To the Graduate Council:

I am submitting herewith a thesis written by David Dayne Cook entitled “Space / Anti-Space: Revisiting a Relationship of Opposites.” I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Architecture.

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Space / Anti-Space

Revisiting a Relationship of Opposites

A Thesis
Presented for the
Master of Architecture Degree
The University of Tennessee, Knoxville

Dayne Cook
August 2007

Dedication

This project is dedicated to my family for their unwavering support during the process of this thesis and most especially to my wife whose patience, support and love kept me going.

Acknowledgements

This project would not have been possible without the help of T.K. Davis, William Martella, and Mark Schimmenti and all others who aided me in my work.

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Table of Contents

.01 Thesis Statement……..1

.02 Introduction……2

Perceived vs. Conceived……9

Ordered vs. Random……13

Formed vs. Unformed……16

Discontinuous vs. Continuous……..20

Conclusion of Comparative Analysis……...23

.03 History……...25

.04 Site Analysis……34

.05 Precedents……49

.06 Program……67

Program Description……...67

Program Specifications……..69

Building Codes……73

.07 Design Solution……..74

.08 Bibliography……91

.09 Vita……..93

List of Figures

01:01 Piazza del Campo ……1
01:02 Le Corbusier's St. Die France……..1
02:01 Farnsworth House Exterior 1 (Plano, Illinois)……5
02:02 Farnsworth House Exterior 2 (Plano, Illinois)……5
02:03 Farnsworth House Interior 1 (Plano, Illinois)……5
02:04 Farnsworth House Interior 2 (Plano, Illinois)……6
02:05 Villa Rotunda (Vicenza, Italy)……6
02:06 Villa Rotunda Section (Vicenza, Italy)……6
02:07 Interior of Rotunda……..7
02:08 Model of Residential Development in Turin……..8
02:09 Piazza del Campo, Siena, Italy……....9
02:10 Piazza del Campo Figure Ground……..9
02:11 Figure Ground of St. Die……10
02:12 Tony Sudekum Homes……..10
02:13 Tony Sudekum Axon Diagram (Perceived Space)……..10
02:14 Residential Development, Turin (Ground Floor Plan)……12
02:15 Shared Backyard Condition at Sudekum……14
02:16 Diagram of Ordered and Hierarchical Spatial Sequencing……15
02:17 Ground Plan, 2nd Level Plan, Top Level Plan……15
02:18 Pantheon, Rome……16
02:19 Axonometric section of Pantheon……17
02:20 Plan of the Barcelona Pavilion……17
02:21 Exterior View Barcelona Pavilion 1……18
02:22 Interior to Exterior View Barcelona Pavilion……18
02:23 Interior View Barcelona Pavilion 2……..18
02:24 Elevation Residential Development, Turin……19
02:25 Diagram of Space – Anti-Space Combination at Entry Threshold……19
02:26 Residential Development, Turin (Ground Floor Plan)……19
02:27 Cenotaph for Sir Isaac Newton……21
02:28 Bibliothèque nationale de France……21
02:29 The Crystal Palace Nave (Interior)……22
03:01 Pruitt Igoe Housing Development……28
03:02 Destruction of Pruitt Igoe ……..28
03:03 Vine Hill Homes 1 (Hope VI)……..32
03:04 Vine Hill Homes 2 (Hope VI)……..32
03:05 Preston Taylor Homes (Hope VI)……33
03:06 Preston Taylor Homes (Hope VI)……33
04:01 Satellite Image of Nashville, TN……..36
04:02 Satellite Image of Sudekum Site……37
04:03 Diagram of Existing Site Amenities……38
04:04 Pedestrian Bridge Over I-40……39
04:05 Pedestrian Bridge Over I-40……39
04:06 Pruitt Library……..39
04:07 Infrastructure diagram……40
04:08 Diagram of Building Fronts……41
04:09 Diagram of buildings that front streets……42
04:10 Nashville Area Figure Ground……43

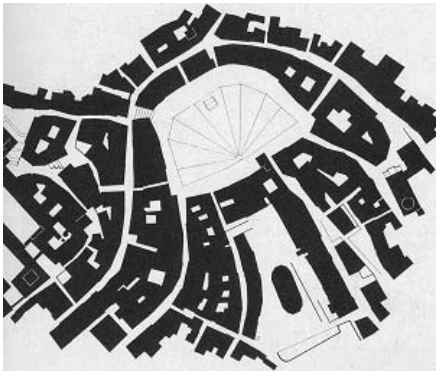
List of Figures

04:11 Figure Ground of Sudekum Development……44
04:12 Diagram of Surrounding Park Areas……45
04:13 Diagram of Sudekum / Chestnut Hill Neighborhood Grid……46
04:14 Diagram of Sudekum / J.C. Napier Development Grid……47
04:15 Grid systems overlay diagram……48
05:01 Abode Development Site Plan……54
05:02 Façade detail of Abode Housing Development……55
05:03 Abode Entry Diagram……55
05:04 Public to Private Progression……56
05:05 Window detail of Abode Housing Development……56
05:06 Drawing of entrance elements (Abode Dev.)……57
05:07 Plan of two bed flat (Abode Dev.)……57
05:08 Plan of two bed flat with areas of allowed anti-space……58
05:09 Sketch of a closed interior condition……58
05:10 Sketch of an opened up interior condition……59
05:11 Plan of two bed house (Abode Dev.)……59
05:12 Plan of Mews house (Abode Dev.)……60
05:13 Photo of Interior (direct relationship between inside and outside)……61
05:14 Elevation of typical street façade……62
05:15 Elevation of typical street façade……62
05:16 Façade detail of Abode Housing Development……63
05:17 Façade detail of Abode Housing Development……63
05:18 Parking detail of Abode Housing Development……64
05:19 Roofscape detail of Mews House (Abode Dev.)……64
05:20 Courtyard of Abode Housing Development……65
05:21 Diagrams of Flexible Living Accommodations……66

List of Plates

07:01 Nashville, TN (Aerial Photo)……..76
07:02 Nashville, TN (Figure Ground)……..77
07:03 Sudekum Development (Aerial Photo)……..78
07:04 Existing Figure Ground……..79
07:05 Axon of Existing Conditions……..80
07:06 Site Reconfiguration Diagram……..81
07:07 Proposed Figure Ground……..82
07:08 Proposed Housing Development……..83
07:09 Proposed Commercial / Residential Relationship……..84
07:10 Axon of Housing Prototype……..85
07:11 Cutaway Axon of Housing Prototype……..86
07:12 Housing Prototype Elevations 1……..87
07:13 Housing Prototype Elevations 2……..88
07:14 Site Section……..89

(.01) Thesis Statement



Piazza del Campo, Siena, Italy (Space)



Figure Ground of St. Die, France (Anti-Space)

In the article "Space and Anti-Space" Steven Kent Peterson states that:

…our objective (as architects) is an elaborate condition of spaces, a collision of inventions; not a neutral ground of anti-space but a plasma of spatial fields promoting multiple interactions, choices and opportunities."

The article focuses on the separation of the two and promotes the exclusion of anti-space in favor of space. Therefore, it is the contention of this thesis that architects can, in fact, fuse the aspects of space and anti-space in order to create more meaningful places than either can do alone.

The vehicle chosen to explore this issue in contemporary Architecture is the Tony Sudekum low income housing development in Nashville, TN. The Sudekum development is a victim of an overabundance of anti-space and little or no discernible space, which detracts from the area's spatial layering and texture. This study will overlay the principles of space and anti-space in an effort to analyze the aspect of place making in America's Housing and Urban Development program, specifically the Hope VI Housing Program.

Mario Botta's Residential Development in Turin will serve as an example of how the fusion of space and anti-space can serve to promote and enrich the spatial qualities needed in place making in contrast to space and anti-space alone. Proctor and Matthew's Abode Housing Development in Newhall, Harlow, Essex, (England) will serve as a precedent that also combines space and anti-space that is illustrative of what the Sudekum Development in Nashville could potentially be.

(.02) Introduction

"Architecture is the art of how to waste space…" **Philip Johnson**

Space and Anti-Space

In the article *Space and Anti-Space* author Steven Kent Peterson asserts that there are two basic spatial elements in Architecture namely Space and Anti-Space. Peterson asserts that:

"Anti-space, because it is by definition formless, can carry no specific meaning beyond its transcendental aspirations. If there can be no form without meaning, there can be no meaning without form…The vacuity of the concept of Anti-Space, resulting in the loss of figural space, induces a loss of formal capacity and a reduction in communicative content. Space must be re-incorporated into Architecture…our objective (as architects) is an elaborate condition of spaces, a collision of inventions; not a neutral ground of anti-space but a plasma of spatial fields promoting multiple interactions, choices and opportunities."

To better understand this statement it is necessary to understand both elements individually.

Anti-Space, according to Peterson's definition, is space that is "undifferentiated and ideally formless, continuous in principle, open and flowing. It is controlled, directed or temporarily captured, but never composed." Space, by comparison, is "conceived as a differentiated volume, identifiable in its configuration as form, discontinuous in principle, closed and static."

"Modern Space is, in effect, anti-space." This phrase by Peterson lends much to the understanding of exactly what anti-space is. Yet, to more fully understand anti-space the principles behind modern space must necessarily be understood as well.

The modern movement, in essence, is much akin to Gothic Architecture in structural and spatial beliefs. In fact, Mies van der Rohe claimed his Barcelona Pavilion to be "Gothic in spirit." Gothic architecture sought to free itself from structural constraints in order to allow for greater amounts of glass in the façade, which, in turn, allowed more 'spiritual' light to shine into the church. In examining the Barcelona Pavilion, the structure almost goes away and there is a direct relationship between the attenuated structure and the symbolic value of light.

Modern architects sought to free buildings of traditional construction methods and to blur the boundaries between the outside and inside. This becomes the most important factor in explaining anti-space. Modern architects utilized (at the time) non-conventional spatial creation techniques (which will be discussed in greater detail later) that reinforced the idea of space as an activated and flowing entity.

Space, from a modern architects' viewpoint, was not believed to be merely the void left over after construction, but an all encompassing entity that as stated earlier was not to be captured or shaped but merely halted or deterred momentarily in its movement.

To illustrate the difference between space and anti-space, two case studies utilized in Peterson's article have been chosen as a beginning point of comparison. The Farnsworth house, which illustrates anti-space, by Mies van der Rohe, clearly and simply puts forth all of what has been said of modern space. Conversely, Palladio's Villa Rotunda, is a classic example of formed space.



02:01
Farnsworth House Exterior 1 (Plano, Illinois)
(Photograph by: Jon Miller, Hedrich Blessing)



02:02
Farnsworth House Exterior 2 (Plano, Illinois)
(Photograph by: LPCI)



02:03
Farnsworth House Interior 1 (Plano, Illinois)
(Photograph by: LPCI)

Mies' Farnsworth House could arguably be the culmination of his architectural ideology. Mies sought to create an "Architecture of nothingness" touting his belief that "less is more". To create an "Architecture of nothingness" space must necessarily be obliterated due to the Architectural elements that are utilized to create space such as walls, floors, and ceilings and not to mention the massive opaque materials used to create such elements.

Sir Banister Fletcher describes the Farnsworth House as:

"remarkable for the simplicity of its form and the precision of its detail. The plan of this flat-roofed, single storey building is rectangular, with a central core (comprising bathrooms, heating plant and a fire-place) around which ***space flows freely****, the various areas for eating, sleeping, etc. being indicated simply* ***by partitions and fittings which do not connect with the ceiling****. Structurally the house is a cage of white-painted steel* ***(with large areas glazed in plate glass****) carried on a concrete slab****, lifted above the ground*** *on low supports."*



02:04
Farnsworth House Interior 2 (Plano, Illinois)
(Photograph by: LPCI)

The boldface terms and phrases illustrate important principles in the creation of anti-space, such as space flowing freely. This aspect is further strengthened by the fact that walls do not act as structural elements, but rather, mere partitioning devices which do not connect with the ceiling 'allowing' space to 'flow' continuously. Mies further heightens this aspect of anti-space by elevating the house itself (due mainly to the practical need to protect the house from flooding prone to the site) and allowing space to flow completely under, over, and around the house itself.



02:05
Villa Rotunda (Vicenza, Italy)
(Photo by Donald Corner and Jenny Young courtesy GreatBuildings.com)

Palladio's masterpiece, The Villa Rotunda, is quite the opposite of the Farnsworth House in many respects. The most important of which is that space is of definite shape and form especially within the rotunda space. The spaces within are disconnected from other spaces and each exist within a specific spatial hierarchy of which the rotunda is the most important. The walls, floors and ceilings are structural and are used to form the spaces within. The materials are heavy (masonry) and transparency is almost non-existent.



02:06
Villa Rotunda Section (Vicenza, Italy)
(*I Quattro Libri dell'Architettura* 1570, Publication de Scamazzi, 1778**)**

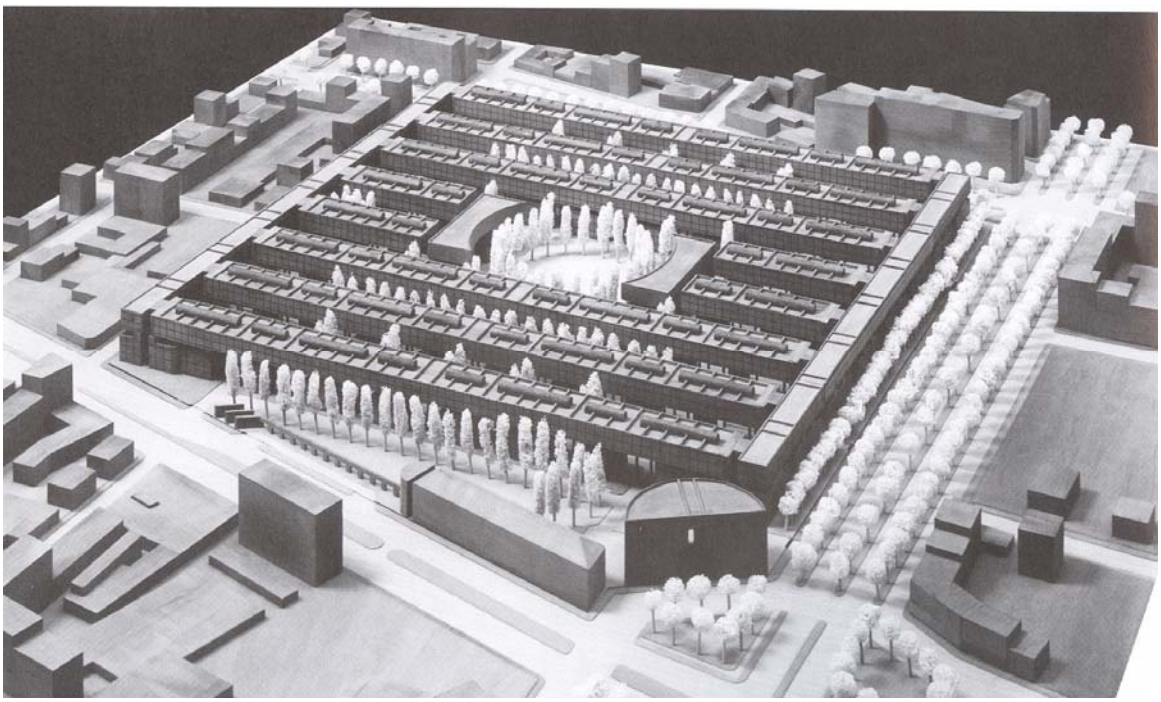


02:07
Interior of Rotunda
(Photo courtesy University of Texas image database)

While Mies' Farnsworth House and Palladio's Villa Rotunda are magnificent examples of how space and anti-space are opposites by nature it is equally important to examine how they can work together. Mario Botta's Residential Development in Turin (1985) has been chosen as a case study to accomplish this task. In his design Botta allows both space and anti-space to exist simultaneously, which will be discussed more in depth later in this work.

To better illustrate the differences between space and anti-space it would be prudent to break them down further in terms of Peterson's definitions. This exercise will examine the architectural elements that are involved in the creation of both space and anti-space through side-by-side comparisons. Understanding their differences is important in order to know how to fuse them properly in the act of architectural creation.

Space	***Anti-Space***
Perceived (almost visible)	Conceived (invisible)
Ordered	Random
Formed	Unformed
Discontinuous	Continuous
Static to flexing	Flowing in motion
Specific	General
Man Made	Natural
Particular	Universal
Variable	Uniform
Multiple	Singular



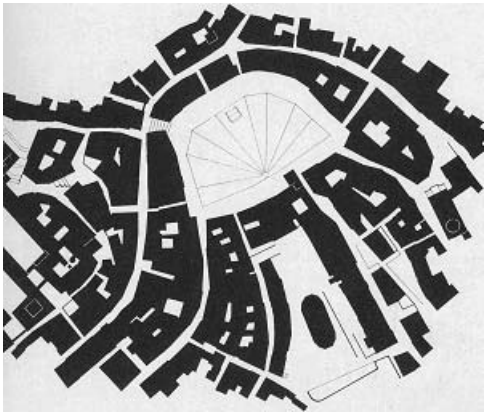
02:08
Model of Mario Botta's Residential Development in Turin
(Photo courtesy "Mario Botta: The Complete Works Volume 2 {1985-1990}")

Yet, by performing this form of analysis it must be understood that some amount of informational overlapping will occur. This is due to the fact that the characteristics listed for both space and anti-space are interconnected and inseparable from one other.

