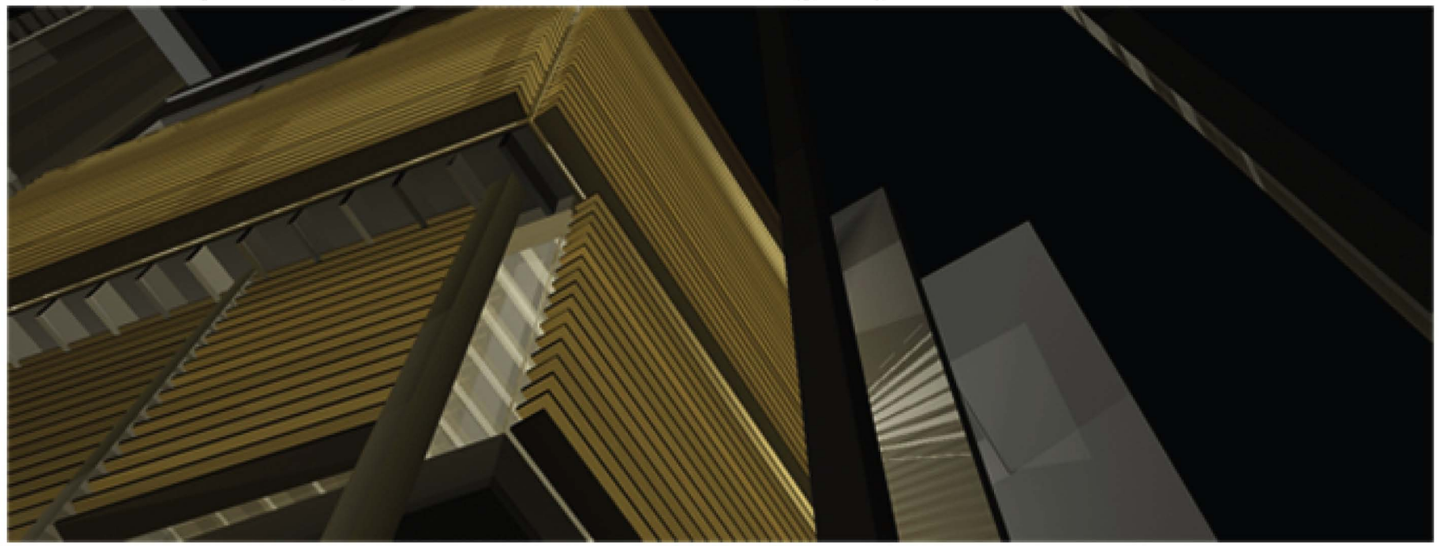
Exploring the Balance & Integrity of Architecture



Carolyn M. Richard

Exploring the Balance & Integrity of Architecture

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Thesis submitted to faculty of the Virginia Polytechnic Institute and State University in partial fulfillment of the requirements for the degree of Master of Architecture.

Approved

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Keywords: balance, kinesthetic pattern, structure, circulation, strength, residential building, educational building

Image by Author

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A B S T R A C T

During the exploration of designing a small residential building along side a three-story mixed-use center for individuals and families newly diagnosed with diabetes, I studied a variety of ways to architecturally embrace the essence of balance. Throughout this thesis, the quests of understanding "balance" accelerated and complicated most of the decision making. Architecturally, this thesis explores the balance between the public city and the private residence; historical architecture and the proposal of new construction; and the between solid obstructions verse the fluidity of circulation paths.

The pursuit of balance even occurs at the small scale of details. How do you achieve balance at the integration of two of more materials?

I believe that visual situations are most stimulating when they achieve the appropriate balance.

Keywords: balance, kinesthetic pattern, structure, circulation, strength, residential building, educational building

DEDICATION

I dedicate this book to my amazing parents, Valeria E. Richard and the late Charles W. Richard.

SPECIAL THANKS

A special thanks to my wonderful new husband. Throughout our first year of marriage he has shown me the meaning of love, in ways only another aspiring architect could. Through his encouragement, critiques, model building, and just the simple nearness of his presence, he sustained me. He encouraged me through the discouragement I felt when there appeared to be no end in sight.

Thank you to my wonderful committee for your guidance and insightful comments. Thank you, Caren Yglesia, for being an honorary committee member.

Thank you to the wonderful WAAC students who helped me pull thing together at the very end. This includes the students who returned the West Room wall back to its original beauty.

CONTENTS

PREFACE

I started my exploration "small," looking for answers to the question, "why am I attracted to certain shapes, color and compostions?" This question sustained months of investigation and refining. In retrospect, I think I should have asked myself what topic can I choose to cause the most stress, self doubt and fuel the quest for life fullfilment.

Aesthetics

There are different levels of aesthetics. If we look to nature we can find different levels of attraction in its most primitive form. Richard Neutra explains his understanding of aesthetic appeal as the sequence of stimulation, optical, olfactory and tactual. Neutra continues by explaining our various levels of appeal. The basic level of appeal can be compared to that of a bumblebee's attraction to a flower. Eventhough the bee is attracted to the flower for pollination purposes, there is another level of attraction, an instinctive attraction. The instinctive elements are what attracts us to flowers, to their color, shape, and smell.

The image to the right is a good example top of optical appeal. This image has been my inspiration throughout my thesis journey. The gentle overlapping shapes and colors are engaging and appealing to view. Optical stimulation is usually the first connection made in an attraction.

All images and photos created by the author

The next level that Neutra explains is that of form. A form that express function can have aesthetic appeal. For instance, the body of a fish can appeal to our senses because we are able to read the functional expressions portrayed in its body characters.[4] An architectural example of this can be seen in the glass certain wall system that is used in the Finish Embassy in Washington D.C. (image to the lower left). The structural elements of the glazing system are functionally expresive. The complexity of this system is intriguing and visually stimulating. One might pause as they visually disconnect and reassemble all the pieces in order to understand how the system works. There is something intriguing about being able to form an understanding of something by visually studying it. With this understanding comes a sense of trust and acceptance is created. Donald Norman believes that we have an emotional appeal towards design. "If it looks dangerous, the muscles tense and they focus on the immediate problem. If it looks safe they can take it easy, but also explore and learn."[7] The primary appeal can happen in two different manners; either as a shock or sudden instance or as a lingering steady happening. [4]

Donald Norman, a professor of computer science and psychology at Northwestern University and co-founder of a consultancy, Nielsen Normans Group explains how design is more than a matter of aesthetics in his book Emotional Design: Why We Love (Or Hate) Everyday Things.[7] He writes in depth about three levels of processing design. Norman believes that our basic level of processing involves natural and automatic interpretation. This level is called the visceral level of process.[5] I think this idea is very similar to Neurta's bee attraction appreal.[5] When we perceive something as pretty our judgement comes from the visceral level. We are responding with our initial reaction.

