KLEM, MEGAN, J., M.S. North Carolina Mill Rehabilitation: An Analysis of Historic Building Character and Design Strategies. (2012).
Directed by Jo Ramsay Leimenstoll. 120 pp.

The intent of this study was to analyze the interiors of four historic mills and determine how historic character and integrity was maintained during the rehabilitation process. Along with maintaining historic character, this study aimed to identify how modern design elements are introduced within the historic interiors. The historic built environment speaks to identity and sense of place through the past, and within rehabilitation, creates an identity and sense of place for a more modern society while keeping significance of the past intact.

The researcher utilized National Register nominations, Federal Tax Credit Applications, floor plans, photographs, site visits, and other documentation to discover the rehabilitation design process of the architect and what significant changes to the interior of each mill building occurred during the projects. The study aimed to find commonalities between the four projects, as well as obvious differences.

A purposeful sample of mills was selected for this investigation based on a set of criteria, which included location within North Carolina and individual listing on the National Register of Historic Places, use of federal historic tax credits, and rehabilitation designed by Belk Architecture. All of the selected mill complexes are located in Durham, North Carolina and have proven to be examples of successful rehabilitation projects that represent models to follow for other possible industrial rehabilitation projects. Two main sources provided criteria used to analyze the research gathered in this investigation. Brooker and Stone's (2004) tactics and Leimenstoll's (1988) eight criteria were used by

the researcher to determine in what way insertion and intervention (Brooker & Stone, 2004) design strategies were employed in the rehabilitations.

The significance and importance of industrial rehabilitation is quickly expanding as the era of older manufacturing and storage mills have come to an end. It is imperative that designers, builders, planners, and communities realize the potential benefits and significance of rehabilitating large industrial buildings for new uses and functions. The investigation produced an understanding of the rehabilitation process for historic industrial mills and how historic character was kept intact when modern elements were used to modernize the interiors for new use.

# NORTH CAROLINA MILL REHABILITATION:

# AN ANALYSIS OF HISTORIC BUILDING

# CHARACTER AND DESIGN

# STRATEGIES

by

Megan J. Klem

A Thesis Submitted to
The Faculty of The Graduate School at
The University of North Carolina at Greensboro
In Partial Fulfillment
of the Requirements for the Degree
Master of Science

Greensboro
2012

Approved by

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Committee Chair

APPROVAL PAGE

This thesis has been approved by the following committee of the Faculty of The Graduate School at the University of North Carolina at Greensboro.

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Date of Final Oral Examination

ACKNOWLEDGEMENTS

My thanks and gratitude goes out to the numerous people who helped me during the process of researching and writing this thesis. First, I would like to thank my committee chair, Jo Ramsay Leimenstoll, whose support and guidance throughout the past two years has inspired and pushed me to find my potential. I would also like to extend my appreciation to Travis Hicks and Dr. Lisa Tolbert for their time, advice, and contributions towards this thesis as committee members. There are many others I would like to thank for the time, effort, and support they provided me and their assistance in the gathering of all my data, including; Tim Simmons (NCSHPO), Eddie Belk (owner / architect with Belk Architecture), and Joe Fitzsimons (architect with Belk Architecture). Thanks to Valeria Ward with the Blackwell Street Management Company, William Hill with HallKeen Management, and Jessie Brown with Scientific Properties for providing tours of the mill complexes, as well as their knowledge about these projects. I would also like to thank my fellow classmates who have proved to be great friends and a welcoming support group these past two years.

Finally, I would like to thank my family for their love and encouragement, as well as all the many ways they have supported me through my many years of education. They have encouraged me to reach for my goals and set my sights for the top.

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# CHAPTER I

# INTRODUCTION

The rehabilitation and revitalization of tobacco and textile mills in North Carolina is a vital part of keeping the industrial, social, and cultural history of the state alive. Although both the tobacco and textile industries are still of great importance to North Carolina's business and economy, modernization has left little use for these historic mill buildings. It is important to preserve these buildings as a reminder of the past, the growth, and the achievement of the state. In order to keep these structures from being demolished and fading into only a memory, many mills are being rehabilitated to serve new purposes.

Industrial buildings provide an array of possibilities for rehabilitation as most of the structures consist of large, open interior spaces. Although there exist structural elements that must be considered, through creative solutions any building can be reused for a new purpose to benefit the community, society, and the economy if its original purpose is no longer viable. Rehabilitation and revitalization of these mills also protects and enhances the historic built environment while providing use for older buildings through modern applications. The National Park Service defines rehabilitation as:

> the process of returning a property to a state of utility, through repair or alteration, which makes possible an efficient contemporary use while preserving those portions and features of the property which are significant to its historic architectural, and cultural values (1992).

Rehabilitation of a building is the process of balancing the past and the future, where the past takes on a greater significance because it is the portion to be altered (Brooker & Stone, 2004).

The popularity in rehabilitation of historic and older buildings throughout the United States is increasing. Many people attribute this phenomenon to the economy, stating that there is a very narrow market for new construction. Steve Schuster, an architect from Raleigh, NC, agrees with this view. He now works primarily in historic preservation projects and has found that there is "great investment in rehabilitation and revitalization of these older buildings" (Schuster, 2011). Architect Eddie Belk is another professional whose practice focuses on historic preservation and rehabilitation projects. His firm, Belk Architecture in Durham, NC, has kept steady business in preservation projects reshaping historic buildings for new uses.

Much of North Carolina's history can be told through the built environment. When reflecting on the state's history, two of the major contributors to the thriving economy were the tobacco and textile industries. North Carolina has been left with massive empty mill and warehouse buildings due to factory closings and business relocation. Unfortunately, many of these structures that make up the built environment are often left to deteriorate because "progress or economics has passed them by or made them unprofitable to operate in their present condition" (Reiner, 1979).

Once regarded as symbols of economic stability and job security, these mill buildings hold great importance in remembering the life and history of North Carolina. In

order to continue to share this history while adapting into modern society, these buildings are being given new life through rehabilitation and revitalization projects with respect and attention given to their historic characteristics and features. These mill buildings have large, open interior spaces that render them flexible for adaptive reuse work. The recycling and rehabilitation of an old historic building can be turned into as many new uses as new construction can provide (Reiner, 1979). Brooker and Stone (2004) further Reiner's advocacy for rehabilitation stating,

> Today, remodeling represents a sizeable market that cannot be ignored. The evidence of big name architecture firms involved in reworking buildings is testimony to the fact that it is a sector of design and architecture that is no longer seen as insignificant. It is important to establish the principles of working with the existing in order to define this field of practice, to demonstrate that this area of work is rich in creative inspiration and packed with some of the best design work of recent years (Brooker & Stone, 2004, p. 15).

To help investigate how alterations to historic mill buildings during rehabilitation for new uses impact their historic characteristics, a purposeful sample of four mills was chosen through specific criteria set by the research and the thesis committee. The research conducted in this thesis is focused on the interior rehabilitations and historic integrity of the four sample mills, which include:

- American Tobacco Campus – Durham, NC
    - Washington, Reed, and Crowe Buildings
- Golden Belt Mill – Durham, NC
    - Buildings 2, 3, and 6

- Brightleaf Square – Durham, NC
    - North and South Buildings
- Durham Hosiery Mill – Durham, NC
    - Buildings A, B, C, and D

Through researching the four mills, the original character and historic integrity of each building were determined. The rehabilitation of the mills has proven successful in fulfilling their new uses. For the purpose of this study, the term "successful" indicates that the buildings are in constant use and the projects were granted federal historic tax credits by approval of the National Park Service. Through the rehabilitation of the historic built environment, each project has revitalized its community. There are three main questions the research aimed to answer through this thesis. The questions, revolving around design issues, include:

- What impact did the rehabilitation and adaptive use have on the historic characteristics of the mill buildings?
- Were there any commonalities / differences in interior rehabilitation alterations between the mills in the sample?
- What are the lessons that preservationist and design professionals can take away from the study of these projects?

This thesis is a study of historic tobacco and textile mill buildings in Durham, North Carolina. The purpose of this research is to identify and critically study the historic characteristics of the buildings and determine how they have been maintained or affected

during the rehabilitation and adaptive use process. Buildings have elements that showcase their architectural style and character, often reflecting the technology, culture, and ideas of the period in which it was constructed. Elements of historic character include building materials, textures, colors, form, massing, craftsmanship, details, finishes, roof types, windows, doors, openings, facades, shape, and the footprint of the site (Kelso & Rabun, 2009).

Maintaining the significance and integrity of historic buildings through sensitive alterations is a key goal of historic preservation and rehabilitation projects. It is important to incorporate elements of original character along with appropriate new uses of historic spaces. When merging the old with the new in rehabilitation, there are multiple strategies that the designer may use. In the case of this thesis, all four mill buildings were rehabilitated through a combination of insertion and intervention strategies (Brooker & Stone, 2004). This research focuses on methods used to introduce modern design features and character while maintaining the historic integrity of the building as a whole. Also, the National Park Service identifies important aspects of a historic property to consider in keeping the significance and integrity of the building intact. These aspects are laid out in the article, *Keeping Significance Intact: Seven Aspects of Integrity*, which include: location, design, setting, materials, workmanship, feeling and association (Leimenstoll, 2009).

In this thesis, the strategies employed and consequent changes to the buildings were examined utilizing two sets of criteria to determine their impact on the historic

character and integrity of the mill interiors. Leimenstoll (1988) provides a list of eight criteria to help determine "how the same historic interior may be altered or expanded without compromising its character" (p. 1-13) including: form, proportion, scale, rhythm, light, materials, finish, and detail (Leimenstoll, 1988). The other criteria were Brooker and Stone's (2004) design tactics, which include: planes, objects, light, surface, movement, and openings. The historic character and modern alterations of the mills are examined and compared to one another through each of the criteria.

# CHAPTER II

# REVIEW OF LITERATURE

This chapter discusses the significance of historic preservation and rehabilitation outlined by scholars who have helped shape the evolution of the preservation movement in various ways. In addition, the researcher provides an overview of the importance of the historic built environment and how the National Register of Historic Places, North Carolina Building and Rehabilitation Codes, Federal Historic Tax Credits, and rehabilitation guidelines direct the rehabilitation process of existing buildings. A brief history of the mill industry in the south, and specifically North Carolina, lays the groundwork for an introduction to the four mill case studies that were investigated through this study. Finally, the researcher provides background information and confirmation of the worthiness of architect Eddie Belk's projects as they pertain to the study of successful historic mill rehabilitation.

North Carolina has quickly grasped the concepts of rehabilitation and revitalization. Across the state, numerous historic industrial buildings, such as tobacco and textile mills, have been rehabilitated for new purposes. These mills were once the heart of communities and the economy. Through these rehabilitation projects, the history of what once was can shine through again in modern-day uses that meet contemporary needs. The research for this thesis was based on a purposeful sample of four mill case

studies located in Durham, North Carolina. The mill samples, literature, historic documentation, photographs, and website information created concise documentation of North Carolina history in connection with the importance of preservation of the historic built environment through rehabilitation and revitalization efforts.

## *Historic Preservation*

Historic preservation is "the process of identifying, protecting, and enhancing buildings, places, and objects of historical and cultural significance" (National Trust, 2012). Another way to think about historic preservation is "keeping older resources in use while also conveying the history of the place" and maintaining historic character (Winter, 2010, p.4). Preservation is relevant to the past, present, and future of the retention of the historic built environment because it has been one of the nation's longest-lasting land-use efforts (Page & Mason, 2003). There are a spectrum of issues that are associated with historic preservation, such as neighborhood retention, use of existing resources, and supporting society while providing a link between the present and the past (Winter, 2010). Howard Green (1998) articulated that it is important to understand the difference between *historic* preservation and *historical* preservation. *Historic* preservation consists of things important in history, while *historical* preservation is associated with things of the past (Green, 1998).

Historic preservation was part of the environmental conservation movement of the 1960s and 1970s, which was fueled by the well-educated and upper middle-class of those

respective decades (Green, 1998). During the 1960s the mass demolition of older buildings sparked an interest and awareness of the past and its significance (Lowenthal, 2005). Lowenthal believes people in general have placed their identity in the buildings and things that give them a sense of place saying, "the past is where we come from" (p.4). Preservation philosophy during the 1960s and 1970s placed an emphasis on the protection of the physical reality of buildings, structures, objects, and places (Stipe, 2003a).

In October of 1966, Lyndon B. Johnson signed the National Historic Preservation Act into legislation because he believed it was important to start taking inventory of the buildings and places that were an important part of this country's history (Green, 1998). After the 1966 Act was placed in action, the National Park Service created a group to cultivate standards for the National Register and to develop a process for nominating properties for listing. One of the most important aspects of this new law required states to generate statewide plans for historic preservation. Following the National Historic Preservation Act, federal tax legislations were passed in 1976 and 1981, which led to an increase in adaptive use and rehabilitation projects (Lea, 2003). Historic preservation became significant to the past because "the spirit and direction of the Nation are founded upon and reflected in its historic heritage" (Green, 1998).

According to Page and Mason (2004), advocacy of historic preservation has the potential to stop the destruction and unregulated development that threatens to demolish the places people identify and connect with. They also believe that preservation

professionals, and the movement in general, need to "lose the blinders and open itself to the new possibilities that only an understanding of history can provide" (Page and Mason, 2004, p.3). As the preservation movement moves forward, it will need to be reevaluated by preservation professionals in order to determine how more modern architecture, rehabilitations, and adaptive use will fit into preservation ideals. It is important for preservationists to protect the general public from what is false and fantasy as the meaning of historic preservation is brought into question (Wells, 2010). There are many aspects that professionals in the field should begin to consider as preservation moves into the future.

Page and Mason (2004) believe that the reinvention of the field needs to be informed by serious reflection on the history of the preservation movement. When the concept of historic preservation was beginning to turn its wheels in the 1960s, preservationists had a passion that helped to ignite the movement. However, it seems as though current preservation professionals have lost that passion and lack the curiosity about the field that earlier preservationists had (Kaufman, 2004). Kaufman (2004) urges preservationists to reignite their passion for historic preservation and make a definitive decision to either defend the movement to those who oppose it, or forfeit. Fighting for historic preservation ideals requires preservationists to move beyond where they are today and acknowledge the full concerns over the loss of places and our heritage. Part of this recognition is for preservationists and the public to realize that growth is not necessarily an ally of historic preservation, regardless of what real estate developers,

businesses, government, and news media promote. This belief that progress is equal to growth is known as the "growth machine". Preservationists need to question the ideology behind growth and the market that push for new development and technologies (Kaufman, 2004).

Historic preservation has moved from a program that focused on history, buildings, and structures to a program that now focuses on history, culture, and heritage when considering significance (Stipe, 2003a). The movement continues to pick up supporters who ignite a passion for historic preservation and the continued use of the historic built environment. As more battles for the retention of the built environment are won, "our success stories give us bragging rights to the public, help us to enlist others in our cause, and reinforce our belief that what we do is important. We have earned the right to be optimistic" (Stipe, 2003a). Through historic preservation we are able to maintain a building's identity so it can continue to tell a story of the past, present, and future.

*Values-Centered Preservation*

In order to understand how preservation works, it is important to see the connections between the preservation field and the concerns of society. The preservation field has a responsibility for managing the built environment and the social memory that is connected to the environment. Randall Mason (2006) describes the preservation ideal today as a values-centered preservation. This is when preservation is used as a planning process to assist us in formulating strategies for new preservation challenges. Values-

center preservation addresses both the contemporary and historic values of a particular place. Mason (2006) also says that the term "place" is complex and full of contradictions. This complexity is within the values of a place, in which value refers to the insight that particular places and things have a number of different characteristics related to the associated value and significance. These characteristics are found in many types of value, including artistic, historic, spiritual, and economic values, and all have an influence on our ideas of why a place should be preserved (Mason, 2006). An example of this influence from different perceived values of a place is the "This Place Matters" campaign that has become ever popular within the preservation world and interested communities.

