LIVING DOWNTOWN IN WASHINGTON D.C.:
Defining Residential Community in the City Center

by
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Submitted to the Department of Architecture
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In Washington D.C., as in many other American cities, a significant section of the downtown is distinguished by boarded-up buildings and vacant lots. In spite of traces of a city plan that could organize and accommodate a variety of activities in the central core, downtown Washington is under used. The eastern section of the downtown, where the majority of decrepit buildings and vacant lots are located, is inhabited primarily by office-workers on weekdays and a small number of tourists on weekends. After working hours the area is virtually devoid of people. Currently there is very little housing downtown. Recently, however, three large mixed-use residential buildings have been constructed in the eastern portion of the downtown. These projects were developed by the Pennsylvania Avenue Development Corporation (PADC) as part of a comprehensive plan for the economic and physical revitalization of Pennsylvania Avenue and its environs. The popular success of these buildings shows that people in Washington are interested in living downtown. It is the premise of this thesis that introducing residential use to the downtown would improve the liveliness of the area which I believe is important for the future vitality of the city.

But how should residential use be introduced to this area where large block-sized office buildings and federal institutions have transformed the previous pattern of blocks made up of smaller buildings and cut by alleys to admit light and access? The sizes and orientation appropriate for residential use are different from those suitable for commercial and institutional use. A problem with the PADC's approach to developing a residential presence downtown is that the blocks and building masses are treated in much the same way for residences as they are for commercial and institutional buildings. To include residential use in the commercial, monumental sector of the city requires a street and block pattern that can be adapted to accommodate large and small buildings. This pattern can be deployed to establish a finer-grained network of residential use within the structure of the commercial, monumental city. The result of this pattern would be an identifiable residential area supporting the physical and social needs of the residents.

Abstract
Living Downtown in Washington D.C.:
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by Robin P. Allen
Submitted to the Department of Architecture on May 12, 1995 in partial fulfillment of the requirements for the Degree of Master of Architecture

Thesis Supervisor: Andrew Scott
Associate Professor of Architecture
In this thesis project I have analyzed block and building types to understand the sizes of urban residential use. I have also considered the qualities of urban residential use by addressing issues of public and private access, solar exposure, ventilation, privacy, community identity, security and parking. I used this information, along with an analysis of the site to generate a strategy for the design of residential blocks and buildings in a 20-block area of downtown Washington D.C. To test this strategy in response to specific site conditions and to develop the architecture of a residential building, considering also the potential for mixed-use, I have focused on the design of a building on a particular block in the site. The building design produced specific information which I used to reevaluate and refine the general site strategies. The strategies I have developed and tested in this thesis provide a basis for addressing the problem of introducing residences in the city center.

The Project

figure 1. (cover) view of the model from the northeast

figure 2. early sketch of the block from the southeast

figure 3. (overleaf) aerial view of downtown Washington, Pennsylvania Avenue, the Capitol and the Mall
Much of the eastern portion of downtown Washington, D.C. is given over to vacant lots and abandoned buildings. There is also a haphazard collection of contemporary office buildings and buildings housing federal institutions. Of the buildings which are in use, most of them are active only during the hours of the working week. On the weekends and at night the downtown is fairly devoid of people. The place does not sponsor many different types of activities and therefore people have few reasons to be there. In other parts of the city, like Dupont Circle, Adams Morgan and Georgetown, where there is a mix of commercial, tourist and residential activity the streets are alive with people at most times of the day and week. It is natural and even desirable for parts of the city to be quiet at certain times of the day and week, but to have so much of the downtown empty of people and to have vacant lots and boarded-up buildings is a waste of urban resources. Developing residences downtown is a way to increase the types of activities occurring there and, in doing that, improve the physical and social experience of being downtown.

The introduction of residential buildings downtown must respond to both the site location in a very public but under-used section of the city and the residents' needs for privacy, security and community identity. Because there is such a haphazard mixture of vacant lots, large and small buildings the organization of use in the eastern portion of the downtown is unclear. Filling in vacant lots and replacing abandoned buildings with residential buildings provides an opportunity to intensify the physical fabric of the downtown and clarify the reading of the different activities occurring there.
Although they have specific needs for privacy and security, the residential buildings should not create enclaves of self-contained living but rather connect with existing patterns of use and access. If the residential buildings are organized by a pattern of smaller streets and blocks within the street grid defined by commercial and institutional buildings then the aggregation of residential buildings can define a residential presence in the area without separating from it. Building within the existing pattern of streets and blocks also allows the flexibility to change sizes and use over time in a parcel by parcel operation.