"Visceral design [is] in advertising, folk arts and craft, and children's items. Thus, children's toys, clothes and furniture will often reflect visceral principles; bright and highly saturated with primary colors."[5 pg 66] Other features of the visceral level are texture, sound, graphics and cleanliness. Norman believes this is why we respect the firmness of car doors and chunk sound it make when we close it.[5]

The second level of processing and design is behavioral. At this level, function and use are important. "Appearance doesn't really matter."[5 pg.70] At this level it is important to understand the user and know how the product or design is works for them. Does the product create problems, how can I eliminate problems and is the product user friendly are just a couple questions that we as designers should be asking. In reference to circulation and the spatial layout within an architectural building, the designer needs to fully understand the purpose of the building. Functionally, the location of spaces should work well with each other to provide a seamless and logic transition.

The third and final level of design according to Norman is reflective design. Reflective design is "all about message, culture, and about meaning of a product or its use."[5 pg.88] The idea of self-image is also included in the reflectiveness of design. In product design the quality out weighs the behavioral design. An example of this can be seen in way people go about selecting a watch to wear. Some may select a watch for it visual aesthesis over its ability to provide a ledgeable representation of time. If the watch looks "cool" and makes the owner feel "cool" them they will buy that watch. The reflective quality is based on how you feel when you wear the watch. In reference to architecture, I think that the behavioral quality is slightly higher than the reflective quality. I think that the way you feel about a building and how you feel inside of it has more depth than the reflective response it might cause, however I see that in moderation. It is important that you don't feel embarrassed walking into a building.

The ability of something having an appeal to it has a direct relation its ability to create a memory. In Frances Yates' book The Art of Memory, he refers to stimulation as a catalyst for memories. "If we see or hear something exceptionally base, dishonorable, unusual, great, unbelievable or ridiculous, that we are likely to remember for a long time." Yates refers to the solar eclipse because it occurs less frequently than the lunar eclipse. "Let art [architecture] then, imitate nature, find what she desires and follow as she directs."10 pg. 13

Withing the walls of the educational and residential buildings colors and shapes have been created by the structure and circulation paths. These buildings are designed with the intent of providing instinctive appeal through the use of visceral design. Both building also incoporate the expression of functural appeal. Due the size and proportion of the educational building, it may be easier to see the expressions, such as the ceiling structure in the library. (Refer to page 74)

Proportion

Building units and methods to measure lengths were originally based on the human body. The human form is actually the measure for many elements of the built environment. These proportions are the standards of balance and beauty. "Proportion is a correspondence among the measure of the members of an entire work, and of the whole to a certain part selected as standard."9

Virtruius explains this concept through his analysis of the body. He explains that the head is in proportion to the body while having separated proportion within its our composition. The distance from the bottom of the chin to the top of the head is one-tenth the height of the body. Likewise, the distance from the bottom of chin to underside of nose is one-third the height of the head.

Sequence & Transitional Spaces

The relationship in which objects are placed in reference to one another is a sequence. The position of one element may disconnect the experience as a whole and cause discomfort for those who wish for a certain experience. An example of sequence and transision comes from Neutra's book called Survival Through Design.[4] Neutra describes how a couch placed in poor relation to a large window can cause neck strain for those how wish to look out the window. "The problems of posture relate a vast number of other sensory experiences to vision, which concerns and directs not only our eyes but our whole body."[4 pg 151] mThe sequence of habitual movement refers back to the an idea mentioned earlier, kinesthetic pattern.

Another part of sequence involves the element of choice. The experience of arriving to a certain conclusion involving multiple options is very appealing. As designers we want to reduce the amount of unpleasant choices.

Kinesthesia is the sensation of the bodily position, movement, or effort arising from receptors in the joints, tendons, and muscles.[10] It is my intension to explore the meaning of space and the activity of traveling to, through and residing within a space. How does the size, square footage, lighting, and openness of a room effects a person's reaction? How a person responds to the different scale.

If we learn a little more about why and how we respond to our environment. It may prove helpful when designing a space. Before making an application of how to create a memorable journey through a building, reviewing the insights of our predecessor's may prove to be helpful. Freud had a very explicit depth of knowledge pertaining to many things, one of which was how the human brain works. Freud developed a profound relationship between life and death. He believed that humans have a life instinct and a death instinct, which are constantly at battle. The death drive begins at birth, once the time in the womb comes to an end. The womb is a place of growth, warmth, protection and comfort. Freud believed that each of us has a memory of our time in the womb and are subconsciously wishing to return.[8] The craving of returning to this quiet equilibrium governs our existence is Freud's nirvana principle. Freud concludes that we "long for resolution and quiet," death. [10]

It is interesting to consider the size and special relationship of the womb to the unborn. In this thesis the experience of the “nirvana principle” can be liken to the comfort and protection that a small intimate space can provide. It is my attempt to provide areas throughout the educational building that allow the visitor to grow in knowledge and to continue to experience life. To shift from imbalanced ideas, to obtaining a more cognizant and holistic understanding of diabetes.

Freud wrote about the human birth, while Filerete likens the process of architecture to birth. In the second book of Filerete, he mentions that architecture is like a woman carrying a baby. Even though he is referring to (paraphrased) the conception of an idea for a building and how it is similar that of a baby; the development of the baby occurs when the architect grows and nurtures the design of the building. The birth of the building occurs during construction.

Indirectly, when we are inside and apart of architecture we feel a sense of enclosure, protection, which allows us the opportunity to grow and function. In the same manner that we are to take care of expecting mothers, we are to nurture our buildings.
Buildings are wombs outside of the womb. The building must be taken care of so that we maintain a positive experience within.

> “You can say that a building does not sicken and die like a man. I say to you that a building does just that, for it sickens when it does not eat, that is when it is not maintained and begins to fall...”
>
> If it has a doctor when it becomes ill, that is the master who mends and cures it, it will stand along a long time in good state.”
>
> Filarete (6r)

APPLICATION AND ABSTRACT

It is my intention to apply the knowledge of aesthetic appeal, sequence and transisional thresholds to the design of my buildings. It is my intension to create spaces that will encourage and strengthen the people within them.