Historic preservation is also related to other social and economic issues such as development, social wellbeing, cultural expression, discrimination, immigration, and politics. In order for something to have historic value and significance, it must be connected to the past within these issues through remnants, stories, and fragments (Mason, 2006). Mason says that preservation has two impulses that relate to society: curatorial impulse and urbanistic impulse. Curatorial impulse builds from preservation's roots and craft approaches in conserving and preserving places. This impulse determines authenticity and contemplates preservation based mainly on the fabric of a place. Urbanistic impulse seeks to "connect historic preservation to the work of other fields and disciplines, such as planning, design, and education, in pursuit of solutions that address broader social goals" (Mason, 2006, p. 25).

This multiplicity of values is not a new idea, it has been a part of the preservation movement from the beginning, and some believe even before the formal movement started (Mason, 2006). Because of the multiple ideals for the value of a place, the efforts to preserve, develop, or manage them can be complex as well. The combination of ideals can cause conflict in the value perception and is also susceptible to change. Value-based preservation theory can provide a framework when traditional methods are too static by offering a model for preservation based on the perceived values of places. The participation as part of the values-based approach is a missing piece to our current historic preservation practices (Mason, 2006).

*Authenticity*

Preservationists have struggled with what it means for a building to maintain its "authentic" integrity. In his article, *Authenticity in More Than One* Dimension, Jeremy Wells (2010) describes three types of authenticity that have been considered during different periods of the preservation movement, and discusses his impression on the role authenticity should play in historic preservation today. Traditionally, the interpretation of historic integrity came from fabric-based authenticity. Fabric-based authenticity means that the importance of a building or place is determined through retention of original building fabric, or the fabric associated with the time period of significance (Wells, 2010). This type of authenticity attempts to quantify significance through the number of historic facts associated with a particular place or building. The more historic facts, or

fabric, the more likely it is to be considered a historical building (Wells, 2010).

Wells (2010) suggests that there has been a shift in preservation when it comes to how authenticity and integrity are being defined. Although it is still important to consider original historic fabric as a part of a building's authenticity, it is becoming more and more acceptable to consider constructed authenticity and experiential authenticity when determining building significance. Constructed authenticity is when significance is interpreted through ideas and meanings of a place rather than through the physical original fabric. This means that cultural and social ideas of a place are preserved, not necessarily the actual fabric of the building. The preservation of fabric comes secondary to the preservation of historic cultural and social aspects connected with the building (Wells, 2010). Experiential authenticity is the final type that Wells (2010) discusses. This type of authenticity interprets significance of a building through the personal and emotional experience and attachment one has with a place.

This shift away from fabric-based authenticity is a positive move when considering the historic significance of buildings like the mills in this study. Large industrial buildings commonly are not significant for their interior architectural detailing since the interiors are usually open and plain, with the exception of columns, structural support beams, and windows. Rather, the mills are significant and authentic because of the constructed authenticity (the cultural and social role the mills played in the past) and experiential authenticity (the connection one has with both the historic and modern character within the same interior). The shift away from fabric-based authenticity is also

due to the beginnings of preservationists redefining what about a building must be authentic in order to be historically significant. Traditionally the exterior was the main concern of preservationists, however, as rehabilitation and adaptive use become more popular, the interiors and buildings as a whole are becoming the focus for determining authenticity and significance.

### *Significance of the Built Environment*

In order to understand the need for rehabilitation of historic properties, such as mills, it is important to understand the value perception of the built environment. David Tomback (2007) quotes Donovan Rypkema in his article, *Valuing our Heritage*, saying:

> Preservationists often talk about the 'value' of historic properites: the social value, cultural value, aesthetic value, urban context value, architectural value, historical value and sense of place. In fact, one of the strongest arguments for preservation ought to be that a historic building adds multiple layers of 'value' to its community (Rypkema, 2004, p. 206).

Rypkema also poses a question about what the historic preservation movement will need to do in order to make preservation relevant in fifty years (Rypkema, 2010). Preservationists and designers need to recognize that rehabilitation of older buildings for new uses is one of the only solutions to maintaining the preservation movement. The built environment tells the story of our community histories and change over time. Whether about the economy, industry, education, or other factors, the built environment is one of the most important and revealing artifacts for studying and answering questions

about our past.

People in general have a connection with their surroundings, which creates a sense of place. The instinct to protect one's sense of place is connected to the increasing interest in "preserving large areas of the built environment, and the effort to protect the surrounding historic properties" (Anderson, 1998, p. 127-128). Connection with the built environment and attachment to historic places brings significance to them. Significance of historic places is not a quality that can be found in a building; rather the significance is created in the minds of those who have a connection with a particular place, "significance is a feeling" (Striner, 1998, p. 140). As part of this effort to protect historic properties, preservation professionals and advocates are pushing for an increase in the rehabilitation and adaptive use of historic buildings.

### *Rehabilitation and Preservation Guidelines*

Rehabilitation is defined by the National Park Service (2012) as "the act or process of making possible a compatible use for a property through repair, alterations, and additions while preserving those portions or features which convey its historical, cultural, or architectural values". The process of rehabilitating a historic building and maintaining its integrity heavily relies on adhering to historic rehabilitation standards, such as the Secretary for the Interior's Standards for Rehabilitation. Just because a building is historically significant and/or listed on the National Register of Historic Places, it is not exempt from complying with current building and safety codes. The

original construction does not always align with modern building and safety codes, in fact it is usually not entirely up to code (NCSHPO, 2011). The North Carolina State Historic Preservation Office offers information on how the property owner of a historic building can seek special considerations from the local inspection authority during the building inspection prior to rehabilitation. This includes applying for certification as historic for the purpose of the State Building Code. If this certification is granted through SHPO, the property owner can then be considered for exclusion from some current building codes by the building inspector.

However, this exclusion from current building code is applicable only to historic commercial buildings, structures constructed before 1936, and historic dwellings used for commercial purposes that were constructed before 1972 (NCSHPO, 2011). The State Historic Preservation Office also makes it clear that it is important to understand that, regardless of historic certification, there are some codes that must be met. These tend to be codes concerning public safety, health, and general welfare. A structural evaluation and analysis will decide what current codes will need to be met within a specific building. Often, this evaluation may take an extended period of time to perform if the new proposed use of the space is very different from the original function (Gianopulos, 1982).

Incorporating current building codes and standards with a historic rehabilitation project is necessary, however, the significance and integrity of the original building is even more important to the rehabilitation design. As pointed out by Gianopulos (1982), “a structural remedy which destroys or alters significant architectural features is no better

than restoring an architecturally significant building which is structurally unsound" (p. 482). There are many guidelines that have been set in place to help keep the significance and integrity of a building intact during rehabilitation. The most commonly followed guidelines are The Secretary of the Interior's Standards for Rehabilitation. This list of ten guidelines offers recommendations that must be met for National Register buildings to qualify for historic rehabilitation tax credits. This requires a higher level of retention of original materials that define the architectural character and setting of a particular building (Park, 2006). Park supports the introduction of a contemporary design vocabulary, stating "rehabilitation allows for the use of contemporary expressions compatible with the historic character" as long as it is "consistent with the period of significance of the property" (Park, 2006, p. 12).

When it comes to the design approach for rehabilitation of a historic building, Brooker and Stone (2004) discuss three possible design strategies designers can apply. These strategies are installation, insertion, and intervention. Installation is when the old and new exist independently of each other, insertion is when the new is built to fit within the existing structure, and intervention is when the old and the new are completely intertwined (Brooker & Stone, 2004). Along with these strategies, they also provide tactics designers can employ to achieve these strategies, including planes, object, light, surface, movement, and opening. These strategies and tactics focus on the dialogue that will be established between the historic materials and features and the new materials and features. Other ways to understand the historic significance and integrity of a building

come from the National Park Service, which are reiterated in Leimenstoll's paper, *Keeping Significance Intact: Seven Aspects of Integrity* (2009). These seven aspects are location, design, setting, materials, workmanship, feeling, and association.

Lastly it is important to understand historic standards dealing with the interior of a building. Criteria for evaluating appropriate design alterations during rehabilitation are suggested by Leimenstoll (1988). In this article, eight criteria are laid out that should be investigated within the interior. These include form, proportion, scale, rhythm, light, materials, finishes, and detail. Each of these criteria are important in considering an appropriate new design for the rehabilitation of a historic building and are applicable to any architectural style (Leimenstoll, 1988). Leimenstoll also makes it clear that not all eight criteria will be equally important. Depending on the specific building, some criteria will be more important to focus on than others, or some may not be applicable to that particular project. A successful combination of historic rehabilitation standards and current building codes can be achieved through the use of a multitude of historic rehabilitation guidelines and codes.

### *National Register of Historic Places*

The National Register of Historic Places is the official list of districts, sites, buildings, structures, and objects significant in American history, architecture, archeology, engineering, and culture. The National Park Service, a federal preservation commission, created and administers the list through the National Historic Preservation

Act of 1966. Most nominations for listing are suggested by the State Historic Preservation Officers of the federal or tribal equivalent of this position. Each state has a professional review board that looks at the nominations and makes recommendations for listing eligibility. The National Register list also includes designated National Historic Landmarks (National Park Service, 2011).

In order for a property to be eligible for listing on the National Register it must be at least 50 years old. Properties that are less than 50 years old can be considered for listing, however this is rare. In order for properties to be considered by the review board they must prove to be exceptionally important to the history, architecture, archeology, engineering, or culture of the United States (National Park Service, 2011). National Register listing is a prerequisite for a rehabilitation project to qualify for historic tax credits and other incentives.

### *Building and Rehabilitation Codes*

When rehabilitating a property listed on the National Register of Historic Places, the developer must be aware of overlay zoning and historic designation codes. This also means that the developer is exempt from some contemporary building codes and may only have to comply with local municipality code enforcement (Kelso & Rabun, 2009). North Carolina has two sets of codes applicable to historic buildings and rehabilitations, Chapter 34 of the North Carolina Building Code and the 2009 NC Rehabilitation Codes.

The scope of Chapter 34 controls the "alteration, repair, addition and changes of occupancy of existing structures" (NC Building Code Council, 2006, p. 533). This chapter allows for a departure from full compliance with the building codes without compromising the minimum standards for fire protection and life-safety of a rehabilitated building. Any changes to an existing structure must conform to building code requirements for new construction. Section 3407 of this chapter contains requirements for historic buildings. This section states, "The provisions of this code relating to the construction, repair, alteration, addition, restoration and movement of structures, and change of occupancy shall not be mandatory for historic buildings where such buildings are judged by the building official to not constitute a distinct life safety hazard" (p. 543).

Proposed work on an existing and / or historic building must be investigated and evaluated in accordance with Section 3210: Compliance Alterations. Chapter 34 of the NC Building Code also provides requirements for wall construction, dwelling, and tenant unit separation, corridors, openings, systems and other categories related to building alteration. However, while compliance with building codes for an existing structure may be allotted discretion, ADA components must comply with the North Carolina Accessibility Codes (NC Building Code Council, 2006).

The 2009 NC Rehabilitation Code is not to be cited for enforcement purposes, but rather as a guideline for rehabilitation of historic buildings (NC Building Code Council, 2009). While the information provided is extensive, the overall material contained in this document includes lists of appropriate materials to be used during rehabilitation, as well

as a Materials and Methods section and Basic Requirements that work must comply with. The Rehabilitation Code provides information specific to the repair, renovation, alteration, and reconstruction work of a rehabilitation project. This code also uses the Hazard Index concept to specify the requirements for a change of building use. These concepts include; basic requirements, means of egress, vertical openings, height and area limits, exterior walls, fire suppression, fire alarms and fire detections systems, structural, plumbing, electrical, and mechanical systems, and accessibility requirements (NC Building Code Council, 2009). The NC Rehabilitation Code is based off of the NC Building Code, however, where the Building Code must be complied with; the Rehabilitation Code is only a guideline, not an enforceable code. The Rehabilitation Code can be utilized during rehabilitation projects involving historic tax credit approval.

### *Federal and State Historic Tax Credits*

In general, historic tax credits are available as a financial incentive to sensitively and appropriately rehabilitate properties listed on the National Register or that have historic significance within a historic district. Tax credits are used for revitalization, renovation, and rehabilitation projects. The main difference between federal and state historic tax credits are the eligibility qualifications. While federal tax credits are administered through the National Park Service, the state tax credits are offered through the State Historic Preservation Officers. There are many benefits that can stem from using historic tax credits, often based around the economy. Historic tax credits have

benefited private sector investment, meaning fewer historic properties are owned or maintained by the government. These tax credits also create jobs and in return a renewed commerce. Properties that utilize historic tax credits often see an increase in property value (Novogradac, 2009).

Federal historic tax credits were first considered in the Tax Reform Act of 1976. However, they were actually incorporated fully as part of the Revenue Act of 1978. Revisions to this act were made in the Economy Recovery Tax Act of 1981, the Tax Reform Act of 1986, and finally the Revenue Reconciliation Act of 1990. The current rules for historic tax credits are now found within the Internal Revenue Code section 47 (Novogradac, 2009). As part of the Tax Reform Act of 1976, legislation enforced a greater and quicker depreciation in value of unused historic structures and a mandatory straight-line depreciation of property related to the demolition of a historic structure. This is what caused the historic tax credits to be introduced into the Revenue Act of 1978. This act established the first tax credit for the rehabilitation of older buildings. An investment tax credit could be granted up to 10 percent of the qualified rehabilitation costs as long as the building was at least twenty years old. This tax credit was an alternative to the increased depreciation under the Tax Reform Act. The Economy Recovery Act of 1981 was established to benefit rehabilitation expenditures accrued after December 31, 1981. In this new act, the increased depreciation deductions under the Tax Reform Act were removed and a three-tier credit system was set in place. The Tax Reform Act of 1986 also placed limitations on the ability to use credits on passive

investment, including real estate (Novogradac, 2009).

The Federal Historic Preservation Tax Incentives program, run by the National Park Service, has a reputation of being one of the "most successful and cost-effective community revitalization programs" (Novogradac, 2009). Revitalization of communities is a direct affect of the rehabilitation of individual or a complex of historic buildings. Tax credits are a dollar-for-dollar credit equivalent to regular U.S. federal income taxes. Generally, according to Novogradac & Company, LLP, federal tax credits are available to a taxpayer who is liable for regular income taxes. These taxpayers include individuals, regular corporations, estates, and trusts. In order to qualify for federal tax credits the applicant must fall within the five criteria. These criteria are: (1) that building must be a qualified rehabilitated building, (2) that if the 20 percent credit is sought, the rehabilitation must be certified as eligible by the NPS, (3) the rehabilitation must be substantial, (4) the expenditure included in the basis with which the credit is calculated be all qualified rehabilitation expenses, and (5) the credit must be reported to the IRS by both the taxpayer and the National Park Service (Novogradac, 2009).

Within the federal tax credits, there are two tiers of credits that can be applied for. The first tier is the 20 percent credit, which requires the building to be a certified historic structure (listed on the National Register or located in a registered historic district and certified as having historic significance to the district by the Secretary of the Interior) and be a certified rehabilitation project. The second tier is the 10 percent credit. This is available to buildings built before 1936 that are located within a historic district that has

been listed on the National Register. In the case of the 10 percent, the National Park Service has to certify that the building does not add to the historic character of the district. Often these decisions are passed on to the state preservation office (Novogradac, 2009).

