ABSTRACT

Title of Thesis:	ENHANCING ELLICOTT CITY: INTRODUCING RESILIENCY TO A DAMAGED COMMUNITY
	Austin Robert Toth, Master of Architecture, 2022
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The historic Main Street area of Ellicott City has suffered massive hardships over the last several years, with two devastating floods causing considerable damage to the vibrant small business community. The county has already begun implementing their flood mitigation development plan which features a tunnel system to divert water from Main Street. While this solves some of the flooding issues, a redesign of the area is crucial to the restoration of the once prosperous community. With small businesses struggling, bringing more people into Ellicott City is important for its vitality. Currently, Main Street is seen as a destination, rather than a living space, even though it contains many of the amenities needed to foster a commercially vibrant and resilient neighborhood. Through tactical urbanism, there are many opportunities to infuse the city with new community spaces, higher density housing, and sustainable interventions, with the goal of creating an economically resilient community.

ENHANCING ELLICOTT CITY:
INTRODUCING RESILIENCY TO A DAMAGED COMMUNITY

by

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Table of Contents

Chapter 1: History of Ellicott City

Location

Ellicott City is located in Howard County, Maryland, in an advantageous location between two major metropolitan areas (Figure 1). The city is about 10 miles west of Baltimore and about 30 miles north-east of Washington, DC. The focus area of this project is the Ellicott City Historic District, which is located on the Easternmost boundary of the greater city designation (Figure 2). While the city originated from the Historic District, the boarders of Ellicott City now encompass a much larger area, which is primarily made up of single-family residential neighborhoods. Much of the Historic District is centered around Main Street, which runs east to west along the Tiber River, descending to the Patapsco River. The area is part of the Patapsco River Watershed, and due to its adjacency to these two rivers, the Main Street area has been vulnerable to flooding over the years.

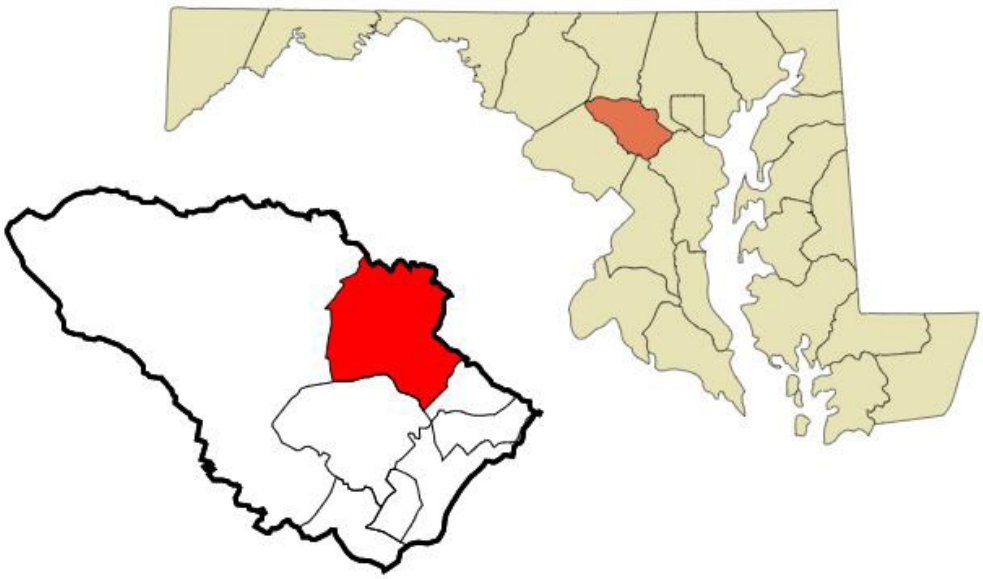


Figure 1: Map of Maryland with Howard County highlighted in orange, and map of Howard County with Ellicott City highlighted in red (Public Domain).

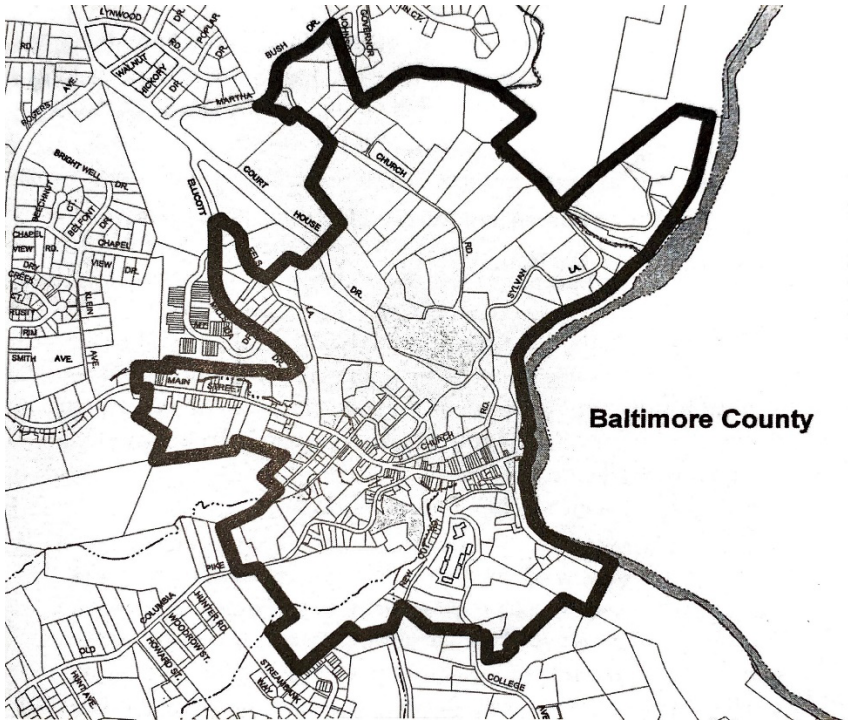


Figure 2: Map of Ellicott City Historic District (Howard County Government)

History

Ellicott City was founded in 1772 when Quaker brothers John, Joseph, and Andrew Ellicott moved down from Pennsylvania to establish a milling town. They purchased an existing mill from Benjamin Hood, located in a rough and overgrown valley at the intersection of the Tiber and the Patapsco rivers (Figure 3). The brothers began construction on a cottage and started to expand on the existing mill. The town began growing around them, through the valley, as their milling efforts increased. In 1830, a railroad station was completed in the heart of the town, now being called Ellicott Mills. This was the first stop from Baltimore of the B&O Railroad, which cemented Ellicott Mills as a preeminent manufacturing and trading town in the area. The Ellicott's had established a great relationship with Charles Carroll, one of the most dignified and influential Marylanders, and a founding father, who pushed for the inclusion of Ellicott Mills on the path of the railway[1].

[1] (Holland 1970)

Figure 3: Topography map of Ellicott City (Google Maps)

The town began to grow in importance throughout the eighteen hundreds. In 1851, the central district of Maryland officially became known as Howard County, at which point the Ellicott City Courthouse became the seat of local government. As the town grew, the Ellicott family became less involved, and eventually "Ellicott Mills" changed its name officially to "Ellicott City." Through the Civil War and the early twentieth century, the town continued to mature as a small, self-sustaining town, with a vibrant business and legislative culture.

Through the 20th Century, much of Howard County started to grow around Ellicott City. As more and more development sprung up around the historic area, businesses profited along Main Street. Our new automobile-based society caused the town to shift away from its industrial railroad-based roots and brought in more people

from surrounding towns and neighborhoods[2]. Large scale developments like Columbia, Maryland brought more people to the area which caused Ellicott City to become a tourist destination. As the surrounding suburbia moved forward into the modern age, the quaint, historic charm of Ellicott City only increased, making the old mill town a premier destination in central Maryland.

Demographics

The unincorporated community of Ellicott City currently has a population of about 72,000, according to the latest census data. The population has increased by about 10% since 2010[3]. The city is fairly dense, with about 2,000 people per square mile, compared to Maryland as a whole which sits at about 600 people per square mile. The greater Ellicott City area is primarily made up of single-family sprawl. About 70 percent of all housing units are single family detached homes. Apartments with 10-19 units make up about 10 percent of all housing options, and the rest are larger scale apartments. That is a similar breakdown to Maryland as a whole but is vastly different from more metropolitan areas like Baltimore, which has about 60 percent single units, and D.C., which has only about 30 percent single units[4].

[2] (Historic Distric Commision 1998)
[3] (U.S. Census Bureau n.d.)
[4] (Social Explorer n.d.)

Architecture

Ellicott City is defined by its historic architectural character. With the mill town founded in 1772, many of the buildings that line Main Street are from at least the early 1800s. The historic district is listed in the National Register of Historic Places. The original buildings that were constructed under the Ellicott's have the defining characteristics of a quaker mill town, but as the city expanded, new architectural styles were introduced. Many of the administrative and institutional buildings are designed in a Neoclassical Revival style, while the businesses and houses draw inspiration from the Gothic, Italianate, Queen Anne, and Mansard styles. This wide range of influences gives Ellicott City a very diverse and eclectic architectural character, while still feeling cohesive (Figure 4).

Figure 4: Architecture of Main Street (Public Domain)

Many of the early buildings in Ellicott City were built out of granite due to its abundance on this site. Much of the early town was made up of mills and residences of the workers. As the milling business grew, the town began to expand up the valley. One of the first major architectural elements of the town was the B&O Railroad station, which was completed in 1831[5] (Figure 5). In addition to government buildings, the city is also known for its historic schools, most notably, the Patapsco Female Institute. Ellicott City is home to several historic churches and a prominent firehouse. The city is renowned for its small business atmosphere, with Main Street full of many historic mercantile shops and restaurants. All of these buildings have their own unique architectural characteristics but are complimentary in their vernacular sensibilities.