Perceived vs. Conceived



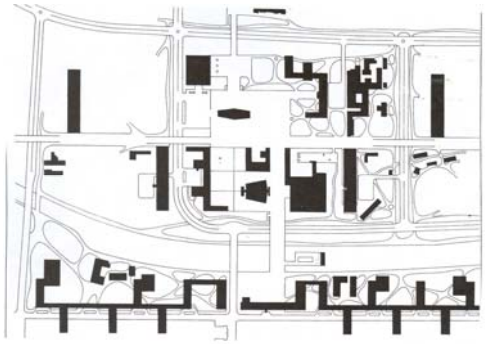
02:09
Piazza del Campo, Siena, Italy
(Aerial Photograph)



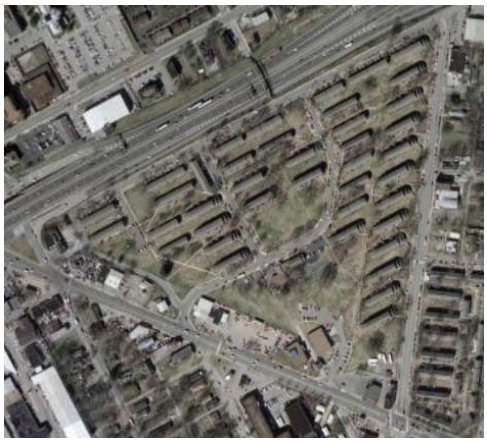
02:10
Piazza del Campo Figure Ground
(Courtesy “Finding Lost Space” by Roger Trancik)

Space, as compared to anti-space, is perceived (or almost visible) as a formed and shaped figure. Consider for a moment the Piazza del Campo in Siena, Italy. This is a classic example of an urban space. The piazza is well formed and enclosed on all sides (save circulation routes) by building facades. These facades give the space its height and the ground its width and length. Considered together these elements give the space a volumetric feel which, in turn, makes it perceivable to our senses. Also, the focus, in this example, is the space itself with the buildings themselves serving as a backdrop to the space.

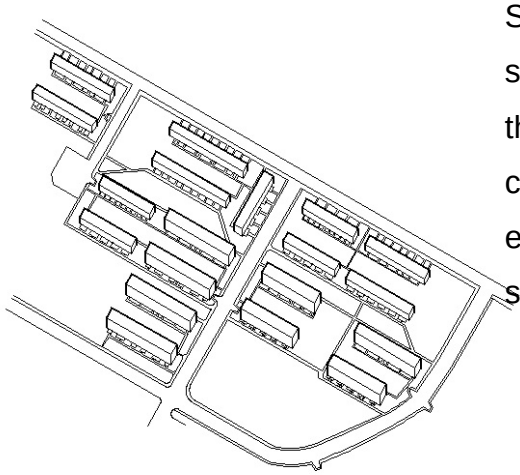
Anti-Space, conversely, is an undifferentiated and formless continuum. It is invisible (or conceived) to our senses and much harder to acknowledge. One such example is the plan of Saint Die, France by Le Corbusier in 1945.



02:11
Figure Ground of St. Die, France by Le Corbusier, 1945(Courtesy of "Finding Lost Space" by Roger Trancik)



02:12
Tony Sudekum Homes
(Aerial Photo Courtesy Google Earth)



02:13
Tony Sudekum Axon Diagram (Perceived Space)
(Diagram by author)

In this example objects do not form the space; rather the buildings are objects in an enormous space.

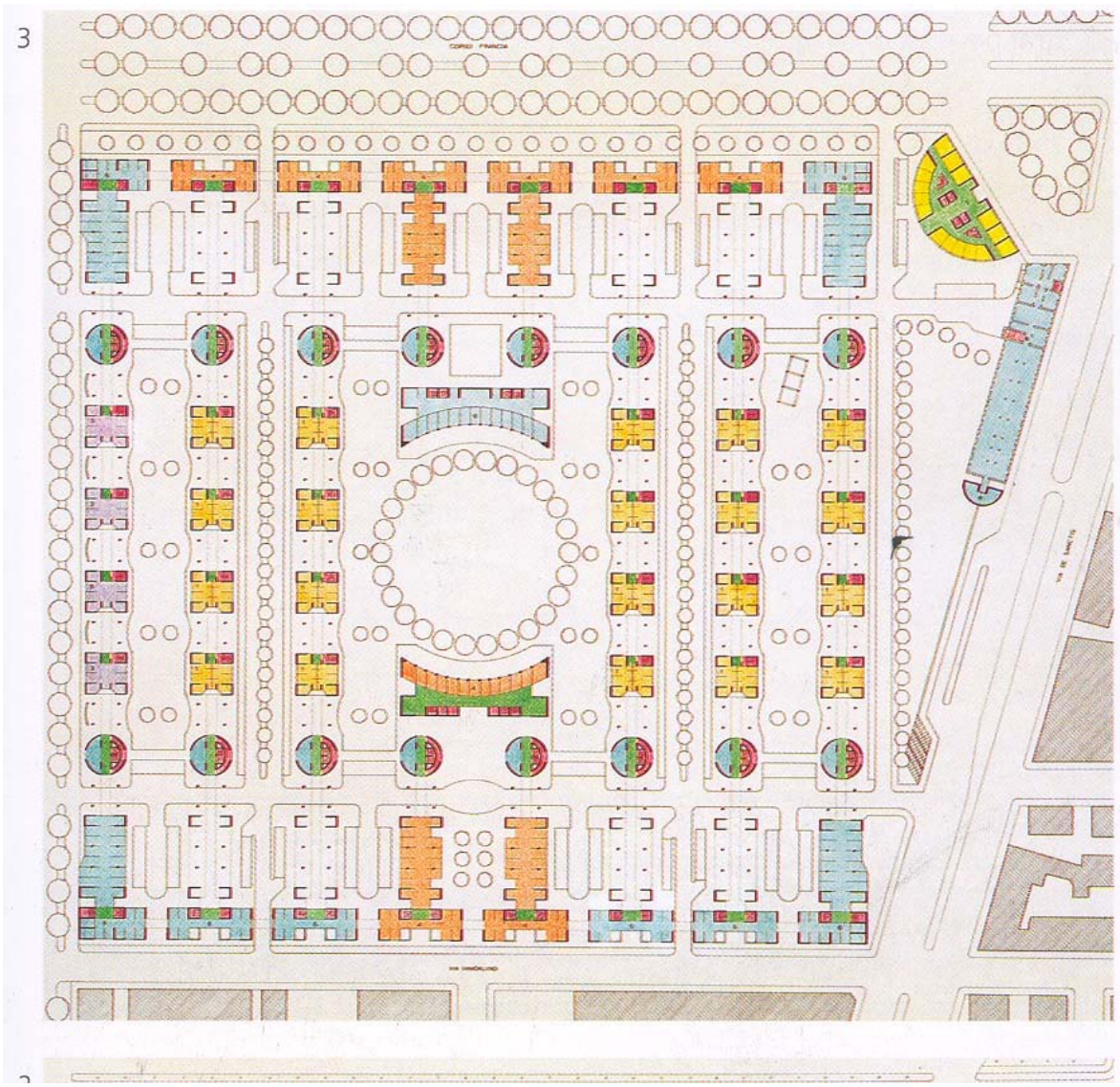
It is evident in this particular plan that space is treated as an activated flowing entity not to be captured or shaped but merely halted or deterred momentarily. The focus here becomes the buildings and not space. Upon studying the plan of Saint Die it is easy to appreciate the amount of anti-space present in the Tony Sudekum Housing Development chosen as the vehicle for this study.

Notice that in the axonometric diagram (of the north west section of the Sudekum site) there is no perceived exterior space to be found, opposite of the condition presented in the Piazza del Campo in Sienna. This condition is typical throughout the entire Sudekum Development. By examining this small section of the site in such a manner as this it is easy to imagine how these buildings could be conceived as objects in an enormous space instead of elements used in space creation.

Both conditions of perceived and conceived space exist in the Turin Residential Development. Notice, in the ground floor plan, that the central public area is a condition of space. Refer back to the model image of the development. The central public space is given existence through both building structure and landscaping, most notably the trees.

It is a similar condition as that of the Piazza del Campo. The central public space here is well formed with the trees creating a peripheral barrier. Space, other than that of the central public space, seems to only occur inside the buildings themselves.

Anti-space is allowed to flow through and around the buildings as in the plan of Saint Die and under as in the Farnsworth House by Mies van der Rohe. The units, on the lower portions of the development, do not create space, but rather exist in an enormous space.



02:14
Residential Development, Turin (Ground Floor Plan)
(Image courtesy “Mario Botta: The Complete Works Volume 2 {1985-1990}”)

Ordered vs. Random

Another difference between space and anti-space is that space is an ordered creation and anti-space is a random phenomenon. Space creation involves also the creation of hierarchies adding meaning to the order.

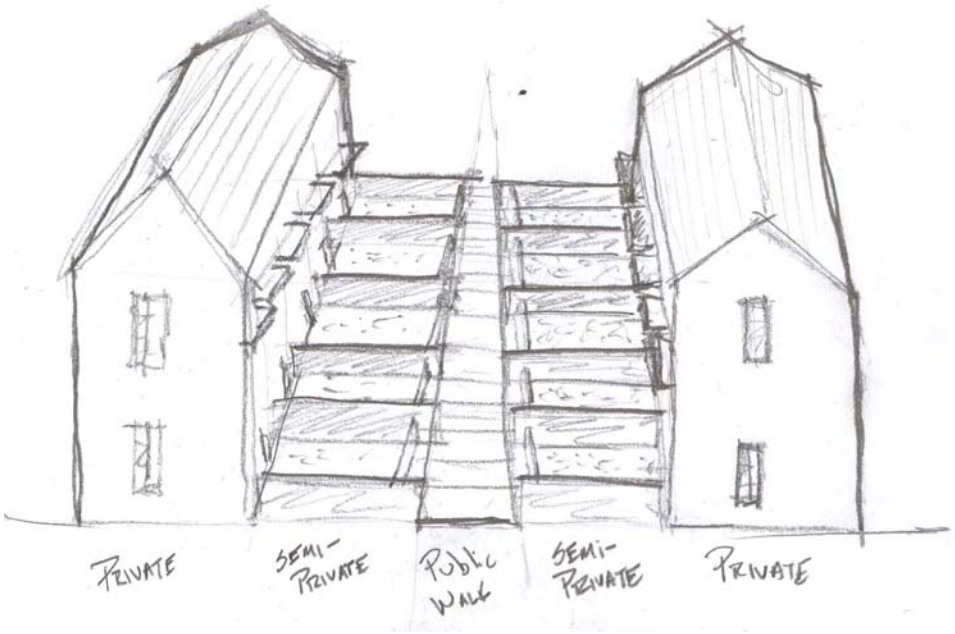
Again, explore the example of the Piazza del Campo. The piazza stands out due to its size in relation to all other spaces. In terms of hierarchy, it is the most important space compared to all others. The same can be said of the Villa Rotunda when examined in section. The rotunda's width and height, in relation to all other spaces, are much larger, thus, making it the most important space.

In the plan of St. Die there are no discernible spaces, although Le Corbusier would most likely disagree based on his idea of the regulating line to imply space rather than physically structuring it. Therefore, there exists no ordered hierarchical structure giving the spatial scheme a random feel. In Le Corbusier's design of Saint Die the buildings become the most important elements to create hierarchy and not the spatial elements.

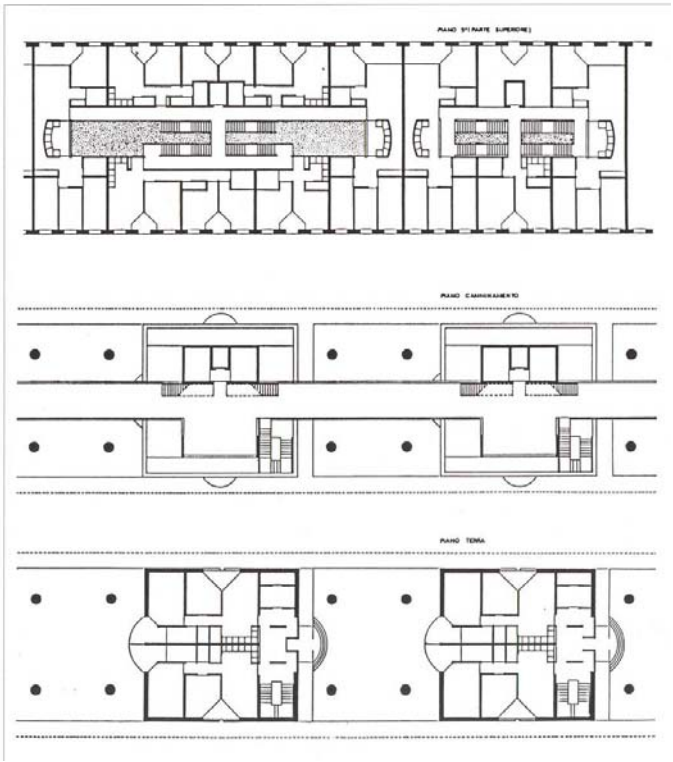
This phenomenon is evident as well in the Tony Sudekum Development plan. Here ‘space’ is left open-ended with no physical structure making the spatial conditions presented into conditions of anti-space. Take this photo of a typical backyard situation at the Sudekum Site. There is no indication of formed or ordered space. The space is implied and is shared by all including the housing units in the far background. The prevalence of anti-space here blurs any distinction of personal ownership, which is evident in the design of the facades as well, with only small stoops giving any indication of individual dwelling units.



02:15
Shared Backyard Condition at Sudekum
(Photo by author)

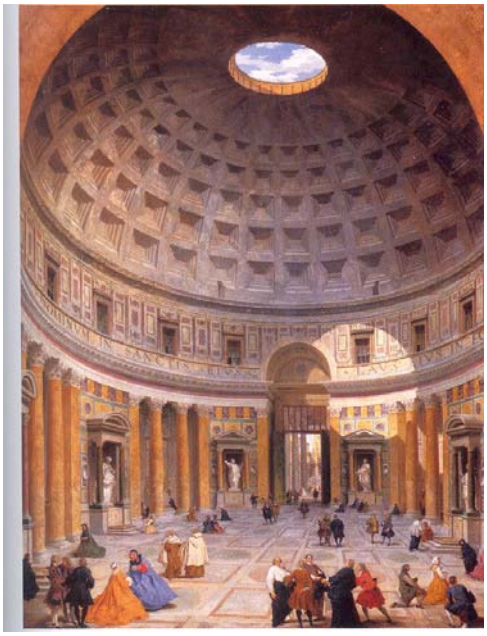


02:16
Diagram of Ordered and Hierarchical Spatial Sequencing
(Diagram by author)



02:17
Ground Plan, 2nd Level Plan, Top Level Plan
(Image courtesy "Mario Botta: The Complete Works Volume 2 {1985-1990}")

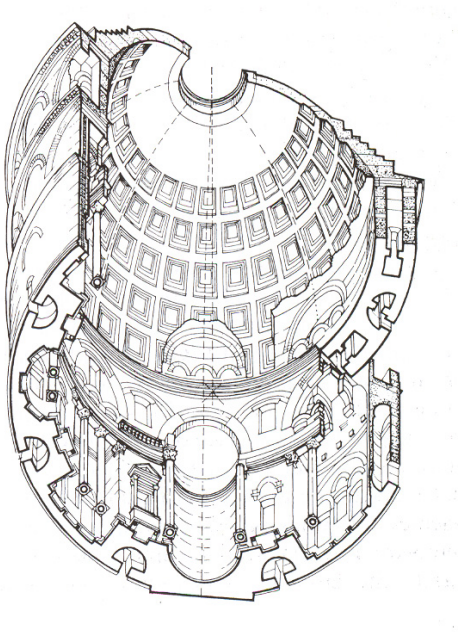
Again we find these characteristics present in Botta's Turin Residential Development. Notice that in terms of hierarchy the central public space (see image of model and ground floor plan) is the most important design aspect, whereas, the presence of anti-space creates the condition of non-hierarchical spaces (or uniformity of spaces especially at ground level) and open-ended spatial conditions that allow space to flow unimpeded throughout the complex on the lower levels, while the uppermost housing units are almost exclusively conditions of space.



02:18
Pantheon, Rome
(Giovanni Paolo Panini, *The Interior of the Pantheon,* ca. 1740. Oil on canvas, National Gallery of Art, Washington D.C.)

Formed vs. Unformed

This comparison between space and anti-space has already been hinted at although not specifically examined. In order for space to be perceived and ordered, it first has to be formed. The same follows for anti-space: it has to be unform in order for it to be random and non-visible. The characteristics that form the foundation of each are interconnected and cannot be taken away.

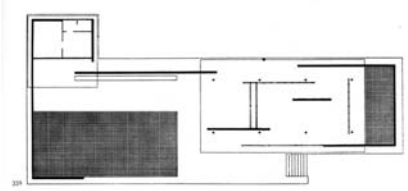


02:19
Axonometric section of Pantheon
(Courtesy *Buildings Across Time* by Marion Moffett, Michael Fazio, Lawrence Wodehouse)

Space has form and cannot be described or thought of without thinking of its three dimensional characteristics. Form also implies volume, especially, interior space as opposed to exterior space, which is usually open to the sky. Space, then, can be thought of needing a container or physical characteristics to create it, as mentioned before about walls, floors and ceilings.