Within the scope of this thesis there is a small building and a large building. The smaller building can be catigorized as a residence. Designing a house has always intreged me. At the beginning of my thesis designing a house was just an excerise to help motivate me while I figured out what I "really" was supposed to be working on. Designing two building of different scales and functions served as an element which defined my thesis as I tried to balance working on to projects.

The larger building in my thesis is an educational building for individuals and family members who have been newly diagnosed with diabetes. This building is not a medical building, but a building with a focus on nurturing an educating those who wish to learn more.

The primary focus or theme of this thesis is about obtaining balance and achieving it with intregrity. The need for balance can be seen through a large range and at many levels. My personal quest for obtaining balance by gaining a better understanding of diabeties. The purpose of the educational building program is to help find balance within the body and blood of a diabetic person, and finding balance amoungst supportive family members.

The comparison of proportion, scale, public and private space within both buildings was a catalist throughout my journey. A solution for creating balance within the residencial building would not always directly apply to the educational building because of there are so many variables.

The following pages document my quest, my thesis for Exploring the Balance ans Integrity of Architecture.

studio

where it all happened

All images and photos created by the author

collage

concept

Collage: an exercise for creating relationships between objects,
an exploration of how one image trasitions to another image

images: human circulation system
image of fishermen
part of a dialysis machine
perspective of an entry

"circulation"

"obstruction"

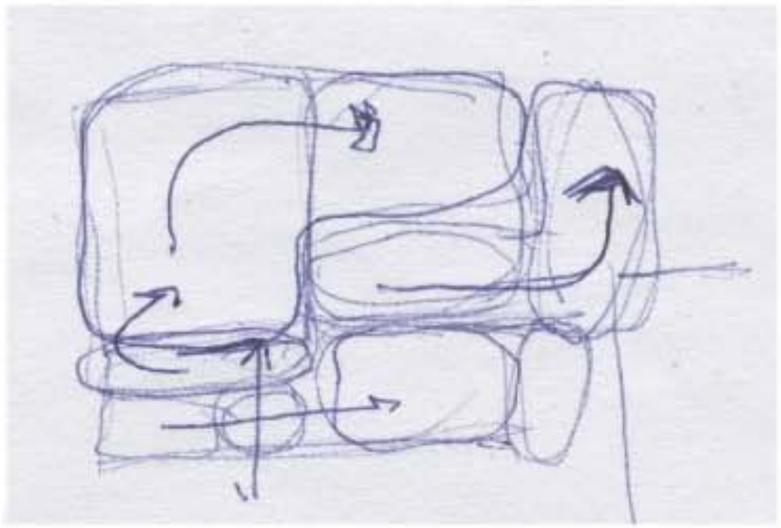
"merge"

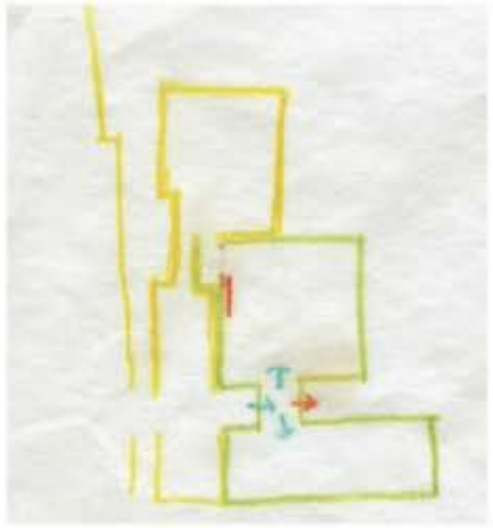
Etched copper plates to create multi-plate, hand pressed, prints.
Exploration of fluid lines and stagent objects... individually and together.

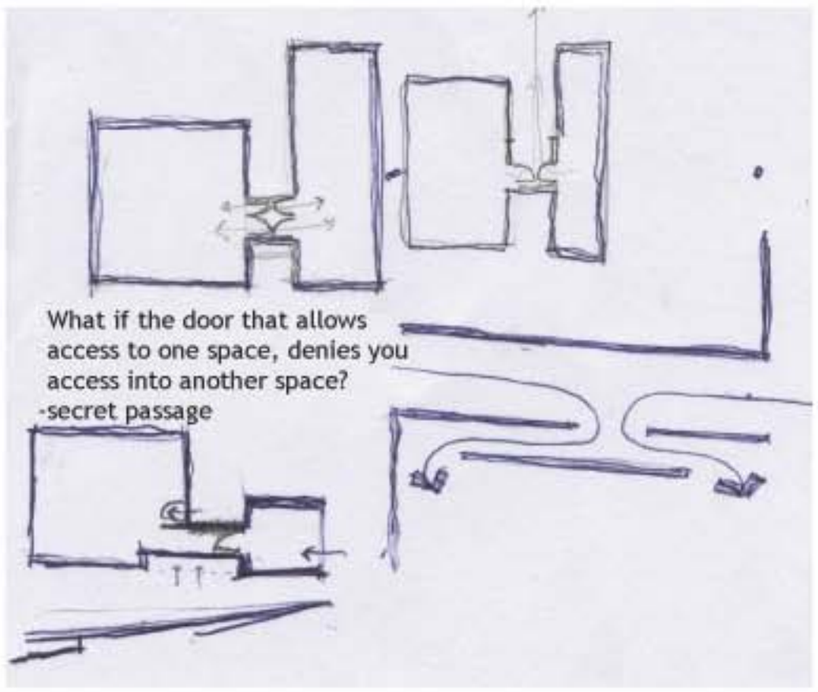
transition

Printed collage of the circulatory system, the gadget side of a dialysis machine, an image of the human body and an entrance into a building.

prints







What if the threshold into a room is not just a door?
What if you entered a room at the center?
What relationship will this room have with its adjacent neighbor?

Personal response to a space:
When you walk into an empty room, are you bold and walk to the center or do you find comfort in the closest wall?

What makes a transition comfortable...seamless?

Sketches of different ways to enter into a room.

concept
transition

"Man's first impression of the surrounding world is aesthetic, through the sense of sound, smell, touch, movement, and vision."