A physical reading of the residential use is important to understand the organization of the urban fabric; it is critical to provide a quality of place for the residents. Because there is no established pattern of a residential living in the downtown, new relationships between the private life of the dwelling and public life of city center must be established in the form and orientation of the new buildings. The building of residences downtown must create an environment to support the private life of those who live there. The dwelling units themselves will accommodate this need for privacy, but the space outside the residences should also build a semi-private, residential sphere within the downtown. Residents need an outdoor residential space to move from the private realm of their dwelling to the public realm of the commercial, monumental city. The definition of a residential neighborhood, however loosely integrated with the public sector of the downtown, provides residents with a feeling of belonging or being at home in that place.
The Pennsylvania Avenue Development Corporation (PADC) is a government corporation created by Congress in 1972 to address the problem of the physical and economic deterioration of Pennsylvania Avenue and its environs. The goal of the PADC plan is to “provide for the development of Pennsylvania Avenue as a vital part of downtown Washington, as the symbolic and ceremonial way between the Capitol and the White House and as a link between the governmental city and the private city.”¹ The PADC has development control of twenty-two acres along Pennsylvania Avenue, an endowment appropriated by Congress, the ability to make loans backed by the U.S. government and the power of eminent domain.

One feature of the PADC plan is the creation of a new neighborhood in the eastern portion of the redevelopment site. Three mixed-use residential buildings have been completed thus far: Market Square, The Pennsylvania and The Lansburgh. These buildings contain a total of 750 units. Five more sites have been designated by the PADC for residential-use buildings to provide a total of 1,450 dwelling units downtown.

In spite of the numbers of residents the PACD will bring to the downtown through its building program, these residential buildings have not been designed in a way that builds a residential community. The building forms are driven by height restrictions and set-back codes rather than by an understanding of the sizes and orientation appropriate to residential use or a vision for how the residential buildings collectively could impact the quality of residential life in the area. The residential buildings developed by the PADC are not easily distinguished from the commercial and monumental buildings in the area.

¹PADC, The Pennsylvania Avenue Plan, 1974, p. 3

figure 6. perspective view of the PADC's proposed residential neighborhood

figure 7. PADC site. 1. Market Square, 2. The Lansburgh, 3. the Pennsylvania Avenue Development Corporation
figure 8. Market Square with the Lansburgh in the background

figure 9. The Pennsylvania with the National Gallery of Art in the background.
Market Square, designed by Hartman-Cox, is located on Pennsylvania Avenue across from the National Archives. 210 residential units occupy the top four floors of the twin buildings. There are eight floors of commercial office space and ground-floor shops and restaurants below. Because of its prominent position on Pennsylvania Avenue the expression of residential use in this building must be secondary to the expression of civic use (the U.S. Navy Memorial is located in the central plaza). Nevertheless, the dimensions of the residential portion of the building suggest that there must be a great amount of dark space in the center of the building. Unless they occupy a corner position, residential units probably have only one wall of exposure to the outside. (I was unable to get unit plans for this building.)

The Pennsylvania, another building by Hartman-Cox, is located just off Pennsylvania Avenue on Indiana Avenue. 150 residential units occupy the brick portion of the building, commercial office space is located in the limestone portion. In this project there is an attempt to provide window bays and balconies that suggest a scale appropriate to residential use, but this block-sized building provides barely adequate access to light and air. The unit plans show a 9'-6" x 11' "sitting room" with no windows and "dining rooms" or "dens" in awkward circulation spaces between the living and sleeping areas of the units.
Of the three projects described, the Lansburgh, designed by Graham Gund, is most recognizable as a residential building. This building is located one block north of Pennsylvania Avenue and contains 387 apartment units. The apartment units in this 12-story building are well designed, but other spaces in the building do not provide a high quality of residential amenity. Particularities of solar orientation and location of units at the ground, in the middle or at the top of the building are not accommodated in a particular way. The residential portion of the Lansburgh is made up of three internally-linked buildings---two existing buildings were gutted to be incorporated into one with the new construction. There was no attempt to break down the size of the complex into discrete and recognizable parts which could give residents a feeling of belonging in a particular place in the building.

