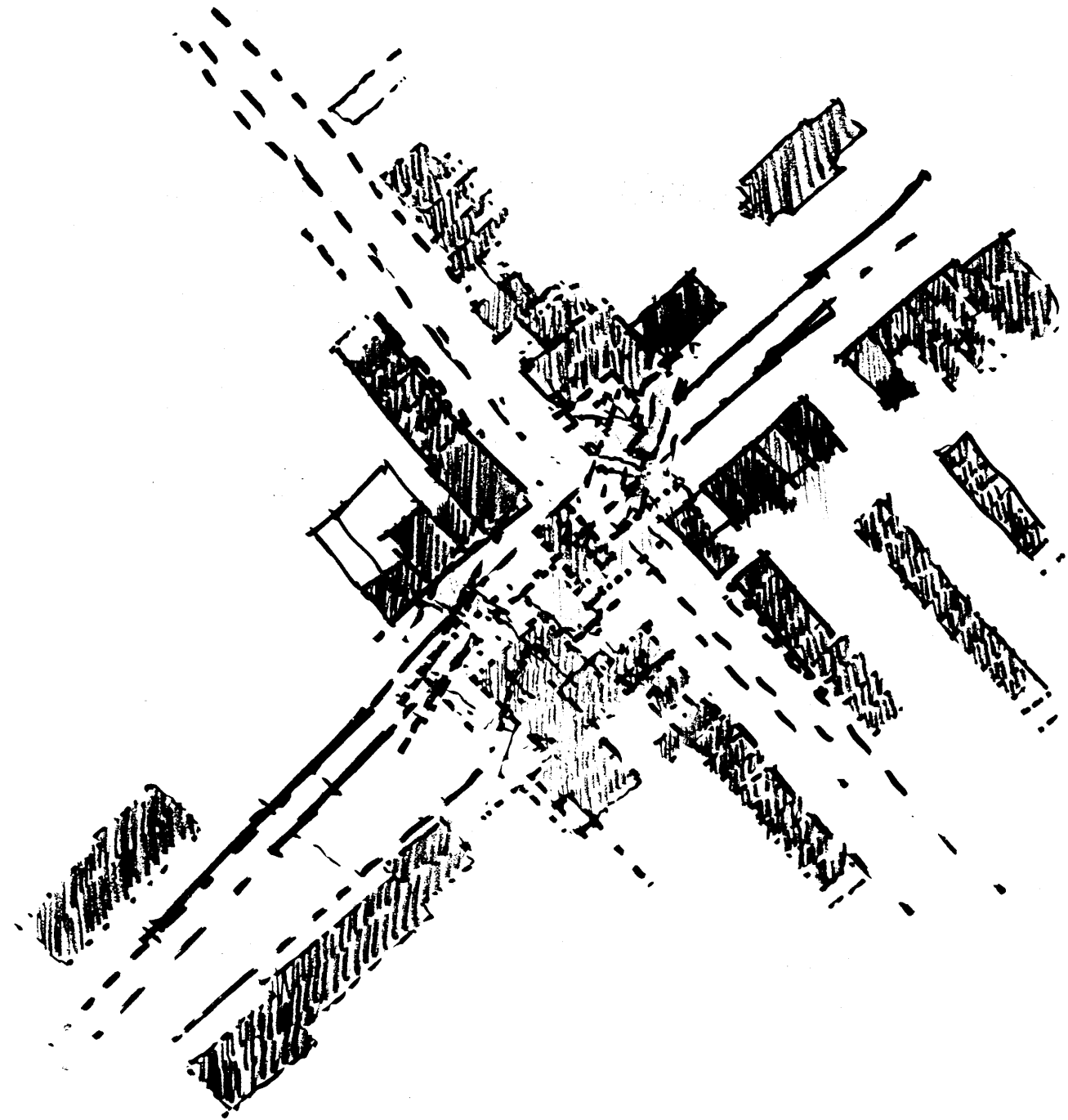
1" = 40' scale mass model



early site direction diagram

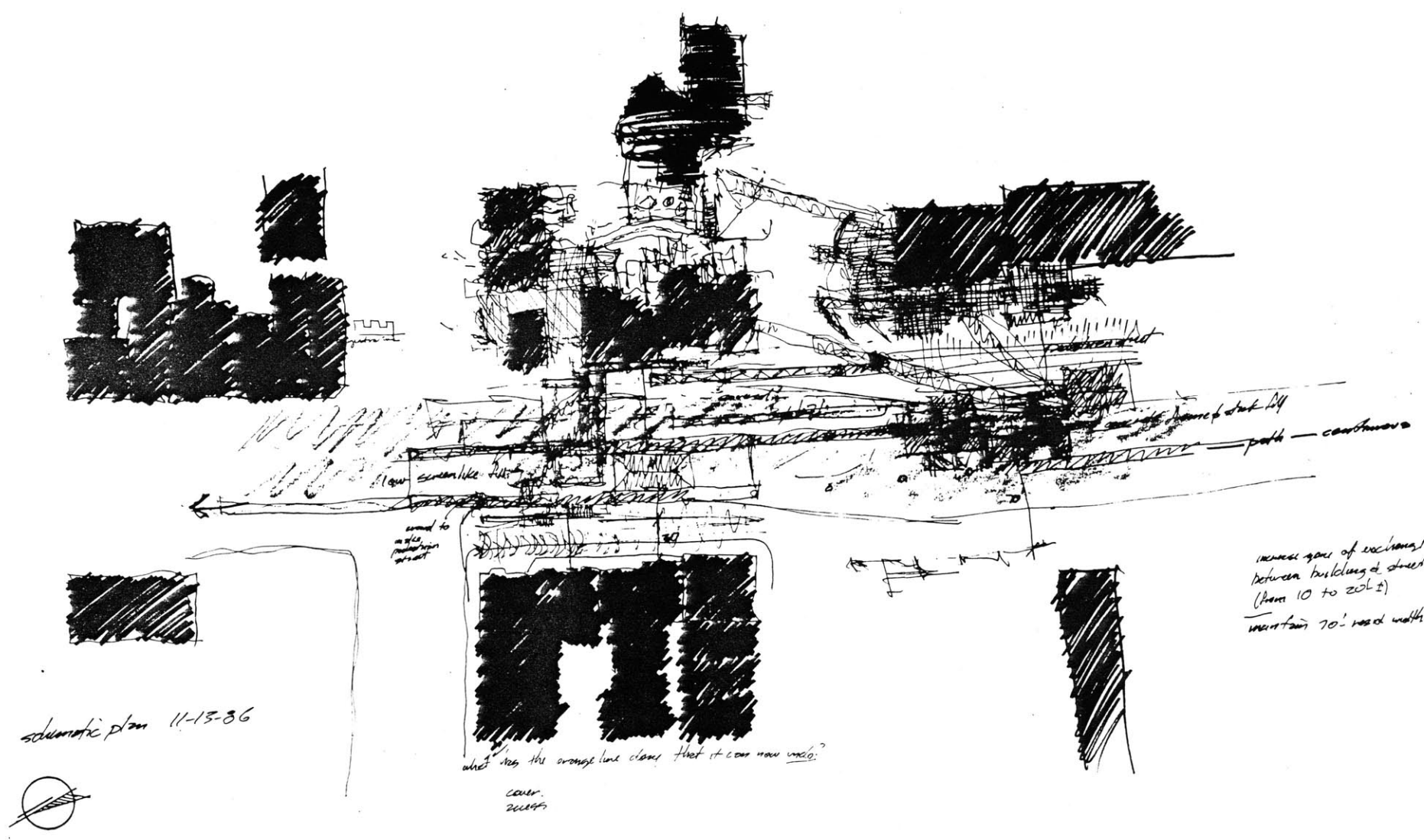


1/16th" schematic model



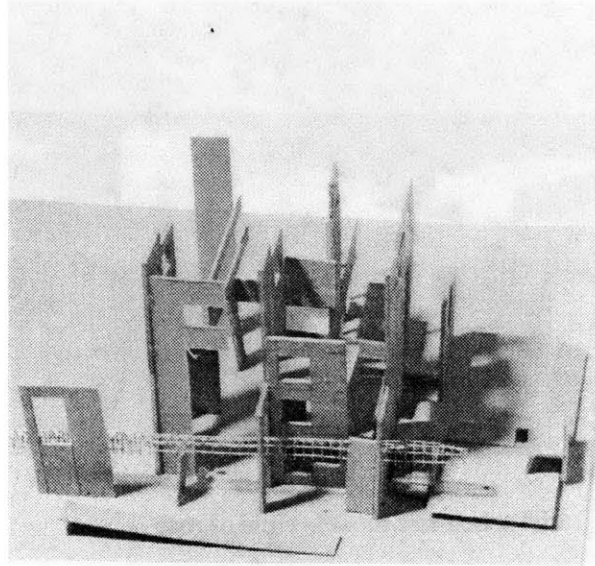
site diagram
9.24.86

site direction diagram

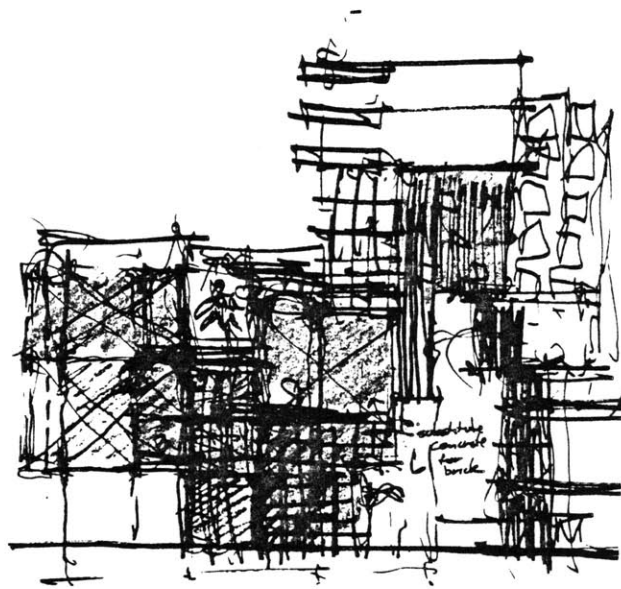


schematic plan 11-13-86

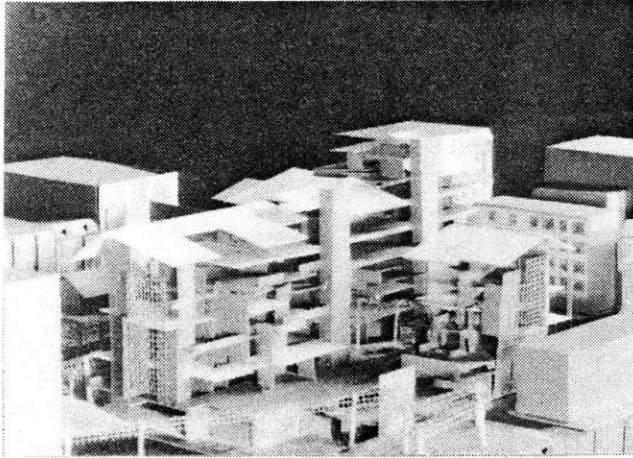
At areas of the design solution where the replacement concrete primary structure system is ground supported and related to nearby partywall buildings, directional understanding is closest to that of these 19th century structures. Along the street elevations, eight foot access, 17 foot room, and 25 foot building sizes are most legible. Vertical access is via communal stairs which are recessed from public traffic and very compact, and thus are not very directional. The overall organization is not as singular nor as vertically-reading as its neighbors, however. Permanent precast concrete floors *alternate* with wood frame intermediate levels, allowing multiple options of inhabitation. Primary access occurs every two floors. Greater flexibility via less completion of concrete structural forms allows *slippage* of some sizes from floor to floor. Access and room sizes no longer simply alternate in vertical bands A,B,A,B. Stairways, though isolated, do turn to reinforce the public direction of the street. Because structural demarcations between 25 foot module sizes are not continuous, multiple interpretations of access are possible throughout the design. Such access options are few in the residential/office areas where greatest definition is accomplished by the primary structure and access direction changes 90 degrees for privacy. *Backyard* zones of these areas are clearly defined and most discontinuous in terms of access.



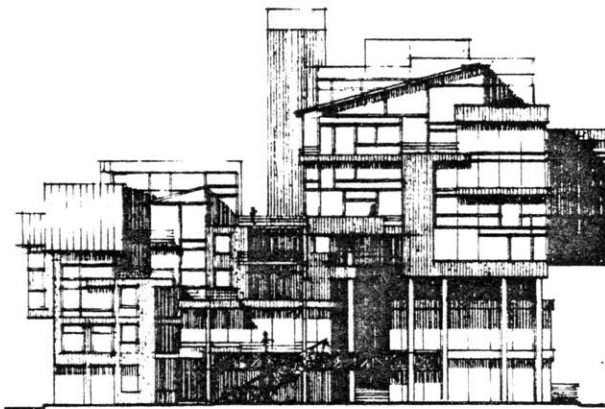
1/16th" study model



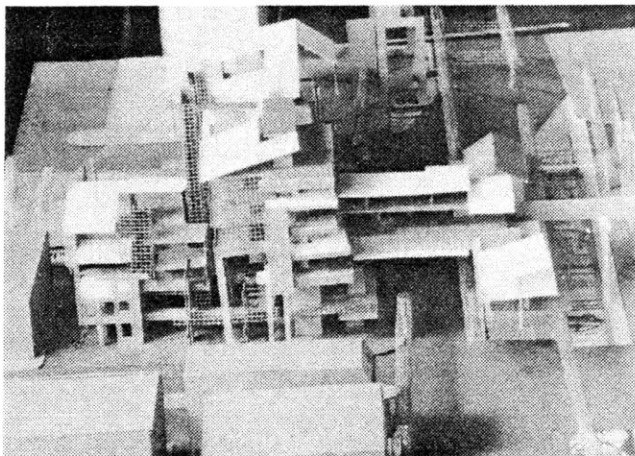
slip of sizes - Mass. Ave. elevation study



1/16th" schematic model- view of rear



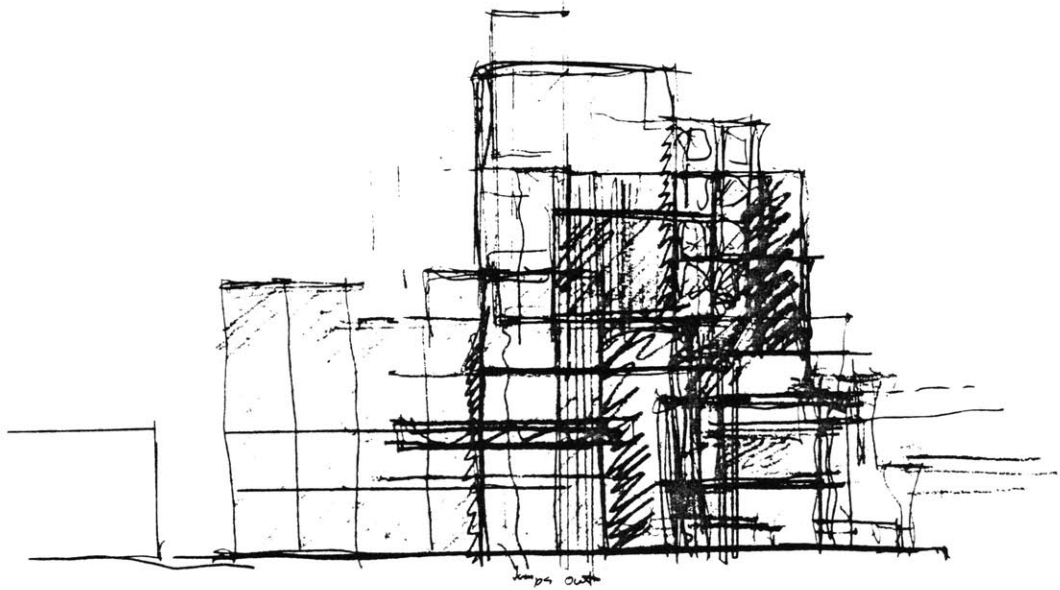
Northeast (Mass. Ave.) Elevation



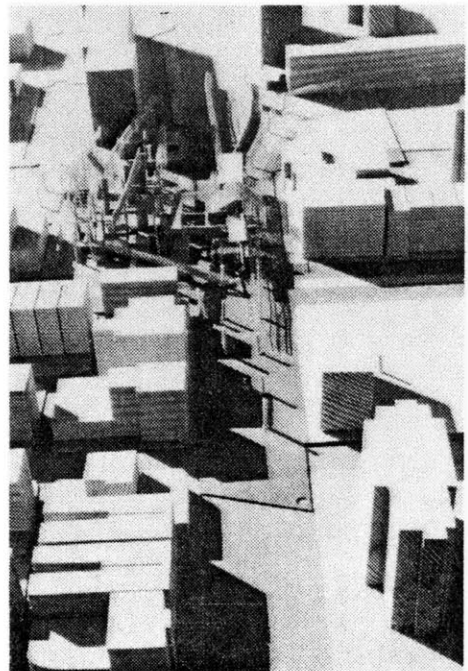
1/16th" schematic model- Massachusetts Ave. elevation

Secondary accessways from upper levels of these building areas is by a series of spiral stairways. Other areas which utilize steel frame structure, such as areas of office and commercial use, consequently have least definition and greatest interpretation with regard to access. As the concrete system is transformed and building mass transferred upward, perceptions of direction and access changes. The orientation of Washington Street is maintained but because the large concrete support structure is so dominant and dimensional rhythm of smaller concrete frame members subdued, horizontal direction is strengthened. Concrete floors again are two floors apart and multiple interpretations of vertical access between are possible. But, due to its height above the ground, access becomes more internalized, either in the center of the building or along the edges. Access to the building is now vertical, via elevators and stair towers.

The large concrete structure too, by extending over Washington Street, serves to laterally displace and partially support another building mass over the street, which turns to support the street direction once again.