In addition to the federal and state preservation tax credits, The North Carolina State Mill Rehabilitation Tax Credit program, run through the NC State Preservation Office, offers tax incentives specifically for the rehabilitation of vacant mill buildings. The program was created to "enhance the economic feasibility of reusing many of the state's former industrial sites" (NCSHPO, 2011). State tax credits are available to both income and non-income producing historic mill properties. There are three main eligible requirements including: (1) the mill was used as a manufacturing facility, a warehouse for selling agricultural products, or as a public or private utility, (2) the mill is a certified federal or state historic structure, (3) the mill has been at least 80 percent vacant for at least two years (NCSHPO, 2011).

Much like the federal program, the state rehabilitation tax credit is divided into tiers. State credits are evaluated on three different tier levels, comprised by counties. According to the North Carolina State Historic Preservation Office, tier one and two counties are eligible for a 40 percent mill tax credit on a certified rehabilitation of an income-producing historic structure. These projects also qualify for the 20 percent federal tax credit. A 40 percent mill tax credit is also offered on a certified rehabilitation of a non-income producing historic structure, however, there is not a federal tax credit to

accompany this. Tier three counties in North Carolina are eligible for a 30 percent mill tax credit for the rehabilitation of income-producing historic structures, but there is no mill tax credit for non-income producing rehabilitation projects. These non-income producing projects in a tier three county are still eligible for regular state historic rehabilitation tax credits (NCSHPO, 2011). It is important to note the difference between the North Carolina State Mill Rehabilitation Tax Credit and the North Carolina State Rehabilitation Tax Credit.

In order for a rehabilitation project to fully qualify and receive federal and state historic tax credits, three important steps must be followed. The first step is to evaluate the historic significance of the building. If a building is already listed on the National Register of Historic Places, this step is unnecessary because its significance is already established. Step two is to report a description of the proposed rehabilitation to the National Park Service. This step usually takes place before the completion of the project, however, it can also be reported when a majority of the work is done. The third, and final, step is to apply for a certificate of completed work. This certification is given through the National Park Service upon their satisfaction that all requirements are met and the building's historic significance and integrity remain intact (Novogradac, 2009).

In total, there have been 2,762 National Register of Historic Places listings in North Carolina, and 1,314 of these are projects completed using federal tax credits as of 2011, equaling over $197,382,479 in state investments (NCSHPO, 2011). Overall, North Carolina has seen $1,047,358,480 of historic rehabilitation projects stimulated by tax

incentives between 1995 and 2011. In 2011 alone North Carolina had 38 rehabilitation and adaptive use projects ranging from small commercial buildings to the large mill complexes (National Park Service, 2011).

### *Historic Mill and Warehouse Construction*

In their earliest construction, mills were typically constructed from brick, concrete, iron, and wood timbers with wood columns; however, the materials and structure of the building were dependent on the machinery and technology available for the production of the mill. Kelso and Rabun (2009) outline three possible types of mill construction: standard mill construction, mill construction with laminated floors, and semi-mill construction. According to Tyrrell (1867), cost played a large role in the design, size, and construction of the mill buildings. Depending on the need for space and the price of materials, mills were sometime constructed with the cheapest available materials that were not intended to last (Tyrrell, 1867).

Mills were primarily constructed between 1850 and 1930, closely paralleling the Industrial Revolution (Kelso & Rabun, 2009). Mill construction was a method of building formation in which the design, size, and specific characteristics were based on the technology facilitated within the building. The most common wall construction for industrial building was brick load-bearing exterior walls with iron columns and brick curtain walls, or iron columns with wood purlins covered in corrugated iron (Tyrrell, 1867). Kelso and Rabun (2009) describe mill construction as "identifiable by their

structural systems as well as their utilitarian form and appearance" (p.16). They also describe mills as brick masonry buildings containing one to four stories with large windows and skylights. These windows and skylights were meant to provide natural daylight throughout the large interiors of the mill buildings. Columns were an important structural feature to mill construction, as they provided support for the weight between different floors and the roof. Until 1860, columns were usually made from wood and set up in a single row formation down the center of the building, supporting the longitudinal wood girder. The finished wood floor as often more formal, made of oak, pine, maple, or hickory (Kelso & Rabun, 2009).

The late 1800s brought about the advancement of fireproof construction, which became a popular method of mill construction. This type of construction eliminated smaller pieces of structural wood elements. Replacing these wood elements were "…noncombustible floors that were constructed of an inventory of railroad rails, wrought-iron or steel beams, and brick of terra-cotta arches" (Kelso & Rabun, 2009, p.16-17). Mill construction used heavy-timber girders, beams, and columns for structural framing within load-bearing masonry walls. Another name for this was slow-burning, heavy-timber construction. Between 1850 and 1860, cast-iron columns were used in masonry buildings allowing for additional building height and more weight (Kelso & Rabun, 2009). These structural materials were developed along with the noncombustible floor construction methods as part of the development of fireproof construction.

Large factories were built to support the high demand for tobacco and textile products. Warehouses were built to serve multiple purposes, mainly for the sale of tobacco. However, these buildings were also used for important community events such as political gatherings, religious services, rallies, and other official public meetings. During the harvest season, warehouses were not only important for tobacco trade and storage, but were epicenters of community activities (Yeargin, 2008). Warehouses became more popular with the establishment of auctions, especially in the tobacco industry, but auctions also took place in the textile industry.

According to Yeargin (2008), these warehouses commonly included large doors, windows, and skylights. These openings in the building provided natural light to the interior of the buildings. They also had areas for unloading and loading large amounts of tobacco crops, textile materials, and products of both. The interior space was lined with columns that helped carry the weight of the multiple floors and the roof. Another feature of these buildings, most commonly seen at tobacco mills, was overnight accommodations for farmers and traders who traveled further distances. These large tobacco and textile mills often covered many acres, which was a basis of advertisement for the company owners (Yeargin, 2008). Because the mill complexes were a staple to the local community, company owners were able to use the buildings themselves as an advertisement like billboards are used today. Over time, and through lessons learned, building materials evolved and changed with technology to comply with new building standards and safety codes.

*History of the Tobacco and Textile Mill Industry in the South*

Both tobacco and textile production have been a major part of industry and life in the South since before the Civil War (Yeargin, 2008). The South provided the world with a vast range of tobacco products, such as cigarettes, cigars, and chewing tobacco, and textile products, such as bags, clothing, and the containers in which to store tobacco products. The connection between the tobacco and textile industries was common as many textile mills were constructed in order to produce the packaging for tobacco products. The first mill was constructed in 1866 in Oxford (Yeargin, 2008).

The steady increase in production of tobacco was linked to urban growth after the end of the Civil War. For its connection to growth and economic success in the South, tobacco was considered "the South's oldest staple crop" (Yeargin, 2008, p.109). Yeargin also claims that the poverty-ridden Piedmont area became the center of a "tobacco boom that enriched the region for generations" (p.110). The historic of the booming tobacco industry in North Carolina, and much of the world, can be attributed largely to the Duke family of Durham. They capitalized on tobacco when they realized the high demand for the product overseas (Durden, 2003).

While tobacco mills have also been an economic symbol in the South, textile mills got their start in the Northern states; however, after the Civil War left the South in desperate need to recover, many southern businessmen and farmers decided that they would expand the textile industry in the South. With cotton as a major crop, Southern textile mill construction started during the 1880s. During the 1920s, the Southern

Piedmont area, including southern Virginia, the central Carolinas, and northern Georgia and Alabama, became the leading producers of cloth and textiles in the world (Hall, et al, 1987). The textile industry was an important influence on the "New South" and provided a way to rebuild the southern economy after the war (Andrews, 1987), as well as many jobs for those left without work.

During the 1800s, James B. Duke was running the tobacco company Duke & Sons, and by 1890 had established the famous American Tobacco Company based out of Durham, NC (Whitten & Whitten, 2006). According to Durden (2003), in the years to follow American Tobacco became the largest tobacco product producing company in the world. The American Tobacco Company led the way when it came to tobacco industry and owned the majority of the tobacco mills in the region. Some of the nearby textile mills were constructed by the American Tobacco Company for production of tobacco bags; however these mills were later taken over by other companies and focused on the production of clothing and other textiles. The success of the company brought with it many jobs and a stable economy for North Carolina (American Tobacco Company, 1954). The development and popularity of a variety of tobacco types lead to greater business and the need for larger and more mill buildings.

However, modernization in technology and rebellion in the South eventually lead to the decline of both the tobacco and textile mills. These rebellions led to the General Textile Strike of 1934. As a result, many textile mills were closed down and mill villages were completely abandoned (Hall, et. al, 1987). This was a common trend throughout the

1980s and 1990s in both tobacco and textile mills. This abandonment of tobacco mills was the result of many factors including new knowledge and awareness of the health dangers and risks associated with tobacco. The textile strike in 1934 was the spark that ignited mass closing of textile mills. However, the abandonment of these mill towns is also often attributed to textile companies closing their doors in the United States and moving production overseas, as it is a cheaper business expense. Although these factors left a number tobacco and textile mills sitting unused, because of their unique construction they can be ideal spots for new businesses and residences.

### *North Carolina Mill History*

As part of a redevelopment program sponsored by the Environmental Protection Agency, mills across the country have been adapted into new useable space. The EPA promotes the revitalization of industrial buildings because they "invoke images of America's industrial strength and success" (Bodine, 2006). The EPA believes that revitalized mills, along with other historic properties, will operate as reminders of their historic roles and demonstrate reinvention of the past into modern times. Mills are important to the history of the United States, and certainly to North Carolina, as the mill operations were the "lifeblood" of growing communities and were the economic foundations and often only source of livelihood for residents (Bodine, 2006).

North Carolina, which contains many historic mills, has become a state with exemplary rehabilitation projects. With the increasing popularity of industrial building

reuse, the preservation field is able to show and teach communities about the histories of their towns and cities. As architect Eddie Belk said, these mills were the "hub of a lifestyle and city, and they can be again… it's the evolution that helps it all connect" (Belk, 2011). Through creative reuse designs, the large mill buildings are once again bringing back life and economy to the benefit of many communities.

*Durham Hosiery Mill*

The Durham Hosiery Company began in 1894 as a textile-manufacturing mill. Four years later, the company converged with Golden Belt Hosiery because neither company could compete with the textile mills in the north on their own. Around the early 1900s the Spanish-American War caused a boom in the textile industry. As a result, Durham Hosiery's production of textile expanded warranting the construction of Durham Hosiery Mill #1 in 1902 (Kueber, 2007). In the years to follow, three annex buildings were added to the original mill along with an engine and boiler building, dye house, storage sheds, and cotton warehouses.

The mill closed in 1934 and sat empty until the Red Cross made use of the building during World War II. Since then, there have been multiple owners who used the buildings for storage (Kueber, 2007). Durham Hosiery Mill was listed on the National Register of Historic Places in 1978 for significance in industry, architecture, and commerce (American Dreams, Inc., 2011). First used as a flea market space after the mill closed its doors, the buildings have been rehabilitated into affordable housing for senior

citizens. The new designs included large apartments, a game room, community room, beauty salon, media room, cafeteria, laundry room, and event space. Belk Architecture completed rehabilitation of this complex in 1987.

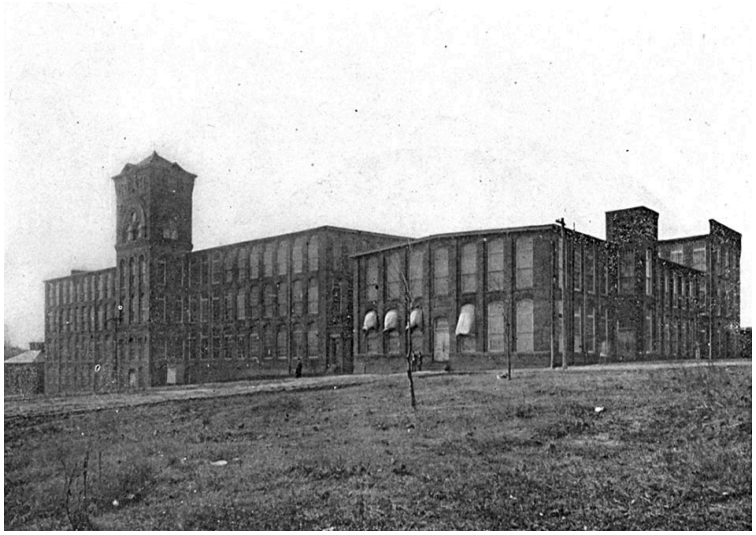

**Figure 1. Durham Hosiery Mill, early years as a textile mill. Courtesy of Gary Kueber / Endangered Durham.**

**Figure 2. Durham Hosiery Mill, current State. Courtesy of Megan Klem.**

*Brightleaf Square*

Brightleaf Square is comprised of two twin warehouses built between 1900 and 1904 by the American Tobacco Company. The buildings, called the Watts & Yuille Warehouses, were originally used for storing, aging, and fermenting tobacco for cigarette manufacturing. In 1911, the American Tobacco Company was split into three different companies because it violated the Sherman Anti-Trust Act and Liggett & Myers Tobacco Company purchased the warehouses. The company used the two buildings for their original purpose until 1970 when the warehouses were closed (Historic Brightleaf, 1986).

The medieval architecture in the Romanesque Revival style was an important architectural statement to the skyline of Durham. The buildings also stood testament to the growing acceptance and popularity of cigarette smoking and the influence of the Industrial Revolution (National Register Nomination). Each of the buildings consists of bays separated by masonry firewalls. The interiors were constructed in the post-and-beam style using local materials, including brick and heart pine timber.

Brightleaf Square's Watts and Yuille Warehouses were listed on the National Register of Historic Places in 1984, just before their rehabilitation, for their significance in architecture and industry (American Dreams, Inc., 2011). Today, Brightleaf Square features a mixture of restaurant and retail spaces, as well as many businesses such as the Duke University Press, a photography studio, and design firms (Historic Brightleaf, 1986). Belk Architecture completed the rehabilitation of Brightleaf Square in 1980.


**Figure 3. Brightleaf Square, the historic Watts and Yuille Warehouses pre-rehabilitation. Courtesy of Gary Kueber / Endangered Durham.**


**Figure 4. Brightleaf Square, the Watts and Yuille Warehouses post-rehabilitation. Courtesy of Gary Kueber / Endangered Durham.**

*Golden Belt Mill*

Golden Belt Manufacturing was originally located on the American Tobacco Campus as the producer of the cloth bags the tobacco was sold in. However, in 1901 the company constructed a new factory that was divided into a cotton mill and a bag mill. Part of this complex consisted of fifty mill houses built to the east of the factories. In 1906, a new two-story building was constructed for the purpose of cotton hosiery production. Four years later, in 1910, the bag mill was enlarged (Keuber, 2007). The architectural fabric of the buildings represent 20th century building styles that characterize the industrial neighborhoods developed in Durham (National Register Nomination). The complex was listed to the National Register of Historic Places in 1984 for its significance in architecture, industry, and commerce.

Golden Belt was rehabilitated starting in 2001, and was approved for historic tax credits by the National Park Service. Currently, spaces at the mill include artist studios and gallery, loft apartments, restaurants, retail, offices, music venues, and event space. The new designs were created based on the culture of the downtown Durham area as well as some of the nation's best urban settings (Golden Belt, 2011). Rehabilitation efforts are still an ongoing process at the complex.

**Figure 5. Golden Belt Mill, textile manufacturing. Courtesy of Gary Kueber / Endangered Durham.**

**Figure 6. Golden Belt Mill, post-rehabilitation. Courtesy of Gary Kueber / Endangered Durham.**

*American Tobacco Campus*

The American Tobacco Company was founded in 1890 when four rival tobacco companies joined Duke & Sons tobacco manufacturing (American Tobacco Campus, 2011). The construction of the American Tobacco Campus in Durham, NC began in 1874 when the W.T. Blackwell & Company Factory (American Tobacco Campus, 2011) was built. Bull Durham, designed in the Victorian Italianate style, is one of the oldest factory buildings in the city of Durham. It was listed to the National Register of Historic Places in 1974 and became a National Historic Landmark in 1977. Rehabilitation of this mill complex began in 2005 and was completed two years later (PreservationDurham, 2012).