An excellent example of space is the Pantheon in Rome. The Pantheon's dome on drum structure creates and celebrates the space inside. This illustrates the inseparable nature of space from its structure. The space is also describable in terms of its dimensions where its diameter is 142 feet and six inches in width and 142 feet high.

It is also describable in terms of its form which is cylindrical and domed. Space, here, is immediately discernible and can be immediately conveyed in formal characteristics.



02:20
Plan of the Barcelona Pavilion
(Image Courtesy of the University of Columbia Architectural image database)

Anti-Space, however, is not so readily described or for that matter understood. To illustrate this aspect of anti-space the Barcelona Pavilion by Mies van der Rohe (built for the Barcelona exhibition in 1929) proves very useful.



02:21
Exterior View Barcelona Pavilion 1
(Photo courtesy of Mary Ann Sullivan from Bluffton image database www.bluffton.edu)



02:22
Interior to Exterior View Barcelona Pavilion
(Photo courtesy of Mary Ann Sullivan from Bluffton image database www.bluffton.edu)

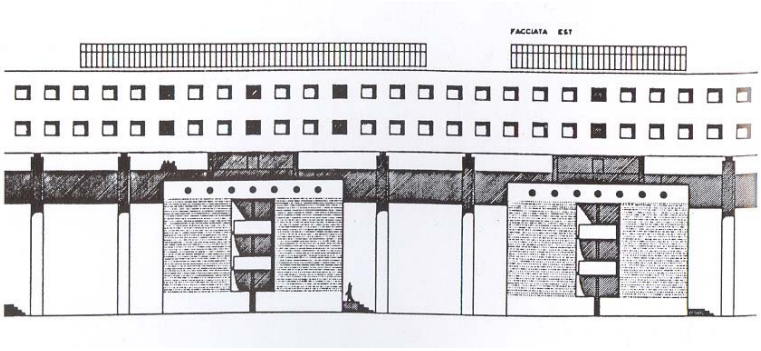


02:23
Interior View Barcelona Pavilion 2
(Photo courtesy of Mary Ann Sullivan from Bluffton image database www.bluffton.edu)

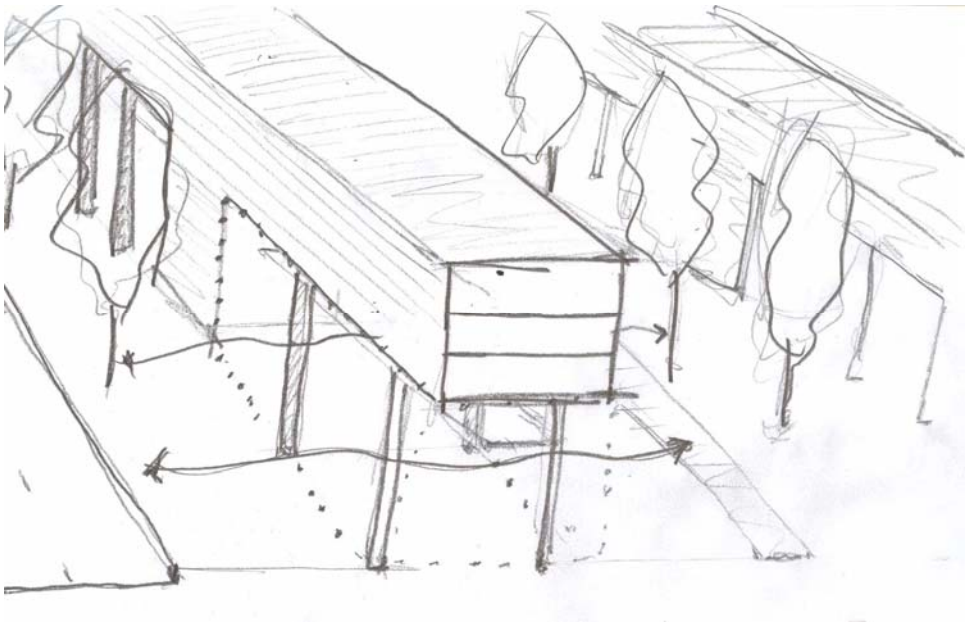
Notice, in the plan, that the 'spaces' created are not formed, but implied. Space, in this example, is merely an idea or construct of the mind, utilizing the partition walls and columns as guiding elements.

Implied spaces cannot be envisioned volumetrically and cannot be discussed in terms of dimension. Space flows from area to area and is never completely formed or isolated. It could be said that the entire interior of the Barcelona Pavilion is only one space, or better still, that the exterior flows through the interior allowing the interior and exterior to become one fused entity.

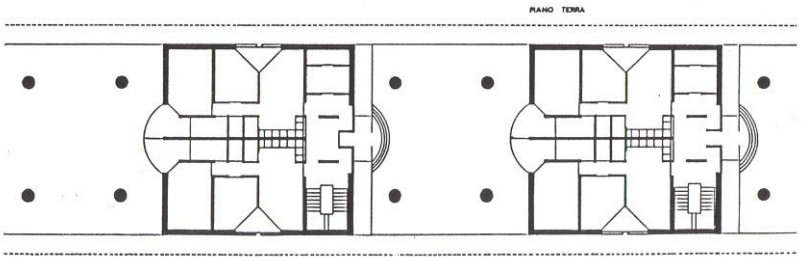
In the Turin case study, again, attention returns to the central public space. This space, as is the interior of the Pantheon, is describable in terms of its shape and volumetric character, and is similar also to the Piazza del campo, with the trees giving it a volumetric character. Most importantly, though, is the fact that the complex as a whole is square in shape formed by the connection of all housing units elevated 11 meters above the ground.



02:24
Residential Development, Turin (Elevation)
(Image courtesy “Mario Botta: The Complete Works Volume 2 {1985-1990}”)



02:25
Diagram of Space – Anti-Space Combination at Entry Threshold
(Diagram by author)



02:26
Residential Development, Turin (Ground Floor Plan of Housing Units and Entry Thresholds)
(Image courtesy “Mario Botta: The Complete Works Volume 2 {1985-1990}”)

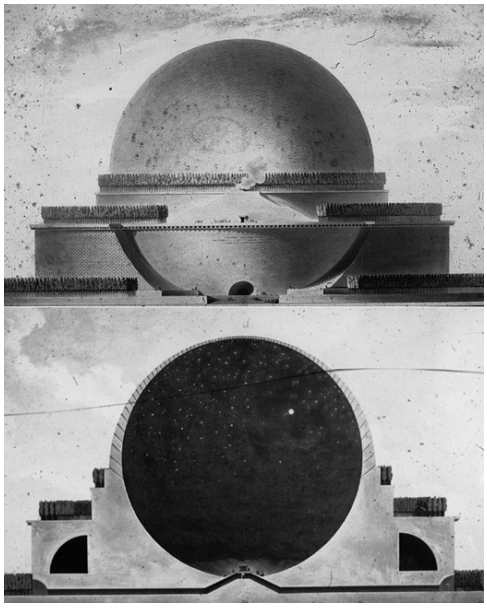
Yet, as with the Barcelona Pavilion, anti-space is present by the simple fact that Botta allows space to flow freely under and around the housing units to each of the layered circulation routes, separating the bars of housing units themselves.

This condition allows for a wonderful layering of public to private space with the crescendo moment of traversing from public to private in the form of the implied spaces created by the separated ground units capped off by the elevated units. This creates a threshold moment necessary for complete understanding that one is moving from areas where he/she has unlimited access to the more restricted private dwellings within.

Discontinuous vs. Continuous

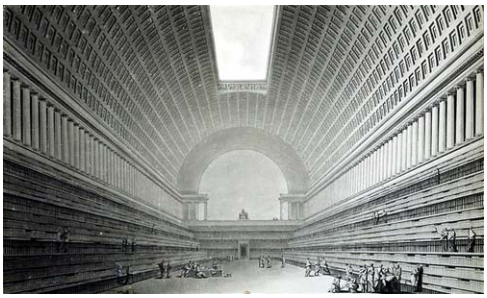
The term *discontinuous* implies that something is stopped or captured, whereas the term *continuous* implies that something continues without interruption. Utilizing what has already been discussed, it can be surmised that space is discontinuous and anti-space is continuous. It is then important to note that anti-space requires an almost constant connection to the outside in order for space to flow continuously.

Space is discontinuous not only in terms of the structure that creates it, but visually as well. As one considers a space, the space itself holds his/her absolute attention because it is visually discontinuous. Adjacent spaces or even the outside is non-existent or at least absent from our thoughts because one cannot see them to even acknowledge their presence. Anti-space, on the other hand, ideally flows inside to outside and maintains a continuous visual connection to several implied spaces simultaneously.



02:27
Cenotaph for Sir Isaac Newton
(Etienne-Louis Boullee, 1784)

The hypothetical and inventive drawings of Etienne-Louis Boullee strike up a strong association with the characteristics of space heretofore mentioned. Two of the most striking examples include his designs for the Cenotaph for Sir Isaac Newton in 1784 and a Library for the King in 1788.



02:28
Bibliothèque nationale de France
(Etienne-Louis Boullee, 1784)

The Cenotaph for Sir Isaac Newton was designed as a hollow sphere 500 feet in diameter, the top half of which represents the dome of heaven, perforated with holes to give the impression of stars and the moon when viewed from the interior. The Library for the King (or Bibliotheque de Nationale de France) houses books in an enormous semi-cylinder lit by an equally enormous skylight cut into a coffered barrel vault.

The spaces are of heavy opaque materials (masonry) and are visually limiting to the shape and form. There is little or no relationship to other spaces with the exterior of the building keeping the focus of the spectator on the immediate space itself. There is absolution in these two designs along with the element of being finite. In other words, the spaces have both a definite physical and visual end.



02:29
The Crystal Palace Nave (Interior)
(Photograph by Benjamin Turner, March 1852)

Paradoxically, a building at the very infancy of modernism is one of the best examples of how anti-space is continuous: the Crystal Palace by Joseph Paxton. The Crystal Palace was a competition submission for a building in Hyde Park, London, to house the first modern world's fair in 1851.

Its structure was almost entirely of steel and glass creating a constant connection between exterior space and interior space. Also, due to its construction methodology and materials, the structure when viewed over a distance practically disappears creating a visual continuance with little or no interruptions.

The Turin Residential Development offers examples of both conditions. Notice the elevation (shown in the preceding section) the system of solid and void (opaque vs. transparent) at the base of the structure. The void between housing units offers anti-space the opportunity needed to flow continuously (not to mention an individual's line of sight) into adjacent areas.

The architect reaches a fusion of both space and anti-space in terms of place making. Both aspects play important roles in order to create an architecture that is replete with spatial layering and public and private spatial understanding.

Conclusion of Comparative Analysis

Having already discussed the first four comparisons of space and anti-space as listed by Peterson, it becomes unnecessary to discuss the remainder in any great detail due to the extreme interconnectedness of all characteristics. Each one relies upon the rest, for without each other, none can exist.

Knowing that space is perceivable (almost visible), ordered, formed, and discontinuous, it stands to reason that we understand also its other characteristics.

We understand that space is static or extremely limited in motion because space is reliant upon its structural form to exist. Therefore, we understand that space is multiple and variable because it is only limited by our imaginations as to the conceivable limits of creating space. Finally, regarding each characteristic of space, it is understood that it is also a man-made phenomenon.

Similarly, knowing that anti-space is conceived (invisible), random, unformed, and continuous the following characteristics fall into place. It is understandable that anti-space alone is not man-made but a natural occurrence, as the universe is a natural occurrence. It is singular (as the universe is singular), uniform, and flowing in motion (as air or water flow).

These principles that work against each other are exactly the principles that can be harvested in order to create textured and meaningful places in contemporary architecture. Both space and anti-space have a role to fulfill in place making such as spatial layering and defining the boundaries between public and private places.

(.03) History

The Tony Sudekum Housing Development, named after the head of the National Housing authority at the time it was built, later became the MDHA, in Nashville, TN. The development, itself, built in the 1950's, is an American interpretation of the modernist movement concerning high density housing. Architects and planners at the time utilized mass production techniques to accommodate the post WWII housing shortages. Yet, to more fully understand the underlying design principles of the site it is important to take a look of the origins of high density housing.

In 1928 the first CIAM (Congres Internationaux d'Architecture Moderne) was held to discuss the state of post WWI society and architecture and included representatives from France, Switzerland, Germany, Holland, Italy, Spain, Austria, and Belgium.

This congress emphasized building rather than architecture as 'the elementary activity of man intimately linked with evolution and the development of human life'. According to Kenneth Frampton in his book "Modern Architecture: A Critical History":

“CIAM openly asserted that architecture was unavoidably contingent on the broader issues of politics and economics and that, far from being removed from the realities of the industrialized world, it would have to depend for its general level of quality not on craftsmen but on the universal adoption of rationalized production methods…CIAM emphasized the need for planned economy and industrialization, denouncing as it did so efficiency as a means for maximizing profit. Instead it advocated the introduction of normative dimensions and efficient production methods as a preliminary step towards rationalization of the building industry.”

It was the beginning of mass production principles to supercede the methods of a craft based era.

In the first developmental stages of the CIAM conferences (lasting from 1928 to 1933) architects addressed the problems of minimum living standards and, later, the issues of optimum height and block spacing for the most efficient use of both land and material.

The second stages of CIAM conferences (1933 to 1947) were “dominated by the personality of Le Corbusier who consciously shifted the emphasis to town planning”. During this time period CIAM IV was held in 1933 aboard the S.S. Patris in Athens and in Marseilles addressing the theme of ‘The Functional City’. From these meetings “a single type of urban housing, expressed in the words of the Athens Charter as ‘high, widely spaced apartment blocks wherever the necessity of housing high density of population exists” was considered in response to the mass production techniques touted in earlier Congresses.

The single type housing discussed for high density housing evolved into “row housing”, which allowed modernist architects to utilize the design strategy of repetitive elements in space creation. The Tony Sudekum Housing Development was based largely in part on these modernist ideologies. Yet, the Sudekum development is not nearly as successful as other row housing developments mainly because it is almost completely devoid of spatial layering especially concerning the procession from the public realm to the private realm.



03:01
Pruitt Igoe Housing Development



03:02
Destruction of Pruitt Igoe
(St. Louis, Missouri 1972)
(Photo courtesy of "Modern Housing Prototypes" by Roger Sherwood)

In Roger Sherwood's book "Modern Housing Prototypes" the author states:

"High density housing in the United States has tended to be either luxury high-rise buildings or racially segregated low-income developments. The luxury housing is publicized and monumentalized (Mies van der Rohe's Lake Shore Drive apartments in Chicago, for example). But more typical has been the Bedford-Stuyvesant/Pruitt-Igoe kind of urban housing—anonymous, overcrowded, racially segregated, and economically depressed. It is doubtful if architecture can ever be the means to social deliverance—the problem is one of national attitudes and policies. Ironically, the dramatic explosive demolition of the housing slabs in St. Louis happened to buildings which the inhabitants found well designed in some respects but which could not survive an extremely hostile socioeconomic environment."

It was due, in part, to these hostile environments that the Hope IV program was created. In fact, “the HOPE VI Program, originally known as the Urban Revitalization Demonstration (URD), was developed as a result of recommendations by the National Commission on Severely Distressed Public Housing, which was charged with proposing a National Action Plan to eradicate severely distressed public housing built previously by America’s Housing and Urban Development Program (HUD). The Commission recommended revitalization in three general areas:

- physical improvements,
- management improvements, and
- social and community services to address resident needs.

As a result, HOPE VI was created by the Departments of Veterans Affairs and Housing and Urban Development, and Independent Agencies Appropriations Act, 1993 (Pub. L. 102-389), approved on October 6, 1992. (U.S. Dept. of Housing and Urban Development, par. 6).”

The Hope VI program has been successful in many cases of improving sites based on the previously mentioned revitalization areas. However, in many cases the program razed housing development sites and started over with a completely new 'tabula rasa' creating a suburban environment within an existing urban context. This strategy reduces occupancy levels and forces existing residents to seek housing elsewhere. Examples of this include the Vine Hill and Preston Taylor housing developments.

According to an article written by Christine Kreyling for the September 20, 1999 issue of the Nashville *Weekly* Wire, In 1997 a $13.6 million Hope VI grant allowed the Nashville MDHA to demolish the "asbestos ridden" Vine Hill housing development. Later, in 1999, the MDHA was given a $35 million dollar grant for a much larger renovation of the Preston Taylor Homes near 40th and Clifton Avenues.

The article goes on to describe the differences between the new and old developments, which are very eye opening and relevant to this thesis topic.

The 280 brick boxes at Vine Hill were built in the 1940s as temporary housing for defense workers. Over time, the 35-acre site became a permanent warehouse for the poor. The project is being replaced by 152 rental units and 18 single-family homes on the site, with an additional 82 single-family homes and 40 rental units off-site.

The style of the new buildings is "Pleasantville modest," with traditional gables, front porches, and private driveways. Inside the model duplex, the central heat and air and wall-to-wall carpeting, the washer-dryer hookups and dishwashers, make the unit indistinguishable from the typical apartment in a Bell Road complex. A community center complete with child-care facility, Vanderbilt-operated health clinic, a computer room, job-training classrooms, a gym, and an ATM machine will be available for the surrounding neighborhood as well.