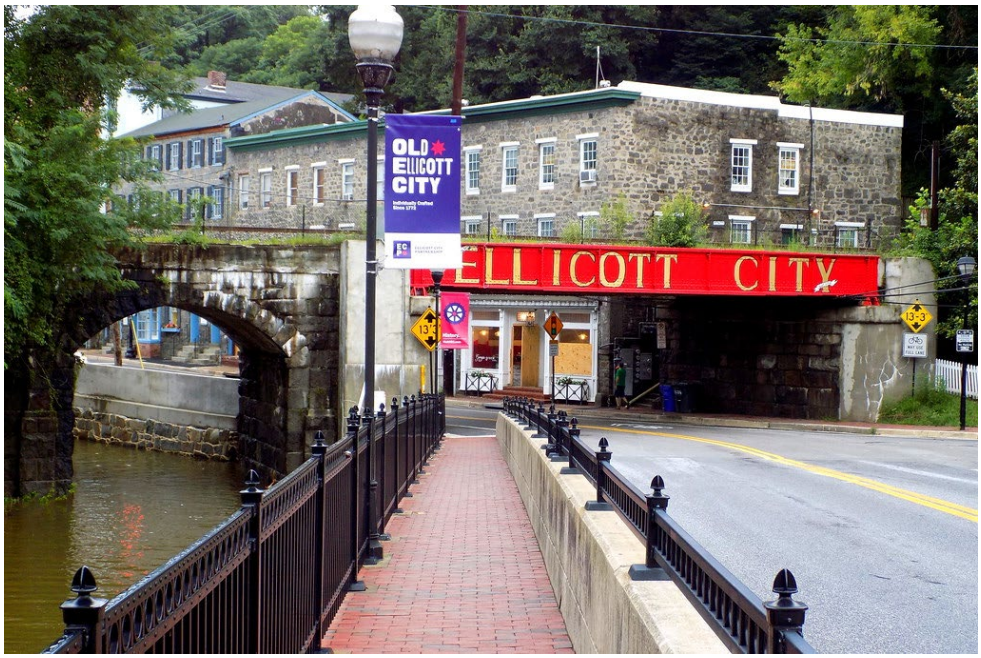


Figure 5: The famous Ellicott City bridge was once a part of the B&O Railroad (Public Domain)

[5] (Kusterer and Goeller 2006)

Chapter 2: Ellicott City Hardships

Historic Flooding

Since its inception, Ellicott City has always had to deal with flooding issues. The location of the Main Street area leaves the lower part of the city vulnerable to natural disasters, that have only gotten worse as the years go on. Main Street is built in a valley, along the Tiber River, with steep granite hills on either side. The street and river descend along the valley, until they run perpendicular into the larger Patapsco River, at the base of the hill. The topography of the site, along with the convergence of the rivers, has resulted in approximately 15 major floods since 1768[6].

The first recorded flood took place in 1768, before the Ellicott's purchase of Benjamin Hoods' mill. This flood destroyed the mill, but it was rebuilt before the arrival of the Ellicott's. The most disastrous early flood took place one hundred years later, in 1868, when Ellicott City was a burgeoning mill town. Reports say the Patapsco rose five feet in only ten minutes, tearing apart rows of mill houses that were unequipped for such a torrent of water. Thirty-six lives were lost, and the destruction accounted for around a million dollars' worth of damages. "Visitors today who pass through the quaint town of Ellicott City, often wonder why most of the homes are perched on the high hills, but it could be that the original builders held

[6] (Preservation Maryland 2016)

vivid memories of how terrible that quiet, peaceful stream lying below could become when the rains come."

Before the recent floods, a flood in 1972 was the worst contemporary flood the city had experienced. This came as a result of Hurricane Agnes, which recked havoc on many low-lying areas around Maryland and Virginia. The water did not rise as quickly as other storms, but the shear amount of overflow from the Patapsco caused billions of dollars in damages and seven deaths along the river (Figure 6). Before this, there were also major floods in 1923 and 1952, and in 2011, many feared a similar situation to Agnes when Tropical Storm Lee raised water levels in the city. The one positive note that came with these floods was a revival of people's interest in preserving the historic character of Ellicott City[7].

Figure 6: Flooding as a result of Hurricane Agnes in 1972 (Howard County Historical Society)

[7] (Rector, 40 Years Later, Agnes Remains Benchmark for County Disasters 2012)

Recent Flooding Impacts

The last few years have seen Ellicott City in a constant state of rebuilding after two disastrous floods in 2016 and 2018. These floods were significantly more disastrous than previous floods, due to the water running off nearby developments and descending from the top of the hill, rather than rising from the river (preservation md), causing large scale damage to the entirety of Main Street. The 2016 flood saw about six inches of rain fall in ninety minutes, which all funneled through Main Street from surrounding areas, causing the Patapsco to raise over 13 feet[8]. The flood took two lives and caused the total destruction of four buildings, with about 20 to 30 suffering significant damage[9] (Figure 7). Many considered this to be a "once in a generation" flood, so it came as a shock when just two years later, Ellicott City was hit by another flood, even more destructive than the last. The 2018 flood dropped an estimated 9 inches of rain on the city, in about a one-hour span[10]. This flood caused one death and a substantial amount of damage to an area that had just recently recovered from the previous disaster.

[8] (National Weather Service 2016)
[9] (Rector, 2 dead, emergency declared after historic Ellicott City ravaged by flash flood 2016)
[10] (National Weather Service 2018)

Figure 7: Damage to the road and buildings from the 2016 flood (Public Domain)

These consecutive floods had a tremendously negative effect on the small business community of Ellicott City. The 2016 flood caused 22 million dollars in damages and about 42 million dollars in local economy were lost[11], with over 100 houses and businesses needing some level of repair[12]. Much of these repairs were undone in 2018, and the city once again needed to rebuild. After the 2016 flood, 96 percent of existing businesses reopened, but after 2018, many businesses felt less optimistic about staying in such a vulnerable location. Soon after the flood, businesses were polled about their willingness to reopen in Ellicott City. About 60 chose to return, but 19 decided to close or move elsewhere, while about 30 were still

[11] (Yeager 2017)
[12] (Burnett 2016)

undecided[13]. The floods caused enormous economic damage to many of the small businesses, and the Covid-19 Pandemic soon after only worsened the situation.

Flood Mitigation Plan

With the city reeling from consecutive floods, something had to be done to ensure the safety of the town. In 2019, Howard County Executive Calvin Ball signed off on a 140-million-dollar flood mitigation plan with the goal of preventing more historic floods in the future. The new infrastructure plan, titled "Ellicott City Safe and Sound," was originally conceived under the administration of Allan Kittleman soon after the 2018 flood. The original plan under Kittleman called for the demolition of 10 buildings on lower main street. After an administration change in late 2018, Calvin Ball reassessed the situation and implemented an updated version. Ball's new plan, while much more costly, will only see the demolition of four buildings: The Phoenix Emporium, Great Panes Art Glass Studio, Discoveries and Bean Hollow. The goal was to preserve as much of this historic context as possible, but those buildings were seen as far too vulnerable and have started to pose safety risks to the community[14].

The main feature of this mitigation plan is a 15-foot-wide drainage tunnel that will run underground parallel to Main Street, diverting much of the excess runoff that causes flooding away from the road and upstream to the Patapsco River. The pipeline

[13] (Magill 2018)
[14] (Howard County Government n.d.)

will also ease much of the drainage strain on the smaller Tiber River, which runs directly under the four buildings on lower Main Street that are getting demolished. The demolition of the buildings opens up a larger channel for the Tiber to discharge into the Patapsco. The project also features a number of bioretention ponds placed in the surrounding neighborhoods to minimize runoff from the higher elevated areas of suburban sprawl[15] (Figure 8).

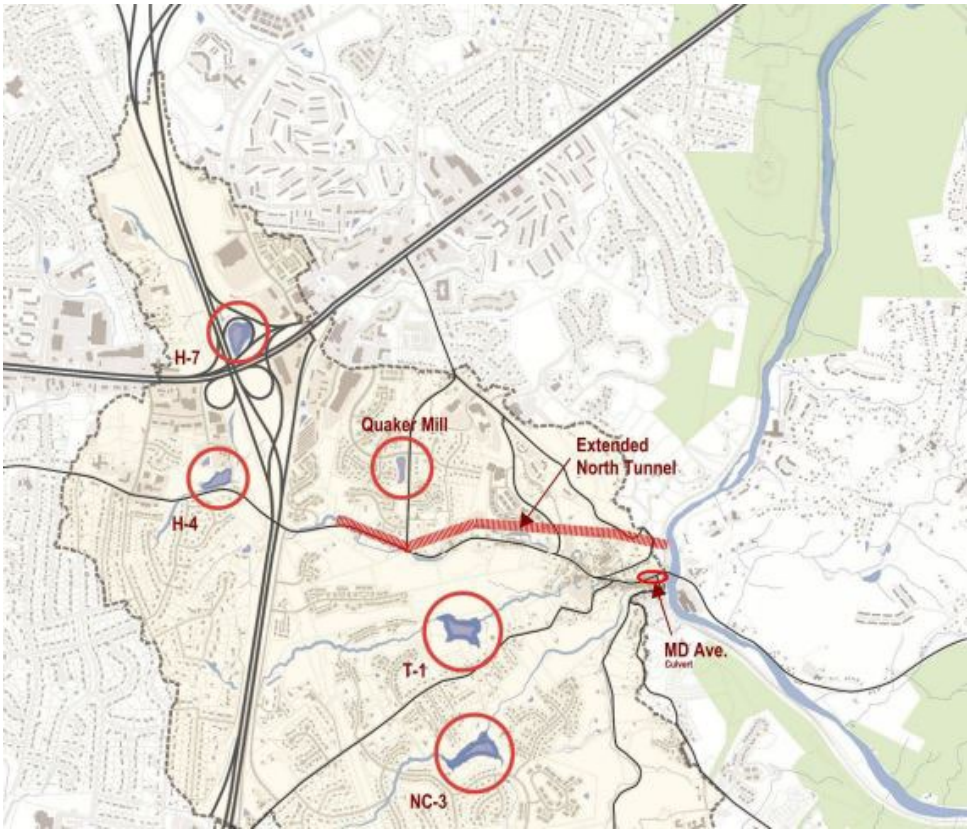


Figure 8: Map showing the water mitigation efforts of the EC Safe and Sound plan (Howard County Government)

[15] (Howard County Government 2021)

While the Safe and Sound initiative is very costly, much of the funds have already been raised, through County and State initiatives, as well as a loan from the EPA. Much of the water mitigation plan is nearing the end of the design phase and beginning the construction phase. Building demolition and pipeline construction is slated to begin in early 2022. Beginning in 2019, this was conceived as a 5-year plan, with the full Ellicott City transformation finishing in 2024. These infrastructure changes should hopefully provide the city much needed assurance that a disaster on the scale of 2016 and 2018 never happens again. Because these efforts are currently in motion, this thesis will build off of the groundwork being introduced in the Safe and Sound plan. Even with these efforts, though, the built environment of Ellicott City still leaves much to be desired in terms of sustainability and water resiliency. The goal of this thesis is to build upon these principals, while also introducing urban interventions which can revitalize a community that has been broken-down many times over the past decade.