During the early 1900s, a true tobacco campus was born with the construction of the Hill Warehouse in 1900 to the west of Bull Durham. The Washington Building was built in 1902, and a year later the Cigarette Building, now known as Lucky Strike, was constructed to the south of Bull Durham. The fifth major tobacco building, the Noell Building, was added between 1902 and 1906 to the west of Lucky Strike (Kueber, 2007).

Today the American Tobacco Campus stands as the largest reuse project in the Southern United States. The rehabilitation of the one million square foot complex qualified and was approved for historic tax credits by the National Park Service. This rehabilitation has provided spaces for five restaurants, dozens of businesses and offices, an event center, residential units, retail, and houses some of Duke University's classrooms and administration offices. American Tobacco continues to undergo renovations for new tenants. The designs and rehabilitation have won awards for Best

Mixed Use Development, Best Renovated Commercial Property, and Best Redevelopment Project (Capitol Broadcasting Company, 2011).

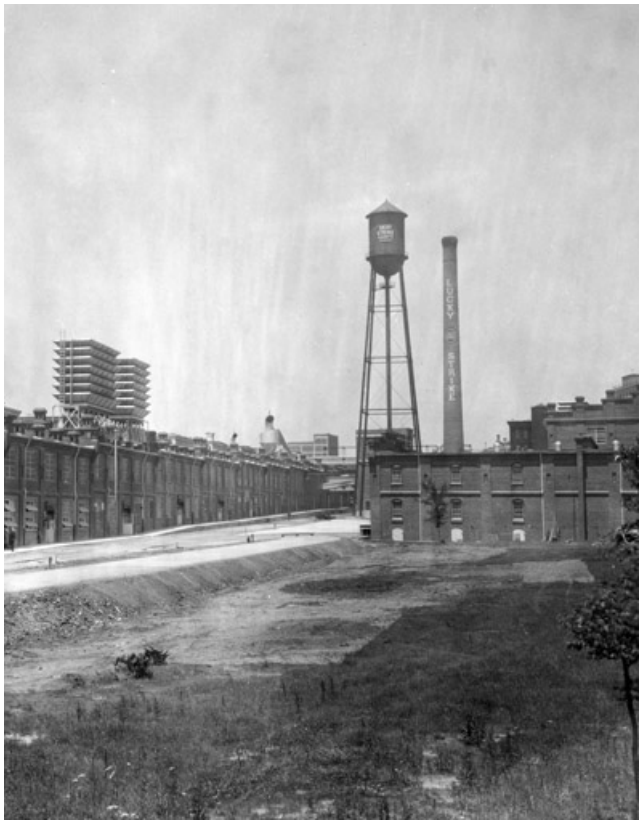

**Figure 7. American Tobacco Campus, early years as a tobacco manufacturing and storage plant. Courtesy of Gary Kueber / Endangered Durham.**


**Figure 8. American Tobacco Campus, post-rehabilitation. Courtesy of Capitol Broadcasting Corporation.**

## ***Belk Architecture***

Belk Architecture in Durham, NC has designed over four million square feet of industrial mill building space (Belk, 2011), leading North Carolina and many other states in rehabilitation projects. Owner and architect, Eddie Belk, has been "an historic preservation pioneer dedicated to recycling our working architectural heritage" for thirty-three years and has set preservation standards and helped direct the "evolution of our agrarian industrial architecture into a sustaining legacy" (Belk Fellowship Application, 2010). As a leader in the architectural preservation movement in North Carolina, Belk was a founding member of both the Durham City / County Historic Commission and the AIA NC Historic Resources Committee. Other rehabilitation and preservation projects

designed by Belk Architecture have included more than eleven U.S. Embassy properties, historic arcades, jailhouses, churches, hospitals, hotels, and homes, among many other various projects.

Belk Architecture rehabilitated the four mills in the sample used in this research. Projects done by this firm have been chosen because of the extensive background and experience Eddie Belk, FAIA, has in this type of design work. Under Belk's direction, the other architects with Belk Architecture have become experts in their own abilities. In national recognition of the impact of his contribution to the preservation of historic buildings, the American Institute of Architects honored Eddie Belk by elevating him to Fellow status in 2011. His extensive portfolio consists of over forty mill rehabilitation projects of large-scale proportions. Given Belk's accomplishments and his prolific practice in North Carolina, it seemed apparent to the researcher and thesis committee that studying his exemplary mill rehabilitation projects would result a sample of successful rehabilitation solutions from which to glean answers to the research questions posed in this thesis.

# CHAPTER III

# METHODOLOGY

The intent of this study was to investigate the rehabilitations of four historic tobacco and textile mills and the impact on historic character and integrity of these buildings. Each of the mills was rehabilitated and adapted for a new commercial, institutional, office, and/or residential use. Typically, the exteriors of historic buildings are the main topic of concern in the preservation field because it is the façade that people see every day. Therefore, when rehabbing an historic building, preserving the exterior is given a higher priority than the interior. However, when applying to use historic tax credits there are also standards that must be followed with the design changes to the interior. It is the interior of these historic mill buildings that tell a story about the building, its architecture and its use. Because each mill has its own history and its own specific character, the alterations had to be evaluated separately to begin with in order to understand each mill in its own terms. The researcher was able to explore these characteristics and then determine how the four individual mills had similar rehabilitation processes and designs.

Through the study, similarities and differences were identified along with determining how the historic character was maintained within the new designs. Four tobacco and textile mills were selected for inclusion in this study based on their National

Register listing, use of federal historic tax credits, location within North Carolina, and rehabilitated for mixed-use. Leimenstoll (1988) and Brooker and Stone (2004) provided the criteria for examining the historic interiors of each mill. Rehabilitation projects often influence the interior of a building the most, leaving the exterior virtually untouched. Through the research, the impact of the approved changes by the National Park Service and the State Historic Preservation Office were studied to determine how the historic character and integrity remained intact during the rehabilitation process.

### *Sample Selection*

In order to determine an appropriate sample of mills, the researcher first contacted the NC State Historic Preservation Office for a list of mill rehabilitation projects in North Carolina. This list consisted of thirteen completed projects using historic tax credits and twenty-one ongoing projects planning to use historic tax credits. From this list, the researcher kept only the mills that were individually listed on the National Register of Historic Places. Choosing the mills that have been rehabilitated for mixed-use purposes then narrowed the list further to seventeen projects.

Since the majority of the mills were mixed-use projects, the next step in the elimination process was to choose mills that had been completed by architect Eddie Belk, FAIA, owner of Belk Architecture, who is recognized for his work on historic mill rehabilitations throughout North Carolina and beyond. The researcher chose to select projects by one architect because of the architect's experience and reputation for work in

this category. Mill rehabilitations by Belk Architecture were also chosen to represent mill projects in North Carolina, as well as across the country, because Belk has produced a successful majority of these types of projects. After the list was narrowed to 13 mill projects completed by Belk Architecture, as listed in Eddie Belk's AIA Fellowship application, the researcher decided to choose the final sample from mills that were located in Durham, NC because this was a city whose history revolved around tobacco and textile manufacturing. The selection provided a balance between tobacco and textile history, as two of the samples were tobacco mills, while the other two were textile mills. With a heavy concentration of mill rehabilitation projects so close together, these four case studies are useful in illuminating the significance of historic mill rehabilitation.

The final step in the sample selection was to choose which buildings at each mill complex would be studied. For the purpose and time restraints of this thesis, the researcher and thesis committee decided to pick the buildings and areas that were most accessible and, in addition, for which the majority of interior work had been completed by Belk Architecture, rather than an outside design group. With this last criteria, the final mill buildings were chosen, which are as follows:

- American Tobacco Campus: Washington Building (1902-1907), Reed Building (1901-1902), and Crowe Building (1953-1954)
- Golden Belt Mill: Building 2 (1901), Building 3 (1929), and Building 6 (1930)
- Brightleaf Square: North and South Buildings (1904)

- Durham Hosiery Mill: Building A (1902), Building B (1904), Building C (1912), and Building D (1906)

Other buildings on each mill complex were removed from the study for multiple reasons. The first reason is that although Belk Architecture was responsible for the rehabilitations, some of the building interiors were furnished and finished by outside design groups. The second reason was that some of the buildings were mainly comprised of private office spaces that the researcher did not have access to. Table 1 is a spreadsheet with general information concerning the four mill complexes.

*Photographs of Included Mill Projects*

**Figure 9 – American Tobacco Campus, pre-rehabilitation. Courtesy of Belk Architecture.**

**Figure 10 – American Tobacco Campus, post-rehabilitation. Courtesy of Belk Architecture.**

**Figure 11 – Golden Belt Mill, during rehabilitation. Courtesy of Belk Architecture.**

**Figure 12 – Golden Belt Mill, post-rehabilitation. Courtesy of Scientific Properties.**

**Figure 13. Brightleaf Square, pre-rehabilitation. Courtesy of Belk Architecture.**

**Figure 14. Brightleaf Square, post-rehabilitation. Courtesy of Belk Architecture.**

**Figure 15. Durham Hosiery Mill, pre-rehabilitation. Courtesy of Belk Architecture.**

**Figure 16. Durham Hosiery Mill, post-rehabilitation. Courtesy of Megan Klem.**

*Mill Sample Information*

**Table 1 - Chart of general information on the four selected purposeful samples.**

| Mill Complex | Location | Date Constructed | Original Construction Method | Original Use | New Use | N.R. Listed | Historic Tax Credits | Finish Date |
|---|---|---|---|---|---|---|---|---|
| American Tobacco Campus | Durham, N.C. | 1874 - 1955 | Brick masonry, heavy timber | Tob. Factory | Mix | Yes | Yes | 2001 |
| Golden Belt Mill | Durham, N.C. | 1901 - 1958 | Brick masonry, heavy timber | Textile Factory | Mix | Yes | Yes | 2008 |
| Brightleaf Square | Durham, N.C. | 1904 | Brick masonry, heavy timber | Tob. Storage | Mix | Yes | Yes | 1981 |
| Durham Hosiery Mill | Durham, N.C. | 1902 - 1922 | Brick masonry, heavy timber | Textile Factory | Res. | Yes | Yes | 1987 |

*Data Collection*

Data was collected on each mill complex and building to analyze the interior and some exterior changes made during the rehabilitation. Information was located using the federal tax credit application, Part I and Part II, historic and pre-rehabilitation photographs, current photographs, the National Register of Historic Places nominations, floor plans, site visitations, tours, and interviews with complex management and architect Eddie Belk. The researcher also took photographs of the current state of the buildings.

The researcher started collecting data by contacting Eddie Belk of Belk Architecture to get a list of the mills his firm had worked on. Initial research to

understand the history and significance of each mill was gained through website research. Once the final mill selection was made, the researcher contacted the NC State Historic Preservation Office in order to obtain copies of the federal tax credit applications and any available original and current floor plans. Since the files for each mill were extensive, the researcher traveled to the SHPO in Raleigh, NC to look through each file and made copies and scans of initial needed information. This first trip resulted in the procurement of copies of the National Register nominations, Part I and Part II of the federal tax credit applications, as well as pre-rehab photographs. Because there were hundreds of documentary photographs for some of the mills, the researcher chose to scan the photographs most relevant to the interior and exterior portions being researched.

The federal tax credit application Part I and National Register nomination forms provided the researcher with background and a history on each of the mills, and some of the individual buildings. Part II of the application offered the researcher a written proposal of the updates and changes to be made during the rehabilitation process. These files also provided floor plans and color photographs documenting pre-rehabilitation and current building conditions. These floor plans, photographs, and tax credit applications were used to give the researcher information to compare the before and after rehabilitation state of each mill. The information also allowed the researcher to understand what the original character of the building looked like through the Part I tax credit application and historic photographs collected through the SHPO and several historic online databases including EndangeredDurham.com and the Durham County

Library Archives. For this research, Part III of the tax credit application was not utilized because (1) for the most part, this section is still in review with the SHPO, and (2) the researcher toured and photographed the mills for post-rehabilitation photographs. Information on what was actually changed during rehabilitation was found through the Part II proposal, site tours with complex management, and observations made while visiting each mill.

### *Evaluation Process*

After the final four sample mills were selected and all the data was collected from various places, the researcher began to evaluate and compare each mill in its pre-rehabilitation and post-rehabilitation state. This evaluation was done through the assessment of each mill with the eight criteria laid out by Leimenstoll in her article, *An Interior Perspective on Design Review*. The eight criteria include: *form, proportion, rhythm, scale, light, materials, finish, and detail*. The researcher also used Brooker and Stone's (2004) strategies and tactics listed in their book, *Rereadings: Interior Architecture and the Design Principles of Remodeling Existing Buildings.* The strategies determined in these rehabilitation projects were *insertion and intervention* and the tactics included; *planes, objects, light, surface, movement, and openings.* Each of these criteria were placed in a spreadsheet and applied to each of the specific building at all four sites. Initially the researcher evaluated the mills prior to rehabilitation, which provided an understanding of the original character and historic significance of the mills. This

evaluation was completed with the use of National Register nominations and tax credit application Part I's. Historic photographs were also sought after and used to gain an understanding of the expansive open interiors of the factory and warehouse buildings prior to their current segmented conditions.

Since each of the four mills sat vacant for at least two years, if not more, the tax credit application Part II provided information on the pre-rehabilitation state of the buildings along with photographs that accompanied this section. Other website research also provided the researcher with information about the state of each mill before rehabilitation. Post-rehabilitation conditions were determined through information found in the tax credit application Part II, current photographs, and observations made by the researcher during site tours of each of the four mill samples.

Further evaluation of the mills came from organizing all the photographs from the document files, websites, and researcher photographs into digital database folders. Photographs were separated by mill complex, building, and further into photographs representative of each of the evaluation criteria listed above. These photographs were individually labeled within the digital folders to help the researcher know which section of the mill it was from. Floor plans to each of the mills were also evaluated. While some of the SHPO files provided pre-rehabilitation plans, original plans were not available for any of the mills. This proved to be a limitation to the study; however, the researcher was able to determine the original and pre-rehabilitation floor plans by examining the existing plans and talking with architect Eddie Belk. Some of the Part I and Part II applications

also described the original interior for the factories and warehouses, which combined with the photographs and current plans, allowed the researcher to further make confident speculations as to what the original interior layout of the buildings were.

For the purpose of this thesis, public spaces were the main focus of evaluation. This is due to the limited access the researcher was granted to private office, restaurant, and residential spaces. It is also in these public spaces that the transformation from open warehouse spaces to the current segmented spaces can be seen. The evaluation of the before and after documents lead to an understanding of changes made to the interiors, and ultimately how the historic character and integrity was maintained throughout the process.

The researcher also used *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (Creswell, 2009), and *Architectural Research Methods* (Groat & Wang, 2002) in order to understand how to evaluate and pull information from the floor plans and photographs. These research tools allowed the researcher to better understand what information needed to be found, how to find it, how to evaluate the information, and lastly, how to make conclusions to the information found and evaluations that were made.