The layout of the new Vine Hill is similar to the old, with two important differences. All units address rather than lie perpendicular to the street, allowing residents to monitor their yards and driveways. And the new complex is to be a gated community, with access controlled at one central point….



03:03
Vine Hill Homes 1 (Hope VI)
(Photo courtesy of Sherman/Carter/Barnhardt Architects)



03:04
Vine Hill Homes 2 (Hope VI)
(Photo courtesy of Sherman/Carter/Barnhardt Architects)

The scope of the Preston Taylor makeover is more ambitious. The 1954 complex lies on 52 acres and contains 550 units in 62 barracks, a density four times greater than the surrounding neighborhood. The nearest grocery is two miles away. There is virtually no public access to the adjacent 14-acre Boyd Park. The crime incidence is the highest in all of Nashville's public housing.

The new Preston Taylor will contain 310 rental units and 40 single-family homes. The layout will be as similar to Vine Hill's as the hilly site will allow, but will not be gated because there is more of a neighborhood fabric with which to connect. An additional 60 single-family homes and 30 rental units will be constructed on vacant lots scattered throughout the surrounding neighborhoods, as well as a 60-unit assisted living facility.

Interestingly, both projects (according to the Tennessee Fair Housing Council) resulted in a 45 percent loss of public housing units. Just over half the residents were transferred to other public housing complexes. But between one-fifth and one-quarter of the residents were given Section 8 vouchers to seek rentals in the private market, but renters often have difficulty finding landlords who participate in the Section 8 program.



03:05
Preston Taylor Homes (Hope VI)
(Photo courtesy of Nashville MDHA)



03:06
Preston Taylor Homes (Hope VI)
(Photo courtesy of Nashville MDHA)

It is exactly this problem that this thesis wishes to address. Therefore, successful examples of high density housing have been chosen for study in terms of spatial layering as it combines space and anti-space.

(.04) Site Analysis

The Tony Sudekum Housing Development located in Nashville, TN was designed and completed in 1953 by America's Housing and Urban Development program to accommodate post WWII housing shortages. The site itself is zoned RM20 (20 units per acre) and contains 443 housing units contained within 40 buildings on 34.1 acres. Of these, 15 are handicap accessible, 235 are two bedroom units, 146 three bedroom units, 52 four bedroom units, and 10 five bedroom units.

The buildings are low rise multi-family row-houses. One of the most important aspects of the site that make it a prime condition in terms of this thesis is the lack of structured space, most notably the exterior spaces, which create an overwhelming condition of anti-space. The site can greatly benefit from spatial layering, especially in terms of progressing from the public realm to the private interior, which at present is a very abrupt and unrewarding experience.

Also, there are little or no exterior spatial elements allotted for the housing units not to mention no true public space as all exterior space flows together, obliterating any notion of spatial layering from public areas to private areas. It is the ambition of this thesis to combine the elements of space and anti-space to create richer more meaningful places for the development. This restructuring becomes a critique of the Hope VI housing program which tends to raze ‘blighted’ housing developments and replace them with suburban designed neighborhoods.

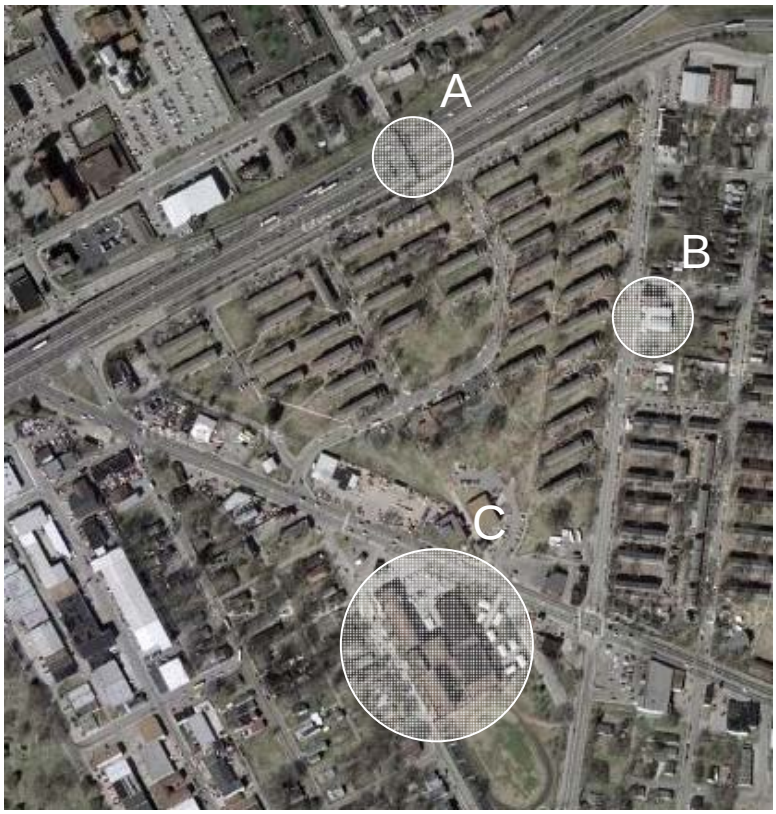
While this program is successful and raises quality of life in terms of housing, the original density is usually cut in half displacing many of the sites original inhabitants. This thesis proposes an alternate form of action where the density would remain the same if not increased, while adding mixed use options and other site amenities.



04:01
Satellite Image of Nashville, TN
(Image courtesy Google Maps)



04:02
Satellite Image of Sudekum Site
(Image courtesy Google Maps)



04:03
Diagram of Existing Site Amenities
(Diagram by Author)



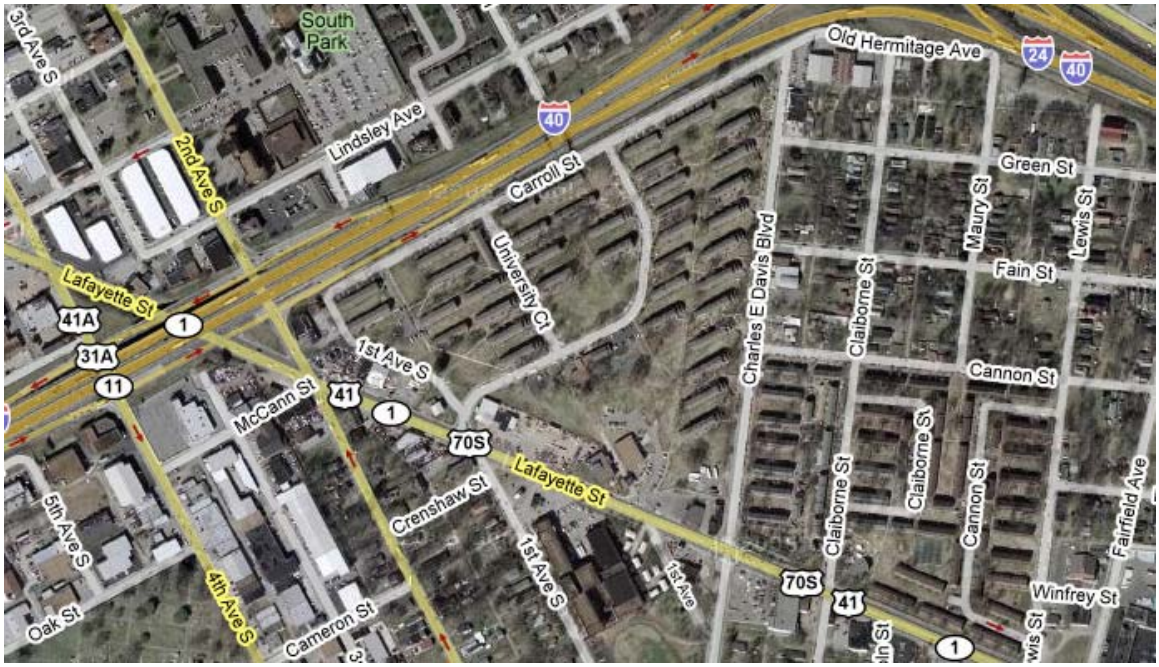


04:04-05
A.) Pedestrian Bridge Over I-40
(Photos by author)

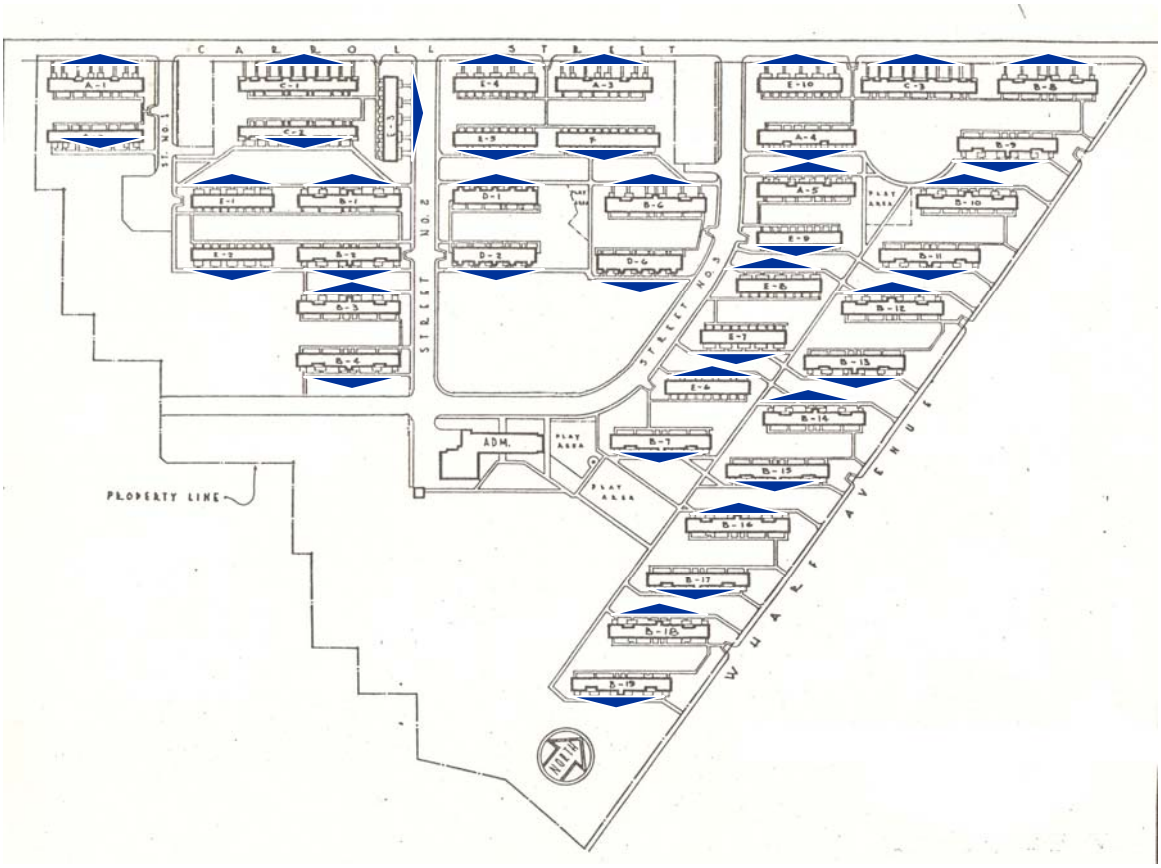


04:06
B.) Pruitt Library
(Photo courtesy Nashville Public Libraries)

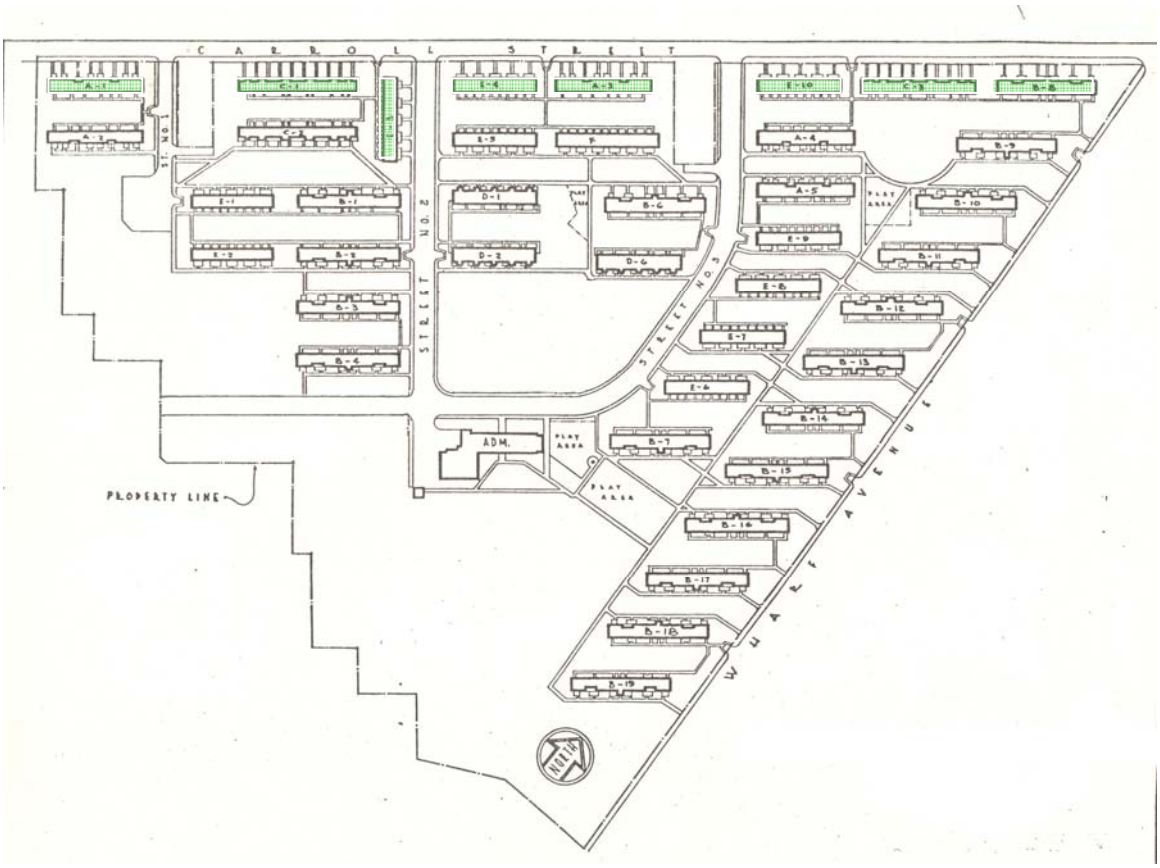
C.) Cameron Middle School



04:07
Infrastructure
(Image courtesy Google maps)



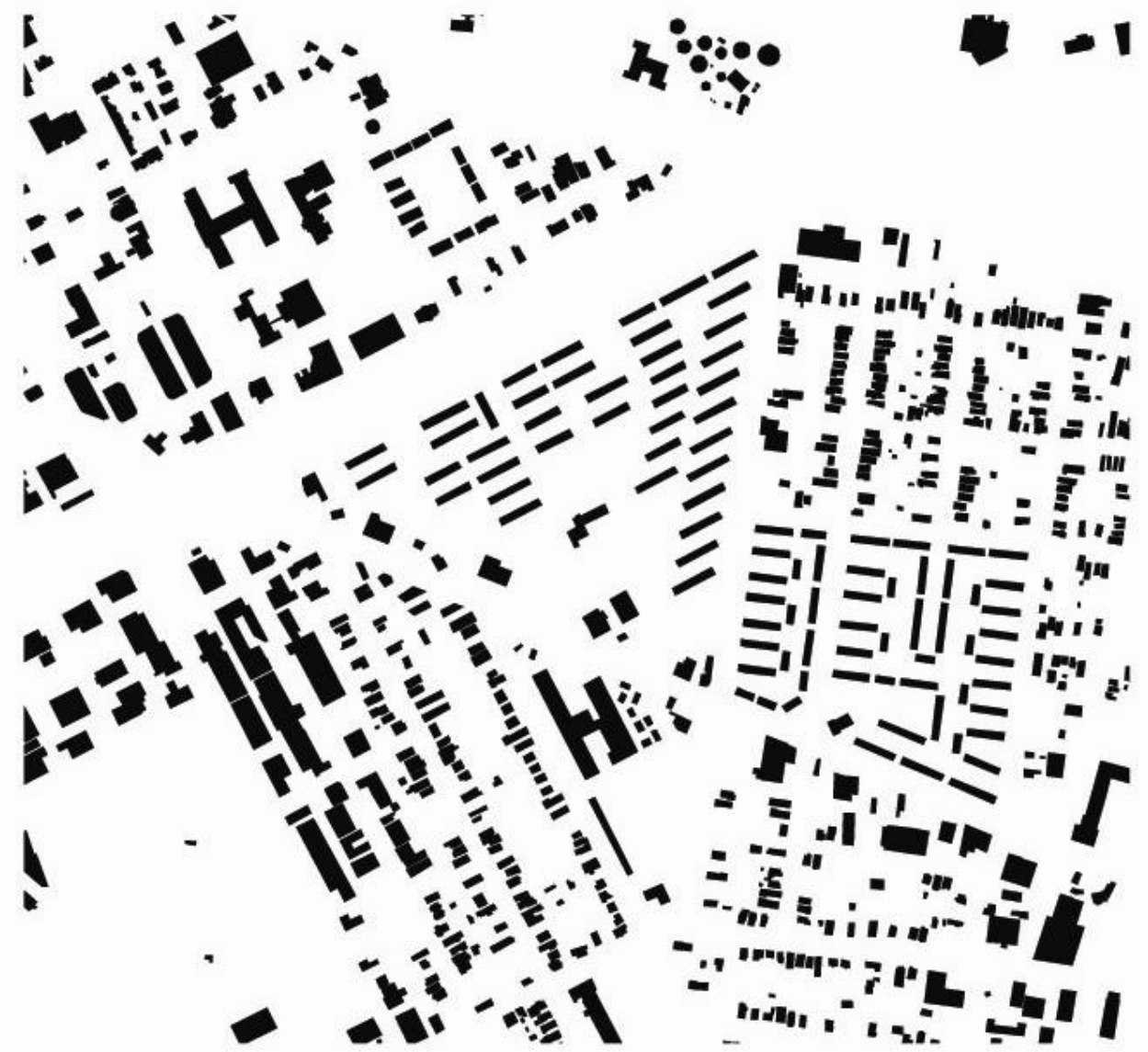
04:08
Diagram of Building Fronts
(Diagram by author)