Chapter 3: Main Street Analysis

Introduction

In order to understand what can be improved with the design of Ellicott City, the existing conditions of the site must first be analyzed. The goal of this thesis is to improve the resiliency of the area in two categories. The first is the economic aspect, increasing the vitality of the community so Ellicott City can become more self-reliant and greatly improve its ability to bounce back from economic strife. The second is the sustainability aspect, so Ellicott City can adapt to more severe weather events and protect its vulnerable historic character from the destruction that comes with flooding. In order to determine the most useful urban interventions, several site conditions along Main Street must be analyzed. The existing building program, the topographic makeup of the area and the street network design are all important factors that will determine the redesign of Ellicott City.

Existing Historic Buildings

In order to fill programmatic needs of Ellicott City, it is important to first understand the existing context of the site. Most of the site which falls under the scope of this project is designated as a growth and revitalization area due to its historic character (Figure 9). Along Main Street, most of the buildings are designated

as historic sites under the National Register for Historic Places. There are 57 historic sites in the immediate context of the site, with a majority of them located directly along lower Main Street (Figure 10). Many of these buildings now contain shops or restaurants, but a few are cultural institutions, such as the B&O Railroad Station, the Old Firehouse Museum, the Circuit Courthouse, the Howard County Historical Society Museum, and a few churches[16].

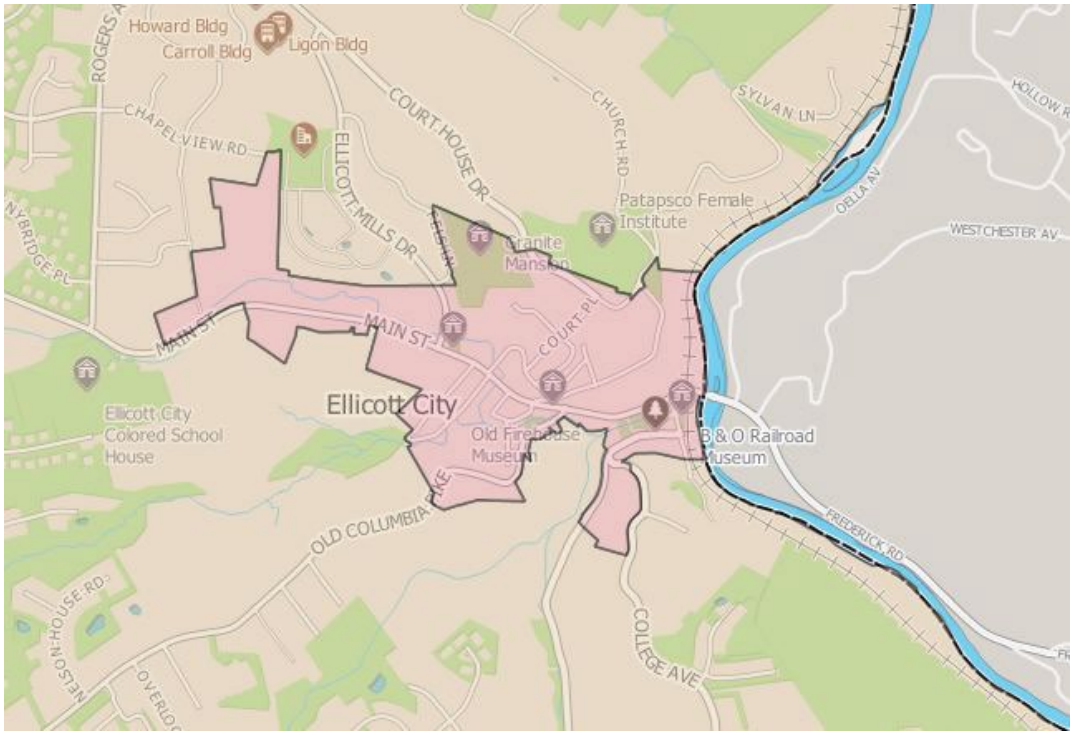


Figure 9: Map showing the Growth and Revitalization designated area which encompasses much of the Main Street context (Howard County Interactive Map).

[16] (Howard County n.d.)

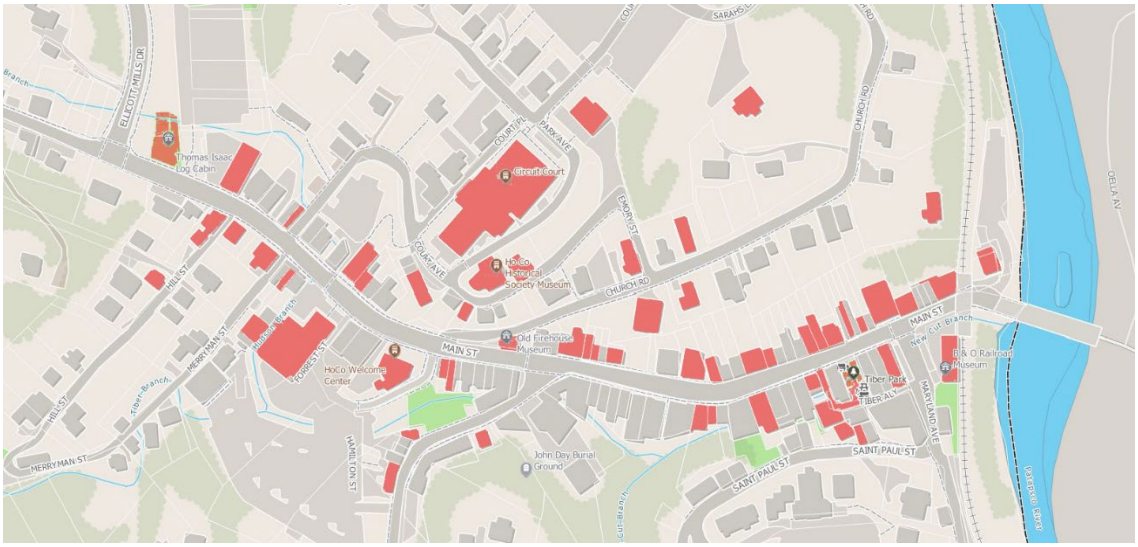


Figure 10: Map highlighting in red the sites designated as historic landmarks by the National Register for Historic Places (Graphic created by Author).

Much of the current program along Main Street is dominated by quaint shops and restaurants at the street level, with private offices or residences on subsequent floors. Historic single-family houses are scattered along secondary roads which branch off of Main Street. Figure 11 shows the ground level program along Main Street. This zone contains 53 retail spaces which open directly onto the street. Much of the retail is consolidated around the middle section of the area, where Old Columbia Pike intersects with Main Street, making this one of the busiest retail zones. The retail program consists mostly of small shops that sell clothing, antiques, jewelry, games, books, records, furniture, trinkets, and/or Ellicott City themed merchandise. The retail program also contains of 14 restaurants, bars, and cafes. There are also a few instances of commercial business that are more private than the shops and restaurants, while still occupying ground floor streetscape. Some examples of these business include law firms, engineering and architecture firms, realtors, and

repair shops. Several of the upper levels of the Main Street buildings contain similar small business as well.

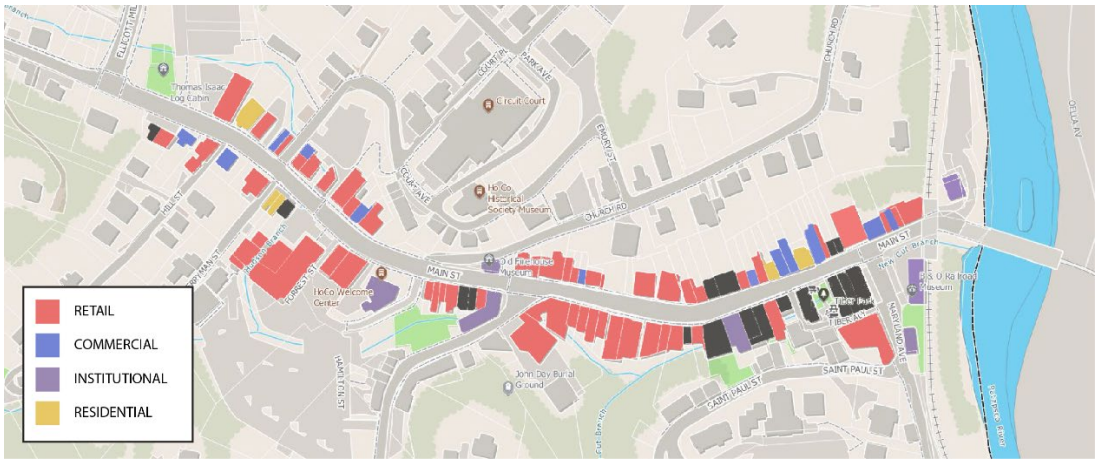


Figure 11: Map showing the programmatic uses of each building along Main Street at the ground level (Graphic created by Author).

In addition to the retail and commercial spaces, there are 7 major institutional buildings along Main Street. These include the B&O Railroad Station, the Old Firehouse Museum, The Ellicott Theatre, the Ellicott City Welcome Center, and some historic buildings which now function as cultural centers and museums. Many of these institutional buildings are set apart from the continuous street edge and viewed as prominent object buildings. There are also several buildings that are currently vacant. Many of these vacant spaces are located on lower Main Street and most likely were the result of the floods. The four buildings surrounding Tiber Park are vacant because they are slated to be demolished in accordance with the County's flood mitigation plan.

While retail use dominates much of Main Street, many of the secondary roads contain residential buildings. Main Street is the primary circulation artery through the site, so having residential almost entirely on the secondary roads creates a more private environment for those living there. The residential context, shown in Figure 12, entirely consists of single-family detached, single-family attached, and duplex housing types. There are no instances in the immediate area of denser housing typologies. Due to the topography of the site, these houses sit atop the hills that surround Main Street, giving them a view overlooking the retail area and the rivers. Many of these houses are built into the granite and have a one-story entry level on the street but then descend several levels as the elevation lowers along the site.