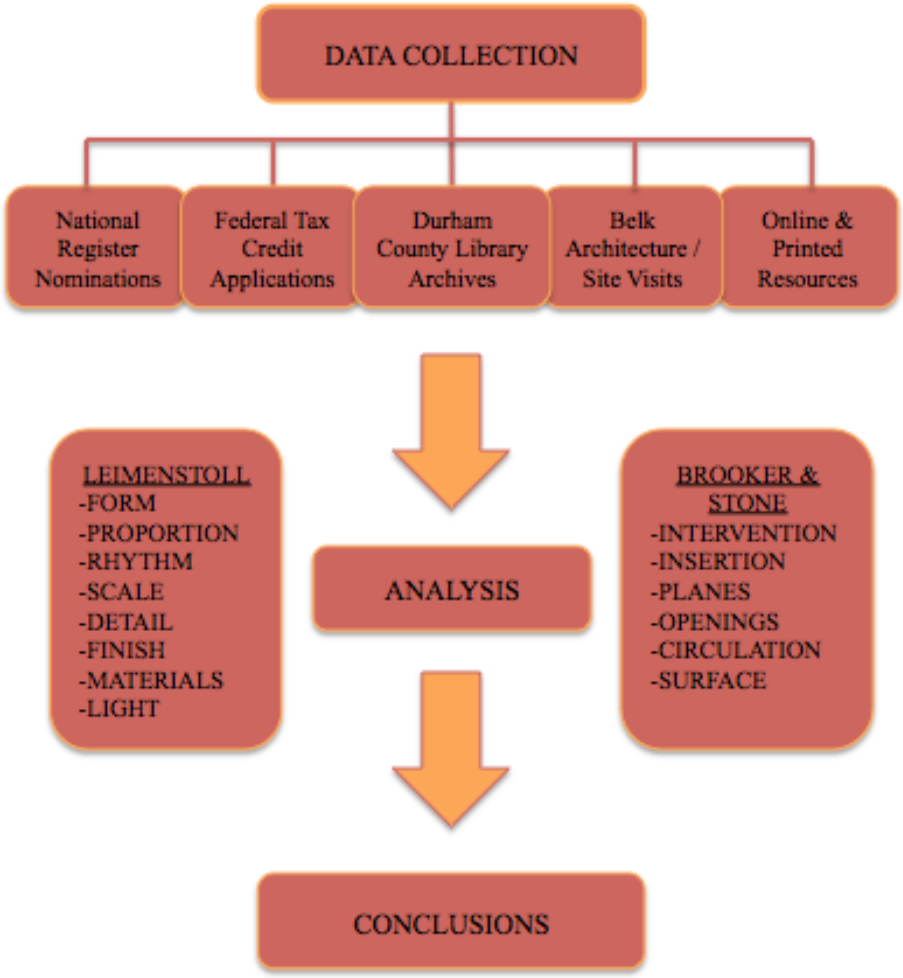


**Figure 17. Methodology Process Diagram. Courtesy of Megan Klem.**

*Limitations*

During the analysis process, the researcher was able to gain a deeper understanding and knowledge of historic rehabilitation projects and the involvement of many different entities, such as the designer, developers, investors, SHPO, National Park Service, inspectors, and perspective tenants for the space. With the help of Belk

Architecture and the NCSHPO, the researcher was able to access pre-rehabilitation information including photographs, federal historic tax credit applications, National Register nominations, and current condition floor plans. Understanding the purpose of rehabilitation projects and how to analyze them was a learning experience for the researcher. Thankfully, the researcher was able to pull from previous knowledge, committee member's expertise, and those involved in the projects to successfully answer the question being asked of the investigation.

Unfortunately, there were unanticipated challenges to the study that limited the analysis in some ways. The biggest setback was that there are no known existing original blue prints for any of the sample mills. Along with this, the researcher was unable to find an adequate amount of historic photographs of the interiors of the buildings, as most historic photographs were of the exterior of the mills. Without original floor plans and historic interior photographs, the researcher had to interpolate from early plans, current plans, and interim photographs to fully understand the historic character of the mill interiors and layouts.

Fortunately, the researcher was able to find information describing the original interiors in the National Register nominations and Parts I and II of the historic tax credit applications. However, without original floor plans, determining where and how original staircases, lifts, offices, and other interior spaces were laid out was difficult. For this reason, and based on existing information, it was assumed that most of the buildings had interiors that were large, open spaces with rows of columns but few or no interior walls.

Another limitation to the study was that documented pre-rehabilitation conditions often made it difficult to determine specific historic characteristics due to alterations made when the mills were in use, as well as the deterioration of the mill buildings from sitting unused for extended amounts of time after the mills had closed. Descriptions of the interior pre-rehabilitation conditions provided the researcher with some insight, but again educated assumptions had to be made based on National Register nominations, tax credit applications, photographs of deteriorated elements, and current floor plans.

The investigation and analysis could have been more comprehensive if the researcher had access to more extensive site observations made during mill tours. Due to the private nature of much of the interior spaces, such as offices and residential sections, the property managers were unable to show many of these spaces, if any, during the tours. For this reason, the researcher focused the thesis on analysis mainly around public spaces including lobbies and corridors. Given the time constraints of this investigation and the size of each mill complex, limitations would have had to have been set on the spaces analyzed regardless of private spaces that could have been observed. However, if this investigation were to continue, individual businesses could be contacted for permission to document the private spaces photographically.

# CHAPTER IV

# ANALYSIS AND FINDINGS

Throughout the process of analyzing the interior mill spaces, the researcher found that the architect's designs for rehabilitation, while maintaining historic character, successfully harmonized both the historic building elements with new modern elements. After the analysis was complete, three main conclusions about the projects were apparent. First, the new designs were sensitive to the historic features and original exposed structural members, such as columns, timbers, and brickwork. These new designs were considered sensitive in that they complemented and enhanced the historic characteristics, rather then overshadowing the original structure and decorative features of the mill buildings. Second, windows played a dramatic role in showing the power of day lighting from before and after the rehabilitations. Day lighting was one of the characteristics that remained virtually unchanged; meaning that during hours with sunlight, the amount of natural light entering the spaces through windows and lighting the interior was similar to the way the sunlight illuminated the building during its original use. The final conclusion was that the original form, space, and character could still be experienced within the new design. Through the insertion and intervention design strategies employed by Belk Architecture, although the open spaces were subdivided, it is still possible to understand the original interior spaces.

Through the use of insertion and intervention design strategies, Belk created a lively dialogue between the new and the old. The insertion strategy molds the new to fit within the existing structure, while the intervention strategy completely intertwines the new and the old (Brooker & Stone, 2004). The design allowed the historic character to still be perceived because the new was differentiated from the original. It is evident in each of the four projects that interior character was impacted by the rehabilitations. Although the significant historic character was maintained, the overall character of the building interiors has been altered through the insertion of new elements. The experience of both new and old within the mills brings new energy to the buildings; however, it has not masked the original character or features. Overall, the rehabilitations of the four mills were a successful balance between the layers of historic and modern character and designs. This more balanced dialogue between the new elements and the historic elements reflects a shift in a traditional rehabilitation approach from intervention towards insertion and allows for a more dynamic interplay of architectural elements within the interior. It also shows a shift from fabric-based authenticity values to experiential authenticity values, in that the significance of the buildings was dictated by the overall experience within the building rather than specific features and elements.

### *Criteria*

Through this investigation, many commonalities and patterns between the four mill rehabilitation projects were found. To begin with, the researcher used Brooker &

Stone's (2004) strategy definitions to determine the design strategy approach used by Belk during the rehabilitations. Through the analysis process, it was determined that although there were some examples of intervention strategies found within the new designs, these aspects were insignificant to the overall study. After site observations and analysis of the interior spaces, it was determined that the vast majority of the rehabilitation projects utilized the insertion strategy. However, the appearance of both insertion and intervention strategies in each of the mill rehabilitations made it apparent that this somewhat hybrid approach is common in the rehabilitation projects done by Belk Architecture. However, an obvious shift from the intervention to the insertion strategy was clear between the older projects, Durham Hosiery Mill and Brightleaf Square, and the new projects, American Tobacco and Golden Belt. Although not overwhelmingly, the earlier projects did use elements and materials that tend to make the visual of the interior blend more with the old. Many elements of the new design respected and reflected important characteristics of the historic interior.

Using two scholarly approaches to the analysis of historic building interior character, the researcher was able to compare photographs, floor plans, and documentation descriptions to one another in order to determine how Leimenstoll's (1988) criteria for the analysis of historic interiors and Brooker and Stone's (2004) design tactics defined the interior changes. Through the analysis of the four mills, significant changes to the interior character were discovered. Changes during the rehabilitation affected primarily the interior form, proportion, scale, and rhythm of the buildings.

Although the overall interior of each building was significantly altered, the National Park Service approved all design work proposals for historic tax credits according to the Secretary of the Interior's Standards for Rehabilitation. This approval of work found in the tax credit application shows the shift in the interpretation of authenticity from purely fabric-based to a combination interpretation, including fabric-based, constructed, and experiential authenticity. The subdivision of interior spaces was a primary planning strategy in the alterations and modifications to the interiors.

The following sections of this analysis will describe the maintained character, as well as the alterations and changes to these interiors, through the evaluations of Leimenstoll's (1988) criteria, which are: form, proportion, scale, rhythm, light, materials, and finish. Brooker and Stone's (2004) design tactics were used to reinforce the analysis of these criteria, including: planes, openings, and movement / circulation. Through evaluation of these criteria and tactics, one can understand how the interiors were altered while maintaining significant historic character according to the Secretary of the Interior's Standards.

### *Form, Proportion, and Scale*

In each of the mill samples, the researcher found that new design elements inserted into the interiors altered the physical, as well as the perceived, form, proportion, and scale of the spaces. A change in one of these three characteristics altered the other two in the process. Since these three criteria were directly affected by the alterations of

the others, the researcher decided that to properly analyze the interior changes, they should be grouped together. According to Brooker and Stone (2004), vertical and horizontal planes define the interior space. Therefore, if planes define the space, then they also set the form, proportion, and scale of interior spaces. The way these three tactics were incorporated into the new designs of the four mill interiors, Belk was able to introduce a new layer of form, proportion, and scale, while still appropriately maintaining historic elements of these criteria. The retention of form, proportion, and scale of the historic interiors is important in preserving its authenticity, however the new elements created a more complex interior experience juxtaposing the historic character with a new architectural vocabulary. The complexity the duality of vocabulary creates in the mill interiors brings new vitality without concealing the building's history.

According to Leimenstoll (1988), form is the "three-dimensional shape or geometry of an interior element, interior space or series of interior spaces" (p. 1.13). While rehabilitation of an historic interior usually involves retaining the form of individual spaces and rooms, the researcher found that, due to the openness of the interiors, the overall relationship of forms took priority in the rehabilitation of these large industrial buildings. Leimenstoll (1988) addresses this issue stating that the "overall relationship of the forms becomes more significant than the forms of individual spaces" (p. 1.13). This view was a common aspect found in the new design of each of the sample projects, which was easily identifiable through floor plans.

The researcher found an exemplary application of this at Brightleaf Square, in which the architect utilized two of the three original openings between the four interior bays of the South Building, maintaining the original circulation and relationship of spaces to one another (Figure 18). This example is exemplary because Belk did not include additional openings between the bays and only utilized original door openings as circulation between the interior and exterior of the building. According to Brooker and Stone (2004), movement, or circulation, through a building "provides access to different areas" and "also serves to bind together separate or disparate spaces" (p. 147). By designing around the original historic openings between the bays and through the insertion of new walls, or planes, Belk was able to create a similar circulation pattern through the building as the historic pattern. The use of these original openings between the bays was significant to the rehabilitation of the building because openings are "crucial punctuation points in buildings" and facilitate movement, admit light, and create views within a space (Brooker & Stone, 2004, p. 147). Because no new openings or exterior doorways were inserted into existing interior walls, Belk was also able to maintain the original relationship of the four separate bay spaces to one another. In this case, both authentic fabric and an authentic experience between spaces were utilized, retaining the historic patterns of the building.

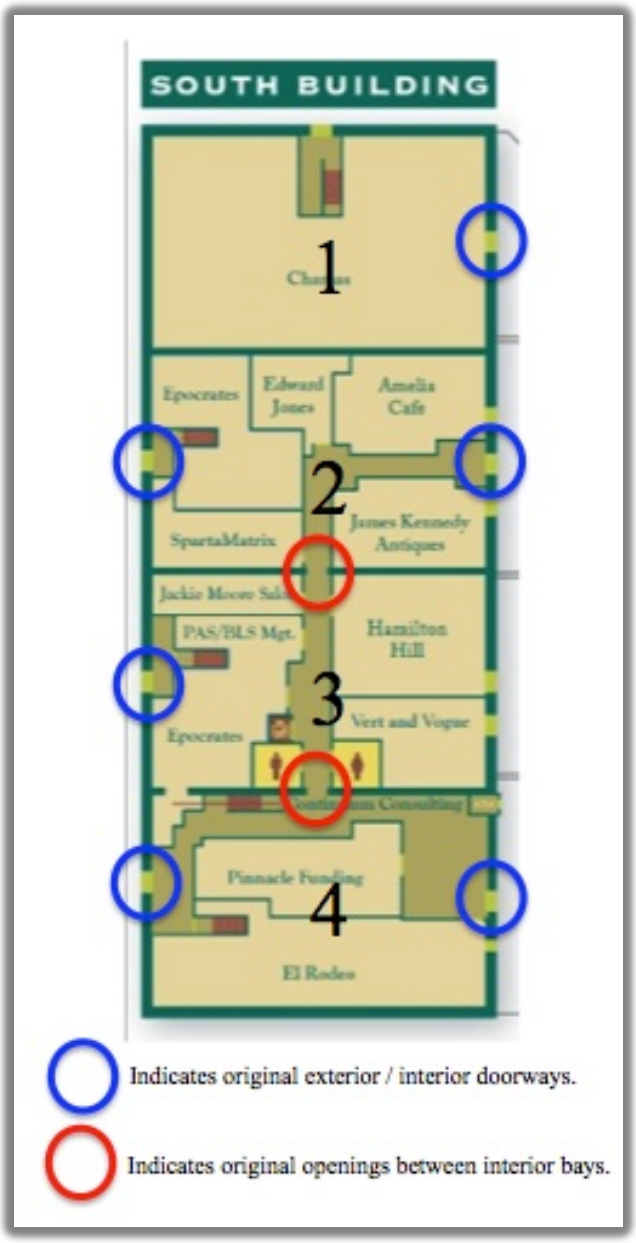


**Figure 18. Brightleaf Square, South Building. The original spatial relationships were maintained through the use of original openings and circulation patterns. Form, proportion, and scale were altered by the insertion of new planes. Courtesy of Historic Brightleaf / Megan Klem.**

The preservation of some interior forms is essential in retaining the historic character of the building. Understanding the original character and use of the building helps determine which forms are essential to maintain when rehabilitating and altering the historic interior. In the case of the four mills in this study, the overall form of the spatial relationships took priority over the individual spaces because the large, open interior did not suit the needs of the anticipated new users. Therefore, the subdivision of interior spaces became an important design feature for the rehabilitation in order to allow for separation of new individual private tenant spaces. The original forms of each of the selected samples were large, open rectangular shapes. With the exception of the one-story at Golden Belt Mill's Building 3 and Durham Hosiery Mill's Annex Building, each of the studied buildings were usually multiple stories of this stacked rectangular form creating a uniform design for each of the levels in the buildings. However, regardless of the number of stories, the researcher found that all the interior spaces analyzed had originally been large, open forms with little obstructing the overall space.