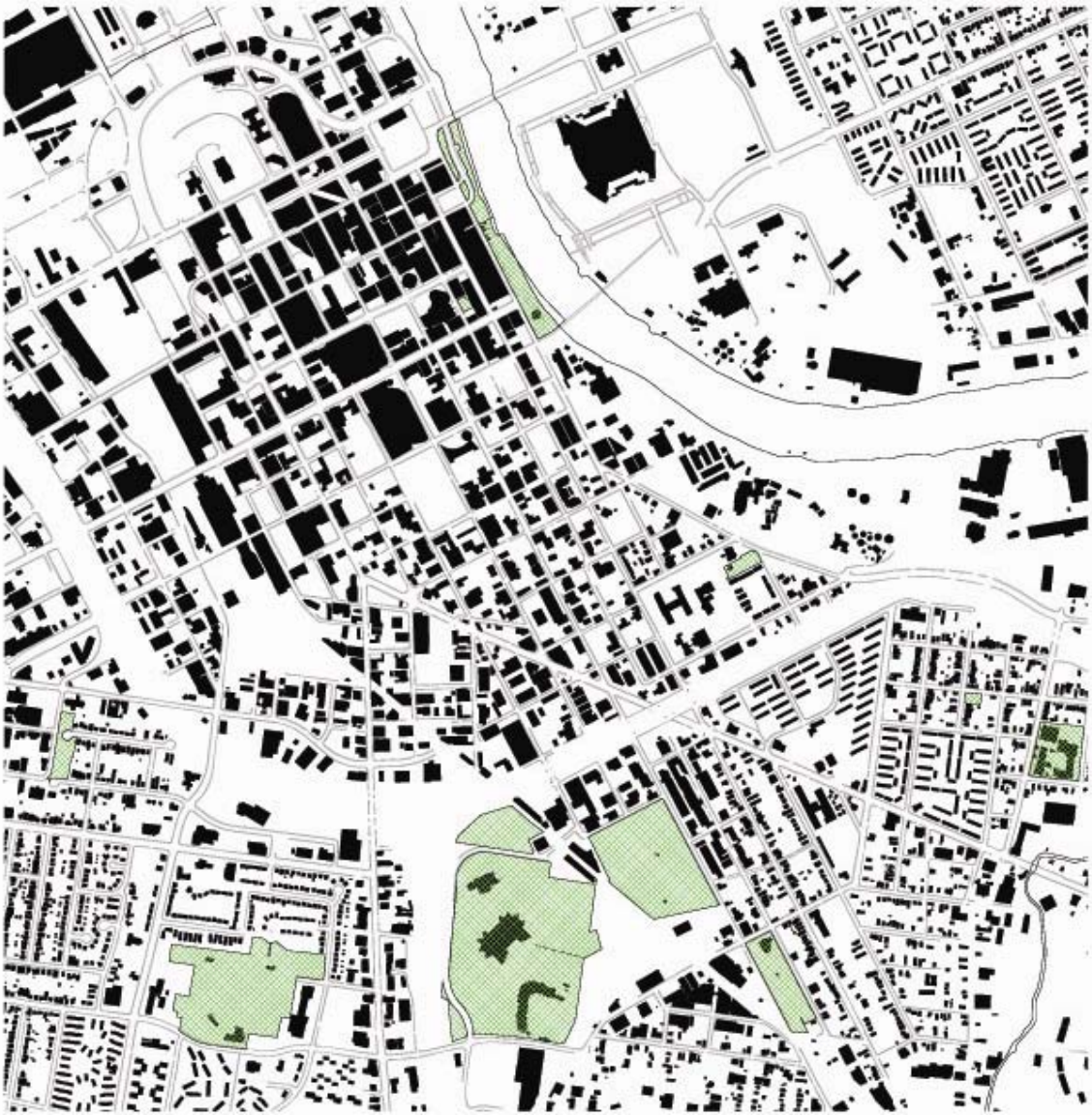
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Diagram of buildings that front streets (8 of 40 buildings)
(Diagram by author)



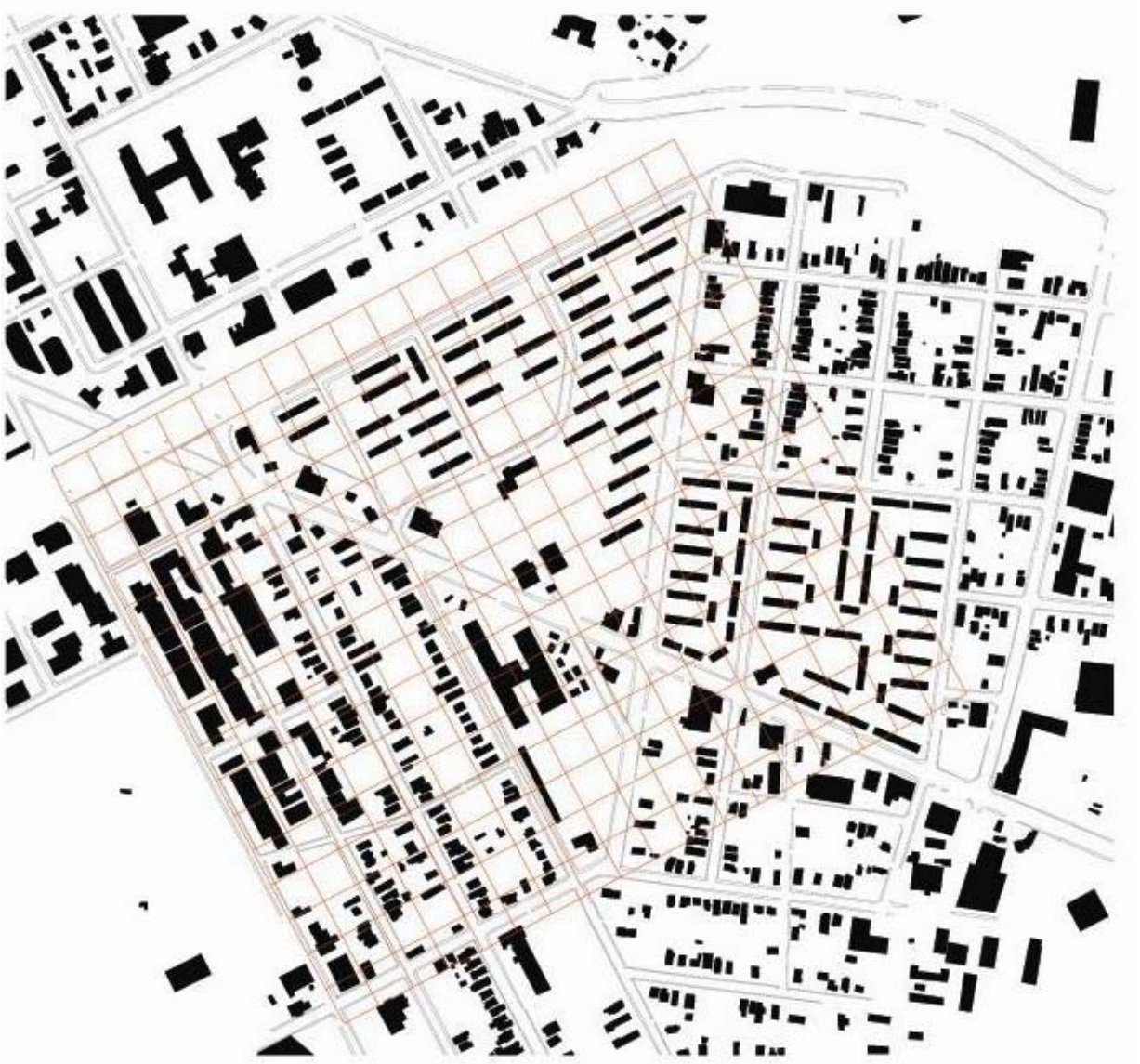
04:10
Nashville Area Figure Ground
(Diagram by author with AutoCAD file provided by Nashville Civic Design Center)



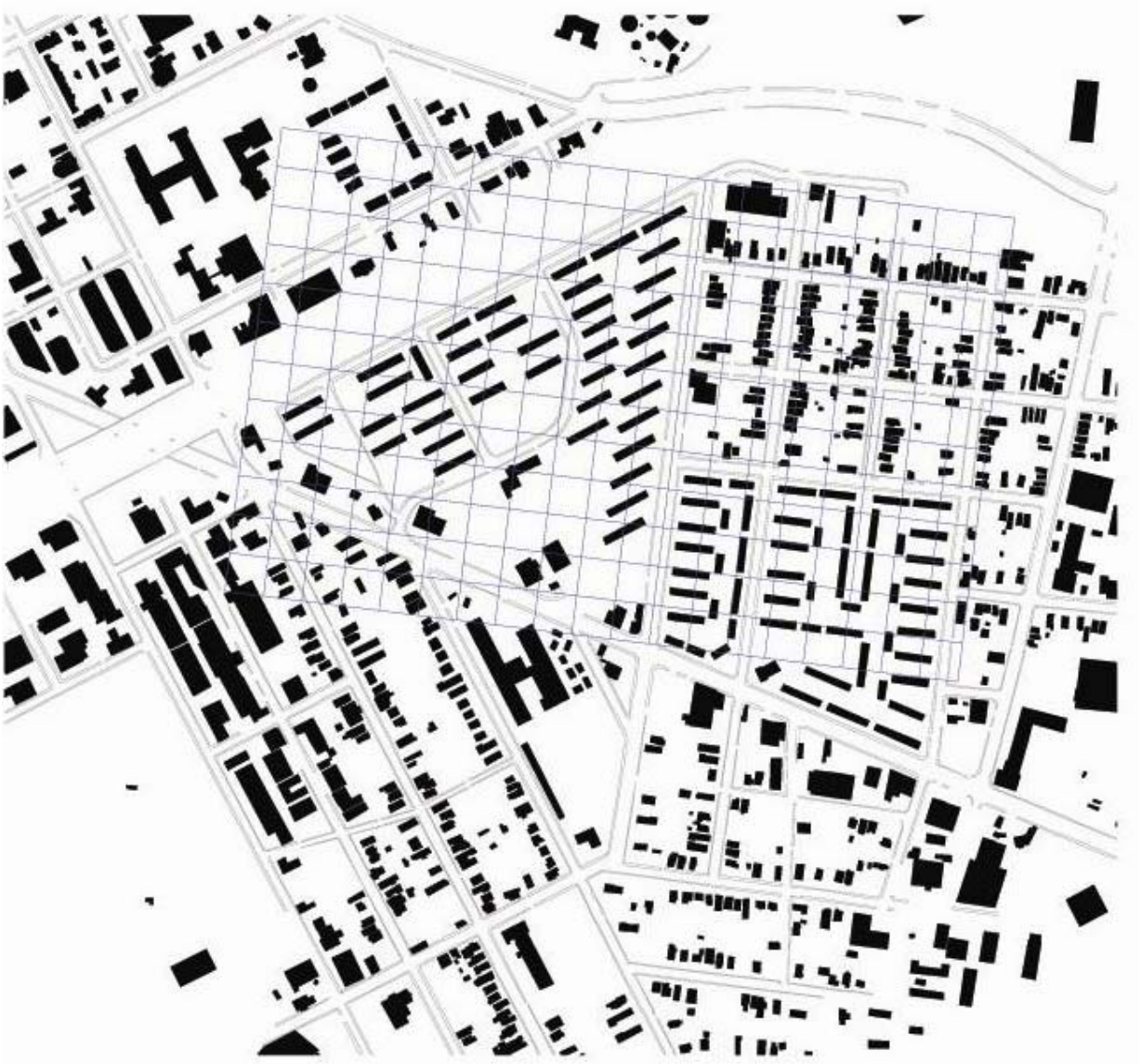
04:11
Figure Ground of Sudekum Development
(Diagram by author with AutoCAD file provided by Civic Design Center)



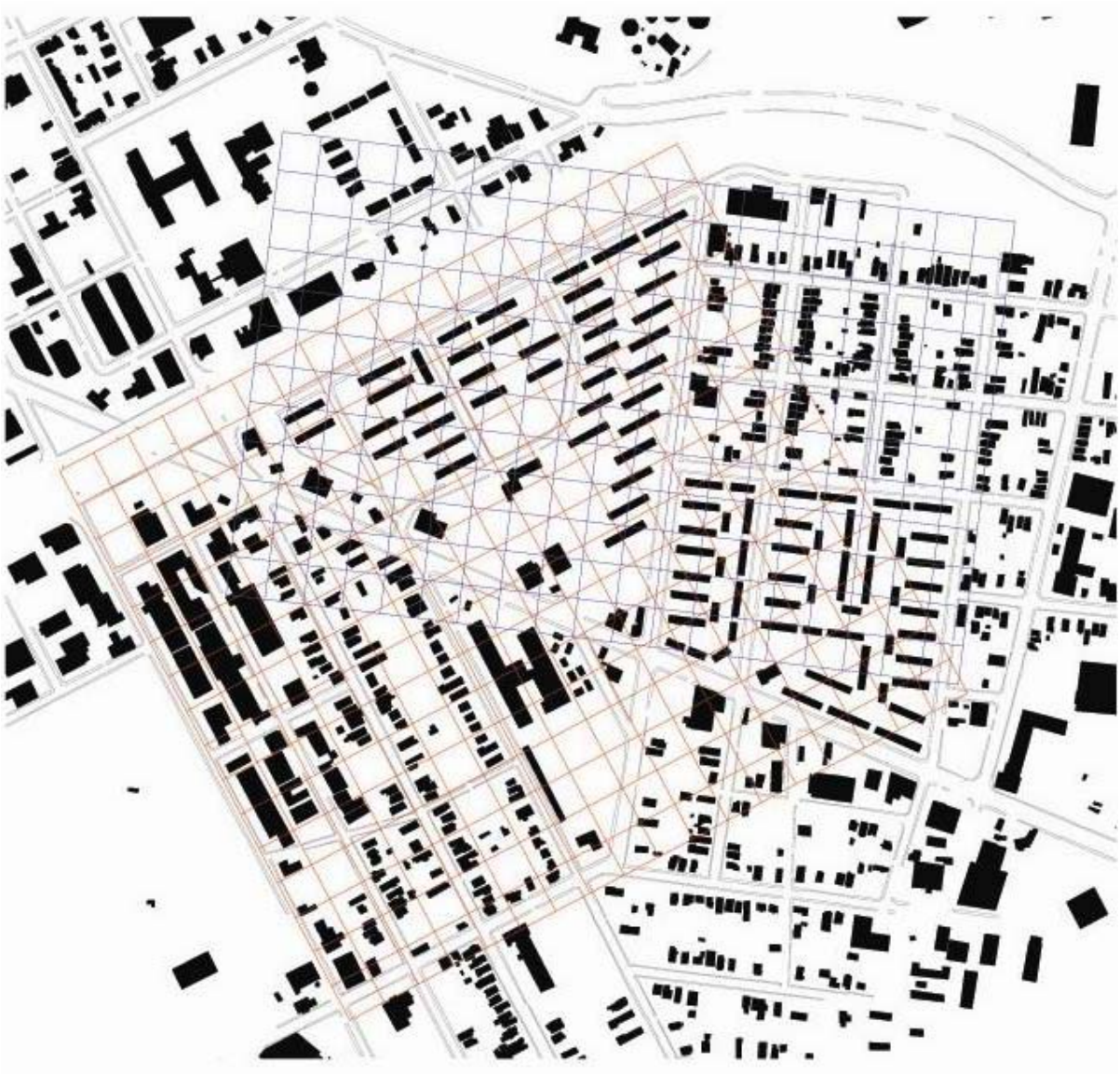
04:12
Diagram of Surrounding Park Areas
(Diagram by author)



04:13
Diagram of Sudekum Relation to Chestnut Hill Neighborhood Grid
(Diagram by author)



04:14
Diagram of Sudekum Relation to J.C. Napier Development Grid
(Diagram by author)



04:15
Grid systems overlay diagram
(Diagram by author)

(.05) Precedents

Abode (Newhall, Harlow, Essex, (England) 2001-04)
Proctor and Matthews Architects

The Abode Development by Proctor and Matthews is an excellent precedent in regard to the argument presented in this thesis. Its design is far from straight forward in any respect and is replete with materialistic issues that create a sense of differentiation and separation. The key factor here, however, is that the Abode development utilizes spatial layering factors that feature aspects of both space and anti-space that enrich the experiential aspects of the project along with processional understanding when one moves from public to private spaces.