For such a large building there are only two points of entry and two cores of vertical circulation. As a consequence, all the apartment units are accessed by a continuous double-loaded corridor that has no natural light. Apartment units (except for a few upper-level units on the corners) only face the outside in one direction, towards the street or towards the courtyard. The courtyard which could be a place of common use is a visual amenity only to those in apartments that face onto it. Because the courtyard is not part of the movement into or out of the building, residents must make a special trip to go there. Use of the courtyard is ambiguous; it is too enclosed to be public and too exposed to be private.
Criteria for Residential Buildings

In response to some of the problems I have identified in the three residential buildings developed by the PADC, I have listed the following criteria as a basis for developing an alternative approach to the design of residential buildings downtown. The residential buildings should include:

- outdoor space that is part of the community life of the building or block
- visible building entries that are recognizable as residential
- multiple, semi-private unit entries and vertical circulation cores
- natural light and cross-ventilation for public corridors
- design recognition of particular location of units in the building
- through-building dwelling units (exterior openings on opposite walls)
- exposure to direct sunlight at some part of the day
- shading to reduce unwanted solar gain
- private outdoor balconies or terraces

With these criteria in mind I selected a variety of residential buildings and analyzed them to develop an understanding of the sizes and relationships appropriate for residential use. The results of this analysis are presented in the following tables. To match the urban condition which I would be designing for, the buildings I looked at were part of an urban fabric in which buildings form a street wall and enclose a courtyard or service space (except for the Aalto building which is free-standing in the center of a lot). Buildings ranged in height from 3 to 9 floors, most of the buildings were 6 or 7 floors high. Most of the buildings had at least 4 units per floor (the greatest number of units per floor was 20). The size of buildings ranged from a single-family row house to a 131-unit workers' housing project. I have also included numbers on the three PADC buildings and my own design, for comparison.
Precedents:

- figure 16. Foundation Lebaudy
- figure 17. Otto Steidle
- figure 18. Foundation Rothschild
- figure 19. Alvar Aalto
- figure 20. Herman Hertzburger
- figure 21. Kammerer, Belz + Partner
- figure 22. Plannungskollektivs Nr. 1
- figure 23. Mayer, Glass and Wittlesey
- figure 24. August Perret
- figure 25. Victor Horta
## Building Analysis

<table>
<thead>
<tr>
<th>Building</th>
<th>Lot Size</th>
<th>Open Space</th>
<th>Floor Size</th>
<th>No. of Floors</th>
<th>Building Depth</th>
<th>Units</th>
<th>V. Circ.</th>
<th>V. Circ.</th>
</tr>
</thead>
<tbody>
<tr>
<td>F. Lebaudy</td>
<td>230' x 176'</td>
<td>120' x 86'</td>
<td>28,560 sf</td>
<td>2.4</td>
<td>4.8 (FAR)</td>
<td>7</td>
<td>33'-40'</td>
<td>131</td>
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<tr>
<td>Otto Stelie</td>
<td>336' x 68'</td>
<td>300' x 42'</td>
<td>10,248 sf</td>
<td>9.8</td>
<td>2.7 (FAR)</td>
<td>6</td>
<td>31'-43'</td>
<td>84</td>
</tr>
<tr>
<td>F. Rothschild</td>
<td>193' x 83'</td>
<td>2@ 24' x 34'</td>
<td>10,600 sf</td>
<td>1.3</td>
<td>3.4 (FAR)</td>
<td>6</td>
<td>26'-34'</td>
<td>102</td>
</tr>
<tr>
<td>Aalto</td>
<td>193' x 82'</td>
<td>66' x 40'</td>
<td>12,790 sf</td>
<td>4.2</td>
<td>6.6 (FAR)</td>
<td>8</td>
<td>34'-52'</td>
<td>80</td>
</tr>
<tr>
<td>H. Hertzberger</td>
<td>183' x 108'</td>
<td>84' x 48'</td>
<td>10,248 sf</td>
<td>4.3</td>
<td>8.0 (FAR)</td>
<td>4</td>
<td>37'-52'</td>
<td>50</td>
</tr>
<tr>
<td>Kammerer,</td>
<td>124' x 96'</td>
<td>80' x 52'</td>
<td>7,740 sf</td>
<td>1.9</td>
<td>3.8 (FAR)</td>
<td>6</td>
<td>22'</td>
<td>30</td>
</tr>
<tr>
<td>Planungs-</td>
<td>193' x 83'</td>
<td>2@ 50' x 42'</td>
<td>7,337 sf</td>
<td>1.8</td>
<td>3.8 (FAR)</td>
<td>6</td>
<td>33'</td>
<td>24</td>
</tr>
<tr>
<td>Mayer, Glass</td>
<td>62' x 58'</td>
<td>-</td>
<td>33,292 sf</td>
<td>-</td>
<td>7 (FAR)</td>
<td>7</td>
<td>82'</td>
<td>12</td>
</tr>
<tr>
<td>August Perret</td>
<td>64' x 56'</td>
<td>-</td>
<td>32,056 sf</td>
<td>-</td>
<td>9 (FAR)</td>
<td>9</td>
<td>58'</td>
<td>9</td>
</tr>
<tr>
<td>Victor Horta</td>
<td>63' x 24'</td>
<td>-</td>
<td>4,536 sf</td>
<td>-</td>
<td>3 (FAR)</td>
<td>3</td>
<td>63'</td>
<td>1</td>
</tr>
<tr>
<td>Belz + Partner</td>
<td>139' x 83'</td>
<td>2@ 50' x 42'</td>
<td>13,537 sf</td>
<td>4,400 sf</td>
<td>11,900 sf</td>
<td>11,537 sf</td>
<td>4,200 sf</td>
<td>14,904 sf</td>
</tr>
<tr>
<td>Mayer, Glass</td>
<td>62' x 58'</td>
<td>-</td>
<td>33,292 sf</td>
<td>-</td>
<td>7 (FAR)</td>
<td>7</td>
<td>82'</td>
<td>12</td>
</tr>
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<td>-</td>
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<td>-</td>
<td>7 (FAR)</td>
<td>7</td>
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</tr>
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<td>Mayer, Glass</td>
<td>62' x 58'</td>
<td>-</td>
<td>33,292 sf</td>
<td>-</td>
<td>7 (FAR)</td>
<td>7</td>
<td>82'</td>
<td>12</td>
</tr>
</tbody>
</table>
In the building analysis I studied lot sizes and sizes of open space to calculate the ratios of building footprint to open space and total building square footage to lot size. These numbers varied so much that they were not very meaningful. More interesting were the numbers for building depth, the number of entries and vertical circulation cores and the number of dwelling units accessed by each entry or circulation core. Courtyard buildings that had units with two-sided exposure tended to be between 22 and 40 feet deep. Depending on the size of the building, there were between 1 and 10 vertical circulation cores which accessed between 2 and 5 units per floor. The PADC buildings are much deeper, Market Square and the Pennsylvania are 165 feet and 135 feet deep, respectively. The vertical circulation cores in the PADC buildings access all the units on each floor which means that corridors are continuous and no units have exterior openings on opposite walls.
### Unit Analysis