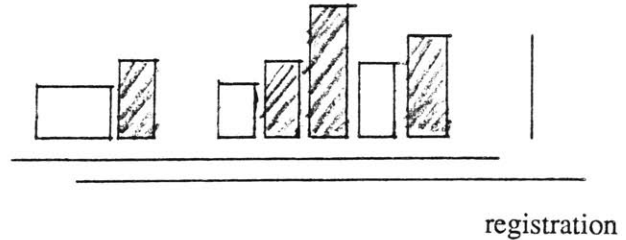
Massachusetts Ave. elevation - study



1" = 40' scale study model

Registration

Edge registration or reference relates to lines and spacial zones, visible or imaginary, which *anchor* other elements. Built and spatial forms acknowledge the presence of such registration forces by aligning an edge with them. Sizes of these forms can vary within ranges of sizes such as those previously discussed. Indeed a variety of sizes strengthens the registration as one edge of the elements is *held* in line while opposite edges are freed. These sizes may be optionally built or unbuilt (or in between). Such reference lines or zones keep elements from *floating* while at the same time reinforcing a given direction. A series of windows, the heads of which all line up with the head of a doorway, is an example of edge registration. Registration may be based upon understandings of front versus back, with building fronts being more controlled and formal along the street while the backs are more casual. It can be dictated by geography. In many locations livelier edges tend to be oriented toward the south and the sun.



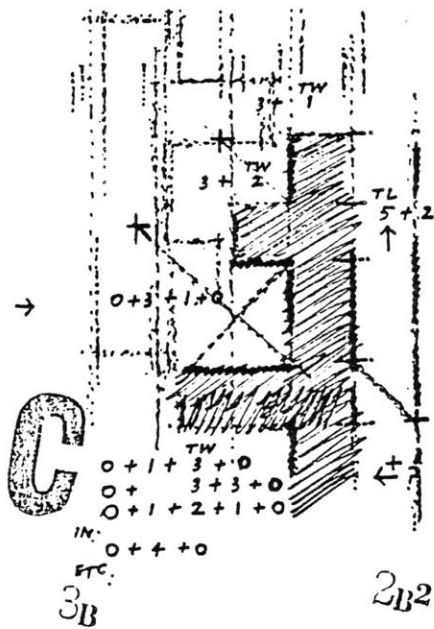
Scaling of undefined space to human proportions maybe achieved by a line drawn on a road, a floor, a wall, a covering surface, a combination of vertical and horizontal planes curved or flat, transparent or massive. It is never a partitioning or closing off, but always a defining element of what is here and there, above and below, between and around

-G. Rietveld

(G. Rietveld Architect p. 15)

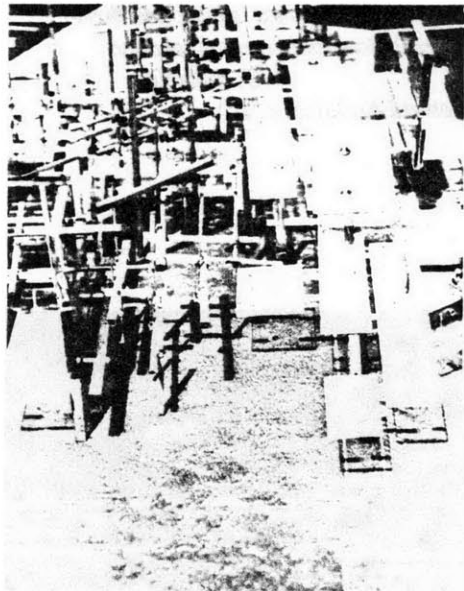


1 Japanese garden walkway



Maurice K. Smith - Formal behavior diagram

2

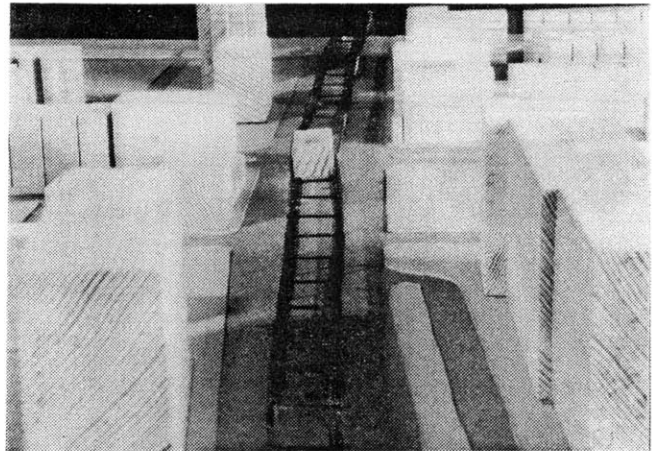


Orange Line as a planar collage

Territorial registration then refers to the *spatial* reference of the edges of non-directional or *place* territories to zones of access. As established in the principle of dimension, lateral extension or **displacement** of built elements from a line of registration establishes *places* or stable *territories* by creating stopping places *between* the displaced form and the access. This displacement serves to shift singular direction into larger fields of similar directions. Multiple readings and understandings are then possible as one moves through the environment. Displaced territories become the larger *places* of inhabitation, where activities occur. An edge of these places borders the access zone. Territories used for access/paths are directional while physical *places* in which one stops are proportionally more non-directional. The access zones become the space or slack between areas of built. If, for example these zones engage neighboring built territories along the street via lateral displacement, then the spaces begin to share space and activity. Primary directional strength and understanding is still retained. Lines of registration can and should be three-dimensional. Vertically, a series of physical levels provides references from which form, space, and use can interrelate both up and down.

Observation of the Northampton site reveals rigid patterns of registration with singularly readable displacement from the ground/street edge only. The Orange Line exists as a continuous ribbon of open structure positioned in the center of Washington Street. It is symmetrical with respect to both the street and itself. The platform of the Northampton stop is an overly strong (albeit singular) reference level 20 feet above the similar reference level of the street. This might be considered a displacement of the street up into the air. Since it is a continuous access way for large trains only, elements registering from this linear structure are minimal. Apart from the entry stairs, no physical territories extend laterally from it. The directional vectors of the operational train system do not (cannot) be displaced laterally or vertically and the steel truss system makes no other territorial gestures toward nearby masonry buildings. The builders of the system at the turn of the century possibly tried to make the system as disassociative as possible for safety reasons, and hoped that it might be ignored. Trains run along outside edges of the Orange Line structure while the Northampton station and platform occupy the center section. The public function of the elevated platform has almost no relationship to the public activities on the street below because there is no lateral displacement made which can provide any exchange between track level and street

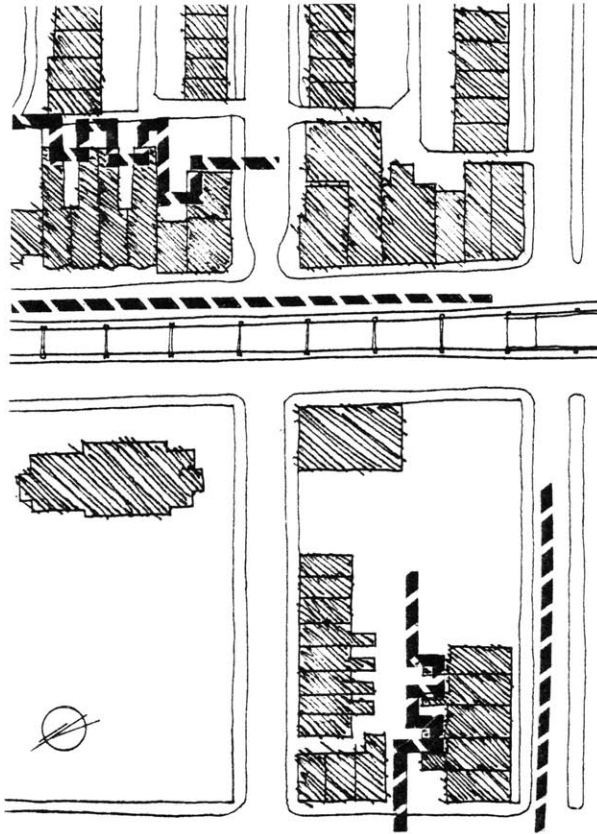
level. It is this lineal and serial isolation, which makes the Orange Line structure so overbearing.



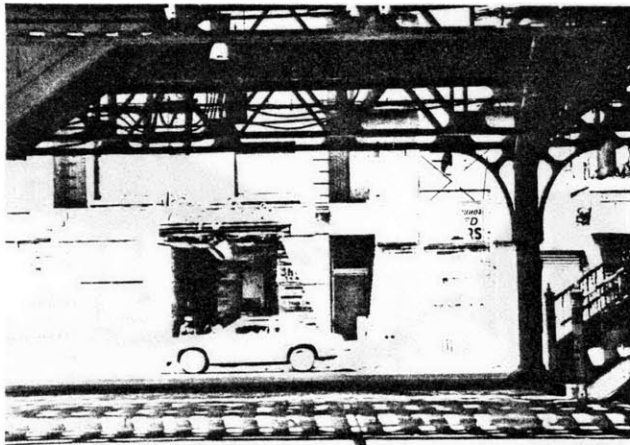
1" = 40' scale site model



view north along Washington St.



registration - area buildings

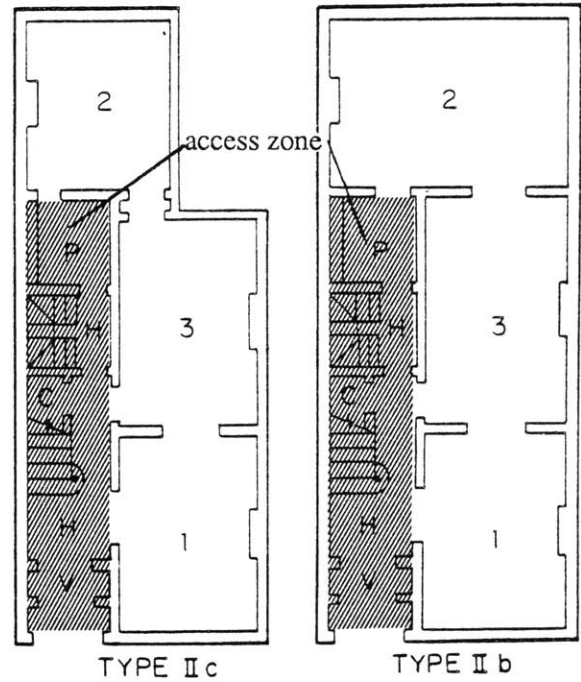


street facades

The masonry system exhibits similar patterns. Partywall structures which line the surrounding streets do in fact edge register with their respective streets while the backs of the buildings do vary considerably in length, position and structure. Lateral displacement and engagement of the building facades with the zone of the street is minimal. In many cases, street direction is rigidly reinforced by block-sized lengths of continuous masonry facade. Actual sizes (widths) of the individual masonry buildings are lost. Variation in building height, different treatment of facade elements, and occasional substitutions of materials and/or colors provide the only formal and spatial recognition for individual buildings. Some commercial storefronts at street level are more open, being supported by large timber columns and beams which reach across the width of the buildings. Such open areas, though done for display purposes, might be viewed as a *virtual* displacement of the masonry up to the second level. Many such locations along Washington Street are boarded up or *modernized* with closed facade systems of *formstone* or panel systems.

Smaller wood frame sizes have minimal impact with respect to registration along the street. Internally however, typical single-wide (24 foot) buildings do have a lineal registration. Rowhouse plans are organized, at least in the front of the buildings, with building entry/access zones (six feet \pm) along one side next to a masonry partywall. A series of 16 foot+ rooms then reference from this zone. Buildings of multiple (24 foot) module widths have greater flexibility in terms of organization. 50 foot wide housing units typically have dual side access arrangements (in mirrored organization) while more commercial/office buildings have axial/central access organizations.

Doorways and storefronts along Washington Street naturally register from the sidewalk level because it is the only level of public access. Openings further up in the facades are typically uniform in height across the width of respective buildings. *Grids* of windows, which are established by multiple floors of like elements, align horizontally and vertically and effectively cancel out any strong reference along any single line. Such window grids are most overpowering in nearby housing project buildings



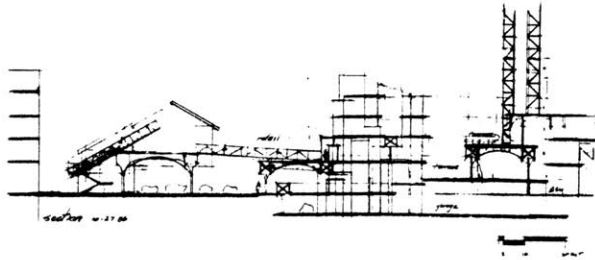
3 19th century rowhouse plans



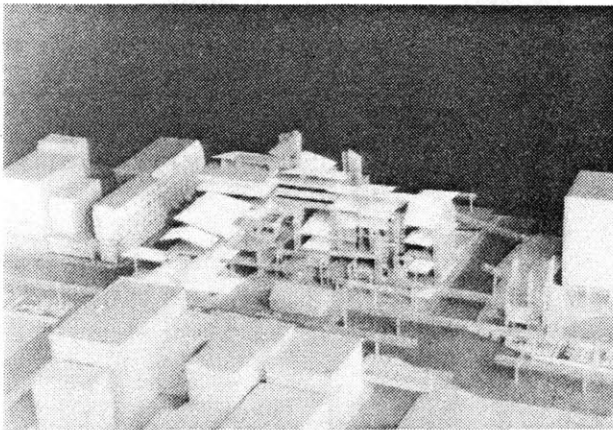
elderly housing building

Design Proposal

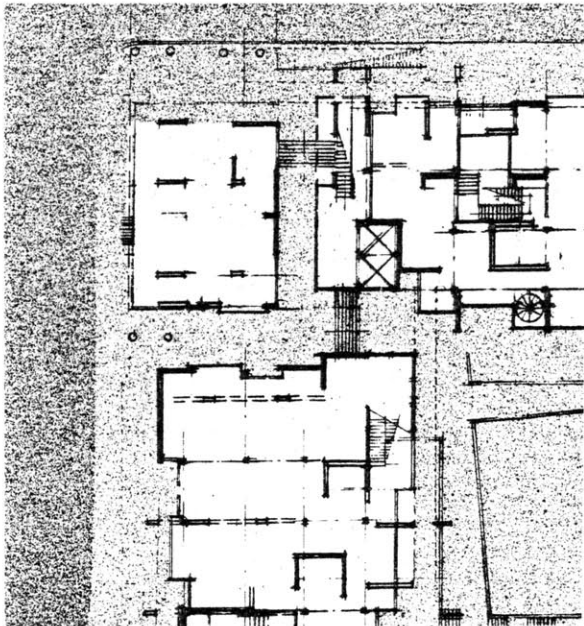
In the design proposal, registration of building elements to Washington Street and Massachusetts Avenue is maintained for the most part; especially at public access levels. Use of a concrete structure system and reuse of the Orange Line truss sections allows greater independence from the ground plane, however. Horizontal access is no longer confined to street levels. Shifting of the Orange Line pieces away from the center zone of Washington Street allows three-dimensional organization of public movement. The truss lengths become displaced multiple reference levels from which forms and movement can associate, above as well as below. At groundbound portions of the design, the street edge is reinforced. Entrance zones for residential/office uses are recessed slightly to establish a stopping place for turning and entering. Continuity along the street level is broken toward the intersection where the building mass is displaced upward. A light pavillion-like structure occupies the space between the ground and the larger structure overhead. This helps to retain a more continuous plane along the street edge. Two large (16 feet) pathways beside and behind this more delicate structure isolate it and provide access to the rear of the site.



early section study

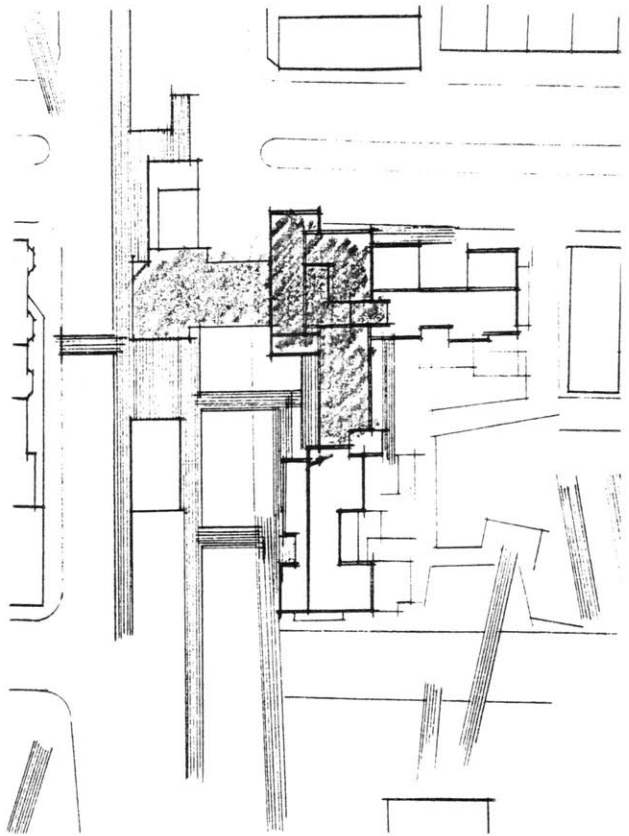


1/16th" schematic model - view east

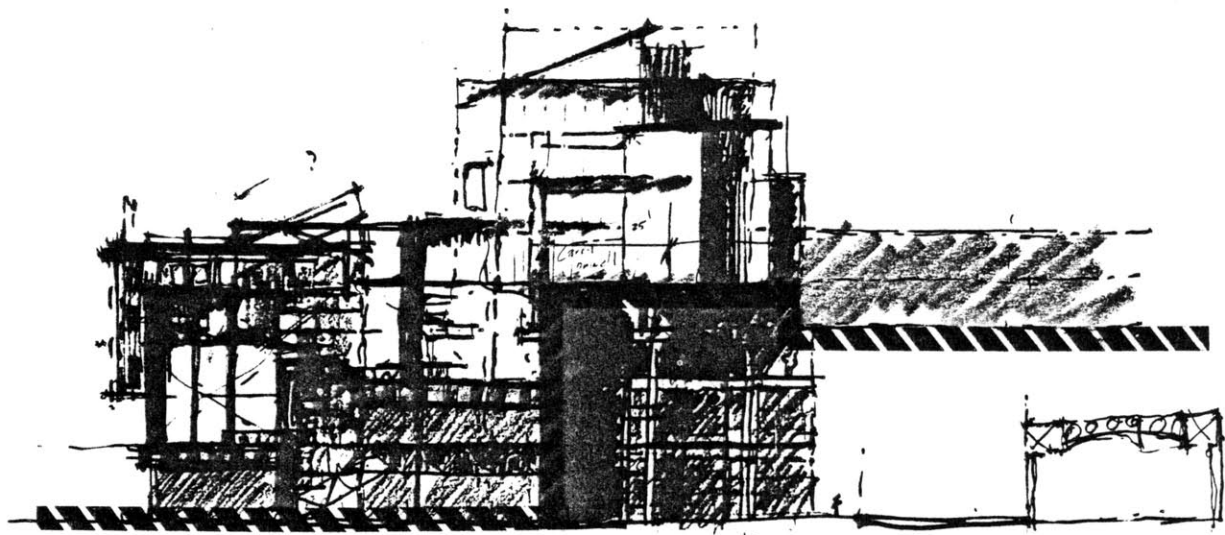


partial plan showing pavillion

The larger upper building is freer. It reinforces the plane of the street, at some points recedes in areas above paths to the back of the site, and displaces laterally out over Washington Street as well. Access within the building occurs every other floor, levels of concrete flooring alternating with wood structure, allowing interaction above and below.