The blending of space and anti-space is immediately evident in the entry sequence into the housing units. Note the screening elements in the form of caged rubble screen walls on the bottom most units. Here, the screen walls act as a visual interruption to the bottom units. Yet, while one cannot see past the screen while viewing it from straight ahead he/she is invited to move around and behind it to the door.

This immediately begins to denote a threshold moment which says many things. First it begins to express to the onlooker that he/she is progressing from a public area, namely the street, to a private dwelling. Also, an implied space is created in the form of an exterior entry vestibule. This is achieved by the elements of the caged rubble screen wall, the stairs, and the overhanging entry element above. The entry vestibule space is implied by the fact that space can flow around (and actually over) the rubble screen wall being only momentarily halted here and there.

However, the important aspect to note is that it is not an abrupt stop; far from it, it is still inviting individuals to come behind it to where the actual final spatial interruption from public to private occurs, which is the exterior wall of the unit itself. Progression here can be stated in terms of moving from public, to semi-public, to private.

The relationship between space and anti-space, however, does not imply only the progression from exterior to interior and the thresholds created thereof, but also ties the interior back to the exterior world that work to enhance the living experience of the units

and the quality of life therein.

Study, for a moment, the different unit plans offered by the Abode development. At first glance the interiors are similar to other development plans which almost exclusively include rigid spatial characteristics. Yet, upon closer inspection there are characteristics of anti-space that have been included to relate the interior with the exterior. To put it simply, the exterior walls have been opened up in areas to allow a spatial flow actually “extending and enlarging” what otherwise would have been rigid formed space. One could imagine this phenomenon as spatial leakage.

Imagine the highlighted areas as if they were not allowed a relationship with the exterior. The space created would be dark and too rigid, almost like a prison cell. Yet, by allowing a dialogue between the interior and exterior the qualities of the spaces created are greatly enhanced along with light, air, and quality of life issues.

The proceeding study sketches illustrate the difference between a closed and static interior condition vs. an interior condition with a mixture of space and anti-space.

The difference between an extremely rigid spatial condition and a mixture of the principles of space and anti-space is easy to see and appreciate. By varying the mix between both elements a designer can control how private and how public different areas are with the outside, with the extreme case of anti-space, being the most public element and the inside, completely rigid and closed, the most private.

Materiality also plays a huge role in the understanding of design and the relationship between space and anti-space. This aspect is most readily understood utilizing elevation drawings and façade detail photographs. When one examines the elevation drawings by Proctor and Matthews he/she can immediately discern material differences throughout the housing units. The bases of the units are of brick masonry to denote the one story flats while the upper portions are of a white opaque material.

Entrances are discerned by utilizing wooden screens or caged rubble partition walls and stairways. The façade is further broken up by means of solid vs. void both actual and implied (transparent materials such as glass). Use of glass in the Abode housing development, allows a connection (albeit

visual only) between the public realm and the private realm while the physical properties of the glass maintain an actual physical separation.

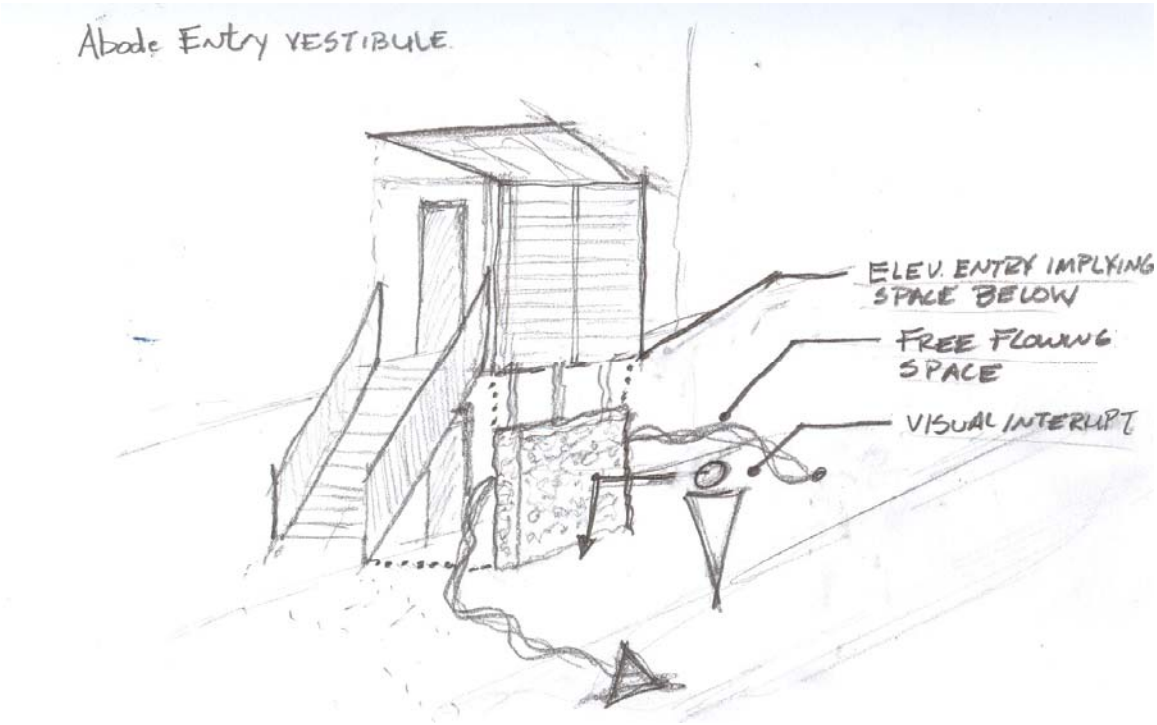
These elements break the buildings up into almost individual dwelling units even though the basic plan is that of row housing where one building houses several adjacent dwelling units. When taken as a whole, the Abode housing development is an excellent precedent in terms of combining the design elements of space and anti-space to create a sense of place.



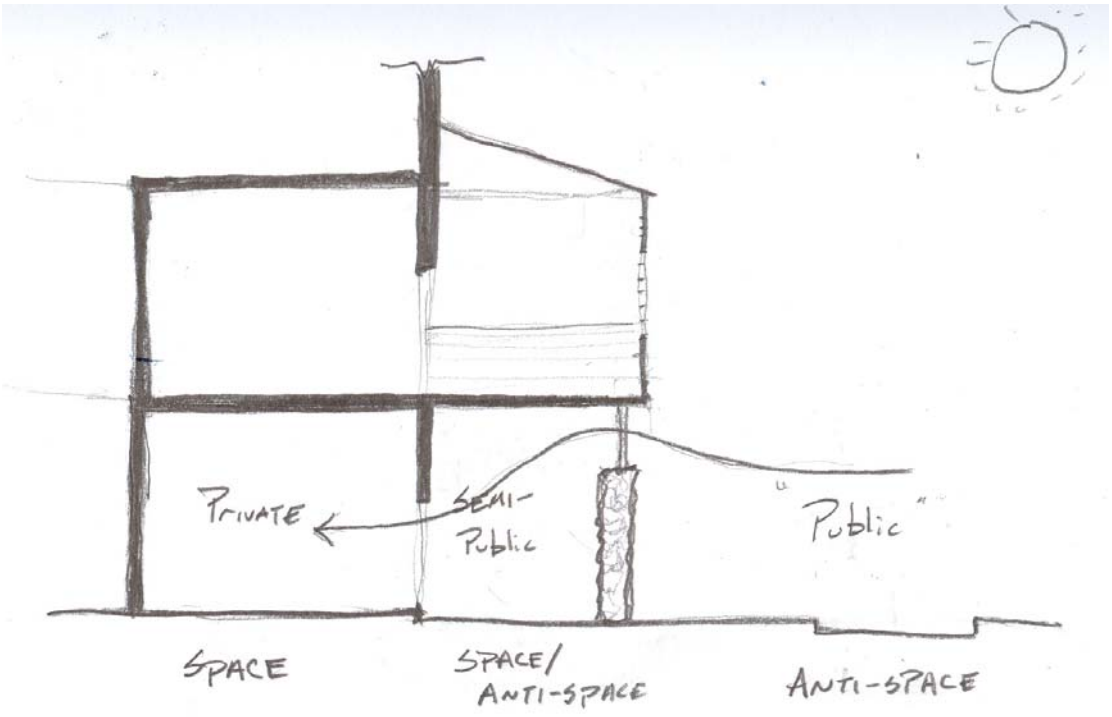
05:01
Site Plan
(Image courtesy Proctor and Matthews Architects)



05:02
Façade detail of Abode Housing Development
(Photo courtesy Proctor and Matthews Architects)



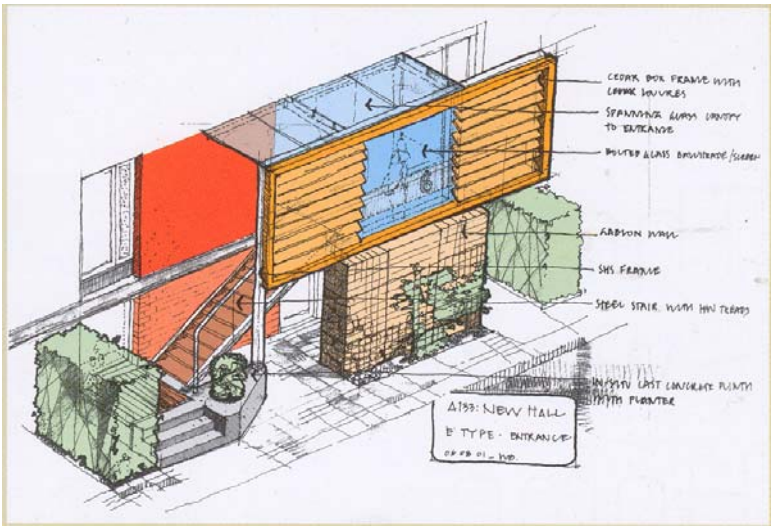
05:03
Abode Entry Diagram
(Diagram by author)



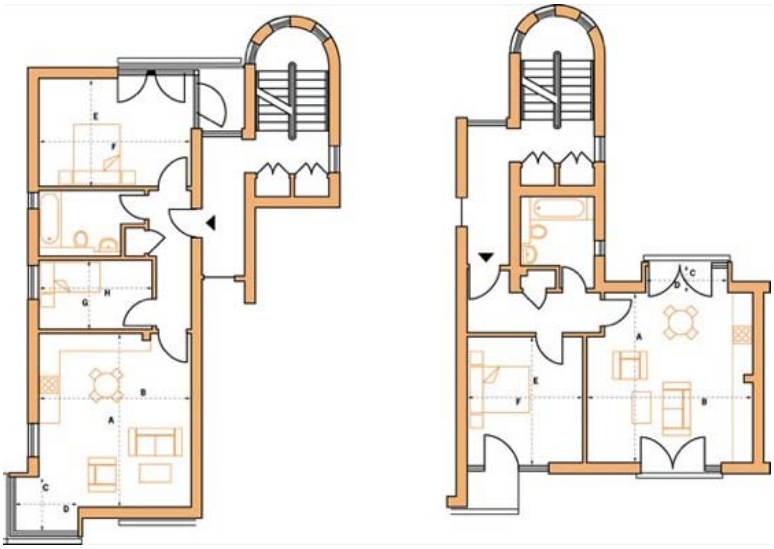
05:04
Public to Private Progression
(Diagram by author)



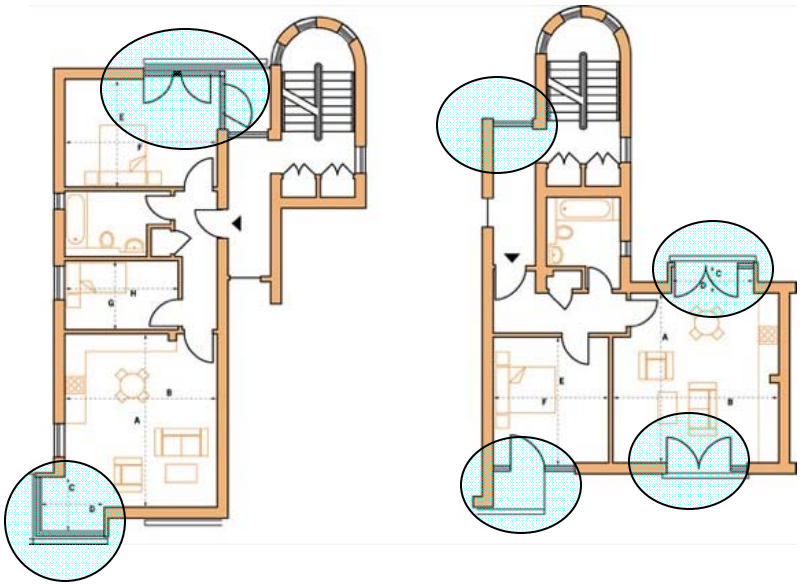
05:05
Window detail of Abode Housing Development
(Photo courtesy Proctor and Matthews Architects)



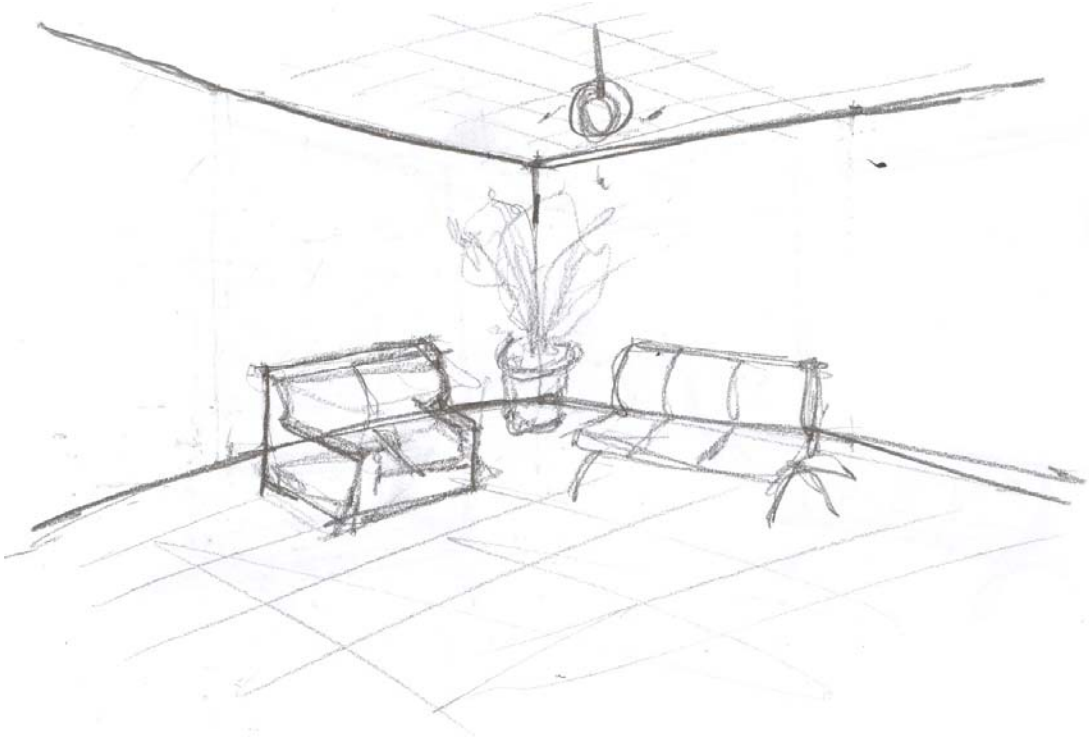
05:06
Drawing of entrance elements
(Image courtesy Proctor and Matthews Architects)



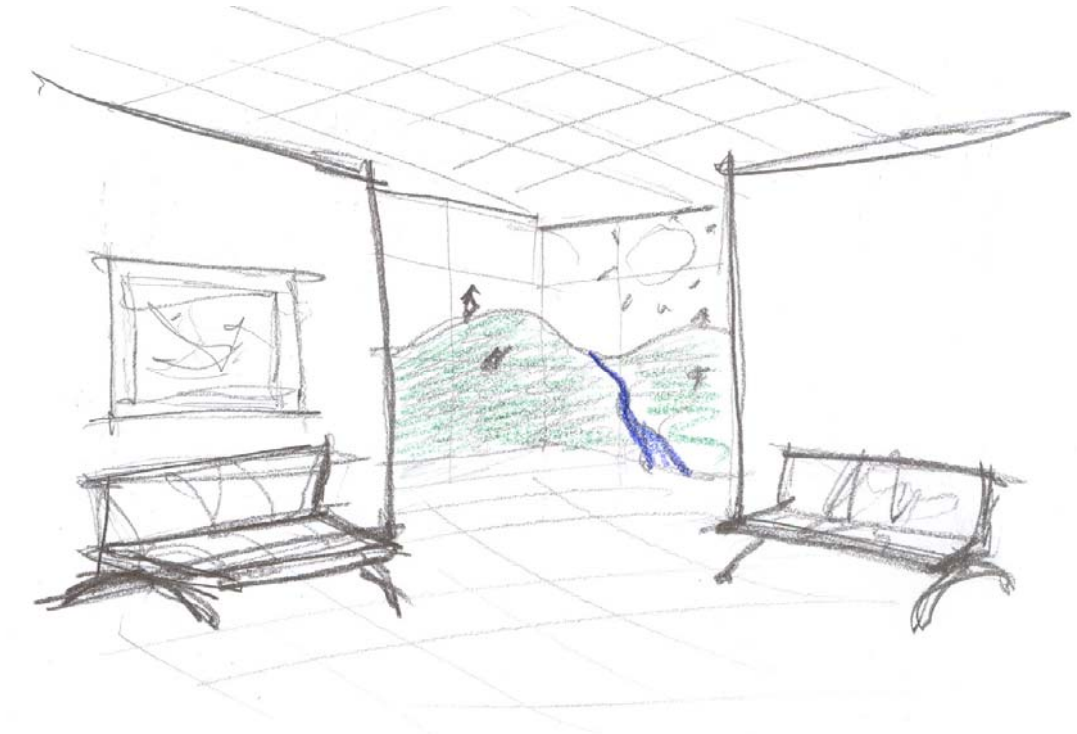
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Plan of two bed flat
(Image courtesy Proctor and Matthews Architects)