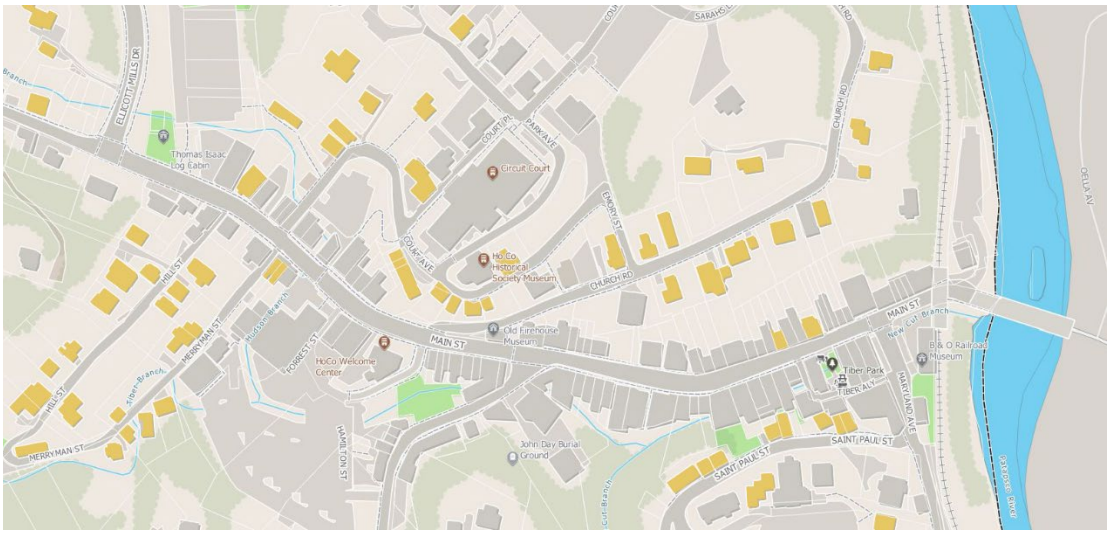


Figure 12: Map showing the residential buildings around Main Street (Graphic created by Author).

Impermeable Surfaces

In order to implement sustainable strategies on the site, it is important to understand the ground plane in regard to water permeability and runoff, and whether or not the open spaces are an efficient use of space. The impermeability of the site begins with the harsh topography, made mostly of granite. There is a large body of granite which stretches east through Howard County, through Ellicott City and into Catonsville, which has been weathered down by the Patapsco River and its tributaries to the point where it is mostly exposed along Main Street[17]. The resulting valley, which Main Street is situated along, is the cause for much of the impermeability of the site. Because of this, the entirety of Main Street is located within the floodplain of the surrounding rivers (Figure 13). From the lowest point, under the B&O Railroad bridge, to the uppermost area of the Main Street site, the intersection with Ellicott Mills Drive, the topography rises about 80 feet in total (Figure 14).

[17] (Cloos 1933)

Figure 13: Floodplain map showing the 1% yearly chance of flooding in pink and 0.2% yearly chance in red (Howard County Interactive Data Map).

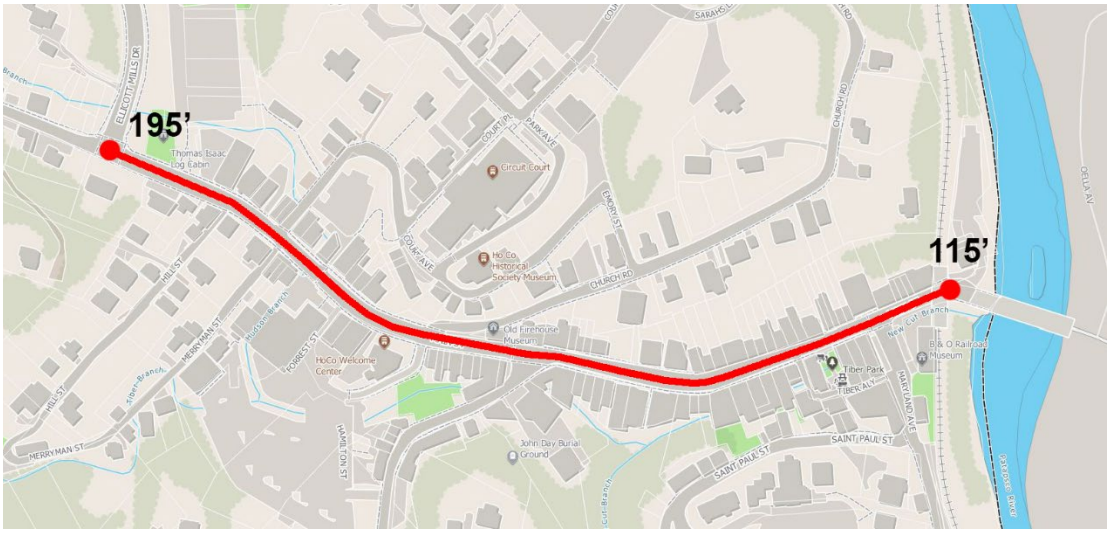


Figure 14: Map showing the elevation above sea level of the top and base of the site (Graphic created by Author).

Aside from the topography, much of the impermeability of the site comes from the built environment. Being that much of the context is historical, the vast majority of the buildings and public spaces were not designed with the same focus on

sustainability and resiliency that spaces are designed with today. The buildings themselves make up a majority of the impermeable environment, due to the dense urban fabric around Main Street. In most cases, runoff is not collected and treated on site, but is rather funneled down Main Street where it can wreak havoc on vulnerable sites. Due to the historic construction, much of the drainage is reliant on smaller storm drains that minimally impact the already narrow sidewalks along the street (Figure 15).

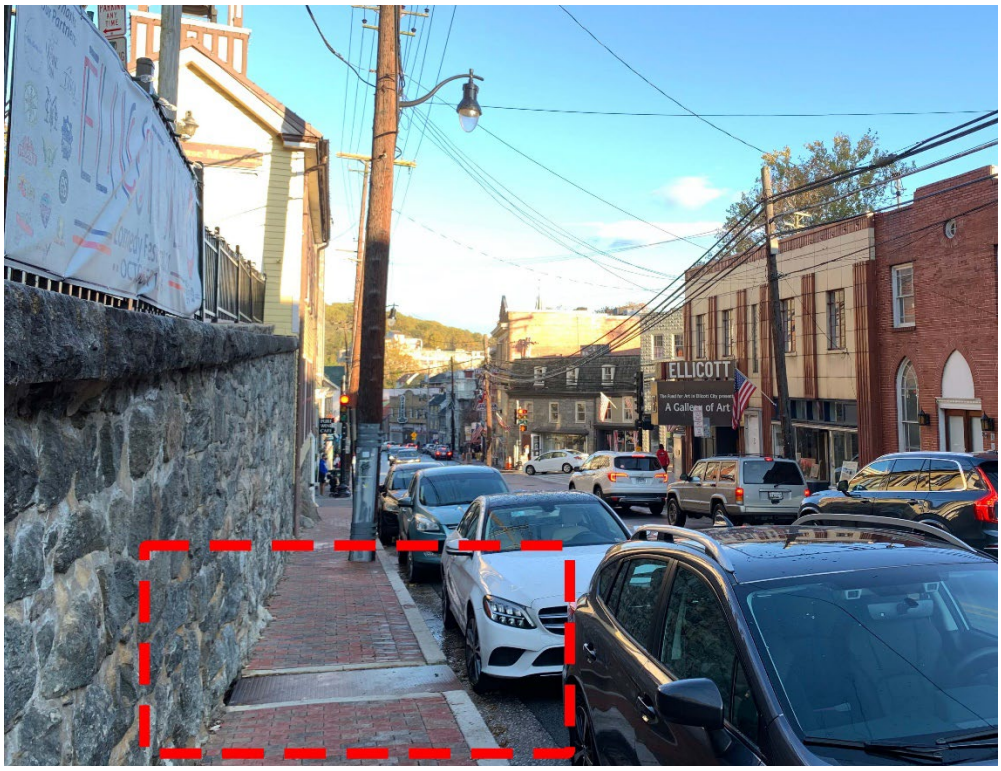


Figure 15: Example of narrow Main Street storm drain (Photograph taken by Author).

Another major component of the site's impermeability is the streetscape. Figure 16 shows the network of major impervious driving surfaces and parking lots. These streets and parking lots are all standard asphalt surfaces, which channel water

down grade, rather than allowing it to pass through the surface where it can be absorbed into the soil. The major artery of runoff is Main Street, which is one of the widest streets in the network at around 50 feet between building facades in most areas. Aside from the street network, the site is also dominated by parking lots. Due to its status as a tourist destination, a large amount of parking is crucial to the vitality of Ellicott City. All of the parking in the site is on grade, meaning there are no higher density parking garages. There is, however, a considerable amount of street parking along Main Street, mostly located on the lower half of the site.

Figure 16: Diagram of the network of major ground level impervious surfaces (Graphic created by Author).

The most important parking lots for this study are Lot D, Lot F, Lot A, and the Courthouse. Figure 17 shows the location of these major parking lots. The largest and most prominent one is Lot D, at approximately 99,500 square feet. This lot is located north of Old Columbia Pike, at a location near central Main Street, giving it an

advantageous location within walking distance of almost everything Main Street has to offer. The next largest lot is the parking lot north of the Courthouse, at about 66,000 square feet. This parking lot serves the administrative buildings clustered around the Courthouse at the top of the hill above Main Street. This lot does not serve Main Street directly, but being a large, elevated surface, contributes to the runoff that makes it way towards the river. Serving the upper end of Main Street, at the intersection with Ellicott Mills Drive, is Lot F, with an area of about 30,500 square feet. At the lower end of Main Street, across the Patapsco and nestled in a more private forested area, is Lot A, with an area of about 24,000 square feet. This lot requires a lengthier walk to get to Main Street but is still accessible to lower area of the site.

Figure 17: Map of the four major parking lots on the site (Graphic created by Author).