<table>
<thead>
<tr>
<th>Building</th>
<th>Unit Size</th>
<th>Living Room</th>
<th>Kitchen</th>
<th>Dining Room</th>
<th>Bedrooms</th>
<th>Balcony</th>
<th>Deepest rm</th>
<th>Distance to Another Bldg</th>
</tr>
</thead>
<tbody>
<tr>
<td>F. Labaudy Paris</td>
<td>35' x 30'</td>
<td>17' x 10'</td>
<td>16' x 12'</td>
<td>-</td>
<td>16' x 12'</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Otto Steidle Berlin 1929-1933</td>
<td>2 fl @ 43' x 13'</td>
<td>20' x 11'</td>
<td>9' x 6'</td>
<td>13' x 13'</td>
<td>2 @ 13' x 8'</td>
<td>9' x 5'</td>
<td>-</td>
<td>42' (81')</td>
</tr>
<tr>
<td>F. Rothschild Paris 1926</td>
<td>34' x 22'</td>
<td>14' x 8'</td>
<td>12' x 7'</td>
<td>-</td>
<td>2 @ 14' x 8'</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Alvar Aalto Berlin 1957</td>
<td>36' x 33'</td>
<td>18' x 16'</td>
<td>18' x 9'</td>
<td>9' x 9'</td>
<td>2 @ 13' x 9'</td>
<td>12' x 9'</td>
<td>-</td>
<td>66'</td>
</tr>
<tr>
<td>H. Hertzberger Berlin (IBA) 1987</td>
<td>37' x 24'</td>
<td>17' x 13'</td>
<td>11' x 7'</td>
<td>-</td>
<td>12' x 9'</td>
<td>12' x 6'</td>
<td>-</td>
<td>48' (84')</td>
</tr>
<tr>
<td>Kammerer, Belz + Partner Berlin (IBA) 1984</td>
<td>60' x 33'</td>
<td>20' x 14'</td>
<td>14' x 9'</td>
<td>14' x 12'</td>
<td>18' x 16'</td>
<td>20' x 9'</td>
<td>-</td>
<td>42' (84')</td>
</tr>
<tr>
<td>Planungs- kollektive N.1 Berlin (IBA) 1987</td>
<td>60' x 33'</td>
<td>20' x 16'</td>
<td>14' x 9'</td>
<td>14' x 12'</td>
<td>18' x 18'</td>
<td>20' x 5'</td>
<td>-</td>
<td>42'</td>
</tr>
<tr>
<td>Mayer, Glass and Wittlesey New York 1962</td>
<td>82' x 26'</td>
<td>36' x 15'</td>
<td>13' x 9'</td>
<td>14' x 9'</td>
<td>22' x 13'</td>
<td>9' x 9'</td>
<td>-</td>
<td>38'</td>
</tr>
<tr>
<td>August Perret Paris 1902</td>
<td>64' x 56'</td>
<td>18' x 16'</td>
<td>25' x 6'</td>
<td>+</td>
<td>2 @ 19' x 16'</td>
<td>27' x 14'</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>(one floor) Victor Horta Brussels 1893</td>
<td>63' x 24'</td>
<td>24' x 15'</td>
<td>24' x 15'</td>
<td>-</td>
<td>19' x 8'</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