The subdivision of space, through the design tactic of inserting new planes, did not generally affect the original scale of the interior because the height of the building and each level, as compared to the human scale, was not altered from the original height. As defined by Leimenstoll (1988), scale is the "size of interior details, elements, spaces, or a series of spaces in relation to human size" (p. 1.14). The scale of the interior was also determined by how the space is perceived in relation to the scale of the adjacent spaces. In this regard, the scales from the original interiors were altered due to the design tactic

of inserting new horizontal planes, such as walls and glass panels, within the confines of the original spaces. However, the height portion of the scale was not changed in any of the buildings, except for the Durham Hosiery Mill, in which drop ceilings were added to the community areas, including the cafeteria, media room, and game room (Figure 19). It was obvious in these spaces that the original height of the room was taller because of the cutouts in the drop ceiling to accommodate the structural column heights. The reason for the drop ceiling in these areas was to adapt for modern systems and wiring.

**Figure 19. Durham Hosiery Mill, Building A. A drop ceiling was added to allow for modern systems. Courtesy of Megan Klem.**

In two of the three projects the scale of the building was actually increased due to openings made between levels. These new openings meant that two or more floors that were once only connected through stairways and lifts were now exposed to one another. This could be seen at American Tobacco's Washington Building – Bay 7 (Figure 20) and Brightleaf Square's North Building (Figure 21). While the opening at Brightleaf Square was minimal, requiring the architect to only need to make use of original columns and beams for second floor support, the opening created at American Tobacco was much larger, demanding new steel columns and beams to be inserted for extra support. In these cases, Belk utilized the insertion of new openings in the floors to create a new form, proportion, and scale within the mill interiors because spatial boundaries were no longer the same between levels. However, by doing so, the original character of these elements remained because Belk utilized existing columns and beams to support the opening.

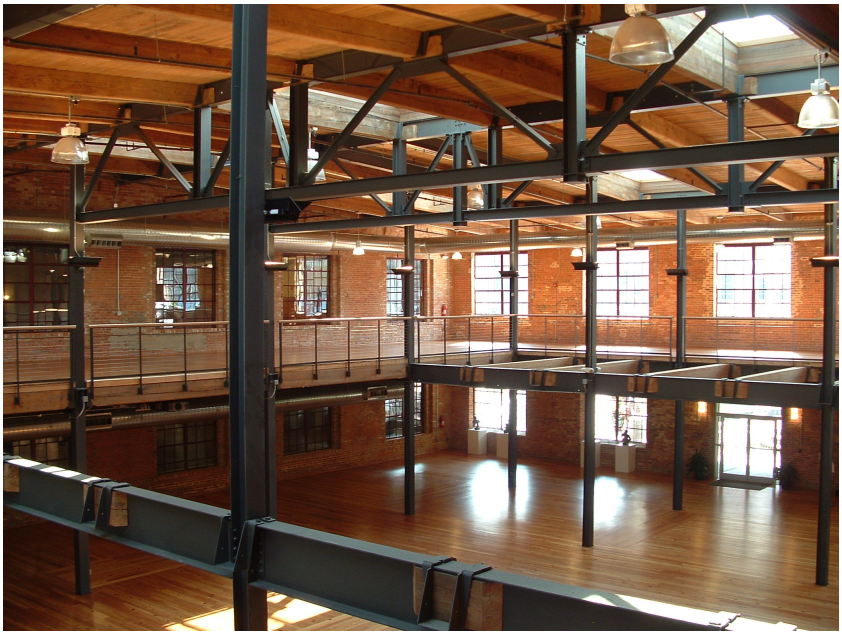

**Figure 20. American Tobacco Campus, Washington Building, Bay 7. Opening up the second floor to the first floor required the insertion of new structural columns and beams to support both the second floor and the roof weight. By opening the two floor to each other, the form, proportion, and scale of the interior as a whole was altered, however it is implied, though the design, that there were once two separate full floors. Courtesy of Megan Klem.**

**Figure 21. Brightleaf Square, North Building. The architect inserted an opening between the first and second floor. In this design, existing wood columns and beams were utilized as support for the opening. This altered the form, proportion, and scale of this space within the building. By using the existing structural elements, the architect was able to retain visual evidence that these two floor were once closed off to one another. Courtesy of Megan Klem.**

Through the insertion of new walls and spatial boundaries, the ceiling heights remained the same, but the newly created spaces sized down the open mill space to a more manageable size that better compares to the human scale, rather than the original scale which was set to reflect and accommodate large machinery and storage as the buildings were initially designed for.

The proportion of the mill interiors was also altered because of the subdivision of space. Proportion is the "relationship of the height to width and depth of a given form" (Leimenstoll, 1988, p. 1.14). Through Leimenstoll's (1988) criteria, the researcher also

found that historic character of the building could be understood through the proportion of other elements such as windows, doors, openings, and lighting fixtures within a particular space. It was through these criteria that the researcher decided to analyze the interior proportions through overall space proportion (height, width, and depth), as well as by looking at original elements such as window heights and the exposed columns. In three of the four projects the visual evidence found in the column relationship with the ceiling and the exposed materials, told the researcher that the height of the buildings had not been altered during the rehabilitations. However, at Durham Hosiery it was obvious that the height had been lowered because cutouts had to be made in the drop ceilings to accommodate for the columns that were taller (seen in Figure 19). The National Park Service approved of the dropped ceilings at Durham Hosiery because the lowering of the ceiling did not affect significant character of the building, such as dropping below the top of windows or covering up important brick detailing. Overall, the architect was able to maintain visual evidence of the historic form, proportion, and scale of each of the four mills while creating new layers of these elements through design tactics such as insertion of new planes, use of existing planes, openings, and circulation patterns.

### *Rhythm*

One of the most identifiable features of an industrial mill building is the rhythm of the exterior and the interior and how these rhythms connect with each other. Leimenstoll (1988) defines rhythm within her analysis criteria as, “the repetition of interior elements

or interior spaces within an historic interior in such a way that they create clear order which helps to organize our understanding of the interior space" (p. 1.14). It was apparent to the researcher that the architect's plans for the four rehabilitation projects were highly influenced by the rhythm of existing windows, openings, columns, and original interior divisions, or bays as these divisions were commonly referred as. The historic rhythm was then transferred to the new design, in which individual spaces evolved around window placement and column grids, and then was transferred to other aspects of design, such as the lighting that was placed as part of the new design. In each of the four samples, interior spaces, regardless of form, proportion, or scale to one another, were designed to fit within the existing structural and decorative rhythm of the mill interiors.

For example, the researcher found that at Durham Hosiery and Golden Belt the apartments were all slightly wider than the width of one window. This was because the architect often aligned the new walls for these residential spaces with the column grid spacing on the interior, which usually coordinated with window spacing. Because of the thoughtful consistent original design of these buildings, Belk was able to utilize what the building had to offer in order to determine spacing and sizing of new spaces. A great example of this was revealed in the floor plans and photographs of Golden Belt Mill. While analyzing how the exterior of Building 6 contained rhythm within the large industrial windows and the full-height monitor roof and windows (Figure 22), the researcher realized that these exterior features were also prominent design features on the interior. The floor plan showed the column grids aligning with the wall space between

each of the windows, which the architect was able to use as guides for spatial planning and new wall installation (Figure 23).


**Figure 22. Golden Belt Mill, Building 6. The evenly spaced windows and spaces between these windows provide a visual rhythm along the exterior of the building. This rhythm was then reflected on the interior with the placement of original columns and the insertion of walls during the rehabilitation. Courtesy of Megan Klem.**

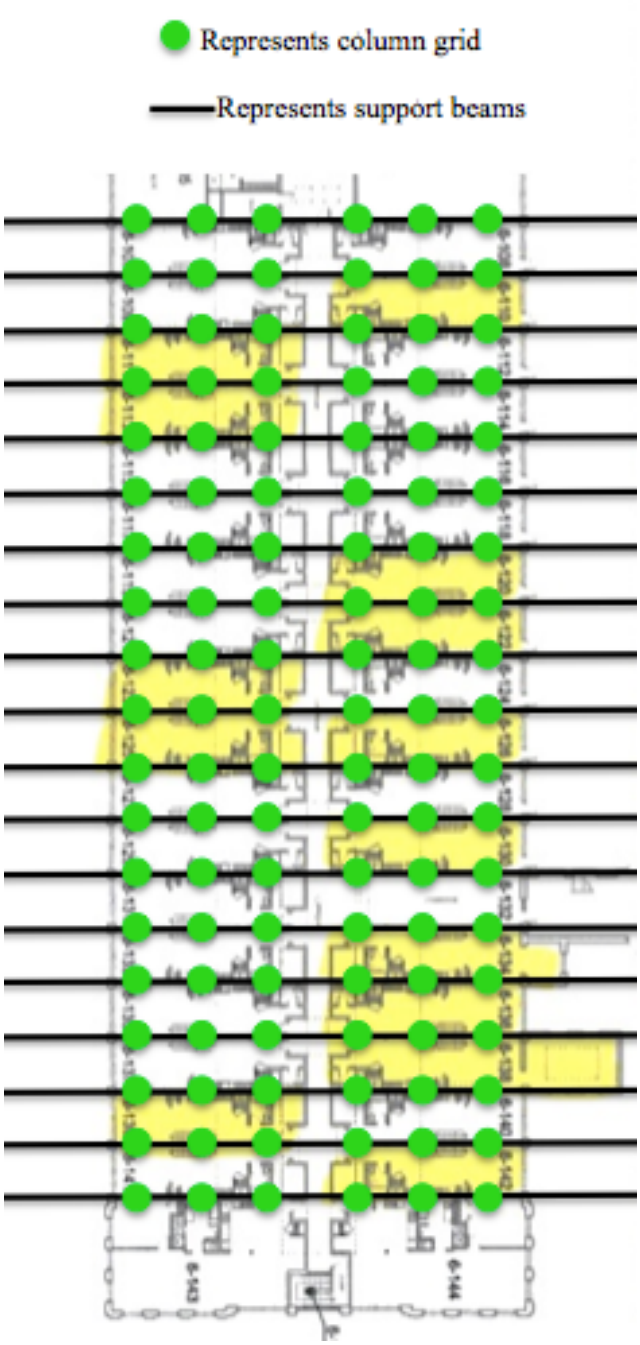


**Figure 23. Golden Belt Mill, Building 6. The rehabilitated floor plan within Building 6 displays how original columns (denoted by the green dots) follow the rhythm of the windows. These columns and windows then drove the design decisions about where to place new walls. Therefore, the original and rehabilitated rhythm match one another, with the new rhythm based off of the original. Courtesy of Belk Architecture / Megan Klem.**

Another prominent example of this connection between the exterior and interior rhythm was found in Building 3 at Golden Belt. Again, the original rhythm within the building played the lead role in how the space was divided and defined. Windows, columns grids, and support beams were utilized to determine how the artists' studios would be laid out (Figure 24).

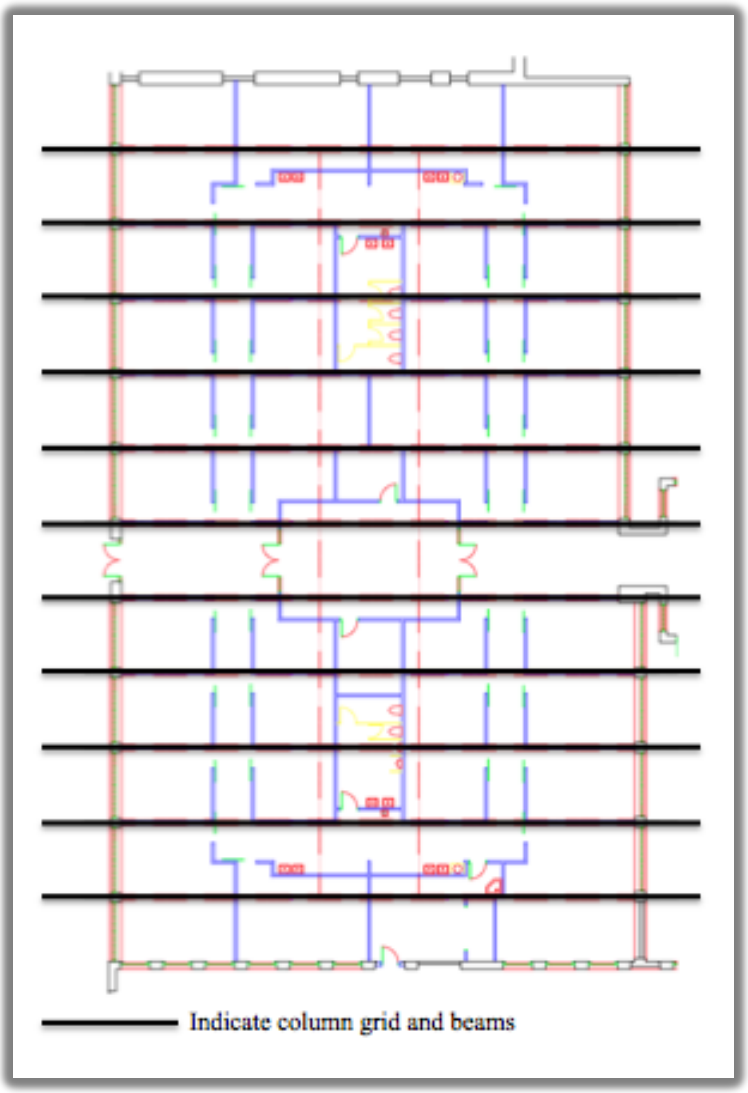


**Figure 24. Golden Belt Mill, Building 3. The architect inserted partial walls within the open interior of Building 3 in order to create multiple personal artists studios. The placement of new walls reflected the structural beams and column grid patterns, as well as window placements. The black lines indicate the column rows, overhead structural beams, and partition walls between artists spaces. Courtesy of Belk Architecture / Megan klem.**

Using these original elements, by looking at the floor plan it is clear that the individual studio spaces are on the same grid pattern as the original columns and beams, where partial walls of the studios directly align with the structural beams overhead. Brooker and Stone's (2004) design tactics were employed in the creation of interior rhythm through the insertion of new planes. In Figure 24, it can be seen that the circulation within the building was placed in the same rectangular shape of the building, rather than one central hall running down the center of the building. With the insertion of new plans, including both walls and some ceilings in Building 6's apartments, the original historic rhythm of the building was enhanced within the rehabilitation design. This new layer of rhythm created by insertion of the partial walls does not mask the original rhythm of the building, which can be seen when looking above the partial walls towards the ceiling (Figure 25). In the rehabilitation design of Building 6, as well as other residential and commercial / office space at each mill, the existing historic elements of rhythm were maintained through the new design. While new walls have covered some original columns in each of the buildings, the placement of new design elements reflects the rhythm and interior spacing of the factories and warehouses.