With all of the historic buildings lining Main Street, the area is rather impermeable and acts as a funnel towards the river. The large, flat parking lots do not help this situation, as they often increase the rate at which water is shed into the streets. Most of these parking lots also have a direct adjacency to one of the rivers on the site, which only adds to the ferocity of the speeding waters when the entire surface area of the lot runs off into the river. These converging issues create an opportunity to rethink the permeability of the site, so the area is more resilient to disasters. There are also opportunities to increase the connectivity around Main Street. Because of its tight knit fabric of buildings, it currently has a walkability score of 53, meaning it is "Somewhat Walkable," according to Walk Score[18]. This score is given because some errands can be completed on foot, primarily dining, drinking, shopping, and entertainment, but the area is still lacking grocery shopping, schools, and errands. It was also given a transit score of 19, meaning there are a few areas nearby that feature buses, and a bike score of 23, meaning there is very limited infrastructure to support bikes. To compare with a neighboring city, Washington D.C., as a whole, has a walk score of 76, a transit score of 71, and a bike score of 69. Ellicott City's scores are much better than the average residential neighborhood, but there is still opportunity for improvement if this area is to become a fully self-sustaining community.

[18] (Walk Score n.d.)

Chapter 4: Tactical Urbanism

What is Tactical Urbanism

Tactical Urbanism is a growing movement in cities as a way to revitalize struggling communities through smaller-scale urban interventions. These interventions are often low-cost, community-based designs, which aim to create new, more sustainable, and resilient spaces. Many examples of Tactical Urbanism relate to street safety, walkability, sustainability, and public space design. Sometimes referred to as "Urban Acupuncture," these interventions can greatly range in their formality, from grassroots and DIY community-led projects to larger-scale, city-led design initiatives[19]. These projects differ from typical urban planning schemes that focus on the design of entire city blocks, meaning these smaller scale interventions can be more universally applied to a variety of locations and scaled up or down to meet the context. Some examples of tactical interventions often seen in these projects are open/walkable streets, greenery, local/pop-up food resources, rethinking paving, pre-vitalization of sites, bike integration, pop-up town halls, and plaza design[20] (Figure 18). All of these efforts are small changes with the goal of strengthening communities in a profound way.

[19] (Tactical Urbanism Guide n.d.)
[20] (Lydon 2012)

Figure 18: Example of Tactical Urbanism to create a pedestrian street plaza (Public Domain).

A tactical approach to design makes sense for Ellicott City for a few reasons. The dense urban fabric leaves very little unused space around Main Street, and the historic built environment that gives the area its character should be disturbed as little as possible. The topography of the site also poses concerns for large scale urban strategies. While the density lessens further out from Main Street in the north and south, the topography becomes harsher, with sharp hills and granite outcroppings, making it difficult to utilize the space. The area also has an abundance of current program elements, which are crucial to bringing in tourists and giving the site its character. A full programmatic redesign is not necessary, but rather should be aided with a series of tactical moves which fill the gaps that are necessary for a vibrant community.

Community Resiliency

In order to create a stronger community in Ellicott City, the characteristics of a strong community must be analyzed. The concept of resilience is vital to the success of this thesis. Resilience in architecture can be realized in a few ways, particularly sustainability and economics. From a sustainability perspective, resilience is defined as the ability for a building or urban environment to weather disruption and be able to rebound efficiently[21]. In the current era of climate change, certain areas are being hit hard by increasingly disruptive weather events. Disastrous events, like the floods in Ellicott City, are going to keep happening, but cities can be designed in a way that better prepares them for hardships so the road to recovery becomes less arduous. The term "resiliency" is becoming synonymous with "sustainability," as urban environments must become more efficient in their adaptability to a changing climate.

Michael Mahaffy and Nikos Salingaros describe in *Metropolis* how resilient cities function through interconnected systems. Cities are reliant on technological systems to weather hardships, but when all external functions are reliant on a single technological method as a means of keeping the city safe, it could be disastrous if that system fails. A more resilient system integrates resilient methods into a variety of programmatic uses at varying scales, so if one method fails, other elements can pick up the slack (Figure 19). A community where sustainability is ingrained through a diverse range of design choices is far more resilient than one which relies on a single

[21] (Mehaffy and Salingaros 2013)

method to keep the community safe. This can be seen in Ellicott City with the county's new flood mitigation plan, which relies heavily on a large tunnel to divert most of the water beneath Main Street and out towards the river where it cannot harm the historic site. While projections show this method to greatly reduce the flow of runoff down Main Street, the community should not have to rely on a single technology to solve the issue, incase this plan fails. This why a rethinking of the site from a Tactical Urbanism perspective is vital, to integrate a series of design solutions along Main Street that can aid the flood mitigation effort.

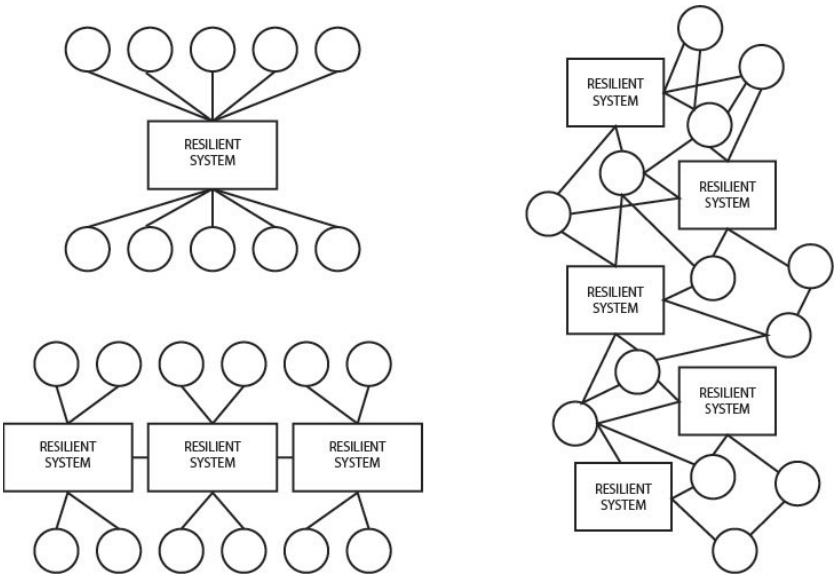


Figure 19: Diagram of the integration of reliant systems into an urban setting. The two graphics on the left represent an inefficient system where all community programs rely on a single or a small series of systems. The diagram on the right shows a more efficient system where resilient methods are integrated within many programmatic elements, so each element does not rely on a single method of resiliency (Diagram created by Author, based on sketches by Nikos A. Salingaros).

The second form of resiliency that relates to this project is economic resiliency. Economic resilience is similar in the sense that it also revolves around a community's ability to adapt to and overcome changing conditions and obstacles,

specifically through economic means[22]. Cities are faced with economic challenges constantly, through changing markets, industry patterns, and even natural disasters which can cripple local economies, such is the case in Ellicott City. Economic resiliency can be partially insured through government oversights and programs, but it also has a strong reliance on the urban context of a community. Some ways economic resiliencies can be achieved through design is with the diversification of programmatic elements, the presence of a strong industrial base, and ensuring safe development practice through careful analysis of building locations so they are not placed in vulnerable locations.

The floods and the Covid-19 pandemic have put a large economic strain on Ellicott City. While the local and state governments have provided subsidies to save some businesses and rebuild the city, including the flood mitigation plan, there is still a long way to go to return it to the vibrant small business district it once was. The goal of the tactical interventions in Ellicott City are to fill some of the programmatic voids that could add to the economic resiliency of the town. These new program elements must also adhere to a strict sustainability standard to ensure resiliency against natural disasters, which in turn hurt the area economically.

[22] (Georgia Tech Center for Economic Development Research 2017)

Enhancing Ellicott City

With the current site program accounted for, it is important to determine what elements of strong community design Ellicott City is lacking, which, once added, could bolster the resiliency of the site. The Main Street area is ripe with small businesses, from quirky shops to restaurants, bars, and cafes. Most of these shops are very particular in their merchandise, from furniture to knick-knacks and games, so they do not meet the necessary diversity in program to foster a sense of economic resiliency. This creates an opportunity for broader industry diversification that would support a more lived-in community, rather than simply a short-term travel destination, through the implementation of markets and general stores that could still adapt to the small business character of the site. Economic resilience can be fostered through more people and industry arriving in Ellicott City, specifically with more places to live and work. There are very few commercial institutions that do not fall under the retail jurisdiction. The area has the retail resources to support different businesses, but does not have a strong commercial presence, meaning it is entirely reliant on people traveling to Ellicott City to seek out the retail experience. There is also not a strong residential community in the immediate vicinity of Main Street. In the same vein as the commercial aspect, Ellicott City has much of the retail base to support a lived-in community but is lacking a diversity in housing opportunities.

The implementation of new spaces to live and work would bring more people into Ellicott City to support local businesses and foster a more economically resilient

community. With more people, comes the opportunity for new, community-oriented amenity spaces, and the retooling on the urban fabric through tactical interventions. A rethinking of the paved landscape is vital to the sustainable resiliency of the area, and could also create a safer, more walkable environment. Parking is vital to bringing people to Main Street, but the massive, flat, impermeable lots need to be reconsidered in favor of denser, vertical parking structures. Shifting parking vertically could add more spaces, while condensing the amount of impermeable surface that is channeling water into the rivers or down Main Street, while still supporting a multitude of new community uses.

Chapter 5: Programmatic Additions

Introduction

Through the analysis of Ellicott City's current conditions, it has been determined that there is a deficiency in certain programmatic elements that make for a fully economic and sustainably resilient community. The city has a strong retail base, with some single family residential and small commercial spaces, but because of the recent disasters, there is an opportunity to incorporate new spaces which can better protect and insure the community for the future. In order to create a more resilient community in Ellicott City, a series of programmatic changes and additions must be implemented at a variety of scales. These programmatic additions can range from larger scale buildings to smaller material changes. Because of the existing dense historic fabric of the city, new construction will have to be limited to a select few sites that could support larger programmatic additions. Many of the additions would have to be more tactical in nature, through the transformation of sites that are currently in use.

New Building Typologies

Between the existing historic context, the harsh topography, and potential flooding hazards, there are not many large open sites for the construction of new

buildings in Ellicott City. There are, however, several sites that feature existing parking lots, which could provide some usable real estate for new construction. Because of the inefficiency of spread out, impermeable parking lots, there is an opportunity to introduce new buildings and park spaces to these areas that better manage runoff and add vital new programmatic uses. With Ellicott City acting as a tourist hub, an overabundance of parking opportunities must be available to the public. In rethinking the current parking situation, new, more sustainable parking elements must be added as part of the program. Unfortunately, there is no form of mass public transit in the area, and the dense context makes public transit integration difficult, meaning most of the access to the city is via personal vehicles or pedestrians on bike or foot from neighboring residential communities. While public transportation is the most sustainable form of transportation, there is still a need for personal transport parking, which is at its most sustainable when it is using the least amount of land required to store vehicles[23]. Parking garages often seem antithetical to sustainable practices, but given the alternative of sprawling parking lots, parking structures can improve areas of concern through their design. Some ways parking structures in Ellicott City can designed to incorporate sustainable ideals are through high density while minimizing the building footprint, encouraging electric vehicles and carpooling, implementing sustainable technologies and materials, and capturing and reclaiming water[24].