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(Note: Diagrams and floor plans are not transcribed here.)
<table>
<thead>
<tr>
<th>Building</th>
<th>Unit Size</th>
<th>Living Room</th>
<th>Kitchen</th>
<th>Dining Room</th>
<th>Bedrooms</th>
<th>Balcony</th>
<th>Length of Distance to Deepest Room in Another Bldg</th>
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<tbody>
<tr>
<td>My Lot</td>
<td>42' x 22'</td>
<td>22' x 14'</td>
<td>14' x 14'</td>
<td>14' x 14'</td>
<td>14' x 14'</td>
<td>22' x 8'</td>
<td>16' 88'</td>
</tr>
<tr>
<td>Washington, D.C.</td>
<td>(1 1/2 fls)</td>
<td>1,587 sf</td>
<td>368 sf</td>
<td>196 sf</td>
<td>196 sf</td>
<td>388 sf</td>
<td>176 sf 16' 88'</td>
</tr>
<tr>
<td>The Lansburgh</td>
<td>33' x 30'</td>
<td>21' x 11'</td>
<td>12' x 9'</td>
<td>16.5' x 10'</td>
<td>7' x 4'</td>
<td>210 sf</td>
<td>20 sf 30' 70'</td>
</tr>
<tr>
<td>Graham Gund</td>
<td>Washington, D.C.</td>
<td>990 sf</td>
<td>231 sf</td>
<td>106 sf</td>
<td>-</td>
<td>310 sf</td>
<td>20 sf 30' 70'</td>
</tr>
<tr>
<td>1995</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Pennsylvania</td>
<td>33' x 31'</td>
<td>20' x 11'</td>
<td>8' x 8'</td>
<td>8' x 8'</td>
<td>20' x 11.5'</td>
<td>15' x 5'</td>
<td>20 sf 28'</td>
</tr>
<tr>
<td>Hartman Cox</td>
<td>Washington, D.C.</td>
<td>1,023 sf</td>
<td>220 sf</td>
<td>64 sf</td>
<td>64 sf</td>
<td>230 sf</td>
<td>75 sf 28'</td>
</tr>
<tr>
<td>1988</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In the unit analysis I compared at room and balcony sizes. Sizes of units in courtyard buildings ranged from 500 square feet (for a 4-room dwelling in a 19th-century workers’ housing project) to 1,980 square feet (for a 6-room dwelling in a Berlin IBA project). I compared lengths of the deepest rooms in courtyard-building units. This distance ranged from 14 to 27 feet. In the PADC buildings the deepest rooms are between 28 and 30 feet.
The site I have chosen to work in is located north of Pennsylvania Avenue between 9th and 5th Streets. This is the area downtown with the most vacant lots and empty buildings. There are also a number of low-story buildings and public parks. Located east of the well developed commercial sector, west of the federal and district court houses, north of the mall and national museums, the site is adjacent to but already slightly distinguishable from the most developed commercial and monumental portions of the city. The pattern of vacant lots, large and small buildings found in the site is characteristic of other areas in Washington, D.C. and in other cities, as well. In this way, the site serves as a prototype for the exploration of the design intentions laid out in the thesis.

Site Analysis

figure 26. Downtown Washington with site area marked by a dotted line. 1. commercial sector, 2. courthouses, 3. the mall.