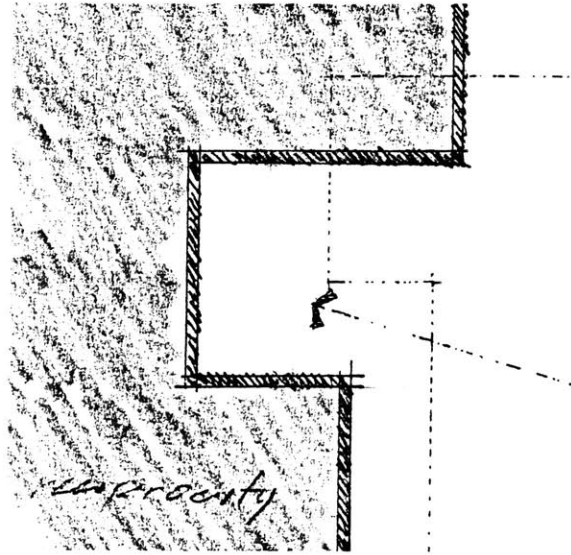
upper building diagram



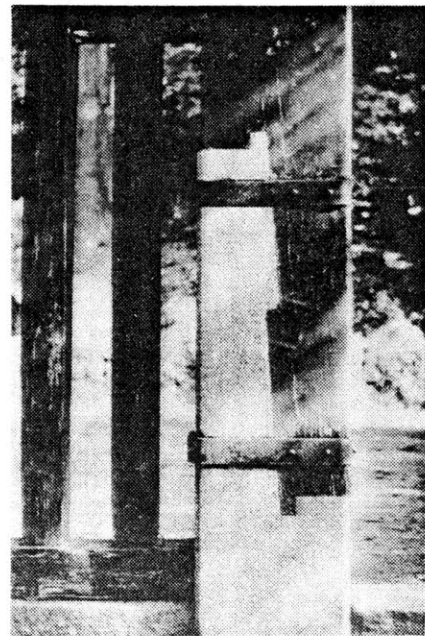
Massachusetts Ave. - elevation study

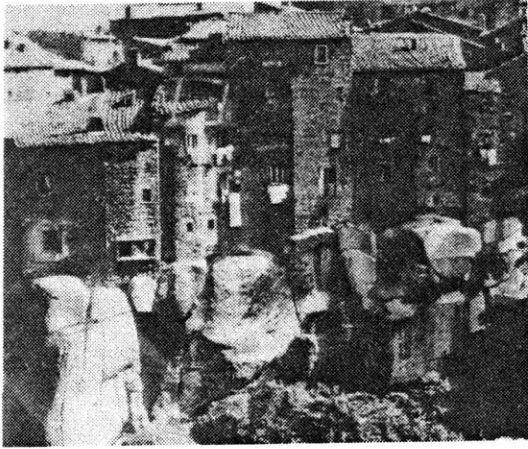
Reciprocity

Reciprocal behavior interlocks form and space by allowing interaction of physical territories. If a directional field may be considered not as single zones of solid and void, of positive and negative, but rather as a *multiple* layering of zones within individual areas of built and space, then reciprocity is the act of crossing these zones so that forms and spaces interact. Mutual lateral displacement of one set of elements into the zones of another creates a *stop* or *pause* with respect to direction. The systems involved then optionally share meanings and understandings at their edges. Such reciprocal relationships and mutual definitions help to build continuity of a place. Various places, spaces, and physical systems are no longer viewed singularly, in isolation from one another, but in a variety of sizes and juxtapositions. A diversity of places composed of partial readings of different systems can exist. Sometimes associated with new uses and meanings, these places are readable separately yet are still part of the whole. Lateral displacement which adheres to specific ranges of size produces reciprocal behavior, which is then recognizable and understandable. Displacement of two (both) edges of a zone results in reciprocity of *territory*. These become stable stopping *places* in the field.



As soon as we open the door, step out of the seclusion and plunge into the outside reality, we become an active part of this reality and experience its pulsation with all our senses. The constantly changing grades of tonality and tempo of the sounds wind themselves about us, rise spirally and, suddenly, collapse. Likewise, the movements envelope us by a play of horizontal and vertical lines bending in different directions, as colour-patches pile up and dissolve into high or low tonalities
-Wassily Kandinsky
(*Point and Line to Plane* p. 17)





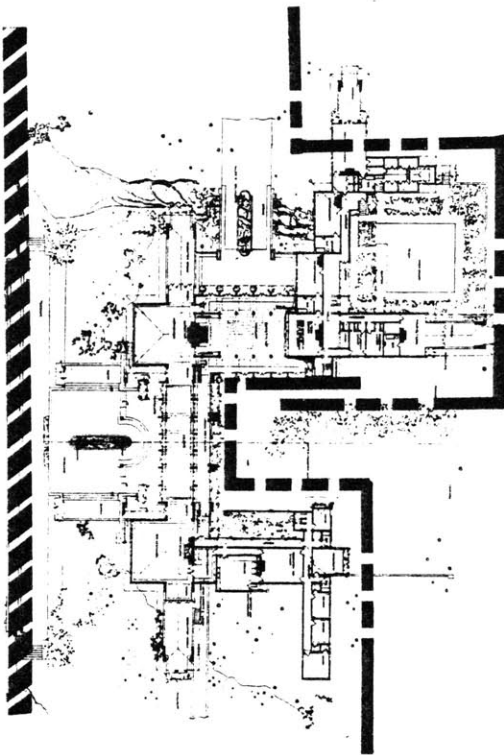
Vitorciano, Italy

2

The primary motive is to make unity from diversity

-Fumihiko Maki

(Investigations in Collective Form p. 32)



Frank Lloyd Wright - McCormick house

3

Reciprocity can be more than a one to one, zipper-like action. For example, entry stairs at residential buildings have a reciprocal relationship with sidewalks along the street. Stair steps alternatively project out from the buildings while open *buffer zones* of space are contained between the front of each building and sidewalk zone. These zones are optionally landscaped or left bare. Such an organization is singular: one size move is repeated over and over.

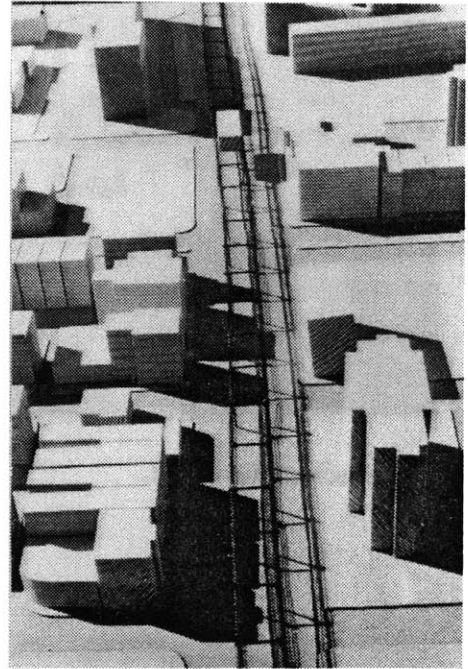
As with the elements which build up a direction, a variety of sizes strengthens the organization. Behaviorally, the edges of field elements opposite those which register often are the *lively* or reciprocal edges. Reference edges (along the street), which are more closely aligned to build strength in a direction, are limited in the amount of displacement allowable.

In the case of the Northampton site, it is the *backs* of the buildings, the sides away from the street, which exhibit greatest reciprocal behavior with the landscape. Series of masonry or wood structures interact within *backyard* spaces. Reciprocity exists here in a variety of patterns due to the variety of masonry and wood frame structures, such as decks and porches, which have been added over time.

Correspondingly few stopping places exist along the street. The Orange Line structure, masonry facades, and other elements form a series of distinct and complete planes along the city streets. The Orange Line is linear, continuous, unyielding, and forms a hostile (if structurally open) barrier between opposite sides of Washington Street. No reciprocal relationships with the surroundings exist. There is no displacement, no *stop*.

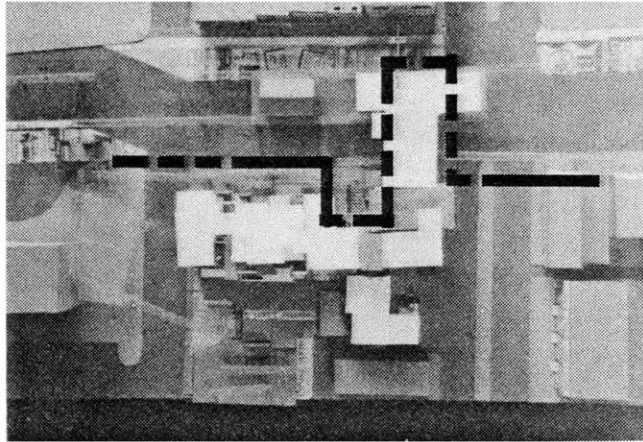
Commercial storefronts represent an almost continuous face of material along the streets of the area. Only in places where buildings have collapsed and the lots have been cleared are any building sized exchanges evident. Above the street level, forms such as masonry bay windows do project a foot or two from the faces of the buildings, thus setting up a very subtle reciprocal undulation along the street. Individual buildings remain distinct spatially. Masonry construction of partywalls almost prohibits any reciprocal association *between* buildings.

Minimal reciprocal moves are made by the tertiary wood frame systems in the form of small overhangs recessed entries and small bay window projections. These projections never cross over the invisible lines of building partywalls and hence are not reciprocal with respect to the masonry systems.

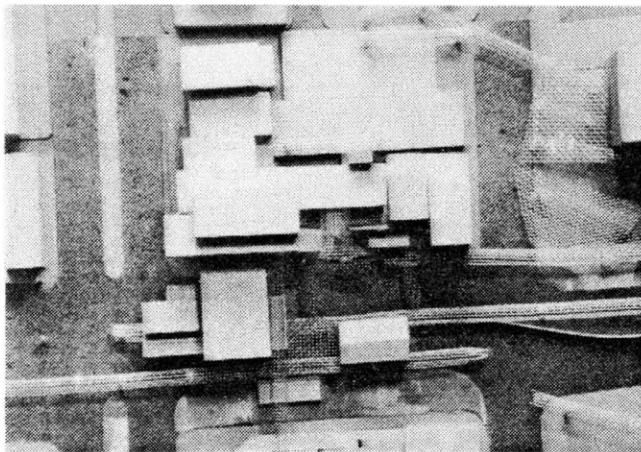


1" = 40' scale site model

but
 IF (POSITIVE)
 the intention is to help GENERATE
 variable environments ^{for} responsive
 towards
 REAL GROWTH and CHANGE,
 through participation — (those same)
 architects will 'discover' the
 designers (could) makers
 exciting coherence of INCLUSIVE ORDER -
 rational PLURALISTIC
 (maximal range of definitions
 polarities
 changing choices
 and offering fresh possibilities
 through RECIPROCAL CONTINUITY.)
 in which
 NO PLACE is wholly self defined,
 USE exclusively
 but is mutually dependent for its
 existence on many others. 4
 form



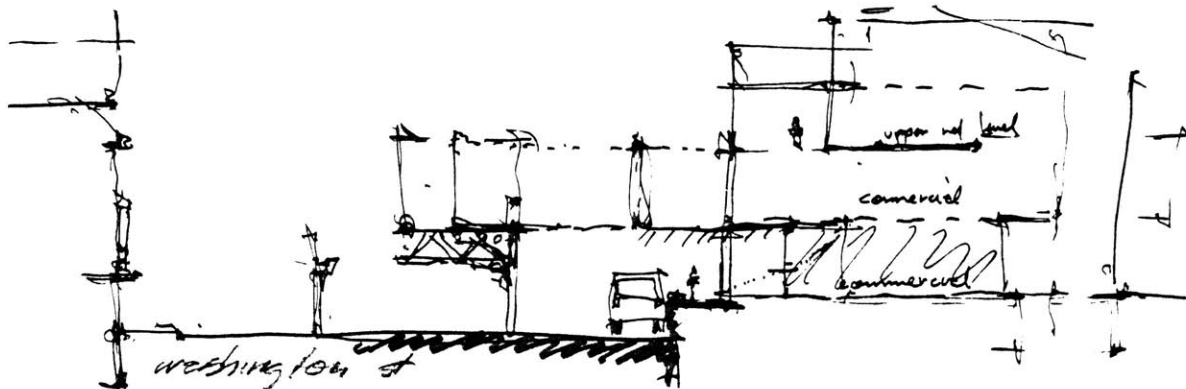
1/16th" schematic model



1" = 40' scale study model

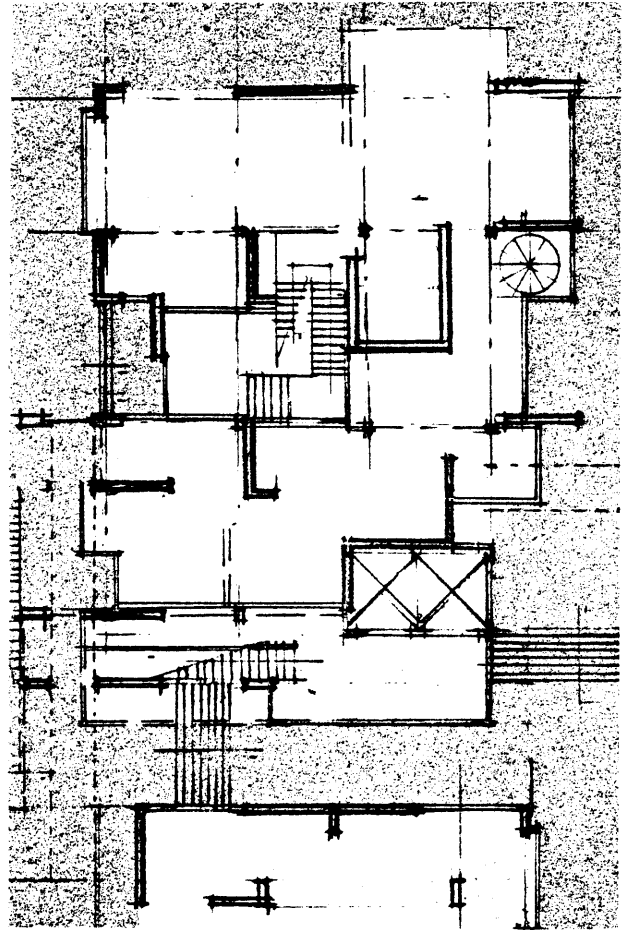
Design Proposal

Interaction between the different systems at the Northampton site is most important to the establishment of reciprocal behavior. Only by utilizing the various systems in association with one another and by deploying pieces less singularly, less completely, can spaces be created and meanings shared. The boldest and most important reciprocal behavior of the design is achieved by simultaneously dismantling the Orange Line, introducing track and truss sections into the site, and by displacing concrete and steel building structures out over Washington Street. This sets up a new reciprocal relationship between the street zone and built zone, between closed structure systems and open ones. The heretofore inviolate spatial zone above the street now engages with the built zone to form large place territories. Two lanes of automobile traffic are reclaimed and Washington Street bends in a reciprocal gesture to the remaining Orange Line structure. Pedestrian movement occurs at multiple levels and in multiple bands of access throughout the zone of the street, linking building territories on either side of Washington Street.

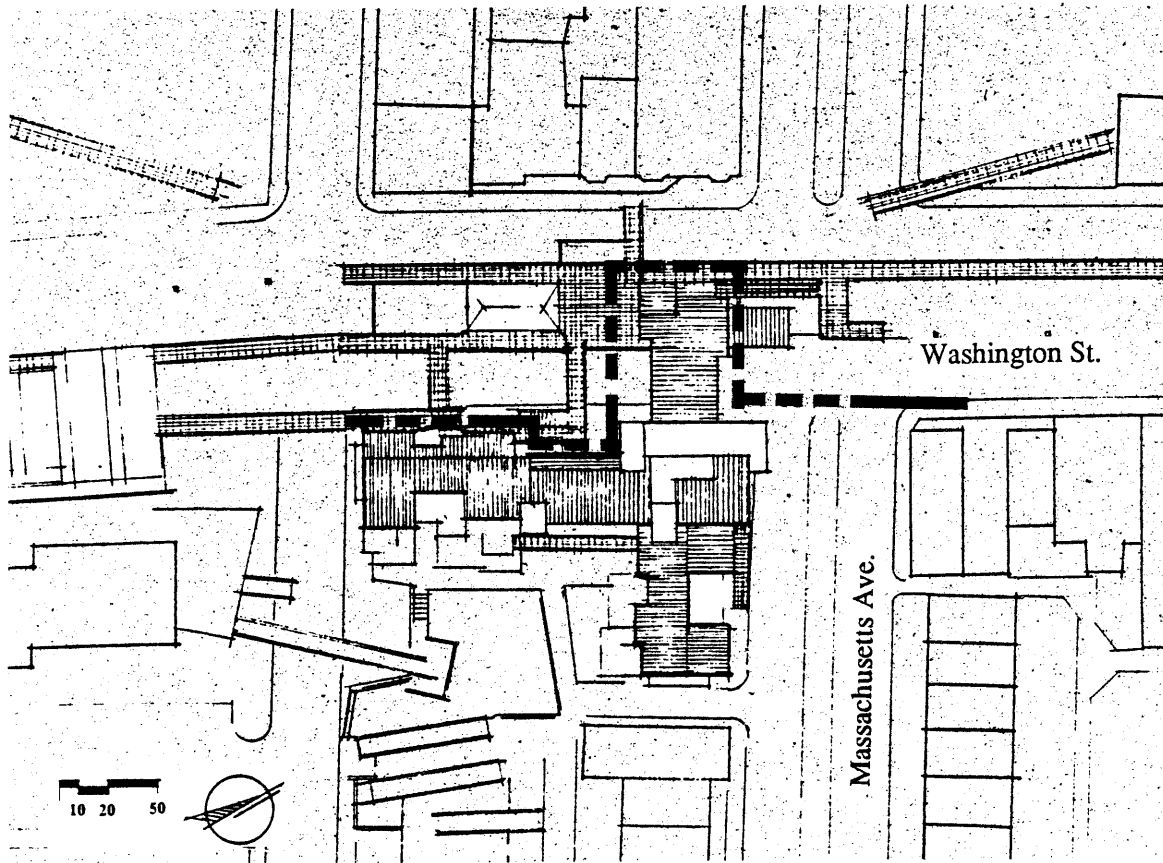


Subtle displacements occur along the sides of the streets: room and building sized elements project and recede two to four feet laterally from the street. Unlike neighboring buildings, larger building and collective-sized displacements are apparent also, particularly at upper sections. The versatile concrete system permits elevation of more contained forms above the street. This allows more open, pavillion-type commercial structures to *slip*, parallel to Washington Street, at ground level. Using alternating concrete reference levels also permits interaction above and below. The street facade is not continuous: it has room and building sized breaks in it near the intersection of Washington Street. The ground itself is built up slightly (four feet) so as to set up subtle back and forth relationships with the buildings and to allow access to the elevated (garage below) rear portion of the site. Reciprocal behavior of the facade closure systems (panel system, concrete with punched openings, or sheet glass system), suggests interrelationships of various uses throughout the building. This tension between the various systems supports a variety of use interpretations and a sharing of meanings between them. Similar to surrounding 19th century buildings, reciprocal behavior is more pronounced at the rear of the buildings.