[23] (Cohen 2018)
[24] (Marcus 2014)

In addition to parking, new construction can also be created on these sites to fill a variety of new programmatic uses. One element that Ellicott City is lacking is a diversity in housing. In the immediate vicinity of Main Street, the only housing options are single-family detached houses, with a few single-family duplexes and rowhouses. The nearest high density housing option is the Burgess Mill Community, located a half mile north of upper Main Street, about a 10-minute walk along Ellicott Mills Drive (Figure 20). This apartment complex, completed in 2013, contains 273 units, with about 50 percent of those units accounting for affordable housing. There were also initial concept plans to incorporate Lot F into the scheme, transforming the surface lot to a more sustainable parking garage, but these plans were never realized, most likely due to the flooding disasters[25]. This complex is a great residential amenity for Ellicott City, but there are still opportunities to provide more high-density housing options in a closer proximity to Main Street.

[25] (Lavoie 2013)

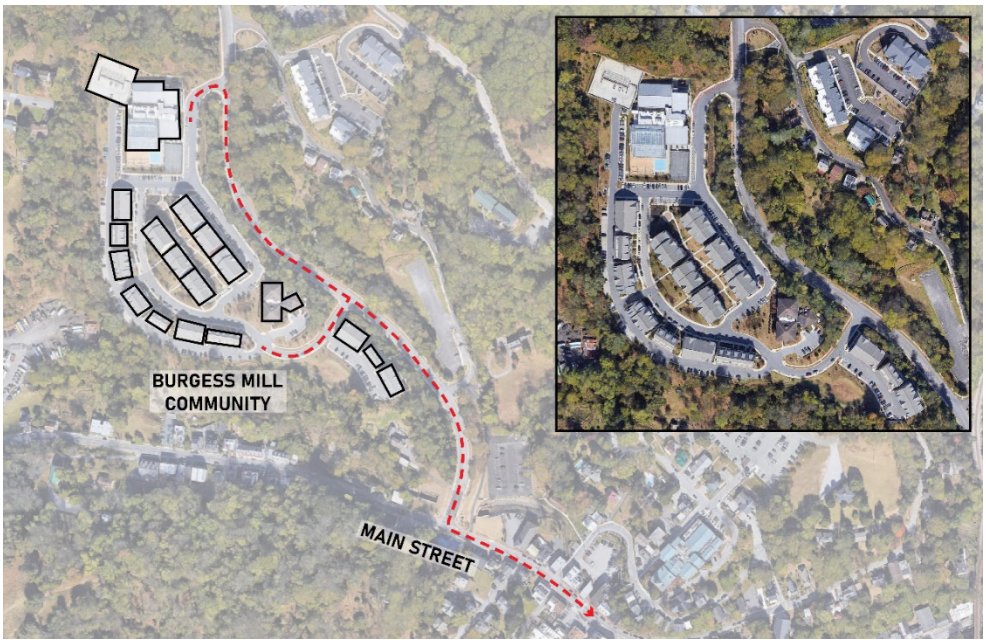


Figure 20: Map of the Burgess Mill apartment complex in relation to Main Street (Graphic created by Author)

These new housing typologies to be introduced to the area can be realized at a variety of density levels, and incorporate affordable housing options, similar to Burgess Mill, as this area has a much higher average rent cost, at $1,615, than Maryland's average, at $1,392[26]. New housing options also bring in more people to the town, which leads to a more resilient economy and adds to the sense of community. The inclusion of more private amenity spaces and sustainable parking options are important programmatic elements of these housing types. Some new housing types can also be realized as live-work spaces. This building typology features one or more living units attached to a commercial workspace, sometimes located on the ground floor of a prominent street similar to many of the retail spaces

[26] (U.S. Census Bureau n.d.)

along Main Street[27]. Live-work opportunities would be beneficial to an area like this which is lacking some commercial program diversification. New housing typologies must also be designed in a way that they do not detract from or overpower the existing historic context, while still providing easy access and adjacencies to Main Street. They can also utilize the redesigned spaces of the surface parking lots, but they may also be implemented through the adaptive reuse of some larger existing buildings in the area.

Much of the program to be implemented as new building construction falls into two main categories: Community amenities and commercial spaces. Much of Main Street's current program involves retail and small-scale commercial offices. One element that this area is lacking is a community center, which would feature amenities for residents and visitors, and can act as the cultural heart of the city. The town is organized in a linear fashion, with no real hierarchy of function along Main Street. None of the current sites act as either an entry or destination point, but rather a single strand of small retail spaces. This creates an opportunity to introduce hierarchy through a space which can act as the community hub. Community hubs can be very beneficial additions to any community through their providence of many integrated services in one central location. They help to craft the identity of a community and contribute to the social and economic prosperity of the community's residents. A community hub integrates many amenities to a single site, such as: meeting/gathering spaces, educational resources, mental health services, social services, open working

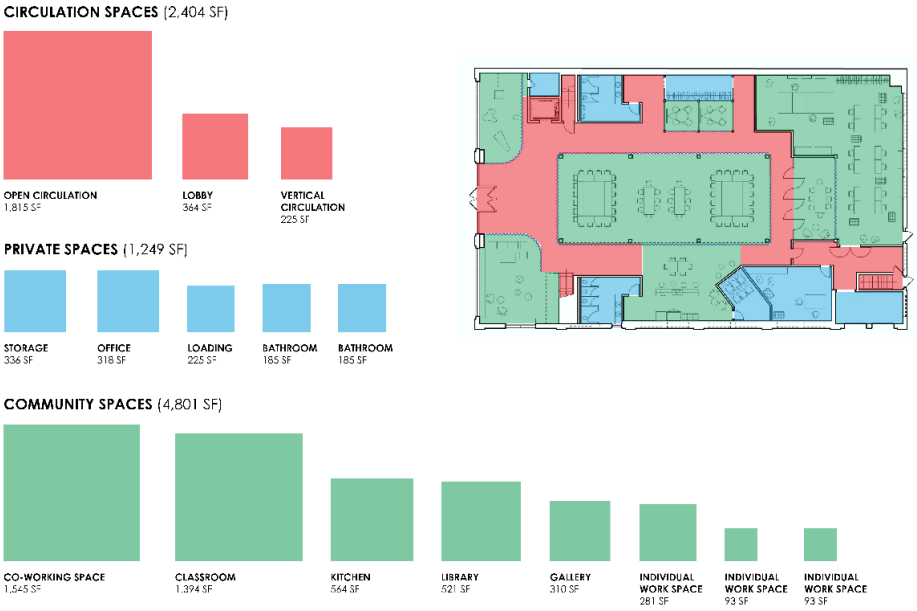
[27] (Katz and Bochinska n.d.)

and office spaces, libraries, cultural and historical centers, recreational facilities, and sometimes public plazas or gardens[28]. Ellicott City is currently lacking many of these programmatic elements, and if the area is to become a more inclusive and resilient community, a community hub would be one way to introduce these functions.

One precedent that shows some of the functions that could be incorporated into the new Ellicott City community hub is 63rd House by Studio Gang in Chicago, Illinois. This project is an ongoing cultural, community, and working center which aims to bring much needed services to an underprivileged neighborhood in the south side of Chicago. This precedent contains many similar programmatic elements and uses to what is needed in Ellicott City, while also being an example of adaptive reuse of an existing building in a historic area. It is also a smaller scale community hub, at 11,250 square feet, making it comparable to the limited open spaces of Ellicott City[29]. Figure 21 shows a breakdown of the program within the building. The public functions of this building are co-working spaces, classrooms, individual workspaces, a library, a gallery, and a large green roof which can be used as a gathering or event space. The building also has photovoltaic panels and other sustainable technologies integrated into the design. It would be a vital addition to Ellicott City to have a space like this for the public's use, especially if it is to become a fully integrated community. While this building is only 1 floor with an accessible green roof, the

[28] (Ontario Municipal Social Services Association 2015)
[29] (Studio Gang n.d.)

program could be organized in a two to three story community hub to fit the context of Main Street.



Department	Space	Floor Area (SqFt)
Circulation	Open Circulation	1815
	Lobby	364
	Vertical Circulation	225
Private Spaces	Storage	336
	Office	318
	Loading	225
	Bathrooms	390
Community Spaces	Co-Working Space	1545
	Classroom	1394
	Kitchen	564
	Library	521
	Gallery	310
	Individual Workspaces	467
	Gross Square Footage:	9485
	Net Square Footage:	8474
	Grossing Factor:	1.12

Figure 21: Programmatic breakdown of 63rd House community hub by Studio Gang (Graphic created by Author)

The second large category of program to be expanded upon in Ellicott City is commercial space. The smaller retail and commercial institutions that make up Main Street are the backbone of this community, but there is room for expansion in terms of scale and prominence of these spaces. In order to give a sense of hierarchy and destination to Main Street, similar to the community hub, there is an opportunity for a commercial hub that could act as a prominent business zone for the community. Much of the commercial spaces along Main Street that are not standard retail are small businesses that service the local area. Introducing larger and more flexible workspaces for businesses at a variety of scales could be very beneficial to the local economy and bring more companies and people to Ellicott City. This area, while containing many food options, is also lacking a singular marketplace-like destination to shop for groceries and household items. The limited number of current residents that live on and around Main Street must leave the community in order to do the bulk of their shopping. In order to create a fully self-sustaining and walkable community, especially with the introduction of new housing and community amenities, all of the required goods and services of the residents must be available along Main Street. The programmatic additions to the new business/marketplace district should include offices of varying size and type, co-working spaces, possibly live-work spaces (in addition to ones available in other new housing construction), grocery stores or marketplaces, and flexible interior and exterior gathering spaces or plazas. The addition of these new conveniences, at an easily accessible location, would greatly add to the walkable, self-sustaining character of Ellicott City.