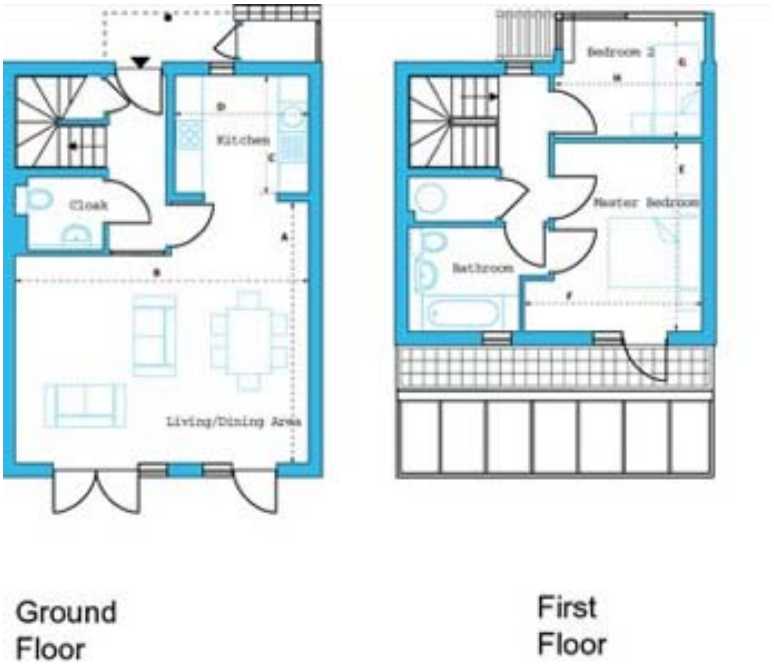
05:08
Plan of two bed flat with areas of allowed anti-space
(Diagram by author)



05:09
Sketch of a closed interior condition (rigid perceived space)
(Diagram by author)



05:10
Sketch of an opened up interior condition (allows space to be more open and flowing)
(Diagram by author)



05:11
Plan of two bed house
(Image courtesy Proctor and Matthews Architects)



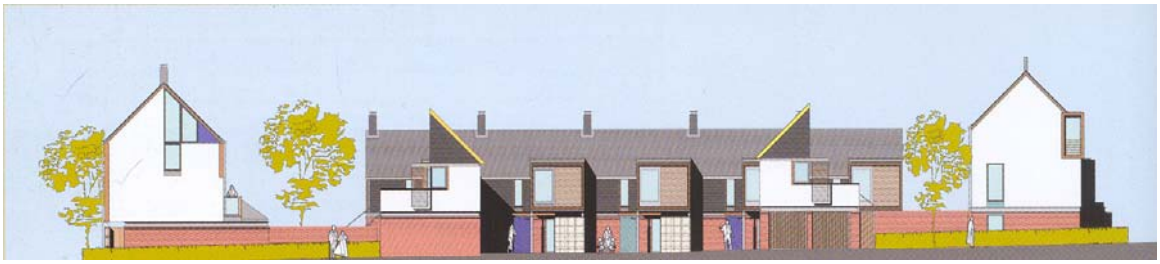
05:12
Plan of Mews house
(Image courtesy Proctor and Matthews Architects)



05:13
Photo of Interior (Note the direct relationship between inside and outside)
(Image courtesy Proctor and Matthews Architects)



05:14
Elevation of typical street facade
(Image courtesy Proctor and Matthews Architects)



05:15
Elevation of typical street facade
(Image courtesy Proctor and Matthews Architects)



05:16
Façade detail of Abode Housing Development
(Photo courtesy Proctor and Matthews Architects)



05:17
Façade detail of Abode Housing Development
(Photo courtesy Proctor and Matthews Architects)



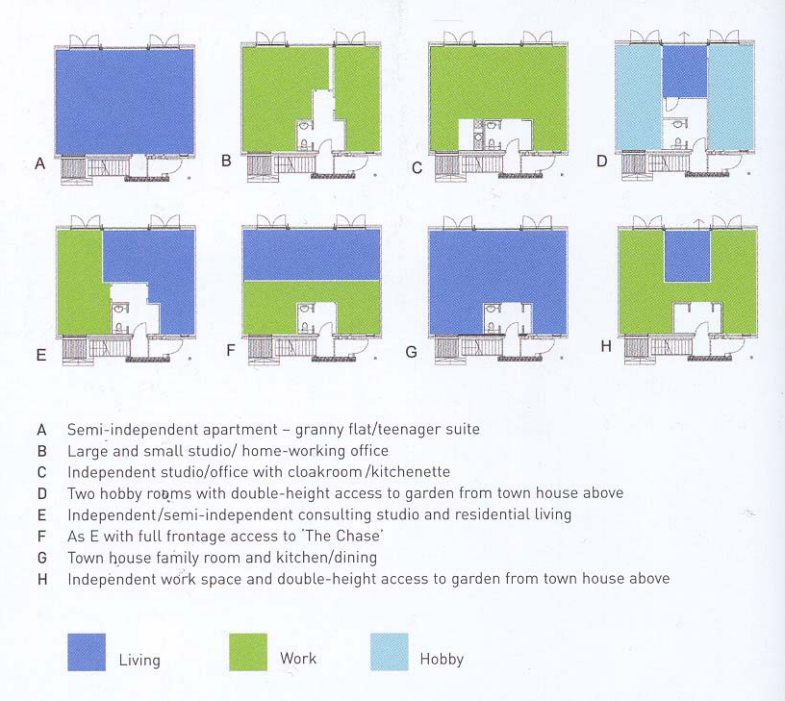
05:18
Parking detail of Abode Housing Development
(Photo courtesy Proctor and Matthews Architects)



05:19
Roofscape detail of Mews House at Abode Housing Development
(Photo courtesy Proctor and Matthews Architects)



05:20
Courtyard of Abode Housing Development
(Photo courtesy Proctor and Matthews Architects)



05:21
Diagrams of Flexible Living Accommodations
(Photo courtesy Proctor and Matthews Architects)

(.06) Program

Program Description

The decision to use the Sudekum Housing Development as a vehicle for exploration was based on the site's inherent qualities befitting the premise of this thesis. The site is designed in a manner that is lacking in formal spatial qualities that will benefit from a fusion of both space and the prevalent conditions of anti-space. This fusion will bring forth unseen potential for place making while enhancing the quality of life for its inhabitants and visitors.

Macro Scale Programmatic Elements

Programmatic elements at the Macro-Scale are tentative in nature with the focus of the project on the housing units and their relation to each other and exterior spaces. Macro-programmatic elements may become more indispensable as the design process continues, at which time they will be given more rigid individual programs.

New Street Systems

The addition of new street patterns brings with it order and layering. Curbside parking will be added to the already existing street parking conditions which contributes to a sense of security by encouraging street use, providing a buffer between pedestrians and traffic, and inherently calming traffic flow.

Play Areas – Neighborhood Parks

Neighborhood Parks offer a neutral ground for people to meet and congregate creating the opportunity for great public spaces. The parks should be spacious and open with access to large amounts of natural light. This area should also pay special attention to the relationship between itself and the housing units. Progression through the parks offer added buffer zones or layers softening the transition from the public to private realm.

Administrative Building

The Administrative Building should be centrally located so as to have quick and easy access by all inhabitants and visitors to the site.

Neighborhood Association Building

This building would be an added element which could combine the now scattered elements of daycare and the on site clinic. Certain other added elements could include an indoor basketball court and swimming facilities which would be shared by the community. The building would also serve as a meeting place for the inhabitants for various functions.

Maintenance and Storage Facility

This facility will house equipment necessary for the upkeep of the grounds and office space for onsite laborers.

Commercial / Mixed Use

“Nearby schools, libraries, and workplaces, as well as ‘Main Streets’ that host a lively mix of commercial and other uses, invite people to walk around the neighborhood and meet others. These shops, schools, and workplaces bring daytime activity to a residential neighborhood, and housing brings after-hours activity to an office zone.” (Goody, Clancy & Associates; Robert Chandler…et al, pg. 16)

Micro Scale Programmatic Elements

Housing Units

Housing Units should consist of One to Five bedroom options which include kitchen areas, dining room, living room, bedroom(s), bathroom(s), laundry, and closet and storage spaces. Housing Units, if possible, should also front streets. This condition places *eyes on the street* to borrow from Jane Jacobs’ term from her book *The Death and Life of Great American Cities* which promotes safer communities through observation on activities taking place outside.

Exterior Spaces to Dwelling Units

Exterior spaces add a sense of privacy and ownership in an otherwise shared community. These spaces also allow for a fusion of space and anti-space in relation to the dwelling units allowing the outside to come in and vice-versa.

Program Specifications

Presumptions: units are 75% efficient in terms of space.

Square footage based off Nashville area code minimums then adjusted according to occupancy needs.

2 Bedroom Units

Program Description	Program Size
Living Room	150 sq. ft.
Dining Room	80 sq. ft
Kitchen	150 sq. ft
Bathroom	45 sq. ft (min)
Master Bedroom	170 sq. ft
Bedroom 2	120 sq. ft
Total: Net and Gross	Net (715 sq. ft.) Gross (953 sq. ft) x 235 units (+ or -)

3 Bedroom Units

Program Description	Program Size
Living Room	200 sq. ft.
Dining Room	80 sq. ft
Kitchen	150 sq. ft
Bathroom	90 sq. ft (min)
Master Bedroom	170 sq. ft
Bedroom 2	120 sq. ft
Bedroom 3	120 sq. ft
Total: Net and Gross	Net (930 sq. ft.) Gross (1240 sq. ft) x 146 units (+ or -)

4 Bedroom Units

Program Description	Program Size
Living Room	200 sq. ft.
Dining Room	120 sq. ft
Kitchen	200 sq. ft
Bathroom	90 sq. ft (min)
Master Bedroom	170 sq. ft
Bedroom 2	120 sq. ft
Bedroom 3	120 sq. ft
Bedroom 4	120 sq. ft
Total: Net and Gross	Net (1140 sq. ft.) Gross (1520 sq. ft) x 52 units (+ or -)

5 Bedroom Unit

Program Description	Program Size
Living Room	250 sq. ft.
Dining Room	120 sq. ft
Kitchen	200 sq. ft
Bathroom	90 sq. ft (min)
Master Bedroom	170 sq. ft
Bedroom 2	120 sq. ft
Bedroom 3	120 sq. ft
Bedroom 4	120 sq. ft
Bedroom 5	120 sq. ft
Total: Net and Gross	Net (1310 sq. ft.) Gross (1747 sq. ft) X 10 units (+ or -)

Proposed Program Specifications for Proposed Units

Presumptions: units are 75% efficient in terms of space.

Square footage based off Nashville area code minimums then adjusted according to occupancy needs.

Proposed units are intended as infill and replacement infill for existing buildings to be demolished as per design solution.

2 Bedroom Units

Program Description	Program Size
Living Room	150 sq. ft.
Kitchen/Dining Room	80 sq. ft
Bathroom	45 sq. ft (min)
Master Bedroom	170 sq. ft
Bedroom 2	120 sq. ft
Total: Net and Gross	Net (907 sq. ft.) Gross (922 sq. ft) x 36 (+ or -)

3 Bedroom Units

Program Description	Program Size
Living Room	264 sq. ft.
Kitchen /Dining Room	165 sq. ft
Bathroom	45 sq. ft
Master Bedroom	198 sq. ft.
Master Bath	53 sq. ft.
Bedroom 2	125 sq. ft
Bedroom 3	101 sq. ft
Total: Net and Gross	Net (1181 sq. ft.) Gross (1235 sq. ft) x 60 units (+ or -)

4 Bedroom Units

Program Description	Program Size
Living Room	264 sq. ft.
Kitchen /Dining Room	165 sq. ft
Family Room	193.5 sq. ft
Bathroom 1	43 sq. ft
Bathroom 2	43 sq. ft
Master Bedroom	177 sq. ft
Bedroom 2	150 sq. ft
Bedroom 3	159 sq. ft
Bedroom 4	154 sq. ft
Total: Net and Gross	Net (1515 sq. ft.) Gross (1854 sq. ft) x 60 units (+ or -)

5 Bedroom Unit

Program Description	Program Size
Living Room	246 sq. ft.
Kitchen/Dining Room	246 sq. ft
Family Room	284 sq. ft
Bathroom 1	45sq. ft
Bathroom 2	45 sq. ft (min)
Master Bedroom	165 sq. ft
Bedroom 2	137 sq. ft
Bedroom 3	140 sq. ft
Bedroom 4	162 sq. ft
Bedroom 5	138 sq. ft
Total: Net and Gross	Net (1465 sq. ft.) Gross (1844 sq. ft) X 36 units (+ or -)

Building Codes

The building codes utilized for the purposes of this thesis is the International Building Code. All proceeding information was gathered from Edward Allen and Joseph Iano's, *The Architect's Studio Companion, Third Edition.* Only information that directly applies to the proposal have been included. The proposed development is considered residential with the likelihood of mixed use buildings as well. As the design evolves, additional Building Codes may apply.

Occupancy Groups

R. Residential	Residential uses include facilities where people live and sleep when not in a supervised setting that would be classified as an Institutional use. *The applicable sub-groups are:* **R-2:** This group includes primarily permanent residential occupancies that contain three or more dwelling units, such as apartment houses, dormitories, fraternities, sororities, and the like.

Construction Types

III-A: 1-hour Ordinary	In 1-hour Ordinary Construction, all roofs, load bearing walls, and floors must have 1 hour of fire protection. Interior Framing: members of wood may not be less than 2 in. nominal dimension. Walls and partitions are framed with studs, floors with joists, and roofs with rafters or light trusses, usually at spaces of 16 or 24 in. Exterior Walls: must be non-combustible. The degree of fire resistance required for exterior walls varies from zero to 4 hours depending on the occupancy of the building. (see Allen & Iano, p. 313 for minimum requirements)

Life Safety/Fire Prevention

An approved sprinkler system is required for all Group R-2 occupancies.

At least 25% of building perimeter accessible to firefighting vehicles on a street or open space 20ft. wide (minimum).

Fire Resistance Ratings:	• Structural Frame including columns, girders and trusses (1 hr. rating) • Exterior Bearing Walls (2 hr. rating) • Interior Bearing Walls (1 hr. rating) • Floor Construction (1 hr. rating) • Roof Construction (1 hr. rating) • Party Walls and Fire Walls (2-4 hr. rating) • Enclosures of Exits, Exit Hallways, Exit Stairways, Shaft Enclosures (2 hours connecting 4 stories or more, 1 hour connecting fewer than 4 stories) • Exit Access Corridors (0-1 hrs.) • Tenant Space Separations (1 hr.) • Dwelling Unit and Guest Room Separation (1 hr.) • Other Nonbearing Partitions (0 hrs.)