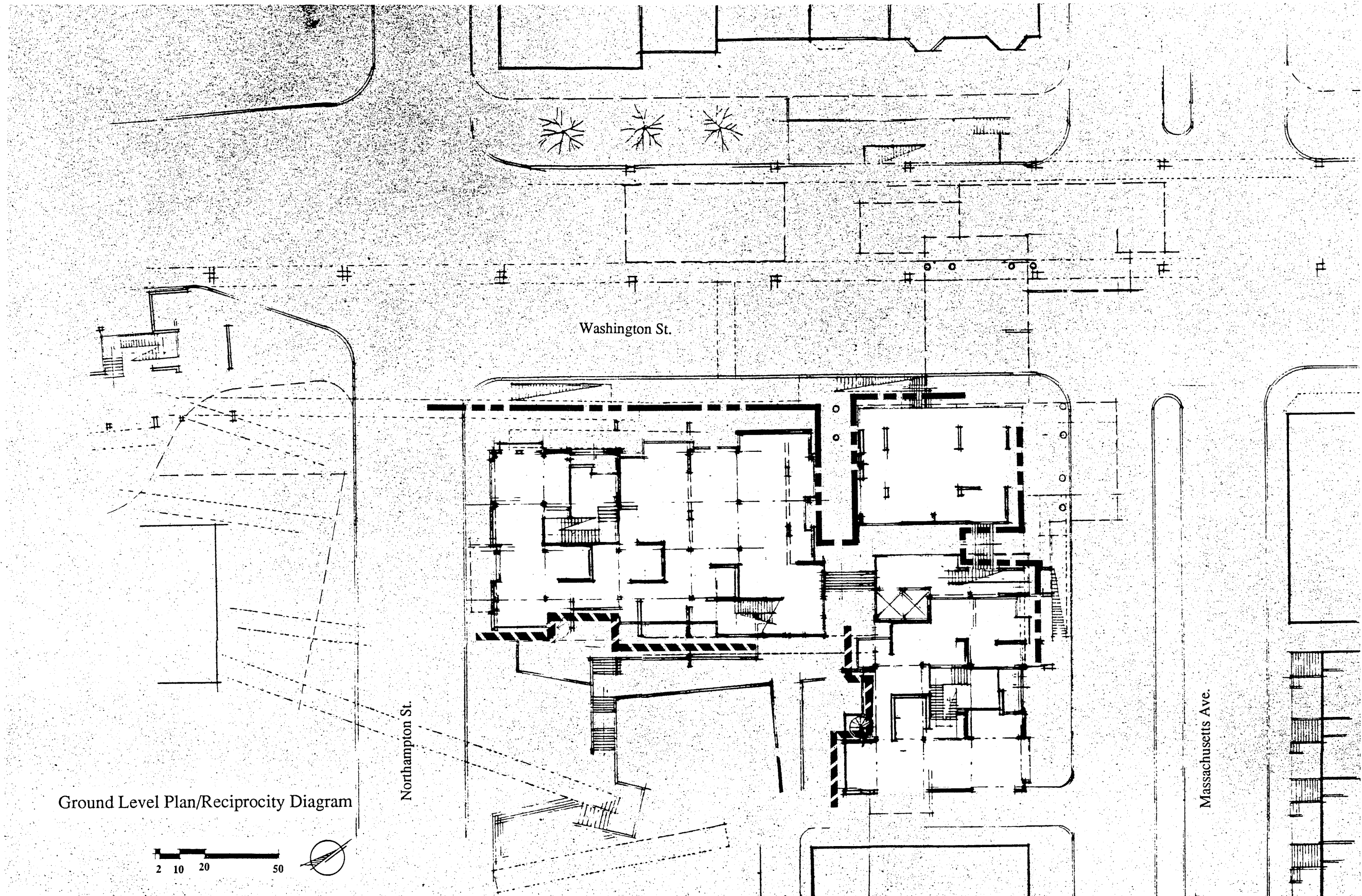
Terraces and porches of room and building sizes shift back and forth in response to locations of vertical access, as do private and room sized openings which allow light into interior spaces. Within the buildings, less complete structural divisions, made possible by the concrete and steel system, allow options as to inhabitation. Spaces may be shared or optionally claimed by adjacent parties.



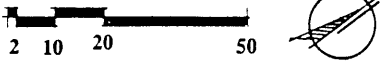
partial plan

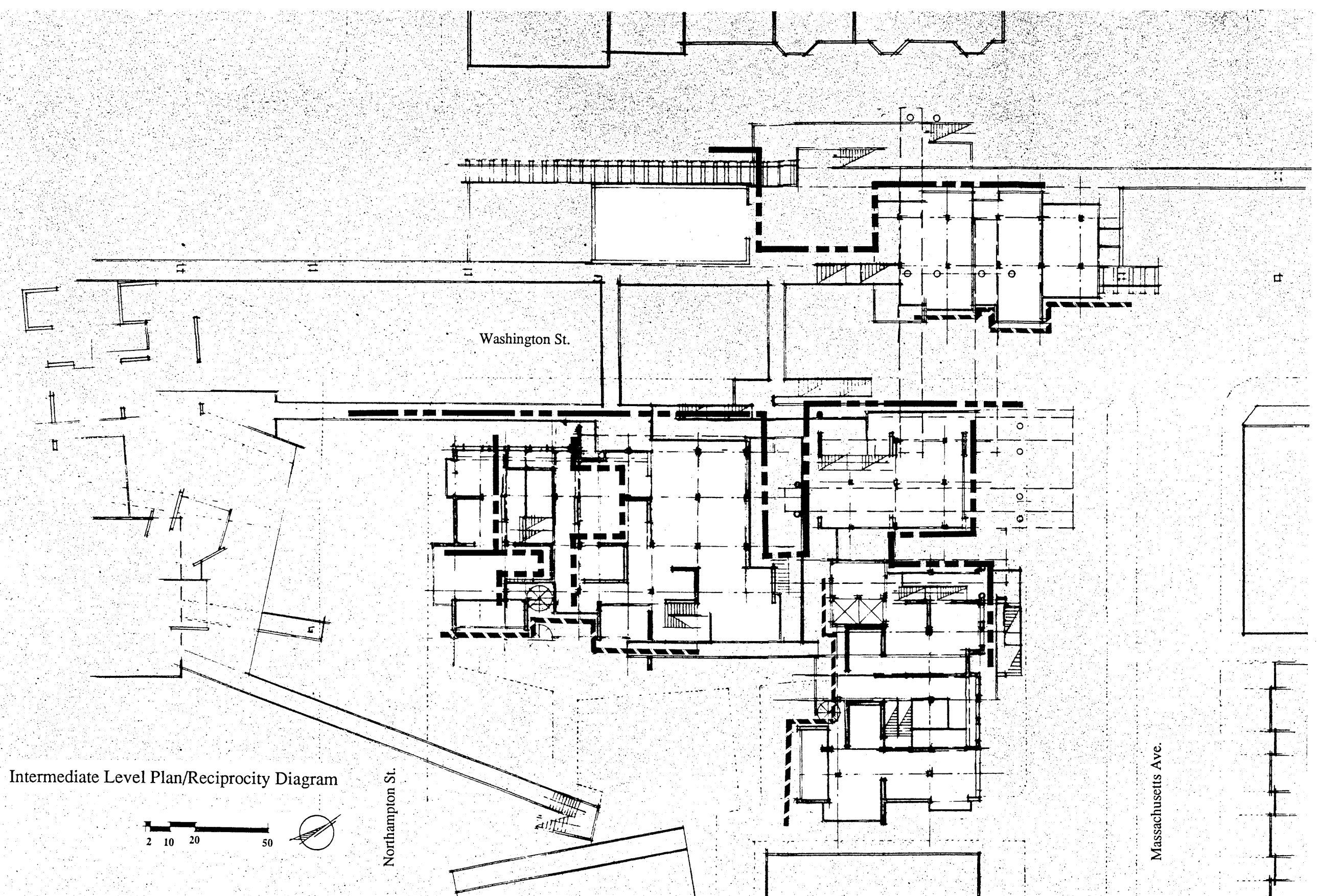


site reciprocity diagram



Ground Level Plan/Reciprocity Diagram





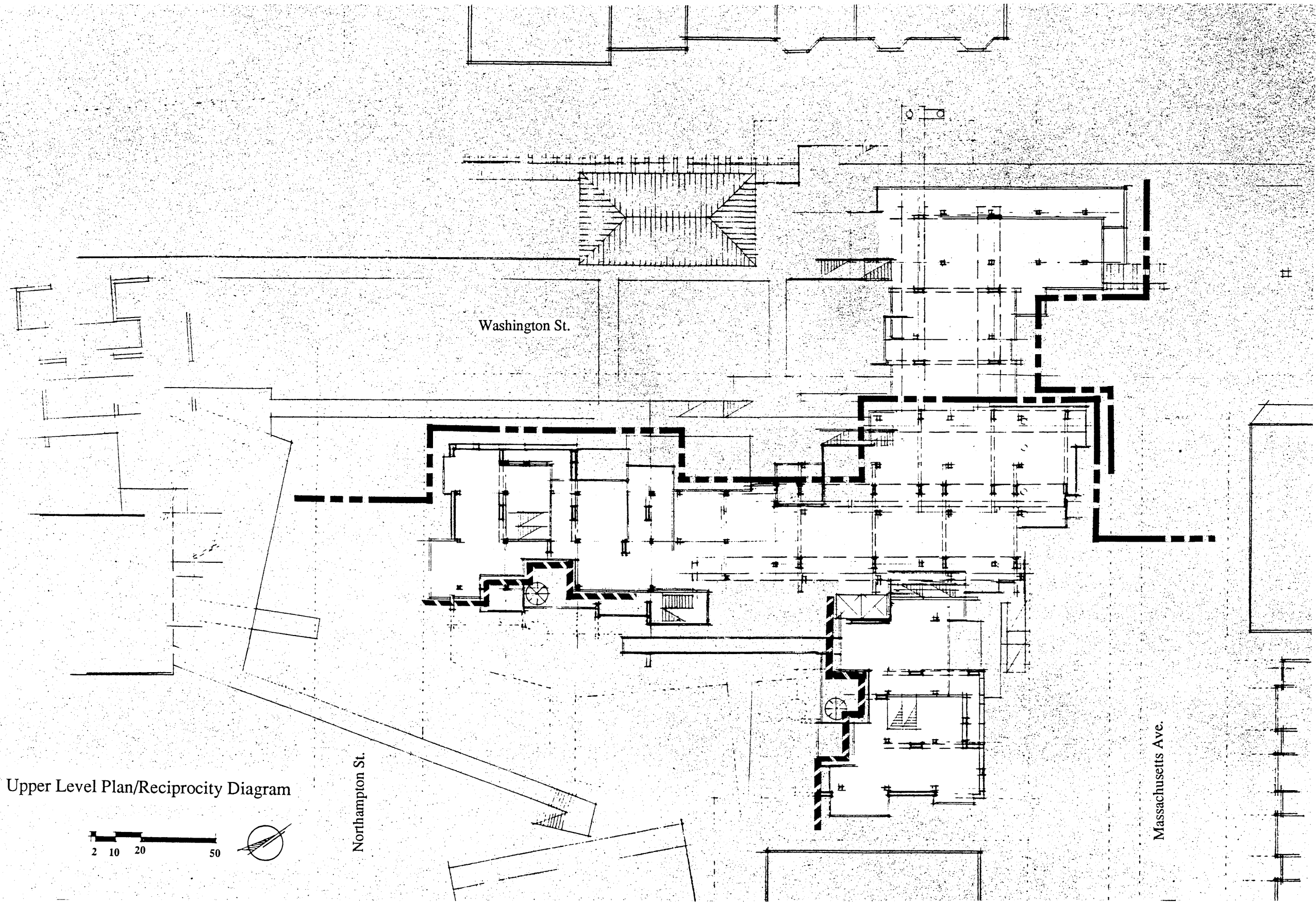
Washington St.

Northampton St.

Massachusetts Ave.

Intermediate Level Plan/Reciprocity Diagram



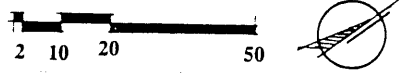


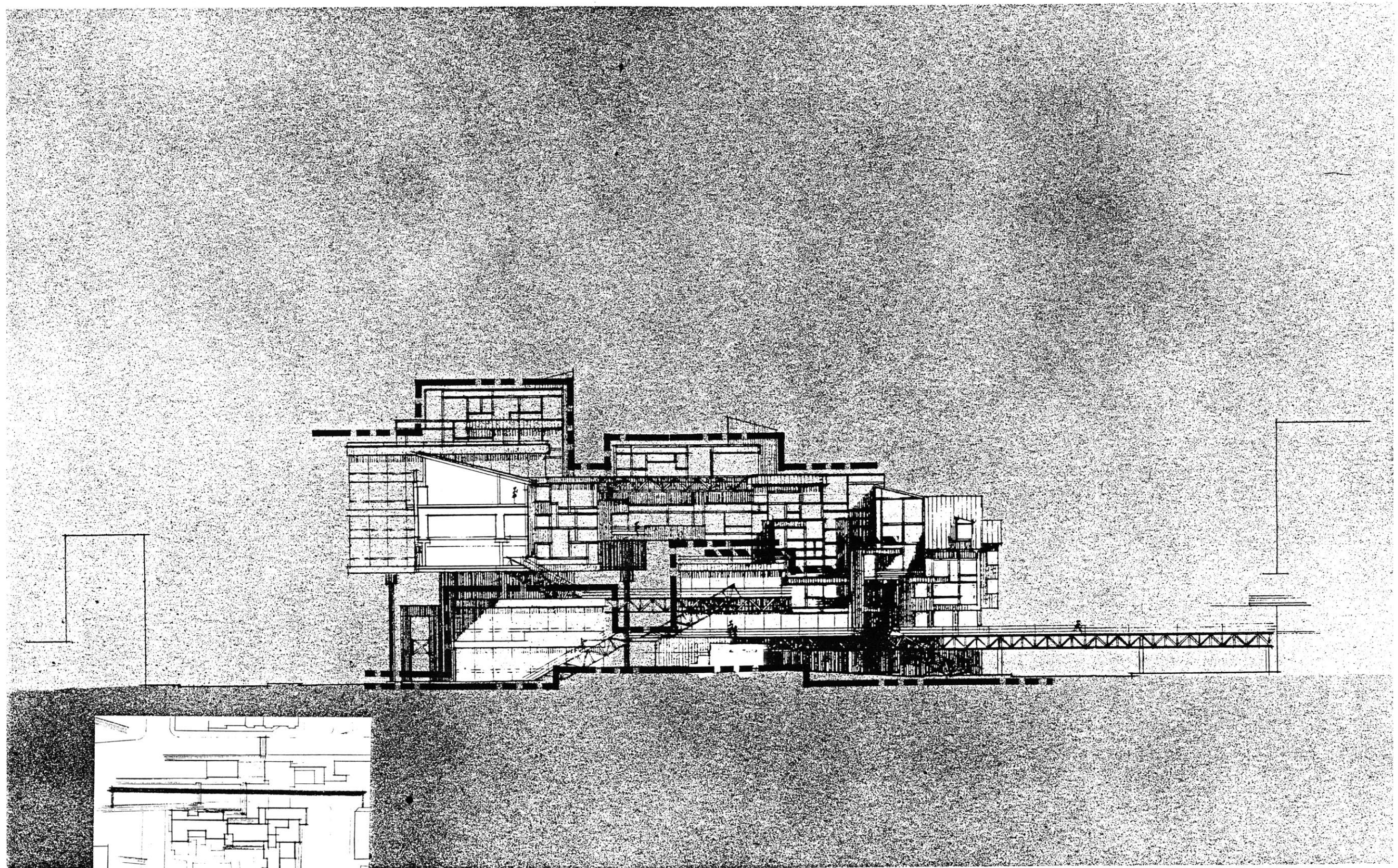
Washington St.

Northampton St.

Massachusetts Ave.