Tactical Interventions

In addition to the new building developments along Main Street, there are also opportunities to take a more tactical approach to the redesign of the materials and organizing principals of the area, in order to create a more sustainable and resilient environment. While these interventions would be at a much smaller scale than the programmatic additions previously mentioned, they could have a profound impact on the human experience along Main Street. Drawing upon Tactical Urbanism principals, the new interventions can be expressed through the removal of paved surfaces in favor of permeable environments, the integration of sustainable systems, and the creation of more walkable and bikeable areas for residents.

One of the main ways Tactical Urbanism can be used to create a more sustainable environment is through materiality. Tactical Urbanism can be used for the redesign of many impervious, inefficient spaces through the elimination and replacement of these materials with more natural and/or permeable materials. In many cases, this impermeable surface is part of a street or a sprawling or underutilized parking lot. In both of these cases, there are opportunities to take some space away from the vehicle dominated landscape to create zones of occupiable space for people. One of the main tenants of Tactical Urbanism is the creation of flexible public parks and plazas for community uses. These projects are often referred as “Pavement to Plaza” designs, and they are created by sectioning off areas of vehicle space by using

greenery, structures, and/or new sustainable paving materials to create usable spaces for gathering, temporary shops, or events[30]. These spaces can be filled with new program and can enhance local economies and social vitality, while keeping pedestrians safe by minimizing street traffic[31]. Ellicott City has many side streets and smaller parking lots that are underused, which poses an opportunity to create more programmatic space in these areas.

On a larger scale, the replacement of sprawling parking lots with more permeable materials creates the opportunity for public park spaces. Public parks provide amenity space for communities while being more effective at absorbing water and reducing runoff than pavement. There are also replacement options for paving that are more successful at minimizing water while still providing hardscape for parking or gathering. There are three main types of these permeable hardscapes: permeable concrete, permeable asphalt, and permeable pavers (Figure 22)[32]. The permeable concrete and asphalt are relatively new materials. They bare a similarity to the typical appearance of their typical forms while allowing water to seep through. The pavers are not as uniform but can provide even quicker absorption due to varying sized gaps between each paver, which sometimes even allow for the exposer of greenery to the surface. All of these methods for reducing runoff are viable alternatives to the major impermeable surfaces of Ellicott City.

[30] (Bruntlett and Bruntlett 2017)
[31] (The Street Plans Collaborative 2016)
[32] (Department of Energy and Environment n.d.)

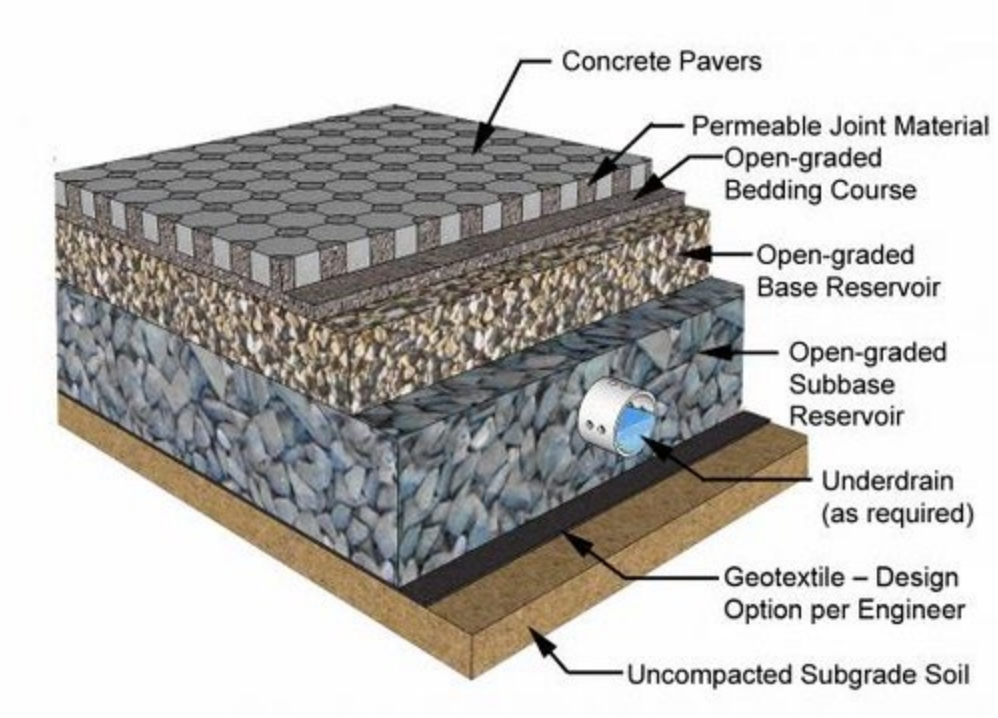


Figure 22: Diagram showing the structure below permeable pavers to allow for water absorption (Public Domain).

There is also an opportunity to introduce more sustainable systems to Ellicott City, particularly involving the management of water. Due to the historic infrastructure of the town, water is not currently maintained on the site of each building. For all new construction being implemented, water management systems will be used to store and treat water on every site to minimize runoff. Some existing sites can be retrofitted with green roofs, collection basins, and cisterns to store and filter water that could cause damage to lower Main Street. Stormwater management gardens are also an important aspect of Tactical Urbanism that can implemented into a site to collect runoff. In addition to these water management strategies, photovoltaics panels can also be used to collect solar energy on new and existing

sites. Solar energy can help to lower operating costs of buildings, which in turn can lead to better fund allocations for community amenities. Another renewable energy source that can be utilized in Ellicott City is water energy. Harkening back to the days of the original mill town, water turbines can be used at points where buildings meet the streams feeding into the Patapsco to create energy and allude to the original character of the town.

Another main tenant of Tactical Urbanism is the integration of walking and biking trails. While Ellicott City is a decent area for walking, it is lacking in the use of bike paths. The hilly topography and narrow streets make biking in the area dangerous, but there are also no dedicated bike lanes to separate bikers from the traffic. A small-scale tactical intervention could include the creation of barriers, in the form of delineator posts, planting boxes, or street parking. Bike paths can also be utilized in new park spaces that would replace paved surfaces. These bike paths, if in a natural context, can be paved with permeable concrete or asphalt to create a smooth path without disrupting the permeability of the site. Walkability can also be improved through the creation of more pedestrian pathways in and around Main Street. Main Street itself is currently the primary circulation pathway through this area. Giving pedestrians more options, specifically with pathways and bridges, can ease the flow of traffic along the street. With viable sites across the Patapsco River, pedestrian bridges could be an effective tool to ease congestion on the existing narrow walkways on the vehicle bridge (Figure 23). The goal of these smaller scale tactical interventions is to create spaces that will enhance the pedestrian experience on and

along Main Street, as an ancillary redesign to accompany the larger program additions.

Figure 23: Existing pedestrian walkway on the bridge across the Patapsco River (Photo by Author).

Chapter 6: Site Selection

Selection Criteria

Now that the program additions have been established, the existing sites in Ellicott City must be analyzed to determine their viability to house these new programs. Through the analysis of Main Street, a collection of seven viable sites was determined. These sites were chosen primarily based upon the amount of unused space present in order to disrupt as little of the existing historic context as possible. Many of these sites are surface parking lots, but some are existing structures that are either being removed or not longer in use. The seven options were placed in a decision matrix, where they were all assigned a value of 1-5 based on how well each site fits each criterion (Figure 24). This was done to determine the viability of each site, based on criteria like the amount of impermeable space, the size, the topography, water resiliency, and more. The final values of each site give a combined score which represents the overall viability and importance of new program integration.

	1 LOWER MAIN STREET	2 LOT D	3 LA PALAPA PARKING LOT	4 LOT F	5 COURTHOUSE PARKING	6 FLOWER MILL	7 LOT A
IMPERMEABLE SPACE	4	5	5	5	5	3	5
OPENINGS IN HISTORIC FABRIC	5	3	5	1	1	1	1
SIGHT LINES	5	1	3	1	3	4	3
ADJACENCIES TO MAJOR SPACES	4	3	4	2	1	2	1
BUILDABLE TOPOGRAPHY	5	5	4	5	5	3	4
SIZE	4	5	1	4	5	5	3
GREEN SPACE	1	4	1	5	3	3	5
RESILIENCE TO WATER	1	3	4	4	5	2	4
ADAPTIVE REUSE OPPORTUNITY	2	1	3	1	2	5	1
PROXIMITY TO MAIN STREET	5	3	4	2	1	2	2
TOTAL (1=POOR, 5=EXCELLENT)	**36**	**34**	**34**	**30**	**31**	**30**	**29**

Figure 24: Selection matrix showing each site along Main Street being graded on a variety of criteria to determine viability for new program (Graphic created by Author).

The matrix shows that all seven of these sites meet a majority of the criteria in one way or another, making them all fairly viable for new program additions. This project will focus on a redesign of the Main Street area at an urban design scale through a series of interventions at many or all of these sites. Most of the large-scale program additions will be expressed in greater detail at the sites shown to have the

most feasibility for these additions. These will be the primary sites, while the other sites will be secondary explorations meant to provide additional program to a variety of points along Main Street. A redesign of Main Street will be necessary to act as the artery of connection between all of these new sites, with the goal of creating a self-sustaining, walkable community.

Primary Sites

Based on information gathered from the site selection process, as well as the programmatic requirements, two primary sites have been determined as the most compelling locations for the community hub and the marketplace/business district. The community hub will occupy the "lower Main Street" site, which is the location of the four existing buildings that are being demolished in accordance with the county's flood mitigation plan. The market district will occupy the Lot D site, because of the large size and central location along Main Street.

The first of these primary sites is "lower Main Street." This area is located at the corner of Main Street and Maryland Avenue and is currently occupied by four buildings, three of which are separated from the fourth by Tiber Park, a small alcove off the street where the Tiber River is exposed from above (Figure 25). Except for at the park, the river is underground as it tunnels beneath the buildings and Maryland Avenue until it meets the Patapsco at the other side of the street. Because of the river's location relative to the buildings, they suffered significant damage during the

two floods, and have been deemed structurally unsafe. With the demolition of these buildings, there is now an opportunity to create a new public space in this enticing location.