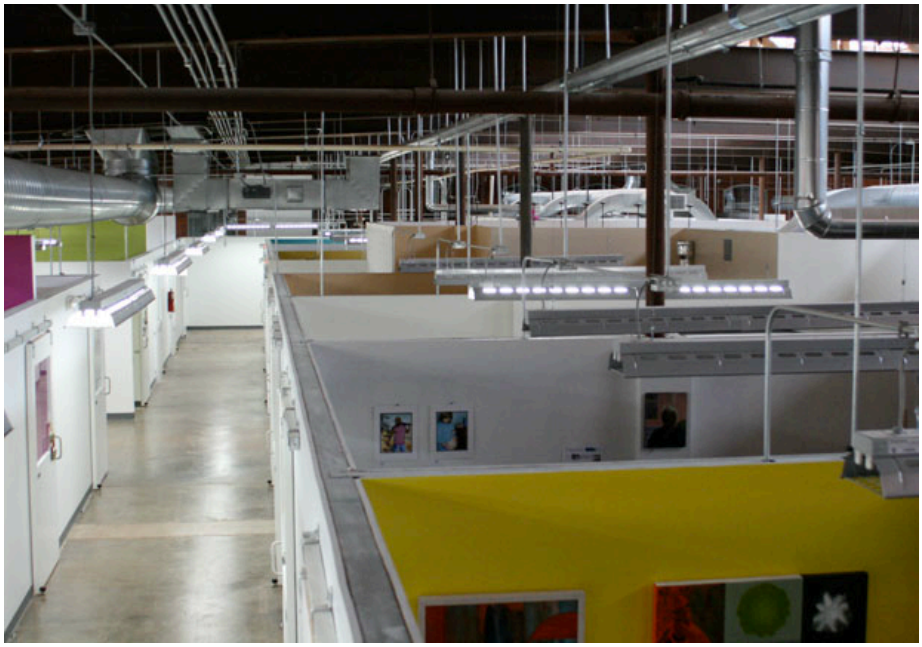

**Figure 25. Golden Belt Mill, Building 3. The architect utilized the original column grid, window placement, and overhead structural beams to create the spaces for artist studios. Seen in this photo is the exposed ceiling and space above the new inserted partial walls. Courtesy of Scientific Properties.**

One final example at Golden Belt shows how the original rhythm of the building could be taken and used as the new rhythm within a space. In the Cotton Room (Figure 26), which is used for an event space, the division of space is delineated by the rhythm of the column grids rather than by the insertion of new walls. This room provides many examples of visual rhythm, including the columns, monitor windows, structural beams, and windows. Unlike many of the spaces at the three other mills, and even the other buildings at Golden Belt for that matter, this room maintained its openness and through the original rhythm, the space was divided. Although Belk Architecture completed the structural work and repairs of each of the mill buildings, often an outside designer created the design of the interior. The rhythm added through decoration was found in the Cotton

Room with the placement of the white curtains. The researcher found this new layer of rhythm interesting in that it moves in the opposite direction of the original rhythm pattern within this space.

**Figure 26. Golden Belt Mill, Building 2. The Cotton Room depicts original rhythm through the division of space by the columns, the structural support beams, and the windows. The interior designer added a decorative layer of rhythm in the insertion of the pictured white curtains hanging between the columns. This room showcases the retention of original historic character and rhythm. Courtesy of Scientific Properties.**

The exterior and interior rhythm correlated with one another in all four rehabilitation projects, mainly through window and column placement. In two of the mill samples, which were American Tobacco's Washington Building and Brightleaf Square, the interiors show rhythm in the original division of space through the use of bays. Rather than demolishing those structural interior walls and replacing them with other forms of building support systems, the architect was able to create new spaces that utilized these original walls. Since the rhythm created in these buildings through windows, columns, and support beams, along with other elements, are important to the understanding of the spaces historically, the National Park Service requires that these elements be maintained or repaired rather than replaced with something new. During the analysis of the four mills, the researcher discovered that in most cases the original rhythm of these industrial buildings enhanced, rather than prohibited, the flow of the new design. This was due to the fact that the historic rhythm came from the layout of the columns. The columns provided a guide for new interior walls in many of the spaces, which allowed the historic rhythm of the columns to become the new interior rhythm within the walls. The original rhythm also enhanced, rather than prohibited, the flow because other than the interior columns, it was exterior elements, such as the windows, and structural elements, such as support beams, that created the overall rhythm of the building. These elements were all incorporated into the new designs, therefore creating a connection between the historic and new elements of rhythm. The rhythm within the mill interiors, as well as the exterior, is both fabric-based authenticity (use of original structural member and window rhythm)

and experiential authenticity (the connection one makes inside the building between historic rhythm in the structure and visual evidence of new elements, like walls, that follow this original rhythm).

### *Light*

Light, much like rhythm, was virtually unchanged during the rehabilitation of the four mills. Because the buildings already featured large windows that provide the space with an abundance of natural light, there was little the architect had to do besides fix or replace deteriorated and broken window frames and glass panes. Through the study of floor plans and observations from site visits, the researcher believes the interior spaces of all the mill buildings were designed to allow the natural light from windows and skylights to penetrate as deep into the center of the buildings as possible. According to Brooker and Stone's (2004) design lighting design tactic, "light can control space and form" (p. 147) and can direct movement through a space, as well as change the perception of things. Historically, natural lighting was the main source of light to the mill interiors (Figure 27). The floor-to-ceiling windows and monitor roof windows that are characteristic of these industrial buildings continue to provide the majority of lighting to the interior spaces (Figure 28). The retention of the natural lighting plays a powerful role in preserving the experiential integrity and authenticity of the mill interiors. In most cases, the four rehabilitations have little need for artificial lighting during the daytime. The before and after photographs of Golden Belt Mill's Building 2 are a dramatic display of how the day

lighting was virtually unchanged during the rehabilitation process.

**Figure 27. Golden Belt Mill, Building 2, pre-rehabilitation. The large windows provide natural daylight to the entire interior floor space. The penetrated light creates a patterned rhythm within the space, another example of how original and new rhythm often correlates. Courtesy of Belk Architecture.**

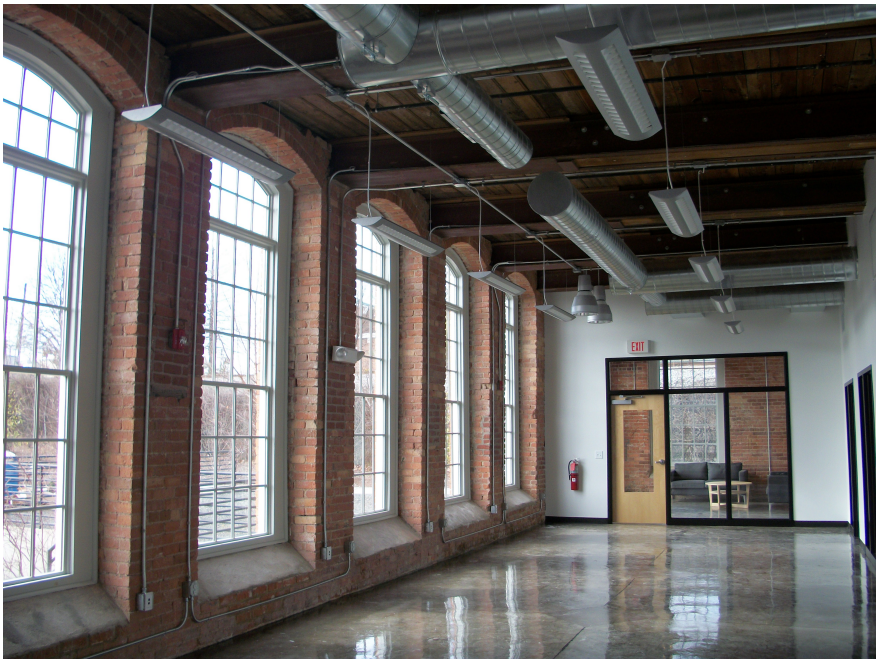


**Figure 28. Golden Belt Mill, Building 2, post-rehabilitation. The same large windows provide ample daylight to the rehabilitated interior. The sealant on the original concrete reflects the day lighting throughout the divided spaces. Courtesy of Megan Klem.**

In the four selected mills, where artificial lighting was used, the main lighting fixtures were industrial pendants or fluorescent tube lighting. Both types of artificial lighting, as well as the natural light, can be seen in Figure 28. The researcher noted that the artificial lighting was used as a secondary source of light in areas with exterior windows, but became the main lighting source in areas towards the building's centers that did not have direct access to natural light. In some cases, such as American Tobacco's Bay 7 (Figure 29) and Durham Hosiery (Figure 30), skylights were also utilized to help bring natural light to the center of these buildings that were cut off from any source of natural light. The architect was also able to utilize existing monitor windows, which were

only found at Golden Belt Mill, in order to get natural light to the entire interior (Figure 31). Because of the need for individual private spaces and the dimensions of the open interiors, it was not always possible for new centrally located spaces to access windows.

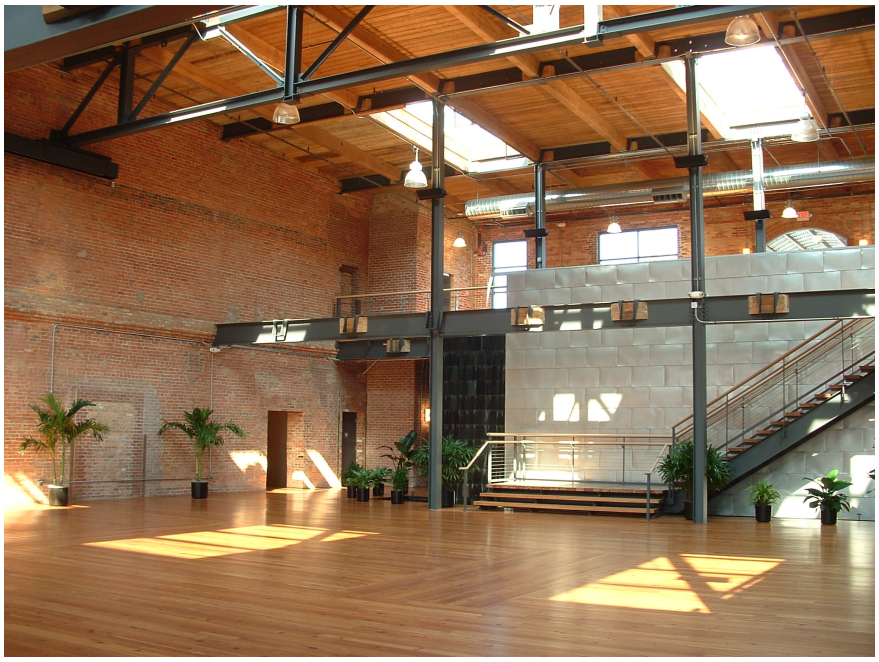

**Figure 29. American Tobacco, Washington Building, Bay 7. Skylights are utilized to help natural light penetrate the entire interior of the event space. The light also creates patterns across the floor and enhances the character of the space. Courtesy of Megan Klem.**

**Figure 30. Durham Hosiery Mill, Building A. Skylights were utilized in the multi-purpose room in order to get natural light into this centrally located space. During the day, the natural light coming through the skylights provides plenty of light so that the artificial lighting is not needed. This space also refers back to other examples of Leimenstoll's (1988) criteria, showing rhythm in the columns and ceiling structure and a hint towards the buildings original scale in the height of the room. Courtesy of Megan Klem.**

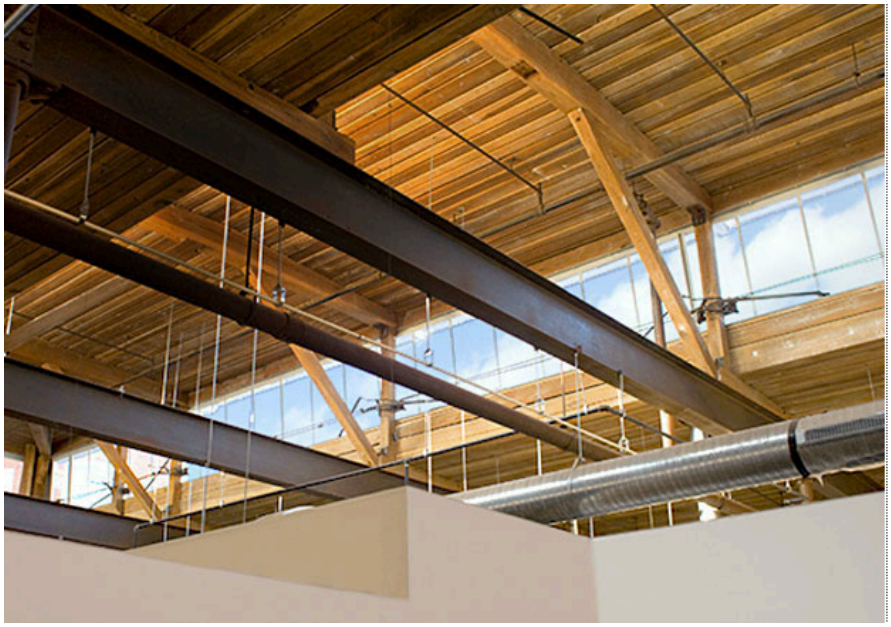

**Figure 31. Golden Belt Mill, Building 3. The monitor roof windows were repaired to help retain the character of this particular building. Between the height of the windows and the partial-height walls in proportion to the height of the entire space, Belk Architecture was able to convey the buildings original form, proportion, and scale, as well as provide natural lighting to all of the studio spaces. Courtesy of Scientific Properties.**

Overall, natural lighting has maintained its influence on the interior of the historic mill buildings. While originally the natural light was able to penetrate the entire factory or warehouse spaces because they were large, open rooms, the rehabilitation of these buildings has left some secondary spaces without much in the manner of natural lighting. Lighting is important to maintaining historic character because the light and shadow day lighting provides creates a unique character within each of the buildings. According to Leimenstoll (1988), the orientation, shape, and number of natural light sources are significant to the quality of interior lighting. While the rehabilitation did not incorporate new windows, except for the Crowe Building at American Tobacco, one of the most

important details in the rehabilitation process was the retention and repairs to existing windows. After looking through the Part II tax credit applications, the researcher noticed that work done with and around existing windows at each site became a concern of the National Park Service. In most cases, windows were to be repaired and not replaced, unless the replacements were of the same size and likeness of the originals. Belk also found a way to incorporate day lighting into some of these spaces through transparent and reflective materials used in the new designs.

### *Materials and Finishes*

Historically, materials related to the interior design and constructions of the four mills were brick, wood plank flooring, concrete flooring, wood-decking ceilings, and wood and /or metal beams and columns. Leimenstoll (1988) says that materials "evoke distinctive images" (p. 1.15) and while new materials are introduced during rehabilitation, it is important to understand material significance to the historic interior and how new material may change that connection. The finishes encompass "both texture and color of the materials and coatings" (p. 1.16). Brooker and Stone's (2004) surface design tactic was utilized in the selection of materials and finishes to enhance and establish a relationship between "human contact and the building" (p. 147). When discussing finishes, surface textures usually ended up the dominating topic. Texture refers to "sheen, patter, and tactile qualities of the historic materials" (Leimenstoll, 1988, p. 1.16).

New materials and finishes to be used during rehabilitation tend to be one of the biggest issues when it comes to the approval of the proposed designs, as seen in the multiple Part II tax credit applications submitted for each of the four projects. The researcher found that the National Park Service often requested revised tax credit application because of the materials and finishes proposed for the interiors. Although specific materials were not always the concern, materials and finishes could alter the other characteristics of the historic interior, such as reflective light and acoustics of the spaces. For the most part, the researcher found that original materials, such as wood or concrete flooring, were utilized. However, one of the four mills had covered the original flooring with carpeting. This change in flooring materials does not directly reflect the historic character of the building, however, due to the buildings new purpose as a residential apartments and the National Park Services' consideration of the Secretary Standards for Rehabilitation, the new material choices were approved. Another reason the carpeting may have been seen as appropriate is because of the time frame in which the project was completed. Durham Hosiery Mill was rehabilitated in the 1980s when the concept of rehabilitation was not well known or understood within a preservation standpoint. Some areas within American Tobacco and Golden Belt were also carpeted over the original flooring material, however these cases were rare and only in areas such as hallways and private spaces. This could have often been the result of individual tenant preferences and tastes.

It was much more common in the other three projects for the architect to leave the original flooring, whether it be wood or concrete, and repair any deteriorated parts. This was partially because the National Park Service usually required this retention of material in the Part II historic tax credit application, but also because retaining the original flooring materials gave the new design much more character and allowed the new elements to fit with the historic character in a more striking and interesting manner. Retention of historic materials within the four sample mills was important in receiving federal historic tax credit approval, in which the Secretary Standards must be followed. These standards place more emphasis on original materials and finishes than a rehabilitation project that does not utilize tax credits.