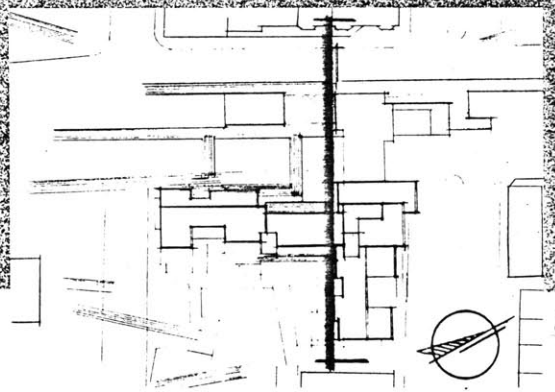
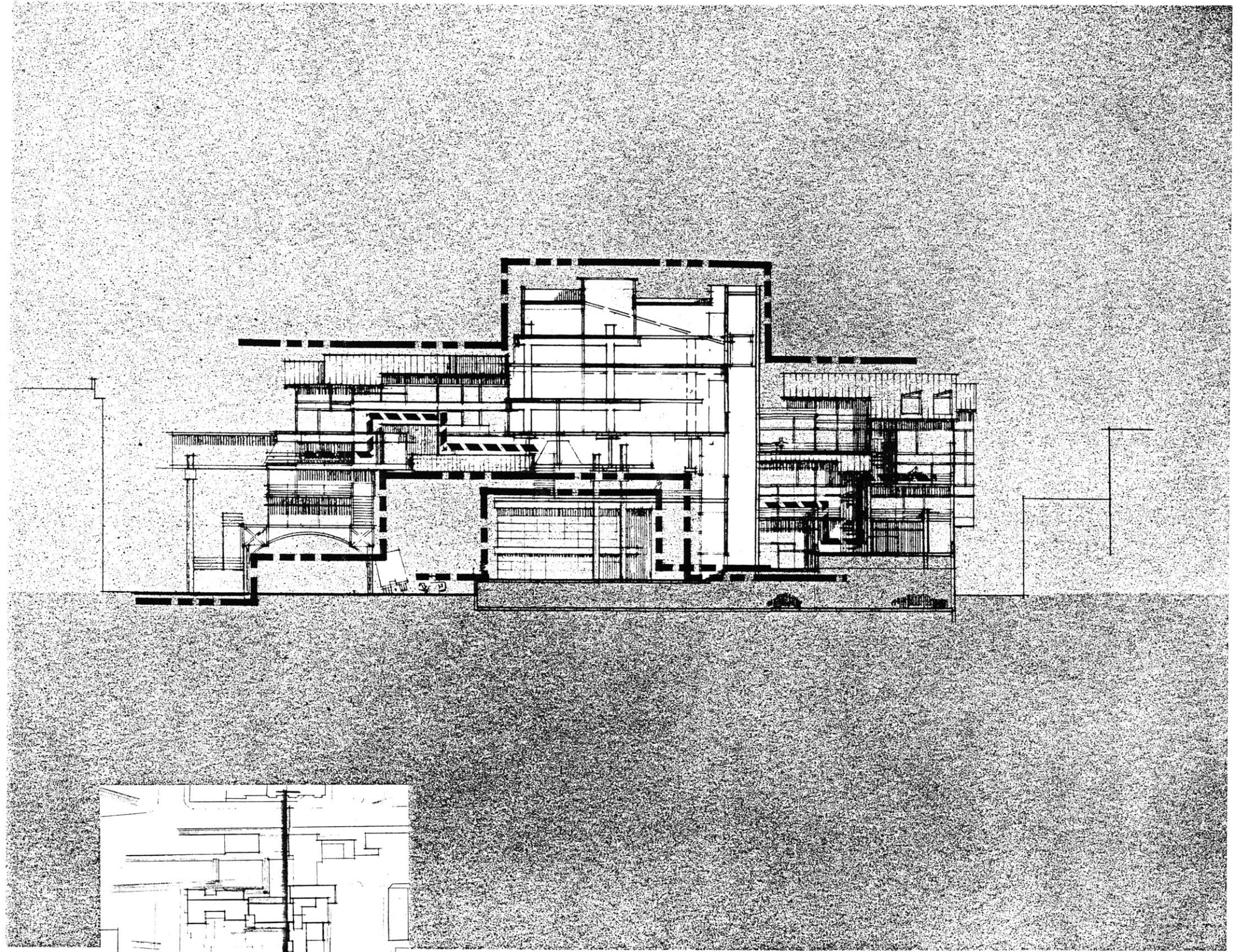
Upper Level Plan/Reciprocity Diagram



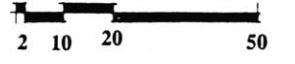


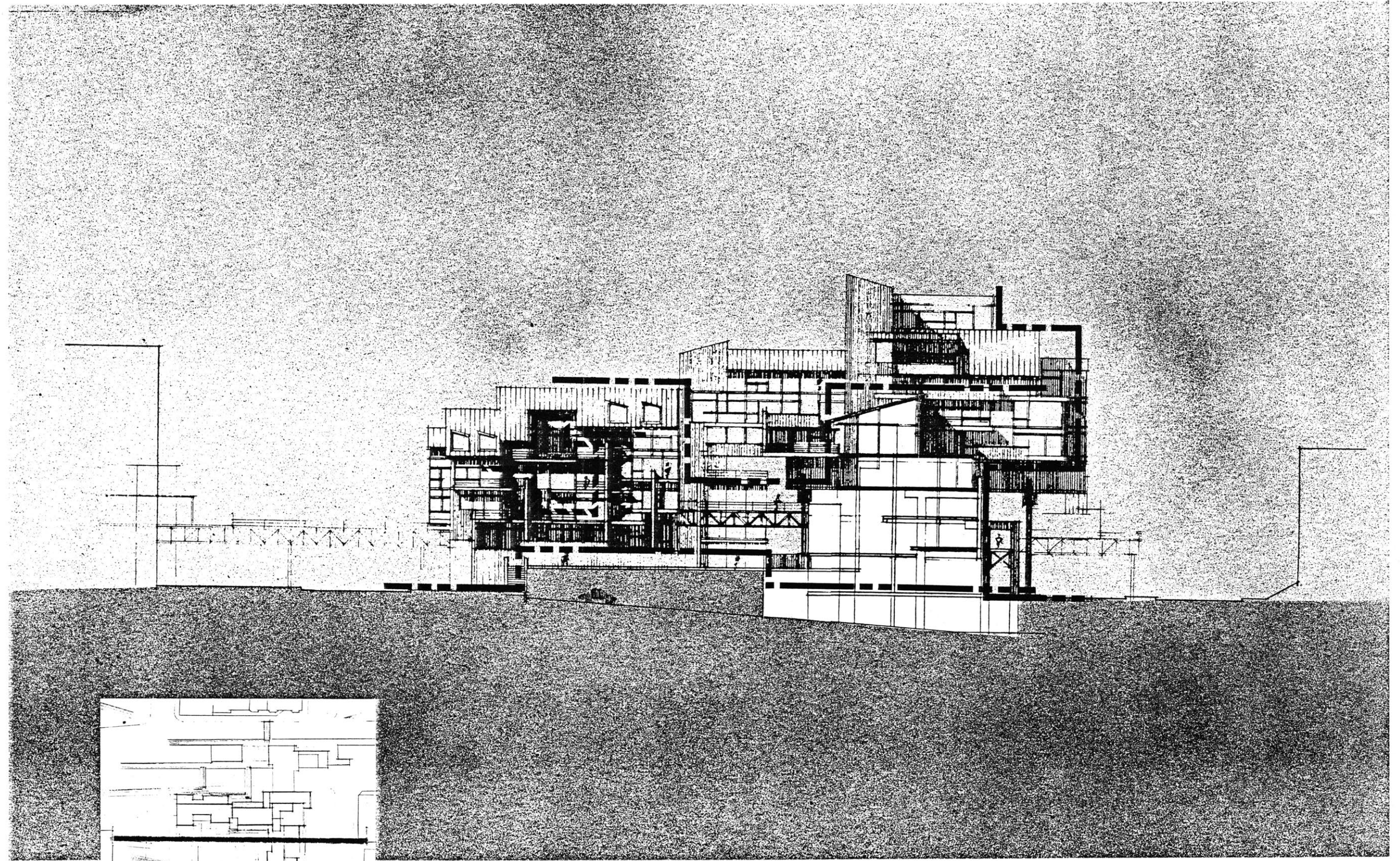
Northwest (Washington St.) Elevation/Reciprocity Diagram

2 10 20 50



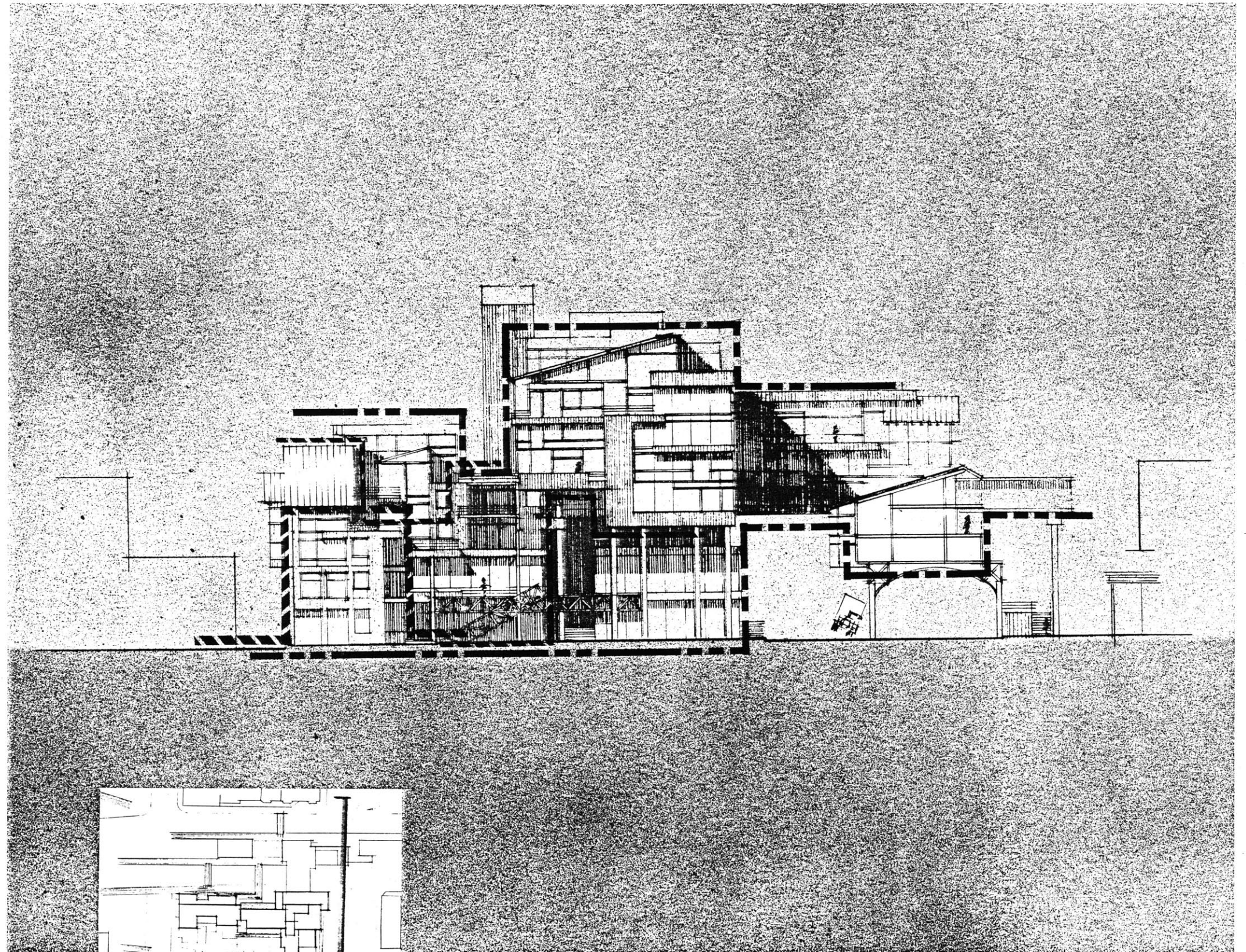
Section/Reciprocity Diagram



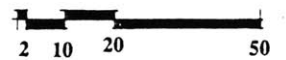


Southeast (Rear) Elevation/Reciprocity Diagram

2 10 20 50

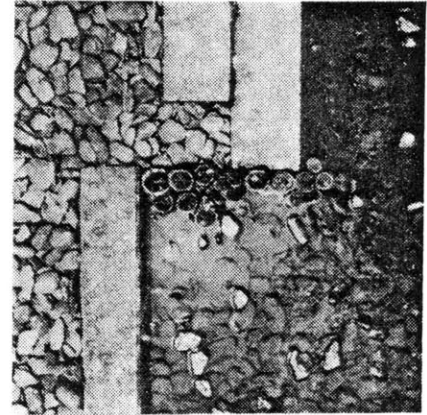


Northeast (Massachusetts Ave.) Elevation/Reciprocity Diagram



Exchange

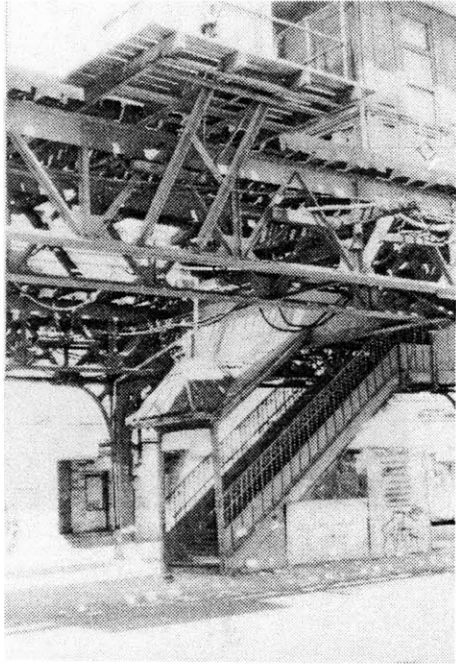
Interaction between formal zones and systems creates a **zone of exchange** between uses, between sizes, and between built and spatial territories. A zone of exchange is just that; an area in which different activities, structural systems and sizes can overlap one with another. It is a zone of ambiguity, of partial definition, of tension. A covered porch, for example, sets up a zone of exchange. It is built of the structural elements of a dwelling, yet it is incomplete, allowing interaction with the landscape. Reciprocal behavior between forms sets up exchange. Incompletion or partial completion of forms is important to the establishment of a *zone* of exchange, as systems which are closed cannot interact regardless of proximity to other forms. In close combination various systems can assume characteristics of others. New spatial understandings and interpretations are possible. Such zones of sharing allow options; a plurality of readings which can in turn support a variety of uses and interactions within a single zone. This exchange lends unity to associated places and to the context as a whole. It is a built territory where the observer is both inside the territory of the building and also a part of the landscape.



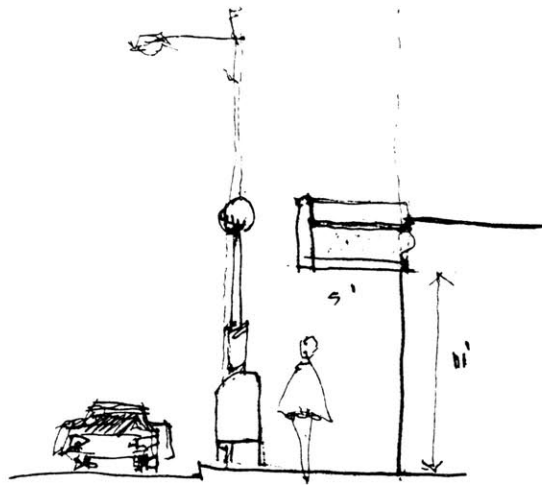
1 Japanese garden

One can see the Medieval street bridges over the Via Ritorta, in Perugia, an example of a link that began as a simple means for joining two buildings at their second story or, perhaps reinforcing structurally weak walls. The bridges, which mediated between two buildings at the second level, also serve to define the overhead in the street, and to reinforce it spatially as a pathway.

*-Fumihiko Maki
(Investigations in Collective Form p. 31)*



Northampton stop entry/exit stairs



exchange @ commercial 9^o

Because little reciprocity exists, little exchange is evident between Northampton site elements. Due to its severe linearity, the Orange Line remains isolated in the middle of Washington Street. It exchanges with the street 20 feet below via one minuscule stairway. A linear zone of exchange might be said to exist between the Orange Line trusses and the street beneath. The only tension which results within this zone, however, is between automobiles and pedestrians struggling to cross the street.

Minimal zones of exchange exist along Washington Street at the individual buildings. The masonry system of facades is a closed one, allowing exchange only at:

1. The ground level, where a wood frame system is sometimes substituted for commercial display purposes thus allowing at least visual exchange

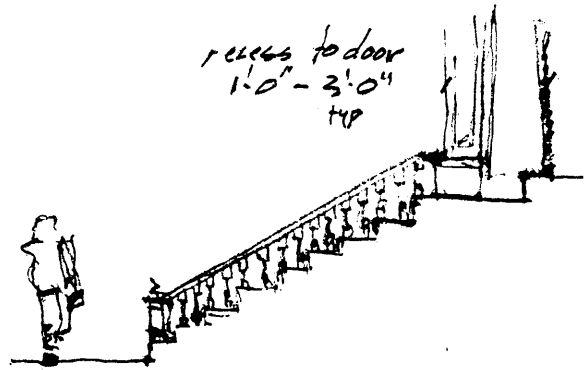
2. Selected places along the street where frame structures such as awnings and signs protrude. These together with doorways, allow multiple *go/stop* readings of the 10 foot wide sidewalk zone.

3. Breaks in the continuous built fabric (mostly caused by fire or demolition)

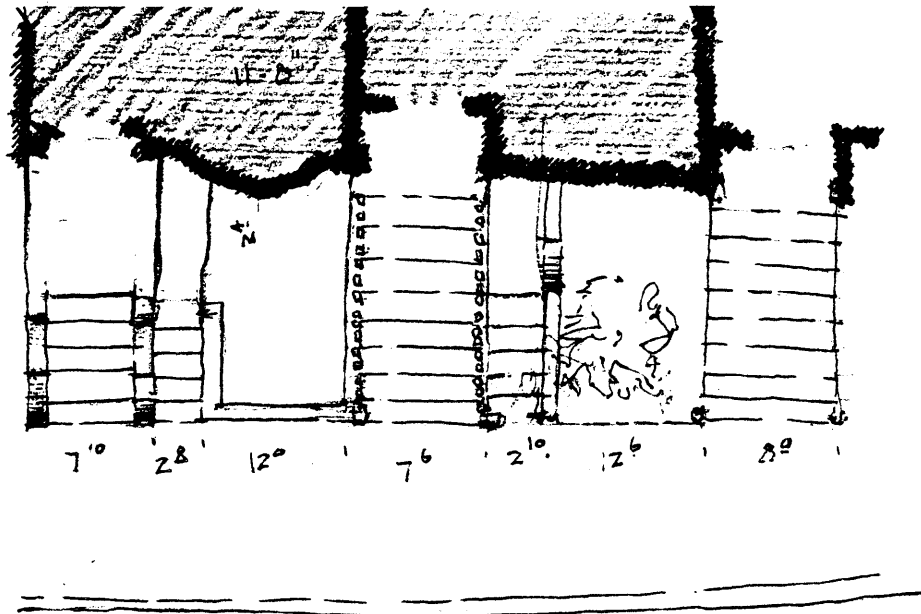
4. Cross streets, where building ceases.