figure 27. Blocks for Potential Residential Development. Blocks were chosen that are vacant or occupied by dilapidated buildings.
figure 28. Access Conditions: Busy Streets. Busy streets connect with other parts of the city through the site. These streets are: (from top to bottom) Massachusetts Avenue, H Street, E Street and Pennsylvania Avenue, (from left to right) 9th Street, 7th Street and 6th Street.
figure 29. Access Conditions: Quiet Streets. Quiet streets do not continue through the site but are interrupted by buildings, pedestrian streets or a highway. These streets are: (from top to bottom) Eye Street, G Street, F Street and D Street, (from left to right) 10th Street, 8th Street, an existing alley that I propose to enlarge to a street and 5th Street.
figure 30. Access Conditions: Service Streets and Courtyards. Service streets and courtyards cut blocks to provide access and light to the center of the block. The lines on the diagram mark the location of existing and potential service streets and courtyards.
Access Conditions: Composite Network. The composite network of streets represents all the potential access points through the site. Blocks with larger commercial or institutional buildings may have fewer, more public points of access, while blocks with residential buildings may have more, less public points of access.
figure 32. Area Amenities: Public Indoor Space. Public Indoor Spaces are free and open to the public. In and around my site these buildings are: 1. the Martin Luther King Public Library, 2. the National Portrait Gallery and National Museum of American Art (former Patent Office), 3. The National Building Museum (former Pension Office), 4. Ford's Theater, 5. the FBI main building, 6. the National Archives, 7. the Museum of Natural History and 8. the National Gallery of Art, West and East Wings.
Area Amenities: Public Outdoor Space. The public outdoor space in and around my site includes: 1. pedestrian streets, 2. plazas and 3. grass lawns.
figure 34. Area Amenities: Private Outdoor Space. Private outdoor space is proposed at the center of residential blocks.
Based on site observations I would organize new residential development on north-south streets and expect commercial activities to fill in on east-west streets.
figure 36. Dynamic Conditions: Weekday Use. During the weekdays activity is concentrated in the shaded areas of the diagram: 1. the commercial sector, 2. the Federal Triangle and 3. Chinatown. Movement is concentrated on the streets marked.
figure 37. Dynamic Conditions: Weekend Day-time Use. On weekends during the day activities are concentrated in the shaded areas of the diagram: 1. Chinatown, 2. the library, museums and pedestrian streets, 3. the FBI and National Archives and 4. the Mall. Movement is concentrated on the streets marked.
Dynamic Conditions: Weekend Night-time Use. On the Weekends at night, activity is concentrated along the shaded portions of F and E Streets where there are a number of nightclubs and restaurants. Movement is concentrated on the streets marked.
figure 39. Proposed zones of residential use. Residences located in the areas shown should contribute to an increase of activities occurring throughout the site at various times of the day and week.
As I first began to consider the potential for residential life in downtown Washington I had certain criteria in mind for the orientation and form of the residential buildings. To provide dwelling units with proper access to light and air I imagined fairly low-story buildings, courtyard gardens and dwelling units with windows on at least two sides of the building for cross ventilation. I also imagined that certain streets within the site would have a greater number of residential buildings than other streets; these streets might even be completely residential. Residential streets would be characterized by private or semi-private entrances to the residential buildings. A good number of residential entrances would activate the residential streets with the movement of residents to and from their homes. To accommodate the two objectives of cross ventilation and private or semi-private unit access I began my design investigation considering the “two-off” building type where entrances and circulation cores access two or three units per floor and units span the depth of the building.

Another intention that guided initial design decisions in the thesis project was that residential buildings should be identified as such. The recognition of a residential building depends on the correct use of sizes, access conditions and orientation appropriate to residential use. The aggregation of a number of recognizably residential buildings, along with the correct deployment of these buildings throughout the site, could create a residential environment that would be an asset to the life of downtown Washington.

The Design: Approaching the Problem

figure 40. The drawing of existing conditions shows the location of vacant lots and a large number of small, narrow buildings, many of which are boarded-up and unused. I selected these spaces as potential sites for new residential buildings. The letter M's (for metro) represent subway entrances.

Site Strategies: The Aggregation of Residential Elements

figure 41. Pattern of Residential Development. In this drawing I propose a way for new residential buildings to transform a portion of the downtown city fabric. The residential quality of this area is characterized by a network of private and semi-private courtyards. This drawing was developed through a process of analysis and design illustrated in the following drawings and model.
figure 42. First Illustrative Site Drawing. With information from the precedent and site analyses in mind, I began to consider the form and orientation for the residential buildings in various locations in the site. In this first illustrative drawing I investigated an access network linking the residential buildings throughout the site.
figure 43. Second Illustrative Site Drawing. In this drawing I considered solar access and green spaces for the residential buildings, as well as the location of ground level public and residential uses.
figure 44. (facing page) Street and Block Dimensions. In this diagram I have documented the sizes of streets and blocks and also the average building height per block. The shaded blocks are potential sites for residential buildings. On blocks where building conditions permitted, an existing alley was widened to make a new street that could be developed as primarily residential.

figure 45. (facing page) Site Model of Proposed Residential Massing. White buildings in this model are existing. The brown forms are a first pass at organizing the heights, widths, forms and locations of potential residential buildings. This model shows how block conditions vary at different locations in the site. Blocks at the bottom of the model, towards Pennsylvania Avenue are built with taller buildings and closer to larger systems of public access than blocks farther north (towards the top of the model). There are also fewer building sites closer to Pennsylvania Avenue.