Height and Area Limitations

Presumptions: Type III-A (Combustible) construction
Approved Residential Sprinkler system throughout

R-2 (Residential)	III-A: 1-hr. rating: 60’ maximum height 24,000 square feet max floor area for any single floor

Egress

Presumptions: Occupant Load: 500 or fewer persons
Floor area/occupant: 200 square feet (gross)

Fire Exits	2 per floor minimum (including windows for bedrooms)
Door, Corridor, and ramp widths	32 in for doors, 36 in corridors within dwelling units
Stairs	44 in stair widths

Accessibility for Disabled Persons

Minimum Number of Accessible Sleeping Accommodations or Dwelling Units
(R-2: Multi-family Occupancy: 20% but never less than one)



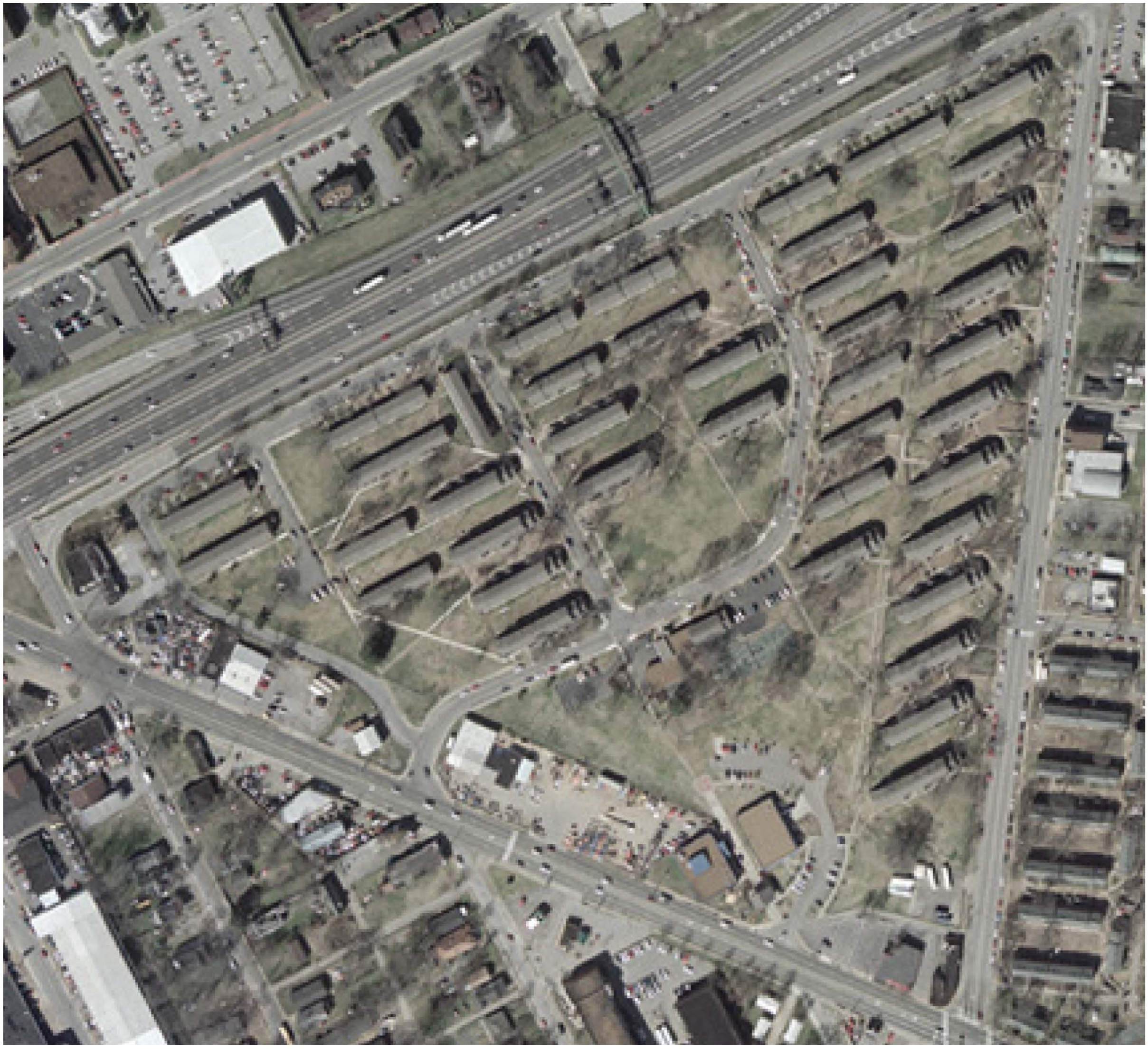
Nashville, Tennessee

Aerial Photograph

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City of Nashville

Figure Ground



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Sudekum Housing Development Existing

Aerial Photograph Sudekum Neighborhood



Existing Figure Ground

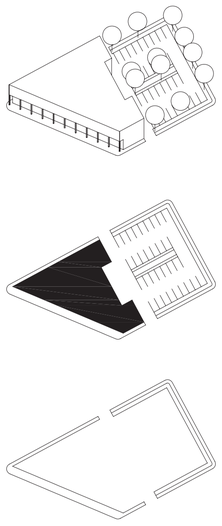
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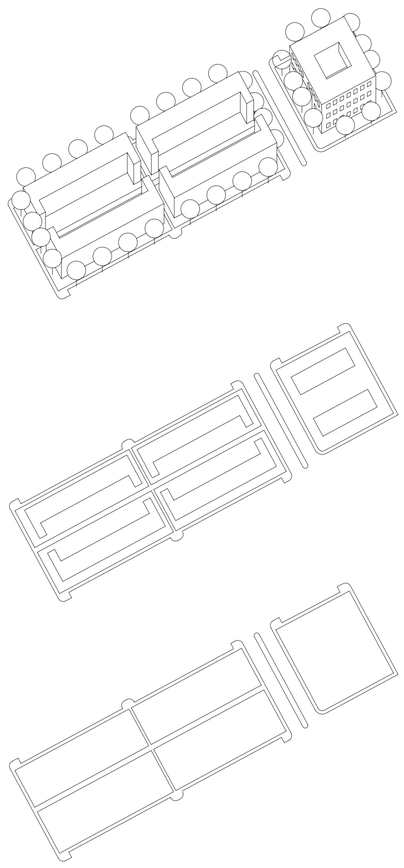
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Sudekum Housing Development Existing

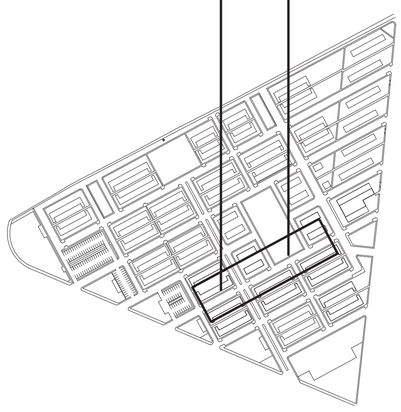
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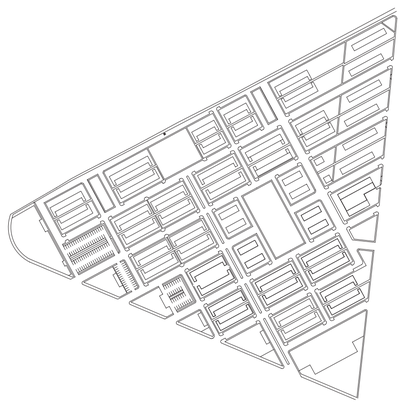
Commercial Blocks



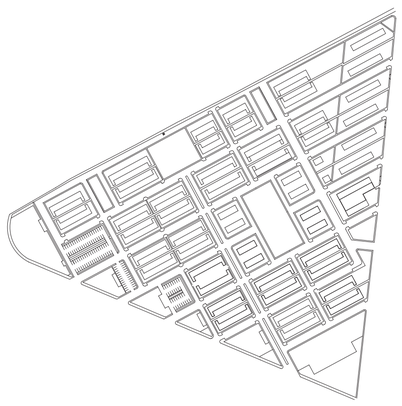
Residential Blocks



Block Patterns



Public Open Space



Framework of Streets



Existing Conditions



Reconfiguration

d

Site Reconfiguration Diagram

Scale:

d

Proposed Figure Ground

Scale: 1:100

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Sudekum Housing Development Proposed

Scale: 1:100

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Proposed Commercial Residential Relationship

Scale: 1:40



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Sudekum Housing Prototype

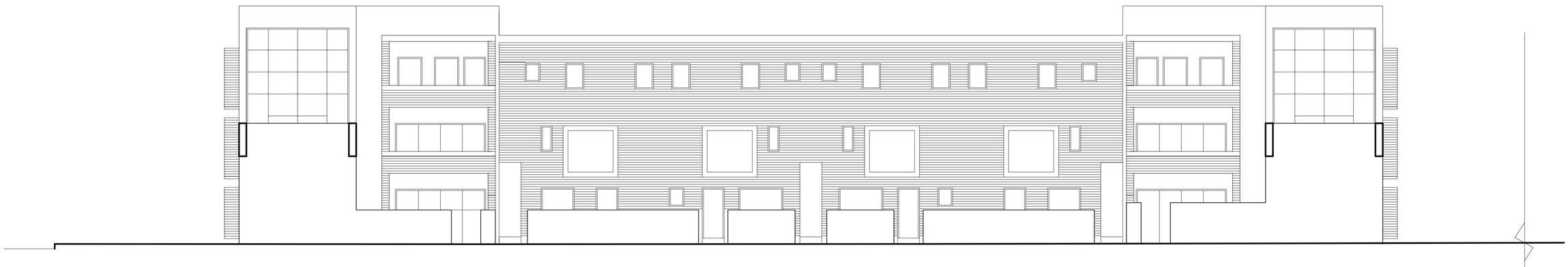
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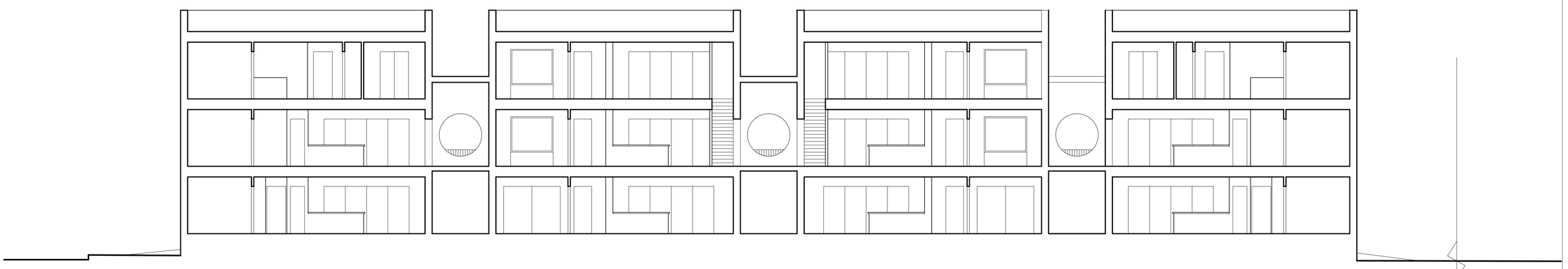
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Sudekum Housing Prototype Cutaway Axon

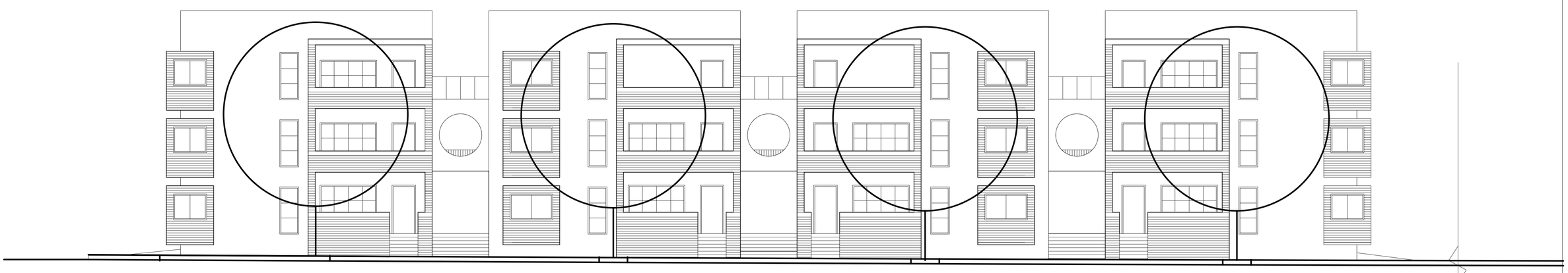
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Rear of Modified Existing Unit
Scale 1/8” = 1’



Longitudinal Section New Housing Prototype
Scale 1/8” = 1’

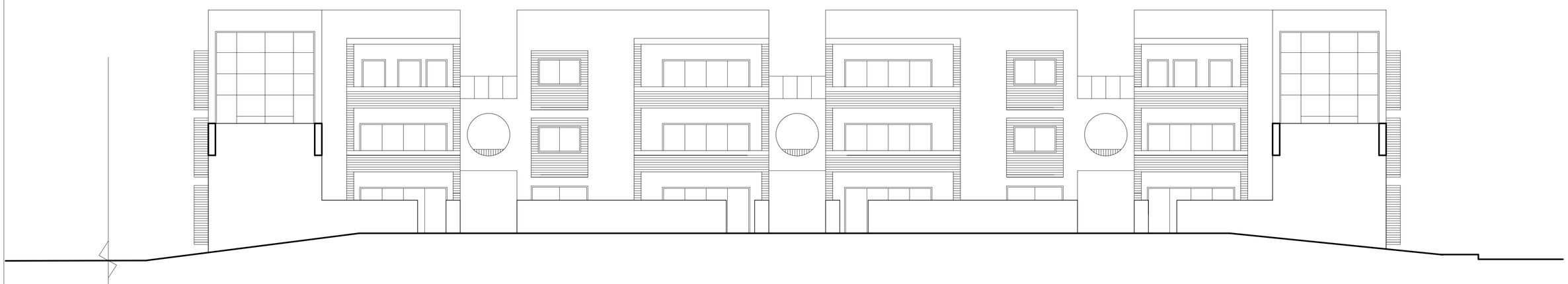


Street Elevation New Housing Prototype
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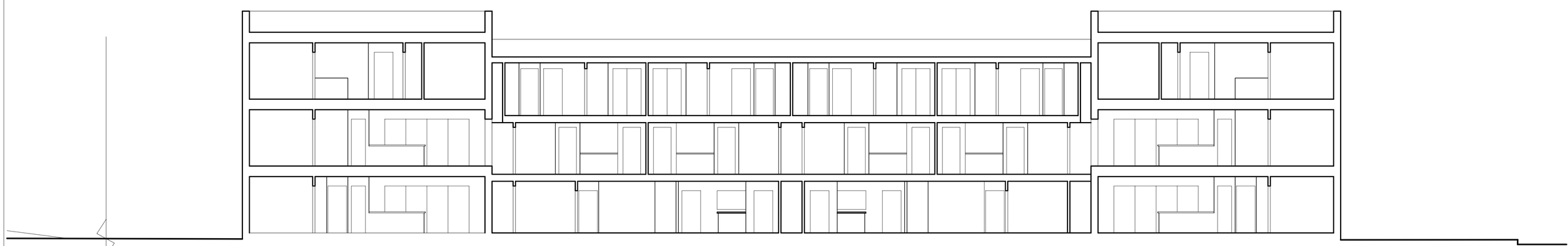
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Sudekum Housing Prototype Elevations

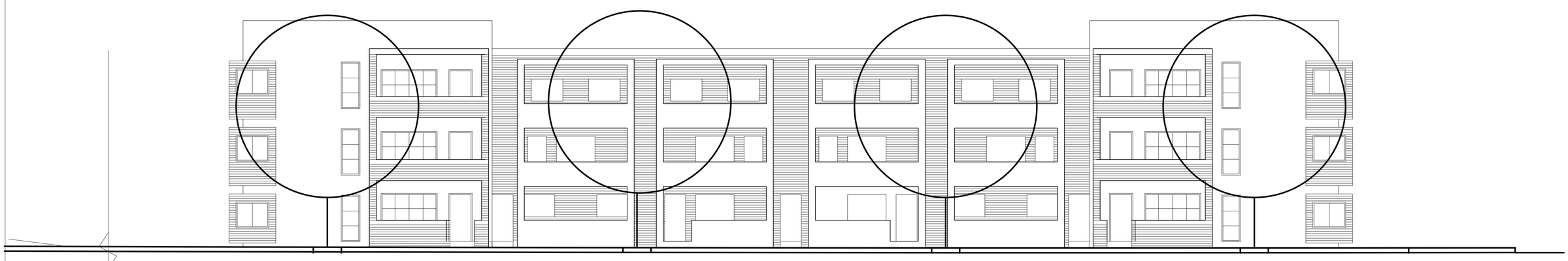
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Rear of Modified Existing Unit
Scale 1/8” = 1’



Longitudinal Section Modified Existing Unit
Scale 1/8” = 1’

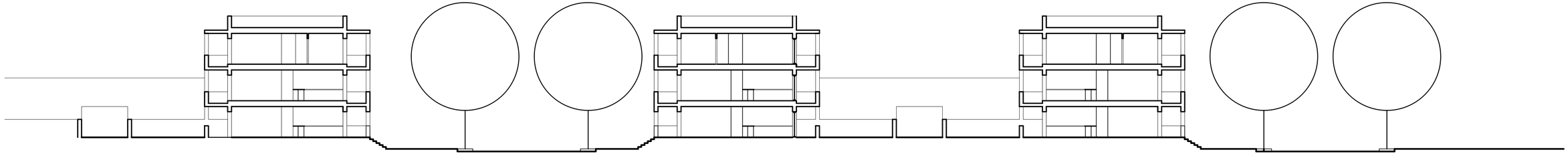


Street Elevation Modified Existing Unit
Scale 1/8” = 1’

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Sudekum Housing Prototype Elevations

Scale: 1/8” = 1’



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Vita

David Dayne Cook was born January 4, 1980 and grew up in London, KY. He attended high school at South Laurel High School where he participated in Varsity Baseball and Golf. He received a Golf Scholarship to Union College in (Barbourville, KY). He attended Union College for one year before transferring to Morehead State University (Morehead, KY) where he earned a Bachelor of Science in Industrial Technology. In the summer of 2004 he was accepted into the Masters Program at the University Of Tennessee College Of Architecture. He is married to Rachael L. Cook and is currently an intern architect at R2R Studio and lives in Knoxville, TN.