In the backyard zones greater exchange exists between juxtaposed masonry and frame additions.

Within individual buildings along Washington Street exchange is intentionally minimal between commercial uses on ground level and office and residential uses above. Away from Washington Street, where residential use takes over all floors, zones of exchange are more generous. Projection of entry stairs down from each building to the sidewalk sets up a zone of approximately 10 feet, which allows interaction between residents and pedestrians.



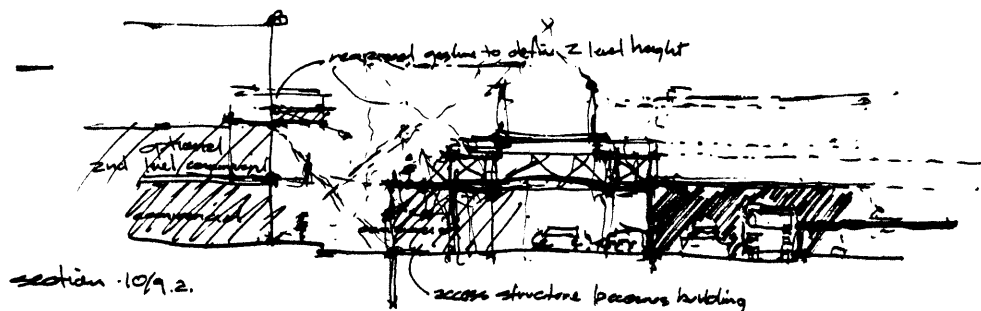
exchange at residential building entries



reciprocity diagram at rowhouses

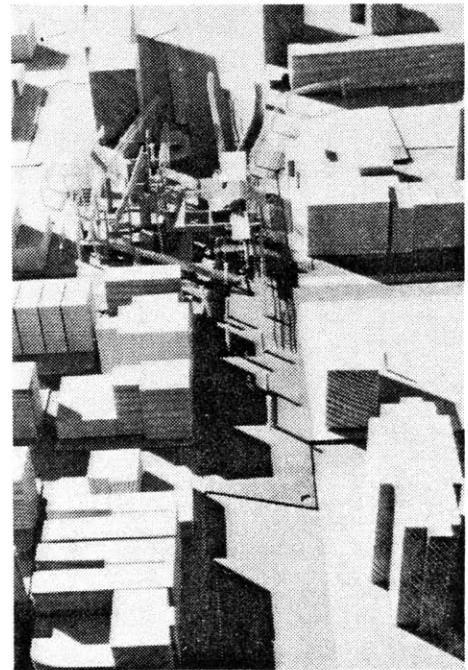
Design Proposal

Additional zones of exchange are established in the new design as a result of greater reciprocal moves accomplished by the various site systems. The most obvious zone of exchange is the large one generated by the reciprocal alternation of open Orange Line sections with closed building masses, both within the site and over the zone of Washington Street. Independent of the ground level and of conflict with automobile traffic, the entire zone above the street becomes one of pedestrian exchange. Inhabitants move *between* sections of steel truss work, and *between* closed building forms to buildings on either side and in the center of the street zone. At the streetside locations in the design, public movement occurs at numerous levels. These various pathways are generated from concrete structure and Orange Line trusses suspended one above the other. They help to define access territories for one another, thus permitting exchange. Breaks in the continuity of the street are by design rather than accident. Exchange is possible between spaces on either side of structural divisions and at breaks in the built zone because concrete

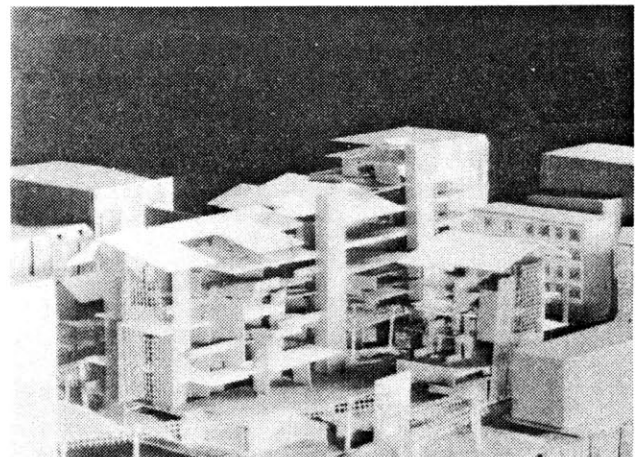


early section diagram

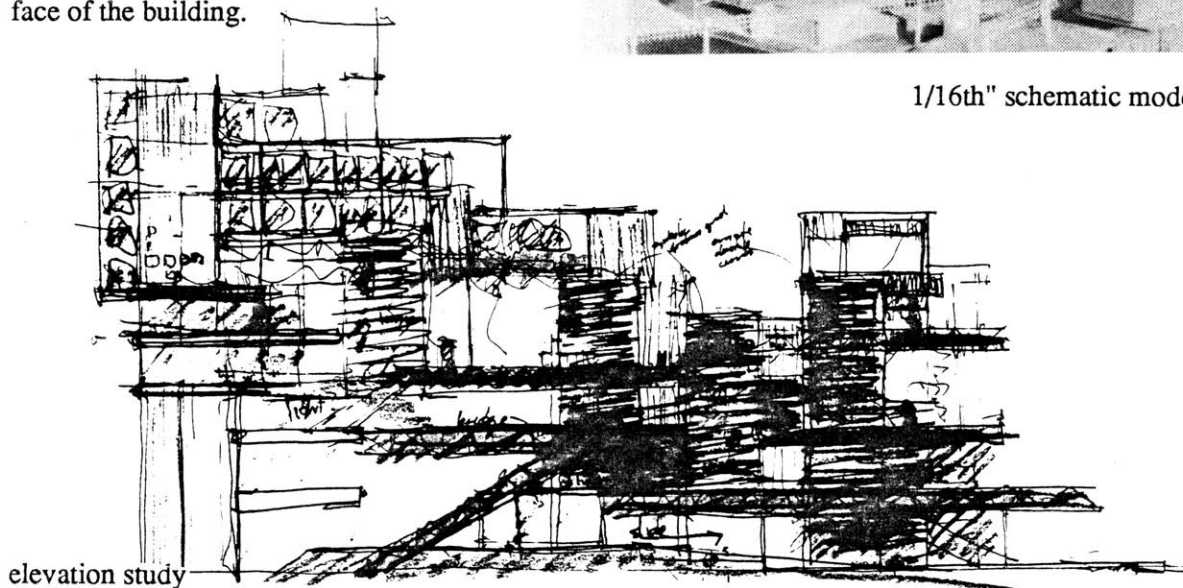
support structures are less complete even in the most closed portions of the building. Areas of least structural definition occur at locations of most public use, allowing maximum interaction of interior spaces with outdoor territories. The pavilion-like structure located near the intersection of Washington Street with Massachusetts Avenue, for example, is so open on its three public sides as to be a virtual extension of the outdoors. In contrast, options for exchange are minimized in upper residential/office locations of the design, particularly at the front where concrete structure is most intense. At higher, less public locations such as upper portions of ground bound buildings, and in the elevated building areas, steel frame systems dominate and a lighter panel closure system allows optional exchange with outdoor territories. At less formal *backyard* zones, multiple layering of porches and use of the panel closure system allows greater exchange than at the more formal street face of the building.



1" = 40' scale study model



1/16th" schematic model



elevation study

Transformations

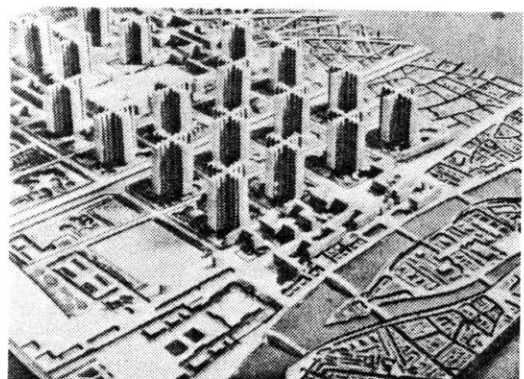
The transformation described here involves a very gradual alteration of structural meanings and materials. Not all steps were applicable in the design solution. Rather, transformations occur at points where new potential *use* directs. The final solution then is not simply a transformation for the sake of transformation only.

It is not enough to analyze the Northampton environment for associative qualities or lack thereof, or to evaluate the site and propose a solution rich and diverse yet distinct from its surroundings. It might be argued that keeping dimensional and directional understandings consistent with surroundings is enough and that, if these forms and principles are adhered to, entirely new technologies could be substituted and the project would remain associative. But in as broad, continuous, and powerful a masonry world as that which surrounds *this* site, such a relatively small intervention would glare at the surroundings like a beacon; the jump in meanings would be too great. In a new project, association with the surrounding building fabric is more than simply one of copying forms, materials and organizations of neighboring buildings. There is a great lack of associative behavior in this locale and, as previously stated, needs of 1987 are very different from those of the original

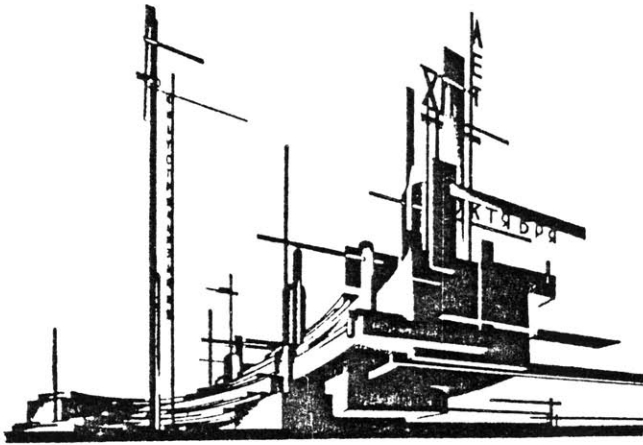
We have no quarrel with the past except in so far as it is used to compromise the future. The past can guide us but past techniques are of little avail. Present techniques and present means must be used to open as many doors to the future as possible.

-J Candilis

(*Team X Primer* p. 45)



Le Corbusier - Plan Voisin Paris 1



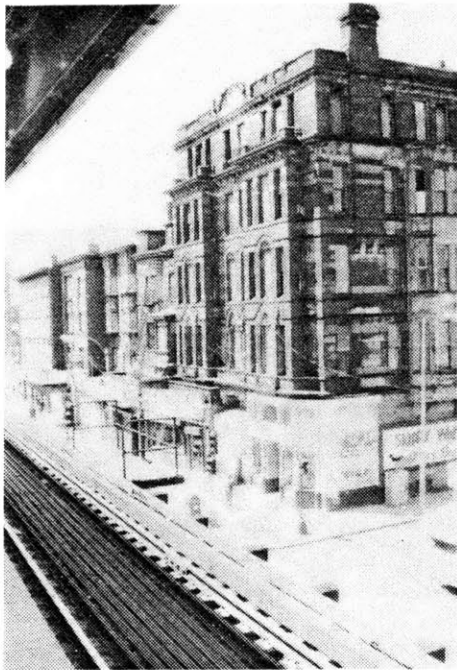
Iakov Chernikov: The industrialization
tribune, 1929.

2

*Homogenization of environment is not, as many
people feel, the inevitable result of mass
technology and communication*

-Fumihiko Maki

(Investigations in Collective Form p. 22)

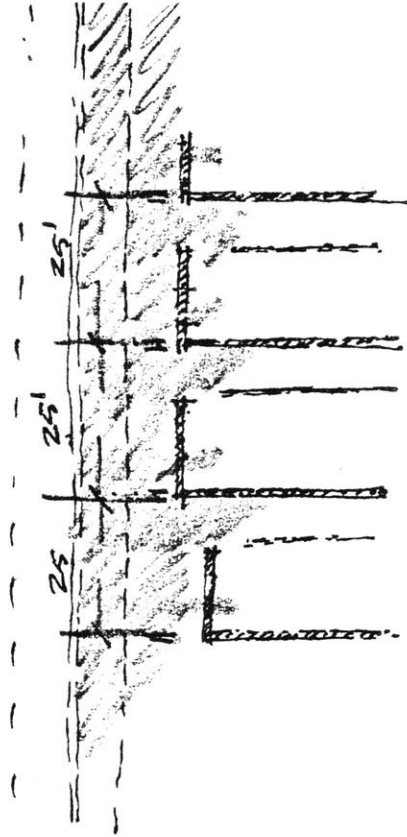


site buildings

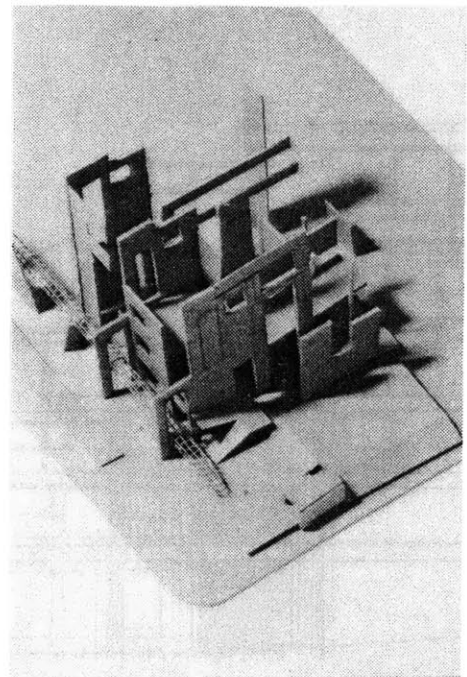
builders of the South End and Roxbury. Requirements of density, transportation, communication, and other factors have changed and the designer has a responsibility to work within a contemporary framework. New technologies must be employed which have much greater spatial potential and strength: ones that can provide more flexible interpretation of inhabitation and allow greater independence from the ground. These technologies should be fully exploited to allow greater multiplicity where previous systems could or did not. , Establishing and maintaining continuity and retaining of the character of the *area* is important, however, and deserves careful consideration.

In such an environment as the Northampton site, the new design proposal suggests a series of transformations, a *gradual* reinterpretation of formal behavior and therefore structural systems. Structural reinterpretation first involves understanding structural organizations of the 19th century buildings. Steps then are necessary to make *understood* the differences between past methods and new technologies. Transformations of *spatial* understanding inherent within such structural changes can be identified simultaneously.

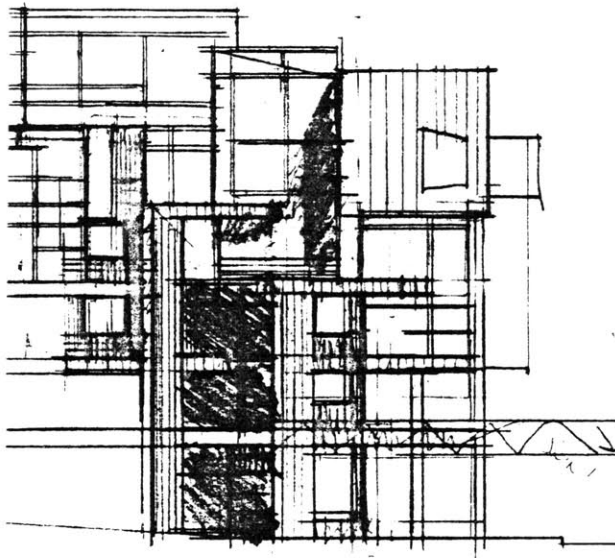
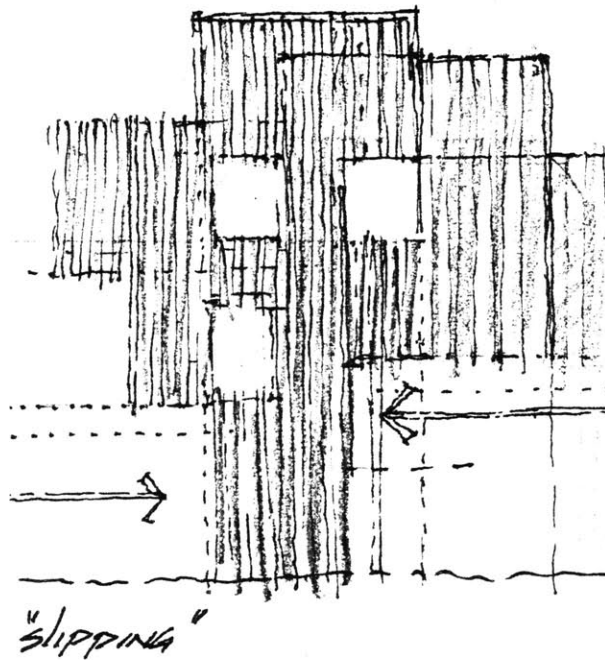
The overall recognizable forms of contextual buildings around Washington Street are perceived first as singular large and closed masses of masonry, dimensions of which range from 100 to 500+ feet. Only after consideration of the facade elements of these structures does the multiple partywall nature of the buildings become apparent. Making understandable the true divisional nature of these buildings involves a reorganization of facade elements to indicate or even exaggerate masonry subdivisions every 25 feet or so, while maintaining dimensional and registration relationships with surrounding buildings. Directions of the structural elements remain consistent with context at this point: vertical elements predominate and are closely associated with the ground as are surrounding predominantly 19th century partywall structures. Registration of facade elements against one edge accentuates structural divisions. Number and size of openings in the continuous building surfaces is increased and multiplied, and a freer use of infill systems allows greater light, reciprocity, and exchange between building cells and landscape.



emphasizing building subdivisions



1/16th" study model

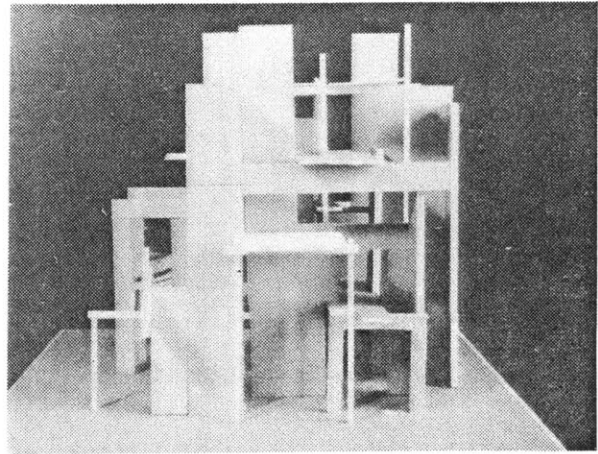


partial elevation study

Subsequent alterations of this understanding and utilization of a more versatile concrete structure system throughout the design allows greater options for freedom of interpretation . Weight of the buildings is transferred upwards, at first visually by allowing pavillion-like commercial/retail uses to *slip* in under weightier residential/office forms, and by cantilevering the concrete structure. Smaller (private and room) sizes of residential uses can lift, allowing *spatial* association beneath the building.