figure 46. Site Analysis Diagram. This diagram records the information described in the preceding drawings and model. The dotted lines just inside the blocks mark a 45 foot width for residential buildings. Lines with triangular ends surrounding the blocks mark potential points of access into the block or building. Dashed circles mark areas of concentrated activity. M's stand for subway entrances. Lightly shaded buildings are open and free to the public. Darkly shaded buildings are the proposed form of residential buildings.
To test the assumptions I have made through an architectural proposition I choose a block in the site on which to design a mixed use commercial/residential building. Because I wanted to investigate the potential for residential use in proximity to commercial and tourist activity, I chose a block in the site surrounded by a national museum, a pedestrian street, commercial and federal office buildings, other blocks for potential residential development and a new “residential” street. There is also a subway entrance on the block. Because a building or buildings on this block must respond to all of the conditions of residential, commercial and tourist use present in the site, the information generated by a design for this site can be abstracted and applied to the design for other blocks in the site that may be affected by different combinations of site conditions.

An important component of the design for any block in the site is the courtyard. Providing a courtyard gives the buildings on the block access to natural light and ventilation as well as an outdoor green space. Additionally, the courtyard can perform as a buffer between the residential and commercial or monumental activities of a mixed-use block. In the case of the block I have designed for which includes residential and commercial use as well as a subway entrance, the courtyard is divided into a series of zones that provide for public movement through the block and into the buildings and a tree-filled garden that can be open to the public or enclosed by a gate and reserved for residential use. Whether or not the garden is open to the public, it serves as an amenity of green open space for the entire block.
figure 49. (facing page) Block sketch model showing two blocks on either side of the new "residential" street. The block to the left is the block for which I have developed a building design. That is the block with the more public courtyard between the commercial and residential sides of the building. The block to the right is more exclusively residential and I imagine that the courtyard in this block would be more private. Because this block is longer I have suggested that some building might occur in the center of the block containing community amenities such as day-care, workshops, laundry, etc.

figure 50. Final ground floor plan. This drawing shows the layout of the residential units to the right and bottom of the block, the private walled gardens, the raised courtyard and planting strip with stairs, the public passage through the block, the two square lobbies to access the upper floors of the building and the subway entrance.
Section East-West

Section North-South

1/16" = 1' - 0"
figure 51. (facing page) Sections through the block. In the east-west section the courtyard can be seen as a series of layers organizing the public and private activities on the block. The street on the left is the residential street. Private spaces in the dwelling units such as the bedrooms and studies are oriented to this street. The living spaces of the units are oriented to the courtyard. All the units have either a walled garden or balcony that is part of the courtyard space. If the raised courtyard space is too vulnerable as a freely-accessed space then access could be restricted by a visually penetrable wall and gates. The public can move freely through the courtyard between the raised garden and the commercial band of building, at ground level or along the balcony which access the second-level commercial space. In the north-south section the raised garden can be seen as a screen or buffer between the residential and commercial sides of the block.

figure 52. Model view from the south west showing the commercial street.

figure 53. Model view from the south east showing the residential street.
figure 54. Model view from the north west showing public access into the block at the subway entrance.

figure 55. Model view from the south west showing public access into the block.
figure 56. Model view from the north west showing close-up of public access into the block at the subway entrance.

figure 57. Model view from the south west showing close-up of public access into the block. The public path moves between the raised garden and the commercial building, under the second-level commercial balcony.
To achieve the residential qualities and the relationship between public and private use that I have described throughout the thesis, I have developed a design that is a combination of two building types: the row house and the street in the sky. The row house type makes up the bottom five floors of the building. This form is used for both the residential and commercial/retail portions of the building; the sizes are changed depending on the use. The row house type is well suited to residential use because units can span the depth of the building with exposure on the street and courtyard sides of the building. The row house type, can also be articulated to define the particular relationship of the ground, middle and upper regions of the building to the courtyard, the street, the trees and the sky.

The street in the sky type begins at the sixth floor. This portion of the building is publicly accessible via the elevator/stair lobbies located in the south west and north east corners of the block. The street in the sky portion of the building is made up of flexible loft space that could accommodate a number of uses. The structural system defines a bay size which could be added up to create any sized space, as small as 22' x 24' and as large as the entire four floors of the top of the building. The loft spaces have mezzanine levels which could be used as private living/sleeping spaces.