Two of the four projects utilized a wide variety of modern and industrial materials and finishes. The researcher found that the American Tobacco and Golden Belt designs had incorporated a mixture of materials including the original wood and / or concrete flooring, original wood-decking ceilings, sealed and / or covered columns and support beams, and original load-bearing masonry walls, along with more modern materials like glass block, glass panels, and the of colored and textured metals (Figure 32). The researcher noted that the materials and finishes chosen at American Tobacco and Golden Belt showcased a broad selection of modern materials, colors, and textures due to the common trend in rehabilitation projects like these to incorporate the "contemporary" with the historic. This lively dialogue was created by the contrast between old and new materials. Examples include: original wood columns versus new metal 'I'-beam supports

(see Figures 20 and 21), original brick load-bearing walls versus new colorful drywall (Figure 33), and original wood plank flooring versus new installation of carpeting (see Figures 32 and 34). Other materials, such as replacement window sashes, were chosen because of their appropriateness and similarities both visually and stylistically to the originals.

**Figure 32. American Tobacco Campus, Washington Building, Bay 6. In this space, the architect utilized translucent materials, like the glass block, to diffuse natural light through the interior office spaces. Courtesy of Megan Klem.**

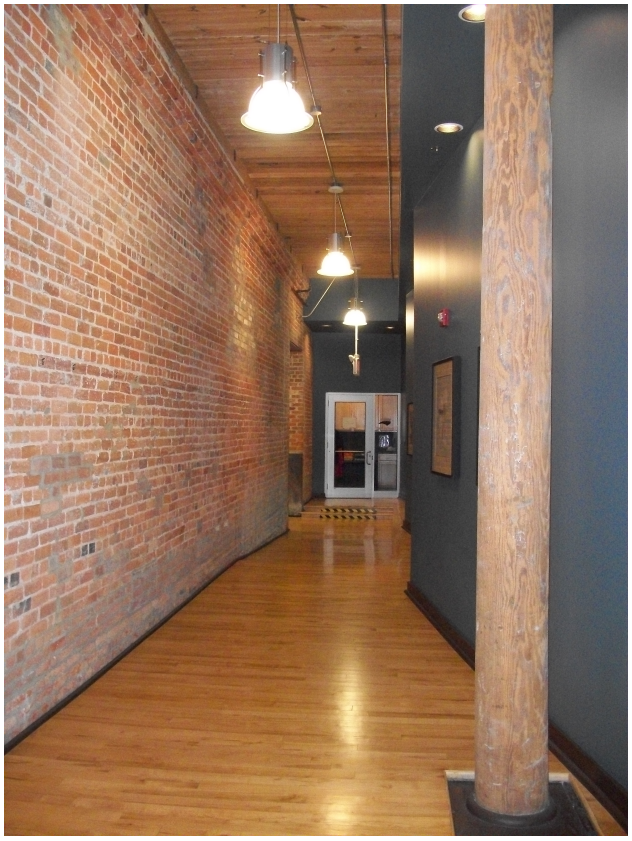

**Figure 33. American Tobacco Campus, Washington Building, Bay 6. The hallway was created by the insertion of a new drywall that follows that path of an original row of columns. One side of the corridor is an original load-bearing brick curtain wall. This image captures the contrast between the old (brick wall, wood flooring and ceiling, opening in the brick wall, and columns) and the new (drywall, industrial lighting fixtures, and metal doorway). Courtesy of Megan Klem.**

Brightleaf Square and Durham Hosiery Mill also had more modern materials and finishes incorporated into the rehabilitations, however, new material options were not utilized to the extent that they were in the other two samples. Durham Hosiery used carpeting over original flooring, wallpaper, wood wall paneling, muted paint colors, and other less expensive finishes (Figure 34).

**Figure 34. Durham Hosiery Mill, Annex Building. Materials utilized in this space were more muted than some of the other mill samples. In this project, the designers utilized carpeting, wallpaper, and muted paint colors. Courtesy of Megan Klem.**

The researcher made the observation that the difference in materials used between the four rehabilitation projects was most likely due to the time frame of the projects and the proposed new uses for these interiors. Brightleaf Square and Durham Hosiery Mill were both rehabilitated during the 1980s, while American Tobacco and Golden Belt were rehabilitated throughout the 2000s. Although the rehabilitation purposes were similar between the four projects, the materials and finishes chosen to complete the interiors

represent budget and time period of the rehabilitation. While this suggests that the interiors of Brightleaf Square and Durham Hosiery are "outdated," the materials used at these sites were, and remain, appropriate selections for their rehabilitation and use of historic tax credits.

Leimenstoll (1988) also talks about the importance of color as a "highly visible component of any historic interior" (p. 1.16). While most historic preservation projects try to associate colors used with the architectural style and era of the building, in rehabilitation projects like the four samples, it is important to created a distinctive line between the old and the new. The researcher found that two of the four projects used bolder paint colors for new drywalls and accents, such as metal staircases and furnishings (Figure 35) to clearly differentiate them from the historic.

**Figure 35. American Tobacco Campus, Reed Building. The metal staircase with wood steps, exposed modern ductwork, glass wall panels, and the bright orange paint, are examples of the insertion of the modern character layer fitting within the historic character seen by the original wood-decking ceiling and structural beams. Courtesy of Megan Klem.**

## *Summary*

Through the new designs for the interior, the architect utilized insertion design strategies in order to retain the historic character and significance during rehabilitation. In using the criteria from Leimenstoll (1988) and design tactics from Brooker and Stone (2004) to analyze and evaluate the mill interiors, the researcher was able to determine that the historic character of all four mills was maintained and further enhanced through their rehabilitation for new uses. This conclusion is verified by the National Park

Service's approval of the work proposed and the projects all qualified for federal historic tax credits. The National Park Service makes these decisions to approve tax credits if the Secretary Standards for Rehabilitation are followed. While these decisions are often based on the authentic fabric retention, the industrial mills allow for a more values-based preservation technique. This means that the community and those connected to the mill building's past find the significance of the building within the constructed and experiential authenticity perceived within the building.

Leimenstoll's (1988) criteria and Brooker and Stone's (2004) tactics help understand the way in which rehabilitations following the Secretary Standards alter and retain the historic interiors. Similarities and difference between each approved rehabilitation project were also discovered through this investigation. The introduction of new materials, finishes, walls, and opening affected the form, proportion, scale, and rhythm of the mill buildings. However, through these rehabilitations, the architect was able to respectfully and appropriately layer in a new contemporary character to contrast and enrich the experience of the historic layer of character that still remain in these four mills. It is this connection of dialogue between the new and the old that brings new energy and visual interest to the building interior without masking or destroying the qualities of the spaces that give them their historic character and significance. This is an example of experiential authenticity in that through the new design, one is still able to experience the historic interior in some ways that it was experienced in the past. The visual evidence of the building's history connects one to this authenticity.

This study and the analysis of the historic interiors are important to the overall theme and movement of historic preservation. As so much of the built environment becomes historic, meaning at least 50 years old in preservation terms, there are more and more structures to consider significant and worthy of preservation over demolition when their intended use is no longer viable. As the years pass, buildings that are eligible for National Register listing seem to become less significant in many eyes, even those of preservationists, because people do not understand the constructed authenticity value of architecture as a testament to community memory. Some of these buildings, especially the large industrial buildings like the four mills analyzed, are overlooked because they seem too daunting of a task to do anything meaningful and significant with.

From this study, and through the analysis examples, a lesson for preservationists is that there is recognition of the shift occurring in the preservation movement. As seen from this study, these standards are already beginning to change in order to accommodate newer materials and building styles. While the National Park Service can not, and should not, allow just anything to take place during rehabilitations, it is important for preservationists to understand that the definition of "historic" and "significant" materials and character are changing rapidly, and if the preservation movement is to keep up with the changing environment, the standards also need some change. One of the most important aspects of the standards to be reconsidered should be, first and foremost, what will be deemed significant to historic preservation in the future. While retention of important and significant original materials and architectural features should be on the

forefront of rehabilitation and adaptive reuse projects, the National Park Service and preservation professionals should consider that many buildings have gone through many phases of use, and that each of these phases is an important piece to the overall story and history of the building. These layers of character throughout the buildings and mill complex history could be seen at the American Tobacco Campus, in which individual buildings were built in different eras and decades. While some were built during the late 1800s, others were built in the 1900s up to 1930. This means that a rehabilitation project like this one need to consider all the eras as important, and preservationists should understand that materials and architectural styles will differ but all be maintained during rehabilitation.

It may be an opportune time to consider whether or not the type of building should define rehabilitation standards and depth the project will take. For example, rehabilitation of a large industrial mill for corporate, institutional, and residential use is much different than rehabilitation of an historic home for a house museum or shop. Rehabilitation standards may also be considered when it comes to the intended new use of the historic mill buildings. As the researcher found, there were differences in the four rehabilitation projects in this investigation, which were mainly based on the new use. In the larger projects that involved many different types of tenants, the insertion design strategy was used in different ways, seen through materials used, scale of the projects, and subdivision sizes. Different tenants require different needs and code requirements. New standards for the rehabilitation of historic industrial buildings should be developed

with input from preservationists and design professionals in order for both professions to understand and further the acceptance of these large mill rehabilitation.

# CHAPTER V

# CONCLUSIONS

This investigation allowed the researcher to learn about how historic mill buildings can be rehabilitated for adaptive reuse while complying with the Secretary Standards for Rehabilitation in order to be approved for federal historic tax credits. The researcher was also able to experience the dialogue between the historic character and modern designs through site visits and observations of the mill interiors. As a result of evaluating the four selected mills, it was made clear that there are a multitude of adaptive use options for these large buildings. The large, open interiors offer more opportunity for adaptive use and rehabilitation than some other buildings do because the interiors are not commonly areas with architectural significance. They also tend to consist of unobstructed spaces beyond the column grids that support the buildings. Often these column grids support the new design by helping the architect create a rhythm and flow throughout the space. This research also revealed that historic character of the interiors has been maintained, highlighted, and even enhanced through rehabilitation.

The industrial mill buildings are a large part of the historic built environment, especially in the South, and to rehabilitate these buildings allows them to become a social and economical part of the community once again. Their adaptive use reflects Mason's (2006) values-centered preservation, one that reflects the community's identification with

and appreciation of the mill buildings. Although the benefits and affects these projects have on the surrounding communities were not evaluated in this study, it is obvious to the researcher that communities can be revitalized through the many new use possibilities that utilize the space within the rehabilitated mill. This was apparent to the researcher during site visits not only because of the people who were at the mills, but also the surrounding areas that were clearly benefiting from their proximity to the mill projects.

Professionals in both the historic preservation and design fields need to understand the process for rehabilitation of historic buildings and that although reuse of these building is what we strive for, it must be done in a way that maintains the historic character, story, and experiences that make it significant in the first place. Evaluation of the mill's historic interiors through Leimenstoll's (1988) criteria and Brooker and Stone's (2004) design strategies and tactics show how the historic character was retained, but also enhanced through new layers of modern elements and the experiential authenticity. Preservation and design professionals can take away lessons from this study, as well as others like it. Preservationists can take the evaluation of the four mills and see that it is possible, and even desirable, to become bolder in the dialogue that differentiates the historic and new character in such industrial buildings. This means that preservation entities, such as the National Park Service, need to start thinking outside the box about how significance and historic character are determined. This study also allows designers to take away the knowledge and understanding of how they can evaluate historic building interiors in order to create an appropriate design for the new use. Design professionals

can look to Leimenstoll's (1988) criteria and Brooker and Stone's (2004) strategies and tactics to understand the different design approaches that can be employed and incorporated within the significant historic interior. It was discovered through the analysis of the interiors that different criteria elements have an affect on how the other elements are perceived, retained, and enhanced. For example, the insertion of new planes within the interior will always affect the physical and perceived form, proportion, and scale of a space. It will also help shape the circulation patterns within the building.

The researcher found there has been an effort in the design field to accommodate for historic preservation ideals. This is seen through the Chapter 34 building code and other codes, such as the NC Rehabilitation Code. In good faith, and for the vitality of the historic built environment and the preservation movement, preservationists need to make a better effort for the inclusion of modern design ideals within historic preservation. One of the most important lessons the researcher learned, that should also be a lesson for preservationists and design professionals alike, is that both fields need to work together in order for adaptive use and rehabilitation projects to be successful in the connection between the new and old character, as well as to provide rehabilitation examples that will validate and further push for the preservation of the historic built environment.

### *Challenges of Mill Rehabilitation*

Throughout the process of this investigation, the researcher found that there are challenges to the adaptive use and rehabilitation of historic mills. The most common

challenge does not deal with the buildings themselves, but rather the biggest challenge is finding a developer who wants to rehabilitate the buildings. Most of these large projects are made possible through federal historic tax credits; however, the process of being approved for these tax credits is not an easy one. To begin with, the developer must be willing to comply with preservation standards, such as the Secretary Standards for Rehabilitation, as well as the requests and requirements of the National Park Service when it comes to design and work proposals. Federal historic tax credits are both a hindrance and blessing to the rehabilitation of mill buildings. While they provide the needed funds to complete a large project like this, they also can slow down the whole rehabilitation process because of the process for approval of the credits. Because of this, it is extremely important for preservationists to convey the significance of the historic built environment, as well as the benefits of utilizing historic tax credits for the rehabilitation of the mills.

Finding developers and completing the process for historic tax credits are not the only challenges to rehabilitating large mills. Once a developer is on board with a project, finding prospective tenants for these spaces can be a daunting task. However, there has been a shift in this trend. When the idea of rehabilitation first began in the 1970s, businesses and shops were hesitant about signing on board with the project because little was known about rehabilitation and there were few examples of what something like this would turn out like. Now that there have been many examples of large tobacco and textile mills being revitalized, people are beginning to want to be involved, and want to inhabit

spaces that have a connection with significant times of the past. Still, with this shift towards an embrace of this type of project, challenges can arise when it comes to individual tenants desires for their spaces. It is important that while designers make sure the tenant's needs are met, that they are done so in accordance with the Secretary Standards and current codes for historic building rehabilitation. However, with the size of most of these projects encompassing an entire mill campus, it can be difficult for the developer, designers, and preservationists to find enough tenants to utilize the space to make a project worth following through with. Here is another reason it is important for preservationists, as well as designers, to educate communities and businesses of the benefits of rehabilitating these industrial giants.

### *Moving Forward*

At the end of this investigation, the researcher realized that more interviews with the architects, and possibly interviews with the developers of each site, could have been helpful. While contact was kept throughout the thesis process, interviews with architects at Belk Architecture took place towards the beginning of the investigation. At this time potential questions that would have rendered useful during the analysis had not yet been realized. Nevertheless, information obtained from initial interviews and tours was sufficient for the purposes and constraints of this study. Engaging the designers in the process after the analysis would enrich future studies.

Looking back on the investigation, the researcher believes there are many opportunities that arise for future study. One such study would be to research and determine the affects of rehabilitation projects like these on the surrounding community from and economical and social standpoint. The research could also include an evaluation of how the mill rehabilitation influences other rehabilitation projects in adjacent areas. A major part of rehabilitation projects on this scale are how the community will be involved after the project is complete and the benefits they will experience. Another study that can stem from this investigation would be to select a different type of industrial or commercial building and evaluate how the interiors alterations affected their historic character. The researcher could then comment on how they compare with historic industrial mill buildings. One last suggested study would be to evaluate other mill building rehabilitations that were not done by Belk Architecture and compare similarities and differences in the interior alterations between designers. Investigations such as these would allow for a better understanding of overall rehabilitation practices for historic mill buildings. These investigations would also provide a better look at the shift towards a bolder dialogue between the new and old character within historic buildings. As Lowenthal said, “Tradition should not be the enemy of innovation” (p. 69).

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