Birgit Cold

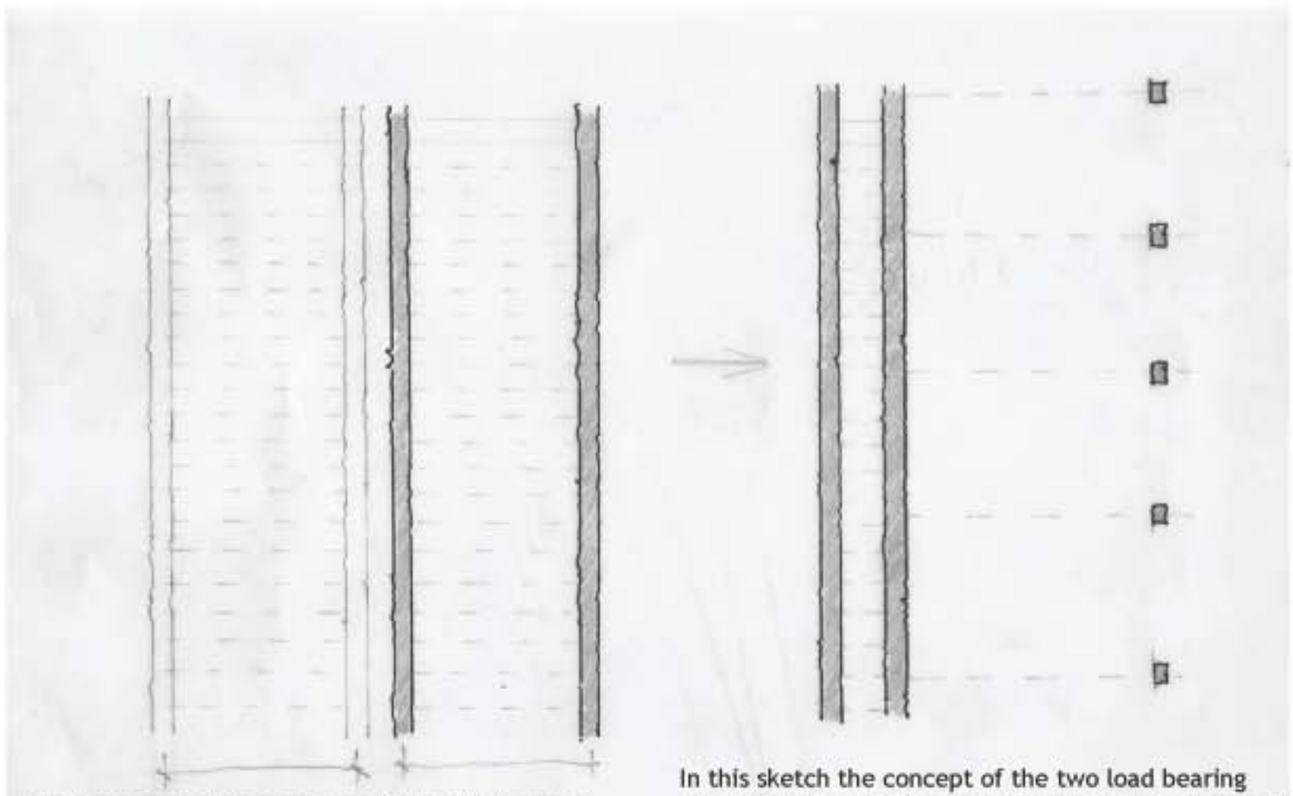
transition

The fisherman and his elevating device share a seamless symmetry. The shape and composition of these two objects are pleasing to the eye. The strength of the structure tranfers into the strength to the man.

concept

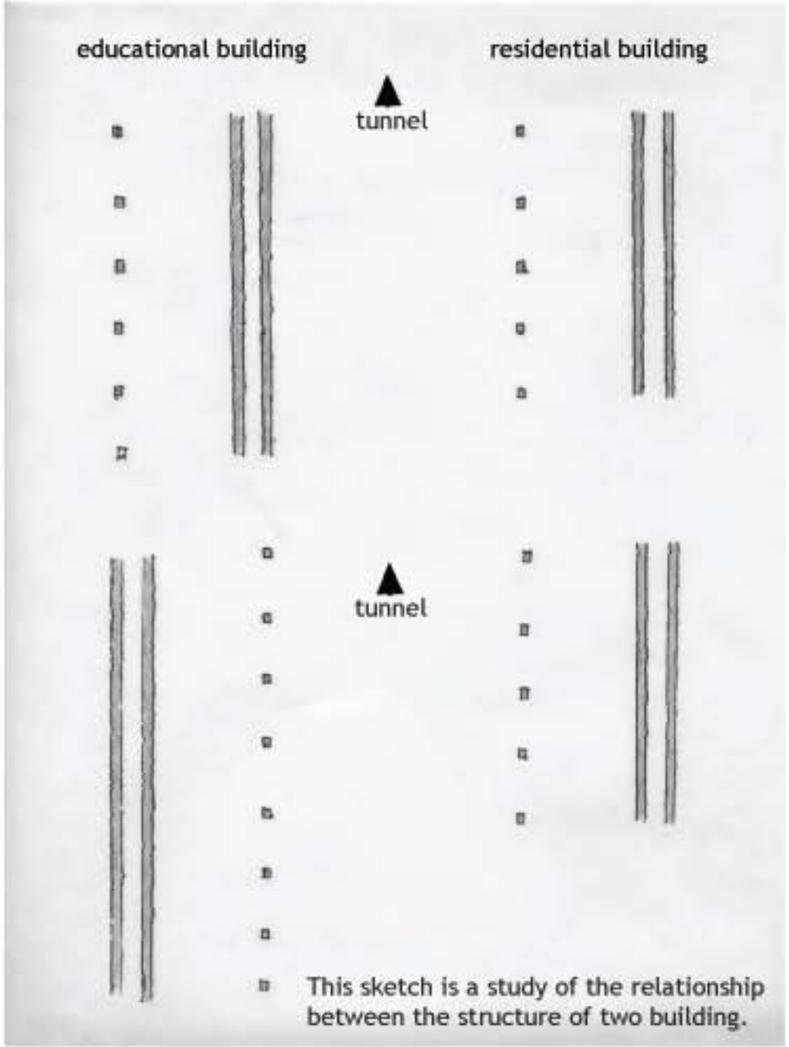
When designing a new building in an architecturally rich city, where do you begin? Answering this question proved to be quite a challenge. It was my intension to design buildings that would create spaces to encourage and strengthen individuals. I found myself looking for answers on the exterior of buildings. My commitee sugguested the I look to the interior composition of the buildings. Once again I refered to my picture of inspiration (page 15). The idea of strength lead me to think of bones, supports, and then structural element of buildings.

These two sketches represent possible structural transformations of the existing buildings in Old Town Alexandria.



The four parallel lines represent the exisiting span between the load bearing masory wall. During the time these building were constructed the length of the wood joist determined the width of the house.