Building Strategies: The Hybrid Row House/Street in the Sky Building Type

figure 58. Ground floor plan showing the row house form and the two-off semi-private entrances between row houses. Ground floor units are accessed directly off the street and have private stoops. The middle units, entered from the third and fifth floors, are accessed by the semi-private circulation points between two units. This semi-private entrance can be accessed from the courtyard as well as the street. The square lobbies, one in the upper right hand corner of the block, the other in the lower left hand corner, access the public sixth floor street in the sky.

figure 59. Sixth floor plan showing the street in the sky and the flexible loft spaces.
figure 60. Overall view of the model from the north east showing the organization of the row house type below and street in the sky above.

figure 61. Overall view of the model from the south east showing the organization of the row house type below and street in the sky above.
figure 62. Overall view of the model from the south west showing the organization of the row house type below and street in the sky above.

figure 63. Overall view of the model from the north west showing the organization of the row house type below and street in the sky above.
figure 64. Model view of the courtyard from the north west showing the street in the sky level of the building and the upper level of the row house residential units.

figure 65. Model view of the courtyard from the north west showing the street in the sky level of the building, the bridge connection from the eastern portion of the building to the western portion and the upper level of the row house residential units.
figure 66. Model view of the courtyard from the south west showing the street in the sky level of the building, the bridge connection from the eastern portion of the building to the western portion and the upper level of the row house residential units.

figure 67. Model view of the courtyard from the south west showing the street in the sky encircling the upper level of the block.
figure 68. View of the section model from the residential street. Lower five floors are residential units and semi-private entrance and vertical access, upper two levels are loft space.

figure 69. Same view as figure 68, from a lower vantage point.
figure 70. View of the section model from the courtyard. Lower five floors are residential units and semi-private entrance and vertical access, upper two levels are the street in the sky and two-story loft space.

figure 71. View of the section model from the courtyard and the cut through the party wall. The lower five floors are residential units. Ground level and third floor units are two stories. Ground floor units have a private walled garden, third and fifth floor units have generous balconies. Upper two levels are the street in the sky and two-story loft space. The mezzanine level of the loft space accesses a balcony above the street in the sky.
figure 72. View of the section model from the street and the cut through the stair hall. The lower five floors are residential units. The rooms on the street side of the building are bedrooms and studies, the semi-private stair hall is located on the courtyard side of the building. The upper two levels are the street in the sky and two-story loft space. The seventh story above the stair hall is an outdoor terrace accessed from the mezzanine level of the loft space.

figure 73. Similar view as figure 72. The semi-private entrances to the five floors of dwelling units can be accessed from the street and the courtyard.
figure 74. View of the section model from the cut through the party wall. The lower five floors are residential units. The rooms on the street side of the building are bedrooms, kitchens and bathrooms, the shared living spaces are oriented towards the courtyard and are connected to a private outdoor space; walled garden or balcony. The upper two levels are the street in the sky and two-story loft space. The seventh story mezzanine accesses a balcony above the street in the sky.

figure 75. Plan of the third floor dwelling units and semi-private stair hall. Shared living spaces are located on the third floor of these middle-level units (first floor of the ground-level units, fifth floor of the upper-level units). The kitchen is located at the bottom of the plan, facing the residential street, the living spaces are at the top of the plan, facing the courtyard. Bedrooms and other private areas are located on the fourth floor above the kitchen. The living space is double height.
figure 76. Close up view of the section model showing the street in the sky and the loft space at the sixth and seventh floors of the building.

figure 77. Close up view of the section model showing the middle-level dwelling unit at the third and fourth floors of the building.
In this thesis I have proposed an approach for developing residences in an under-used, non-residential portion of the city center. The objective has been to create an identifiable residential presence in the area that invigorates the existing fabric and provides an environment to support the residential use. The design process was informed by an analysis of precedents and site conditions, as well as my own ideas about the relationship between the commercial, civic and residential use downtown.

To test the assumptions I have made in the thesis I designed a building on a particular block in the downtown site. Design for the block I selected had to respond to nearly all of the site conditions found downtown: commercial, civic and residential streets and buildings and a subway entrance. By investigating design solutions for all of these conditions I have developed an understanding of how these conditions in other combinations, might be handled on other blocks in the site.

The design I have developed proposes a new, or hybrid type of urban residential building: the row house below, public-accessible street in the sky/loft space above. When the general plan for this row house/ street in the sky type is clear, a number of proposals can be accepted in the site. In this way the area is not stamped by a single developer or architect, rather it is built as the city has been, incrementally over time according to established principles. This method of design is not exclusive to my site in Washington, D.C. but should be seen as a prototypical approach to design under similar conditions in any city.
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Bibliography


All photographs and illustrations are by the author unless noted below:

**Credits**

figure 3. Landslides/91 B47045, Roach Visual Collection, MIT

figure 6. brochure, Pennsylvania Quarter Neighborhood Association.

figure 8. brochure, The Pennsylvania Avenue Development Corporation.

figures 9, 10 a-c. brochure, The Pennsylvania Plaza Associates.

figures 11, 12, 15. brochure, The Gunwyn Company.