While these relationships are maintained, the inner partywall divisions begin to erode, allowing greater light, access, and spatial interpretation potential. Masonry might be an appropriate material at this point, for the structure is still groundbound and openings *punched* through portions of the partywalls are small. Such transformations have occurred in nearby buildings over time. With the advent of concrete technology, further removal of materials is possible. The rectangular wall form is chewed away to allow structural bearing *across* partywall demarcations. Thus reciprocity is built into the pieces themselves, permitting spatial relationships to develop between building forms. Such partial partywall forms are termed vanes.

These groundbound vanes tend to diminish, getting lighter toward the top, where a supplemental (but still considered primary) steel frame system is required to provide sufficient bearing surfaces for upper level structures. Offset from the concrete vanes, the steel columns optionally bear at ground level and reach to upper floors, or bear eccentrically on corbels cast in the concrete wall surfaces. Overall the building achieves a lightness as it reaches higher up from the street. Options regarding inhabitation of the space are greater. Territorial definition is accomplished via a tertiary wood system at this point. Leaving the concrete wall forms incomplete and using the non-territorial steel system allows for introduction of other structures, such as the Orange Line trusswork, for public access. This makes exchange between the systems possible.

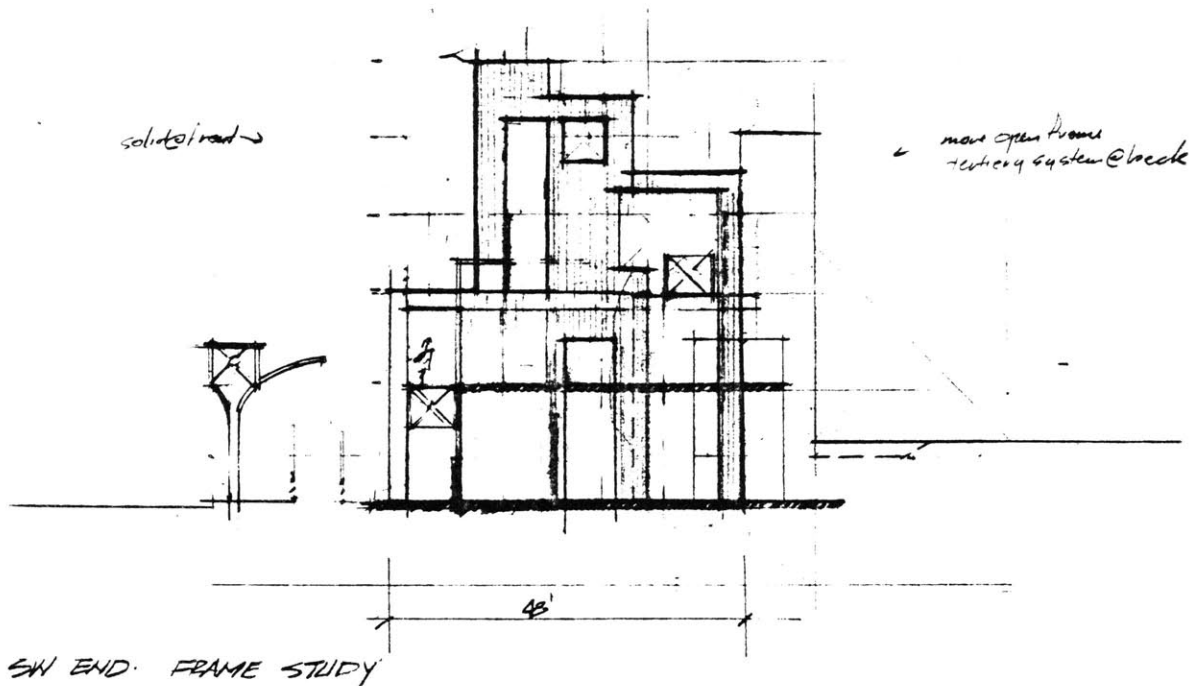


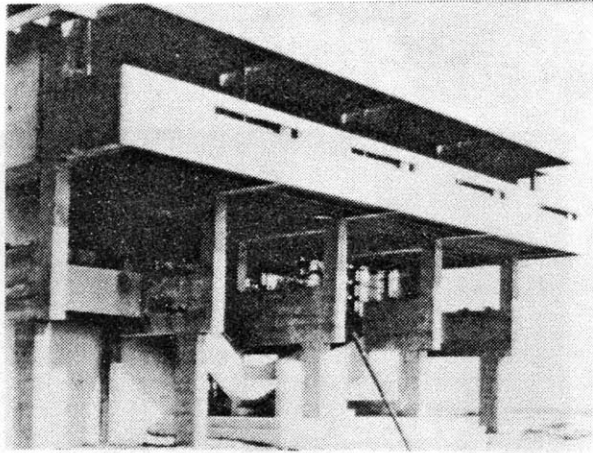
1/4" scale structural study model

Modern man for a long time believed that science and technology had freed him from a direct dependence on places

-Christian Norberg-Shulz

(Genius Loci p. 18)

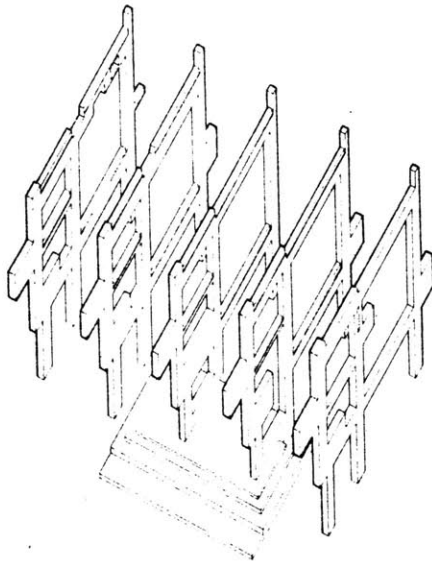




Rudolph Schindler - Lovell beach house

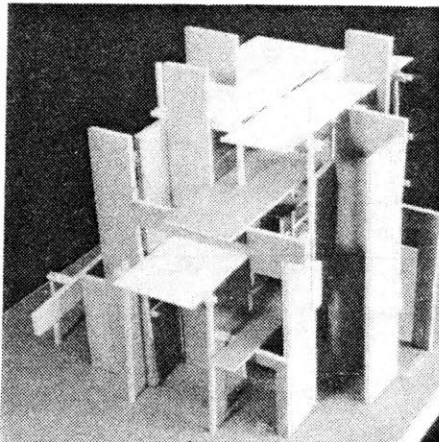
3

Reduction in the amount of materials in these concrete frames also reduces the spatial definition potential of the system. At this point the structure makes few decisions regarding room definition or ways of moving through and inhabiting the territories between structural frames. Direction is less clear. The elements of the concrete frames might be viewed as a series of beams held together in a stacked plane organization. No space is contained. Cantilevered concrete floor planes help define direction and dictate movement, but wall definitions and infill are left totally to secondary systems.

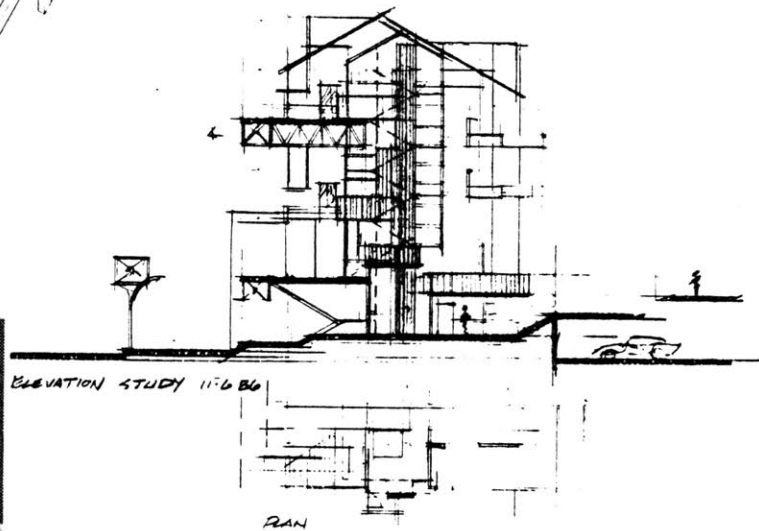


Lovell beach house - structure

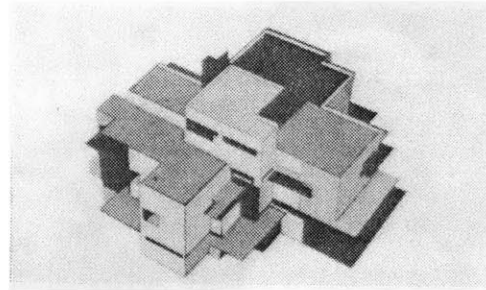
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1/4" scale structural study model

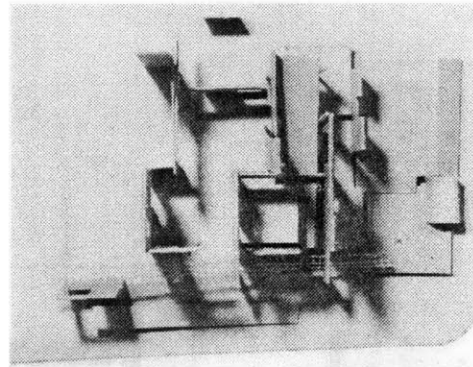


Consider concrete frames, whereupon as slabs of solid material are removed from the plane of the structure they are hinged or displaced instead, and either cantilever or bear on adjacent concrete frames. Such a move sets a precedent for building greater spatial definition at 90 degrees to the direction of the structure while retaining evidence of the element's original location. Flooring then has greater flexibility, for it no longer needs to span building sizes. Flooring direction may change 90 degrees as required. This hinging action occurs in upper floors, where added definition is required for more private uses. Such folded pieces are omitted in lower levels in order to allow flexibility for commercial uses. In addition to the folded panels, some groundbound concrete vanes are utilized in order to create core-like elements where stairs and mechanical services can be located. In upper floors, such vanes are U-shaped, to provide room-sized territorial definitions.

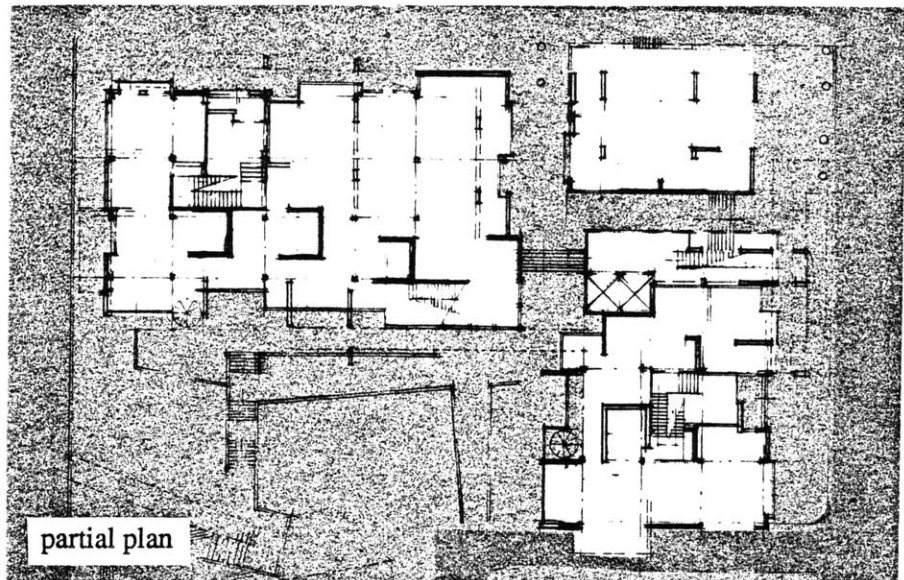


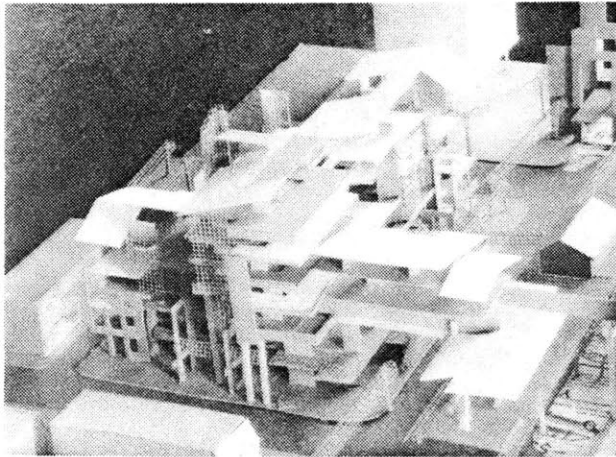
5

Theo Van Doesburg - architectural designs

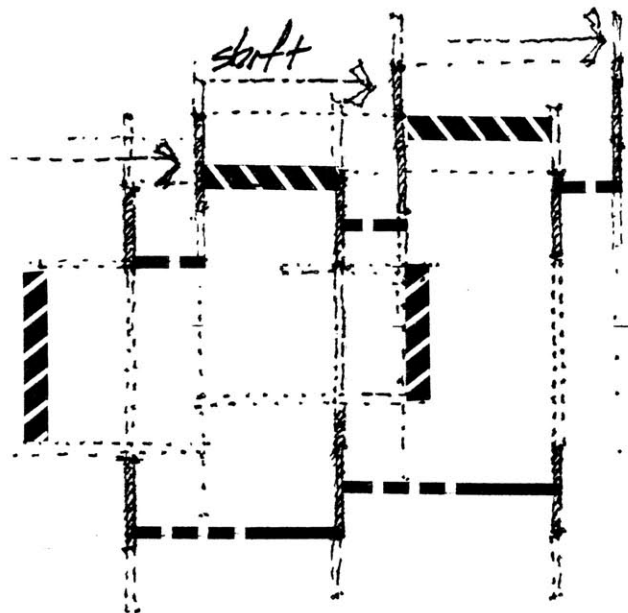


1/16th" study model





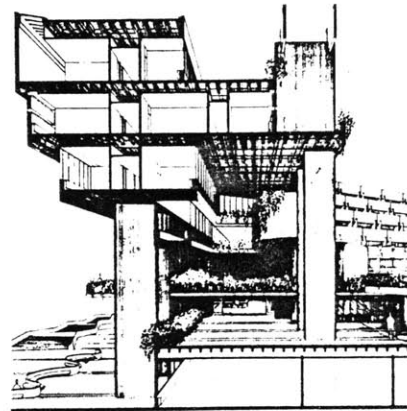
1/16th" schematic model- view south



At some intermediate point in this transformation from bearing wall structure to open structure, when attributes of both open and closed systems are evident, the elements may be displaced from the site out into the zone over Washington Street, setting up a dialogue of systems and forms. Such an intervention in the street is a reciprocal gesture and further serves to break up linearity and dominance of the Orange Line track structure.

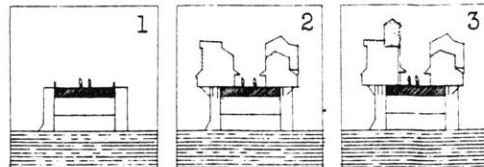
The now open, but still overall planar, structural forms established by this optional frame/planar system break and shift in a direction parallel to Washington Street, maintaining the dimensions of buildings sizes but offset from front of building to back of building. Such shifting identifies access and room sizes along with building sizes. Additionally, it facilitates creation of reciprocal territories and relationships by breaking the planar configuration of the structural pieces. Beam-like elements become more prominent, spanning across these lateral shifts. Structurally the building becomes less ground-tied. A more horizontal organization of light and access is possible.

Once the various elements of primary structure are transformed to run in directions other than normal to the street, and enough material has been removed to make elements frame-like instead of characteristic of a ground bearing wall, containment and definition also become minimal. Converse to the relationships of steel columns bearing on concrete corbels, primary structure of concrete wall and frame elements now has the potential to exist *above* the ground, supported by more spatial frame-like elements below. Sets of large concrete beams and columns create bands of *virtual* ground above actual terra firma, allowing light and space to slip under the building and simultaneously allowing structural elements to extend upwards. Location of structure becomes more critical now as there is no broad ground plane on which to bear. Lateral movement of structural elements is restricted, while weight of the elements and the amount of territorial definition is reduced. The upper structure is composed of less concrete and more steel. Horizontal readings dominate.