In this sketch the concept of the two load bearing masonry walls remains, however the spacing between them was reduced to create a circulation corridor. In addition, a new material, steel was introduced to create the parallel supporting wall.



This sketch is a study of the relationship between the structure of two building.

structure

The structural steel will allow for a more open wall which can lead to a variety of options.

1

1 The corner of Queen and North Royal in Old Town Alexandria is very inspiring building because the design of the masonry wall. The placement of the windows allows the wall to read as a massive element. If the windows were flush with the outside edge of the wall the building would have little character.

2

2 A closer look at image 1 which provides a better view of the lintel.
It is amazing how thin the steel lintel is compared to the depth and size of the openning of the masonry wall.

building inspiration

Site Selection & Analysis

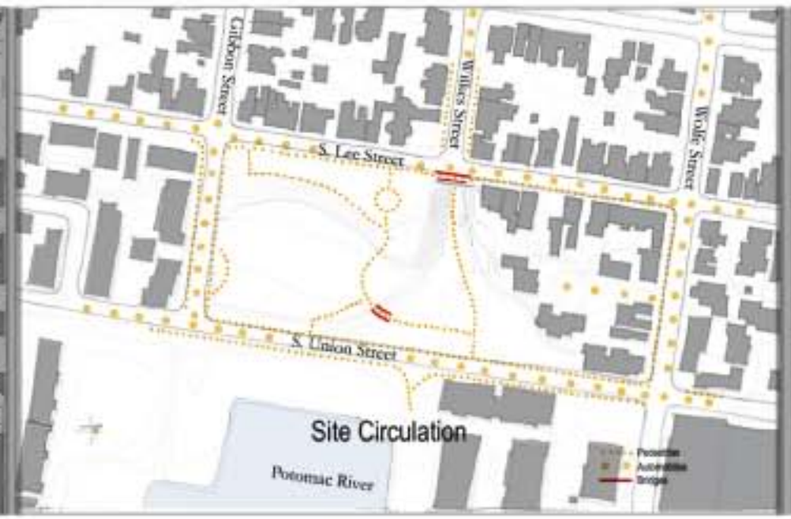
After about three and a half months of working on a site surrounded by five and six-story buildings tightly nessled at the top of a hill, I found myself struggling and uninspired. Just before winter break I stumbled upon Windmill Hill Park. Once again the excitement returned and I was encouraged by the flow of creative ideas.

I was excited about the challenges that Windmill Hill Park presented. There is a large grade change which occurs when traveling West to East as you approach the water. On this site there is an entance into a tunnel which creates a lower level for pedestrian traffic. Above the tunnel is a road called Wilkes Street. The termination of the road above the tunnel is a location on the site that I wish to improve. All the amenities of the site created a different problem which affected and molded the building image.

Things considered:
How many stories tall should the build stand? Two stories at street level will be three stories at bottom of the hill...or will it?

Do I design one or two buildings? Are both buildings on the same side of the tunnel or is there one on each side?

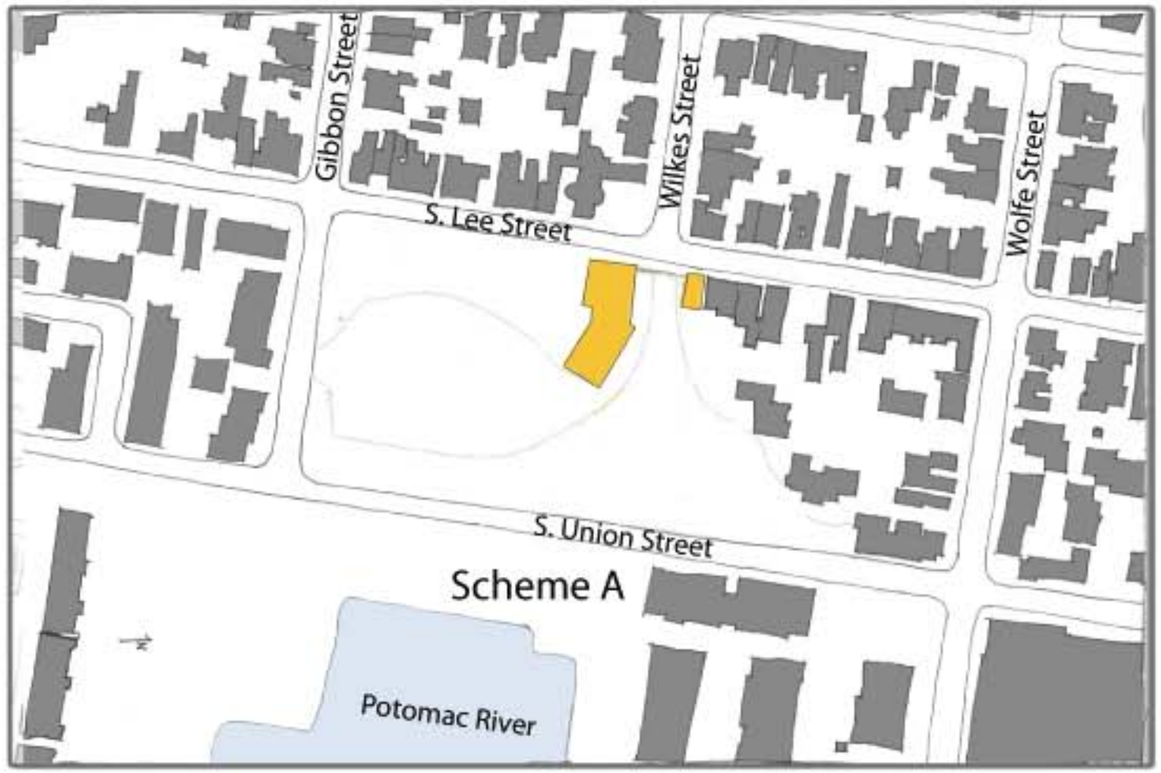
How do you engage a passerby with the building if they don't enter it?



site

January 2006

analysis



Scheme A:

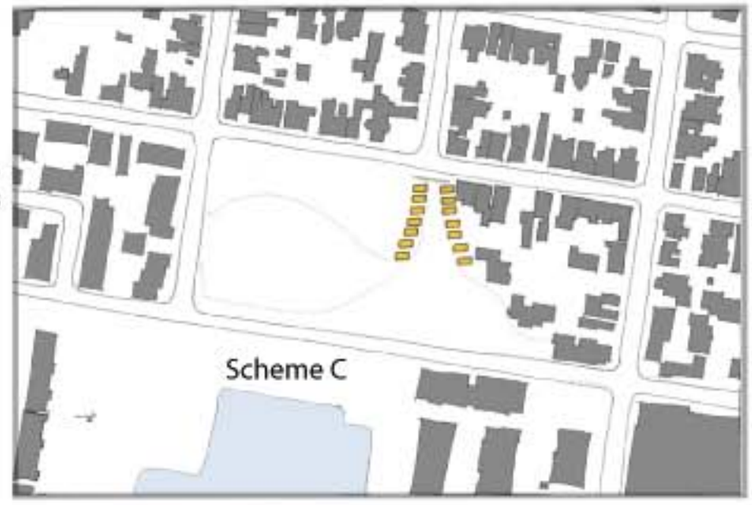
Scheme A is the scheme of choice. The building on the left is a building of many functions assembled together as one unit. This scheme places a building on each side of the tunnel which encourages a medium to connect them. The space between the the two building will also act as an attractive terminous for Wilkes Street.

Scheme B:

This site scheme places both buildings on the same side of the tunnel. The predestrian traffic that travels through the tunnel doesn't have an opportunity to interact with the building. This scheme does not feel balanced.

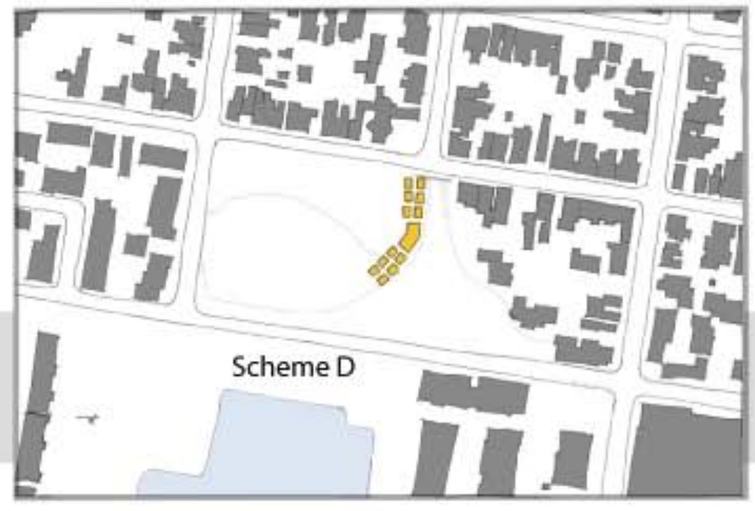
Scheme C:

This site scheme is a more rural response to how multiple buildings would follow the contours of the site. This scheme is morebalanced than scheme B, but it does not respect the language of the city.



Scheme D:

This site scheme is a combination of both schemes B and C. Sheme D does not engage the tunnel.



site schemes

West elevation

The red rectangles indicate the location of the proposed residential and educational buildings.

West elevation continues

site

Tunnel level

photos


1


2


3

Google Earth image

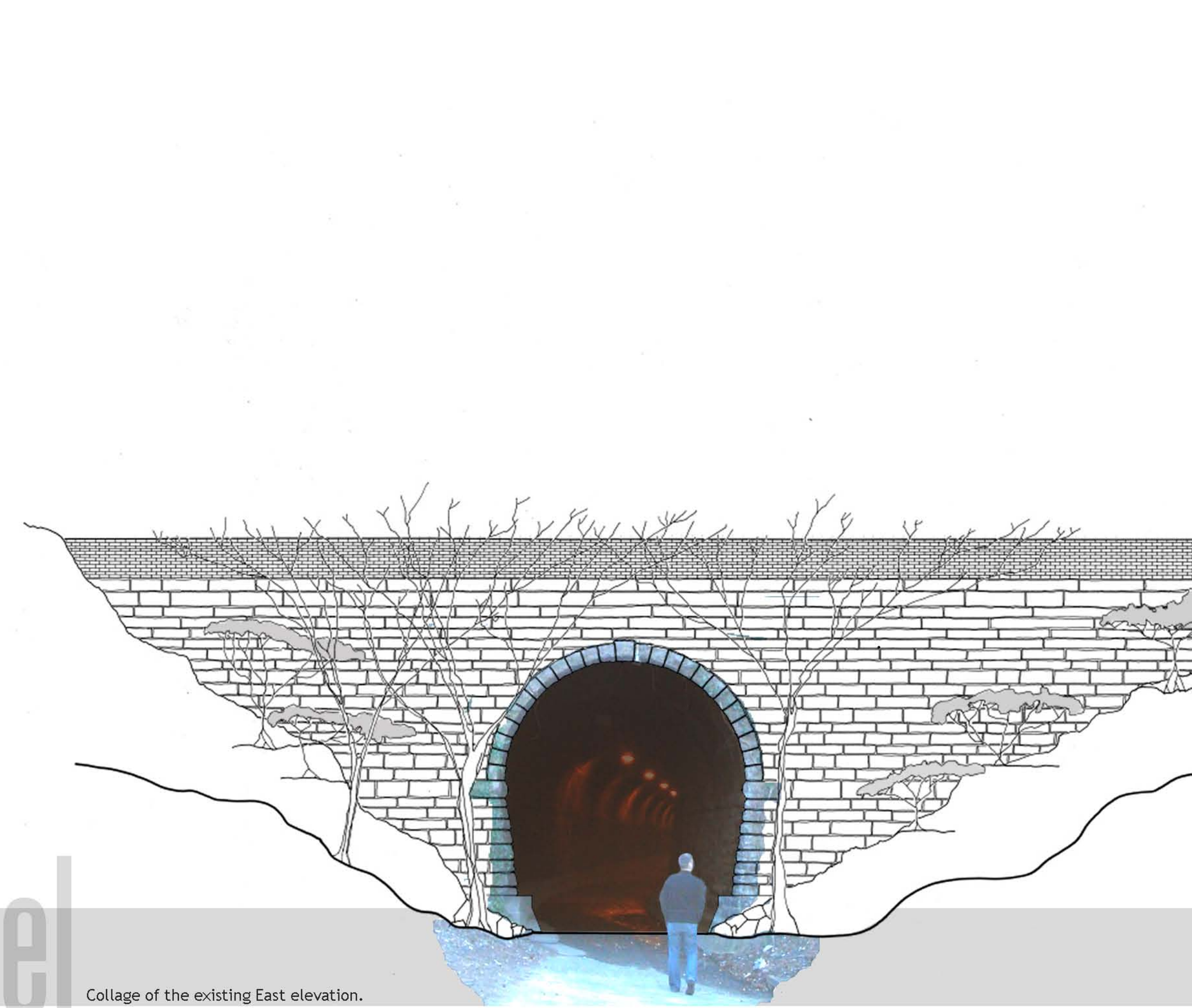
Existing conditions

site photos

4


5


6



tunnel

Collage of the existing East elevation.