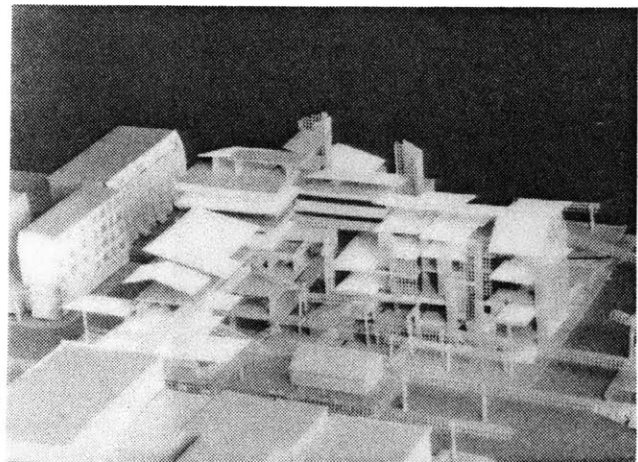


Paul Rudolph -

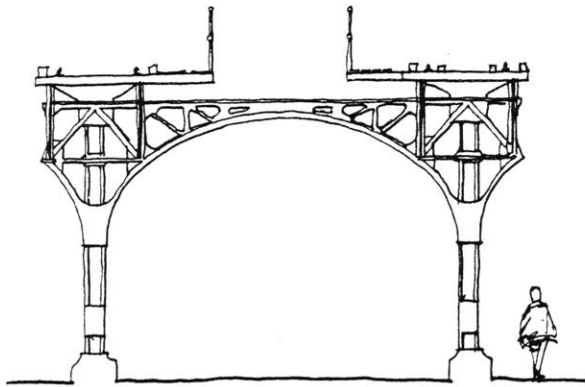
6 Boston Government Services Center



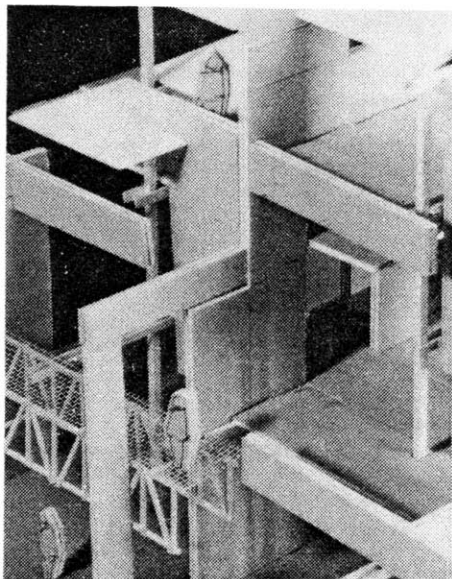
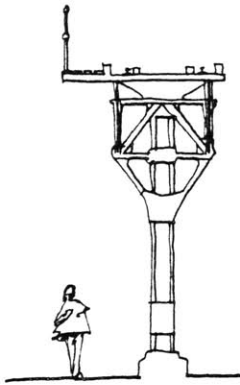
7 transformation diagram



1/16th" schematic model- view east



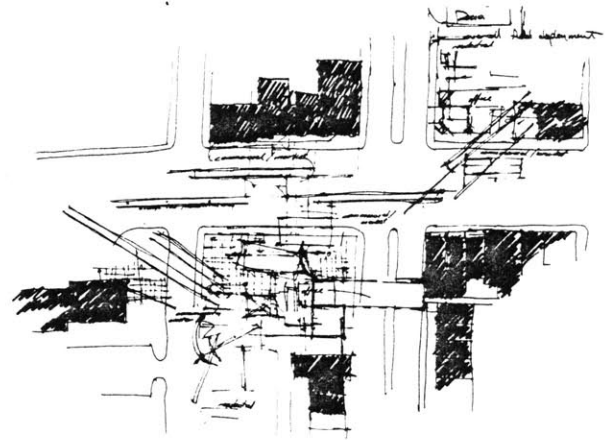
Orange Line structure



1/4" scale structural study model

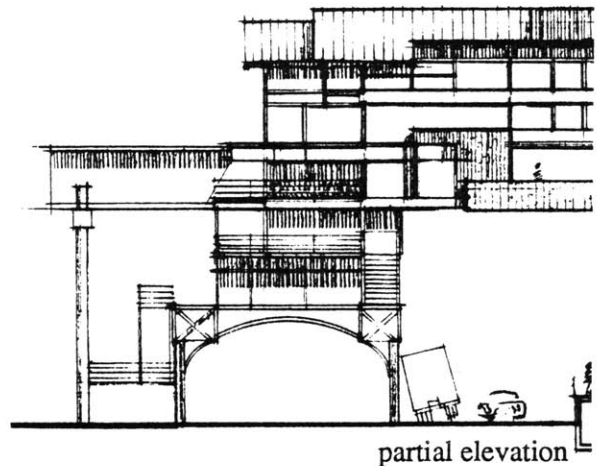
Transformation with respect to the Orange Line is treated somewhat less dramatically than with the primary concrete systems. This is because the Orange Line is a unique existing system, a series of "parts" dismantled from a zone in the center of Washington Street, which are subsequently redeployed throughout the site area. The extent to which the original structure may be dissected while retaining recognition of its origins is minimal. Longitudinal trusses are paired for each set of train tracks. Two sets of these tracks, connected by arch-shaped trusses, comprise a single section of structure as found at Northampton station. Individual sections are approximately 50 feet long between sets of columns and 30 to 40 feet wide. These 50-foot sections of double track structure are independently recognizable and may be displaced from their original linear position in the middle of Washington Street. Elsewhere on the Orange Line system, individually supported *single* units of track, rather than doubles, may be found. Single track pieces may be displaced from the center area of Washington Street, and original meaning will still be understood. Such displacements of the open trusswork sever the strict linearity of the Orange Line, allowing engagement with the surroundings and establishment of reciprocal relationships between the street zone and the built areas adjacent it. In general, the direction of the trusses should remain close to that of the original system

(NE-SW). This is the only direction that the Orange Line originally defined. Once a broad area of directional strength is established, some truss elements may "escape", angling away from Washington Street. In this way the track structure acts as an extensive network of pedestrian walkways linking activities of surrounding sites with Washington Street.

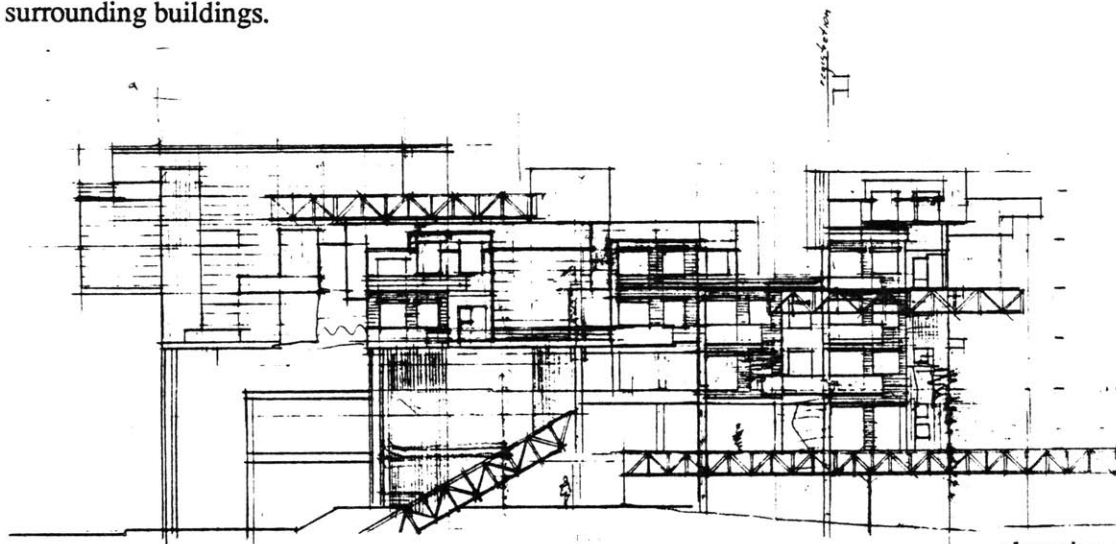


early site plan

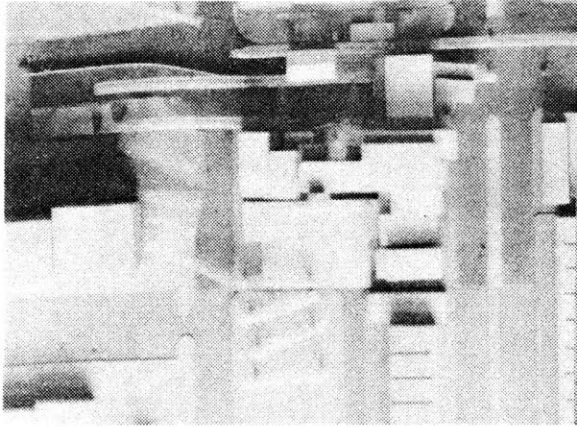
The Orange Line has strong associations with public access. Combined with elements of the concrete system, its trusses are used to designate access ways of *buildings*, with the trusses bearing on the concrete systems instead of on columns. Simultaneously, as the concrete system moves out into the street zone, the Orange Line structure retains its position over Washington Street and becomes a partial support structure for large building forms above. Linear continuity of the original track zone is further broken to generate access and territories which exchange with surrounding buildings.



partial elevation

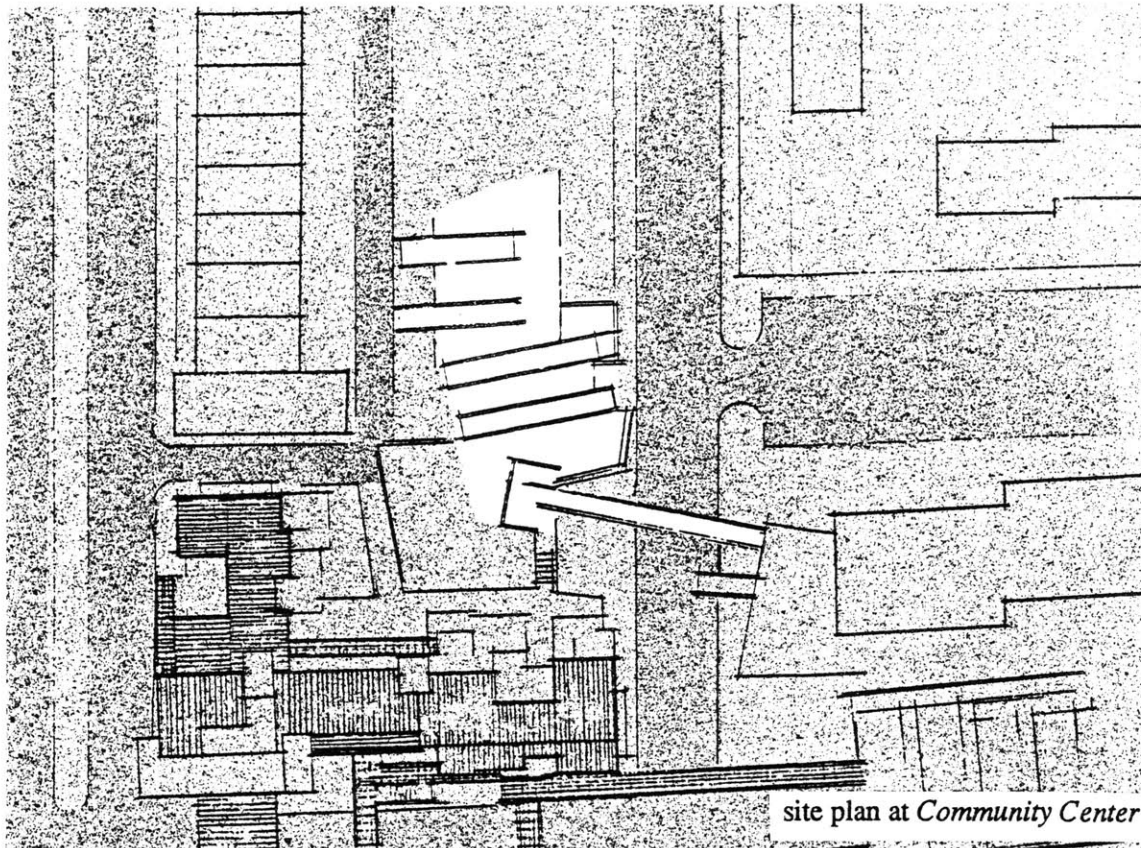


elevation study



1" = 40' scale mass model

The action of displacing single 50 foot (\pm) sections of truss allows the Orange Line to be transformed from an access/transportation system with one set of directional characteristics to organization as a *building*, in a direction normal to Washington Street. The *general* form of the *community center* is achieved by deploying multiple sections of Orange Line structure to reinforce the direction of Northampton Street. Because it has no solid (opaque) components, the Orange Line structure has little spatial defining potential. Such definitions must be the responsibility of other systems used in combination with redeployed truss elements.



Conclusion

This design projection is intended to act as a bridge:

1. Between rigid, grid-like planning organizations and more additive generations of buildings developed using principles of association and consequently
2. Between 19th (and 20th) century building technologies, which restrict structural bearing and public movement to ground levels only and more flexible techniques which add the potential for building and moving above the ground.

Use of associative attributes permits the greater flexibility and expression desperately needed in cities today. In this design, once building structure is potentially free of the ground, reciprocal extension of building territories into the zone of the street, with displacement of street zone elements (Orange Line) into the building areas, constitutes the first steps in building according to *spatial* requirements. In opposition to limits imposed by street rights of way and property lines drawn on parcel maps, requirements of space and light become the primary factors determining architectural design.

If this design proposal may be viewed as an initial, somewhat timid step in such a transformation of understanding, what are the next steps and how far can this process go? Clearly there are points where conflict arises between freer organizations based upon principles of dimension, direction, and exchange, and existing groundbound, building structures. This design has generally taken the approach of leaving the existing fabric alone and building *near* it. Such a method preserves the autonomy of existing structures without attacking them. Given the potential of 20th century construction techniques, this has far greater potential than displayed in this design. *All* spaces of appropriate size are potentially buildable. This includes areas between existing buildings as well as over and around them. The degree of freedom allowable in building wherever *space* allows can severely compromise the environment near existing buildings as well as building meanings, particularly at ground levels.

The impact of such small associative interventions must also be questioned when dealing with vast areas of urban grid. While this thesis argues that building associatively produces a richer environment one which offers multiple options of interpretation, the methods and degrees to which such an organization may be superimposed or interwoven with an existent fabric remains debatable.

Endnotes

Introduction

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- ²Norberg-Shultz, Christian. Genius Loci: Towards a Phenomenology of Architecture. (New York: Rizzoli International Publications, Inc., 1980).
- ³for more information about linkage of collective built, see Maki, Fumihiko. Investigations in Collective Form. (St. Louis: Washington University School of Architecture, 1964).
- ⁴Norberg-Shultz, Christian. Genius Loci, p. 5.
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Site History/Geography

- ¹Whitehill, Walter M. Boston: A Topographical History.
- ²J. G. Hales map of Boston, in Whitehill, Walter M. Boston: A Topographical History, p. 123
- ³Boston Redevelopment Authority, "Filled Areas of Boston" map.
- ⁴Whitehill, Walter M. Boston: A Topographical History, p. 241
- ⁵Clark, Bradley; The Boston Transit Album. (Cambridge, Mass.: The Boston Street Railway Association, 1977), p. 18.

Visual References

Introduction

- ¹Sorano, Italy in, Norman F., Italian Hilltowns (Kalamazoo, Michigan: Documan Press Ltd., 1980), p 62.
- ²Diagram of Sorano, Italy. Ibid. p. 63.
- ³Diagram of Vitorciano, Italy. Ibid. p. 70.
- ⁴Vitorciano, Italy. Ibid. p. 71.
- ⁵Cistemino, Italy Piazza Vitorio Emmanuel in Futagawa, Yukio (ed.), Villages and Towns #5: Italy II (Tokyo: A.D.A. Edita, 1974) p. 67.
- ⁶Diagram of Piazza Vitorio Emmanuel. Ibid.
- ⁷United States Geological Survey, South Boston Quadrangle map.
- ⁸Drawing by Anna DeCarlo, Space and Society #6, p 73.
- ⁹Piet Mondrian Composition #6 in Tomassoni, Italo, Mondrian (London: Hamlyn Publishing Group, 1970) p. 33.

Site History

- ¹Boston Transit Map, Arrow Publishing Co.
- ²1775 Map of Boston in Boston Society of Architects. Architecture Boston. (Barre, Massachusetts: Barre Publishing Co., 1976), p. iv.
- ³J.G. Hales map of Boston Neck in Whitehill, Walter M. Boston: A Topographical History. (Cambridge: Belknap Press of Harvard University, 1968), p. 123.
- ⁴Filled Areas of Boston map from Boston Redevelopment Authority, Boston City Hall.
- ⁵United States Geological Survey, South Boston Quadrangle map.
- ⁶1901 Photo of Northampton stop in Clark, Bradley; The Boston Transit Album. (Cambridge, Mass.: The Boston Street Railway Association, 1977) p. 18.

Use

- ¹Lucien Kroll Ecumenical Center, Catholic University at Louvain, Belgium in A+U, October 1979, p.23.

Dimension

- ¹Procida in Futagawa, Yukio (ed.), Villages and Towns #3: Mediterranean Sea. (Tokyo: A.D.A. Edita, 1975) Cover of publication.
- ²Typical Rowhouse plans in Bainbridge Bunting, Bainbridge. Houses of Boston's Back Bay: An Architectural History 1840-1917. (Cambridge: Belknap Press of Harvard University, 1967) p.131.
- ³Section of Backbay Rowhouse. Ibid. p. 274.
- ⁴Original Orange Line elevation from Massachusetts Bay Transit Authority.

Direction

- ¹Kasimir Malevich painting in Karshan, Donald. Malevich: the Graphic Work: 1913-1930 (Jerusalem: The Israel Museum, 1975) p. 169.
- ²Sidewalk in Berlin in Norberg-Shultz, Christian. Genius Loci: Towards a Phenomenology of Architecture. (New York: Rizzoli International Publications, Inc., 1980) p.22.
- ³Street in Tursi, Italy in Carver, Italian Hilltowns. p. 66.
- ⁴Piet Mondrian Church Facade in Tomassoni, Mondrian. p. 32.
- ⁵United States Geological Survey, South Boston Quadrangle map.

Registration

- ¹Path in Japanese garden in Carver, Norman F. Form and Space of Japanese Architecture. (Tokyo: Shokokusha Publishing Co., 1955) p. 155.
- ²Formal behavior diagrams of Maurice K. Smith.
- ³Typical rowhouse plans in Bunting, Houses of Back Bay Boston. p. 131.

Reciprocity

- ¹Japanese post in Carver, Norman F. Form and Space of Japanese Architecture. p. 63.
- ²Vitorciano, Italy. Idem. Italian Hilltowns. p. 73.
- ³McCormick house plan in Wright, Frank Lloyd. Drawings and Plans of Frank Lloyd Wright: The Early Period (1893-1909). (New York: Dover Publications, Inc., 1983).
- ⁴Smith, Maurice. "Non Writing on Built Form: (especially in educational non-buildings)", Harvard Educational Review, Vol. 39 No. 4, 1969.

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- ¹Japanese garden pool in Carver, Norman F. Form and Space of Japanese Architecture. p. 162.

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- ¹Le Corbusier Plan Voisin, Paris. in Rowe, Colin and Koetter, Fred. Collage City. (Cambridge: The MIT Press, 1978) p. 30.
- ²Iakov Chernikov: The industrialization tribune in Space and Society #8. p. 81.
- ³Lovell beach house in McCoy, Esther. Five California Architects. (New York: Frederick A. Praeger Publishers, 1975) p. 164.
- ⁴Lovell beach house structural diagram in Oppositions 18, Fall 1979. p.65.
- ⁵Theo Van Doesburg architectural designs in Brown, Theodore M. The Work of G. Rietveld Architect. (The Netherlands: A.W. Bruna and Zoon, 1958) p. 67.
- ⁶Paul Rudolph, section through Boston Government Service Center in Paul Rudolph, Paul Rudolph: Bauten and Projekte. (Stuttgart, Germany: Verlag Gerd Hatje, 1970) p. 99.
- ⁷Bridge transformation diagram in Perez de Arce, Rodrigo. Urban Transformations. (London: The Architectural Association, 1980) p. 16.

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