WILKES STREET TUNNEL

The Wilkes Street Tunnel was part of the eastern division of the Orange & Alexandria Railroad, founded in 1848 to promote trade with western Virginia. The Orange & Alexandria inaugurated its track in Alexandria on May 7, 1851 with a run from the north end of Union Street to the Wilkes Street Tunnel. Thus, the tunnel linked the railroad to warehouses and wharves along the waterfront. Located nearby, the Smith and Perkins Foundry manufactured locomotives for the Orange & Alexandria and other railroads.

Wilkes Street Tunnel is typical of cut-and-cover tunnel construction. Presumably the tunnel was cut through the bluff overlooking the Potomac River and covered over to continue the streets above. After the sides were built up with stone, the arch probably was constructed over wood falsework from both sides using a centering technique to form the brick barrel vault. The tunnel was deepened after World War I to accommodate higher boxcars.

The Orange & Alexandria line was one of the many Alexandria railroads taken over by Union forces at the onset of the Civil War. While this northerly section of the railroad was incorporated into the U.S. Military Railroads, the length of track south of the Rappahanock River remained in Confederate hands. Both sections played a major role in the strategies of North and South, as well as a decisive element in the Confederate victory at the Second Battle of Manassas or Bull Run. Wilkes Street Tunnel gave the Union army access to the wharves for shipping military supplies on car ferries south to Aquia Creek, terminus of the Richmond, Fredericksburg & Potomac Railroad.

Shortly after the Civil War, the old Orange & Alexandria line was incorporated into the Washington City, Virginia Midland & Great Southern Railway controlled by the Baltimore & Ohio Railroad. Wilkes Street Tunnel played a part in the rivalry between the Baltimore & Ohio and Pennsylvania Railroads for supremacy in the north-south trade across the Potomac River. The Pennsylvania Railroad acquired Congressional authorization for exclusive use of Long Bridge (14th Street). To maintain a competitive position, the Baltimore & Ohio offered trans-Potomac service by way of carfloats linking Wilkes Street with Shepherd's Ferry on the Maryland shore until about 1906.

The Wilkes Street track continued in operation until 1975 when declining industrial activity along the waterfront no longer warranted rail service. The tunnel is significant today as Alexandria's only 19th century transportation tunnel surviving intact.

Photograph of printed information on a worn metal plate attached to the interior wall of the tunnel.

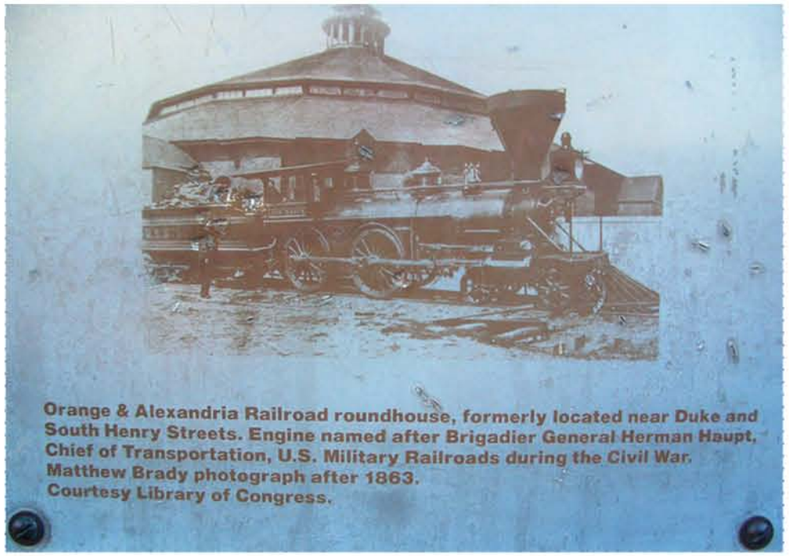
West elevation

West elevation

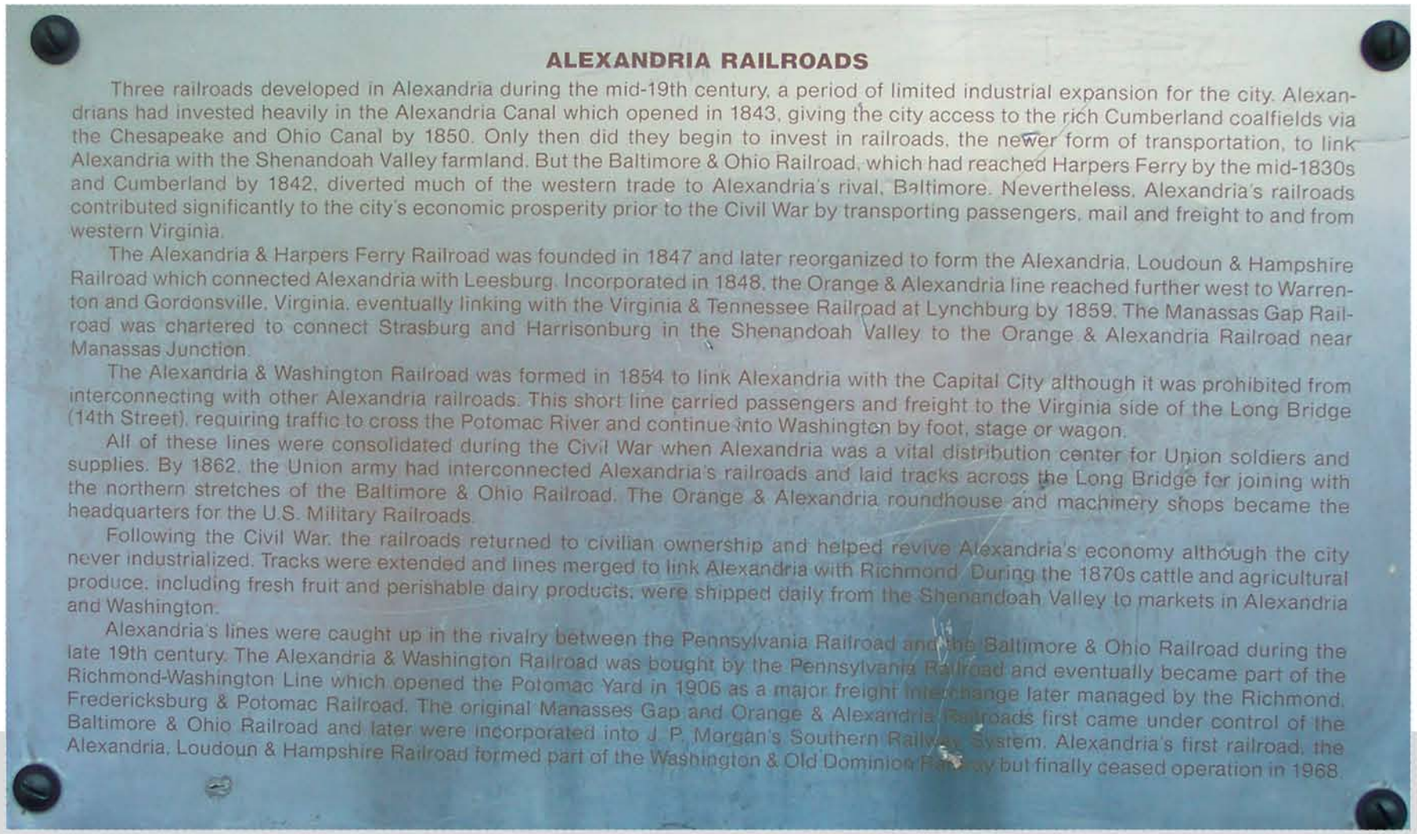
West elevation

East elevation

tunnel photos



railroad



ALEXANDRIA RAILROADS

Three railroads developed in Alexandria during the mid-19th century, a period of limited industrial expansion for the city. Alexandrians had invested heavily in the Alexandria Canal which opened in 1843, giving the city access to the rich Cumberland coalfields via the Chesapeake and Ohio Canal by 1850. Only then did they begin to invest in railroads, the newer form of transportation, to link Alexandria with the Shenandoah Valley farmland. But the Baltimore & Ohio Railroad, which had reached Harpers Ferry by the mid-1830s and Cumberland by 1842, diverted much of the western trade to Alexandria's rival, Baltimore. Nevertheless, Alexandria's railroads contributed significantly to the city's economic prosperity prior to the Civil War by transporting passengers, mail and freight to and from western Virginia.

The Alexandria & Harpers Ferry Railroad was founded in 1847 and later reorganized to form the Alexandria, Loudoun & Hampshire Railroad which connected Alexandria with Leesburg. Incorporated in 1848, the Orange & Alexandria line reached further west to Warrenton and Gordonsville, Virginia, eventually linking with the Virginia & Tennessee Railroad at Lynchburg by 1859. The Manassas Gap Railroad was chartered to connect Strasburg and Harrisonburg in the Shenandoah Valley to the Orange & Alexandria Railroad near Manassas Junction.

The Alexandria & Washington Railroad was formed in 1854 to link Alexandria with the Capital City although it was prohibited from interconnecting with other Alexandria railroads. This short line carried passengers and freight to the Virginia side of the Long Bridge (14th Street), requiring traffic to cross the Potomac River and continue into Washington by foot, stage or wagon.

All of these lines were consolidated during the Civil War when Alexandria was a vital distribution center for Union soldiers and supplies. By 1862, the Union army had interconnected Alexandria's railroads and laid tracks across the Long Bridge for joining with the northern stretches of the Baltimore & Ohio Railroad. The Orange & Alexandria roundhouse and machinery shops became the headquarters for the U.S. Military Railroads.

Following the Civil War, the railroads returned to civilian ownership and helped revive Alexandria's economy although the city never industrialized. Tracks were extended and lines merged to link Alexandria with Richmond. During the 1870s cattle and agricultural produce, including fresh fruit and perishable dairy products, were shipped daily from the Shenandoah Valley to markets in Alexandria and Washington.

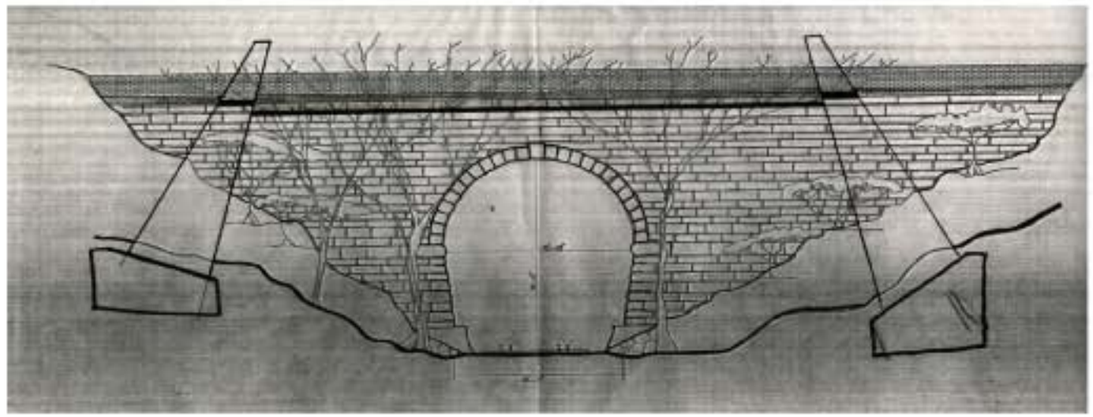
Alexandria's lines were caught up in the rivalry between the Pennsylvania Railroad and the Baltimore & Ohio Railroad during the late 19th century. The Alexandria & Washington Railroad was bought by the Pennsylvania Railroad and eventually became part of the Richmond-Washington Line which opened the Potomac Yard in 1906 as a major freight interchange later managed by the Richmond, Fredericksburg & Potomac Railroad. The original Manasses Gap and Orange & Alexandria Railroads first came under control of the Baltimore & Ohio Railroad and later were incorporated into J. P. Morgan's Southern Railway System. Alexandria's first railroad, the Alexandria, Loudoun & Hampshire Railroad formed part of the Washington & Old Dominion Railway but finally ceased operation in 1968.

Photograph of printed information on a worn metal plate attached to the interior wall of the tunnel.

history

Exsiting tunnel condition

Exsiting tunnel condition



Elevation study of how and where to locate the structural system of the balcony above the tunnel.

site

A collage examining the transition into the tunnel by introducing a free-standing metal structures and inegrating them with exising plants.

Final solution:
Retain the existing brick wall which stands 3.5 feet tall, remove two 4-foot areas to allow entry onto the extension of the sidewalk. The extension is a concrete slab trimmed with an iron rail, complementary to the styles found amoung many homes in Old Town.

bridge