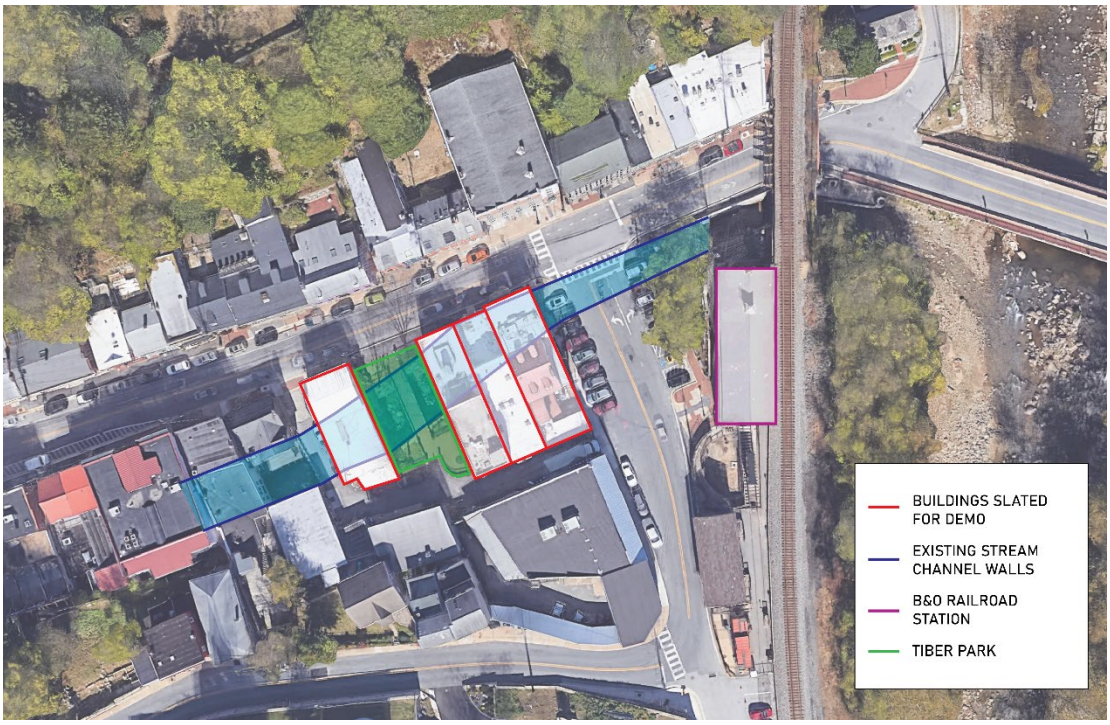


Figure 24: Map and diagram showing the Lower Main Street site's existing conditions, highlighting the expected demolition of buildings (Graphic created by Author).

Lower Main Street is at a very prominent intersection, which acts as the gateway of the base of the city. The B&O Railroad station is directly across the street and features a small plaza/gathering area at the corner. With the buildings demolished, this site would feature some of the mildest topography, as the steepness of Main Street levels out as it reaches the bottom of the hill before crossing the river. The site does come with some potential threats, however, specifically due to flood

risks. It is located near the point where the Tiber intersects with the Patapsco River, posing high risks of flooding and rapid water movement. A potential benefit with the Tiber, however, is that this site could be integrated with the water in a way that slows down or mitigates flooding concerns, which could also make for a unique public amenity space that captures the character of Ellicott City. The goal of this site is to change the narrative from the destruction of the historic to the rebirth of a new resilient community through the design of public amenity spaces that can highlight the flood mitigation efforts.

The second site that acts as a primary area of design is Lot D (Figure 25). This surface lot acts as the main parking area for people visiting Ellicott City. It is a large, impermeable area that is located directly off of the center of Main Street, making it an appealing location for the commercial center of the city. While the lot itself is mostly flat, the topography slopes up sharply on the south and east sides, away from Main Street. Much of the context on those sides features single family housing nestled into the sharp landscape. On the east side is a small plaza area which contains some retail and food options, directly off of the parking lot. Separating the lot from Main Street on the north side are some larger buildings which feature a mix of retail, restaurant, and commercial uses. To the west is a smaller residential road which is inaccessible from the lot. The Tiber River is also exposed in the center of this lot, after entering the area from underneath a larger retail structure fronted on Main Street, before it eventually gets channeled back underground where it snakes its way towards lower Main Street.

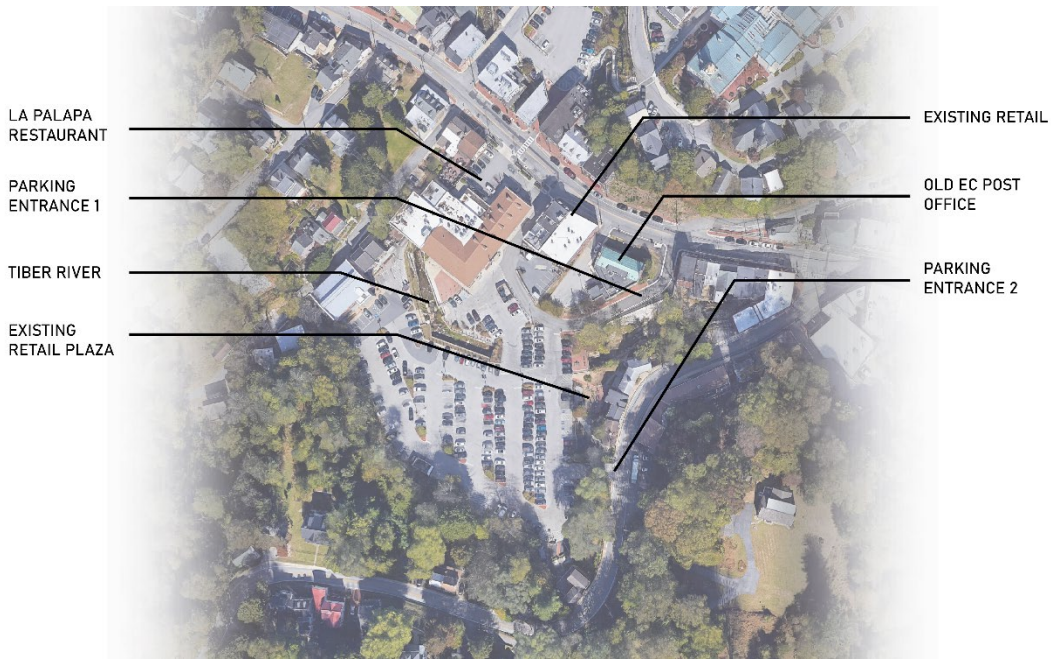


Figure 25: Map showing Lot D and its surrounding context (Graphic created by Author).

Lot D is an appealing location for a commercial core due to its large size and prominent location surrounded by retail, however it does come with some challenges. The surrounding topography funnels water down into the lot where the impermeable surfaces cause runoff into the Tiber and onto Main Street. Water will have to be managed both on the site itself and from runoff of the surrounding higher topography. There are opportunities to greatly reduce the amount of impermeable surface in this area to better manage the runoff. With the removable of impermeable parking spaces, there will need to be new parking options introduced to this site to account for the high level of traffic activity in Ellicott City. The new parking could be more vertically integrated as a parking structure which interacts with new office and market spaces. With the removal of the surface lots, there are also opportunities to use some of this

space as public park and green areas, which would be better adapted to manage water and provide amenity spaces for the community. There are also opportunities to have public spaces that interact with the river, and act as a catchment basin to slow down the rapid flow of water that can prove to be destructive downstream. The goal of this site is to transform this lot into a more efficient use of space that provides amenities to residents and new business opportunities at a prominent site within Ellicott City.

Secondary Sites

While the two primary sites are used to provide Ellicott City with much needed centers of community and commerce, the collection of secondary sites will be used to introduce new housing typologies, rethink parking, and provide connectivity while implementing sustainable systems and Tactical Urbanism ideals to Main Street. The five secondary sites to be analyzed are the La Palapa parking lot, Lot F, the courthouse parking lot, Lot A, and the flower mill.

The first secondary site is the parking lot in the front of La Palapa. La Palapa is a popular restaurant along Main Street in one of the larger buildings in the area. The building is in between Lot D and Main Street, with its own more private lot fronting the street. One current drawback of the site is that the location of the street-facing parking lot breaks the continuum of the street edge created by the building facades (Figure 26). This creates an opportunity to either make this streetscape a more usable area or continue the street edge through new construction added to the

building. Due to its proximity to Lot D, this site could also be added to the program of the commercial district through the adaptive reuse of the restaurant building.

Figure 26: Map showing the street edge context surrounding the La Palapa parking lot, accompanied by a zoomed in view of the lot itself (Graphic created by Author).

The other three prominent parking sites around Main Street, Lot F, Lot A, and the courthouse lot, all present opportunities for the construction of new housing typologies. Lot F is located at the upper end of Main Street off of Ellicott Mills Drive, and it supplies most of the parking opportunities for the upper area (Figure 27). It is in a relatively close vicinity to Lot D but does not take up nearly as much land. It is directly north of an exposed area of the Hudson River, which then dips underground where it meets with the Tiber River at Lot D. There is a clear opportunity to minimize

the runoff from this impermeable lot, which would lessen the water entering the stream where it builds in speed towards lower Main Street. Past lower Main Street, on the other side of the Patapsco, is Lot A. This is a more private parking lot, nestled in a vegetated area with steep topography surrounding it (Figure 28). This lot mainly services some of the small shops and restaurants on the other side of the river, but also acts as an access point for some hiking trails leading west of Ellicott City. Some use this lot for parking when visiting lower Main Street, but it is about a quarter mile walk to the lower Main Street site. This site is not at as much of a risk of flooding, but its impermeable surface still leads to runoff into the Patapsco. The last of these three lots is the parking north of the Howard County Courthouse (Figure 29). This is one of the largest lots in Ellicott City, comparable to Lot D. It sits atop the hill to the north side of Main Street, which minimizes the threat of flooding, but still accounts for runoff down towards the street. The size and lack of vulnerability make this a very promising site; however, it is quite separated from Main Street as a whole. The lot is located about 700 feet from the street, atop a steep hill, and separated by a series of institutional buildings that make up the system of court buildings. This does, however, make the site very private, but it has little bearing on the program of Main Street. While the large lot is primarily used by the courthouse, Howard County recently vacated this courthouse in favor of new Circuit Courthouse located elsewhere in the county[33]. This negates the need for such a massive parking lot, which could be transformed into other functions.

[33] (Howard County, Maryland n.d.)

Figure 27: Map of Lot F with surrounding context (Google Earth).

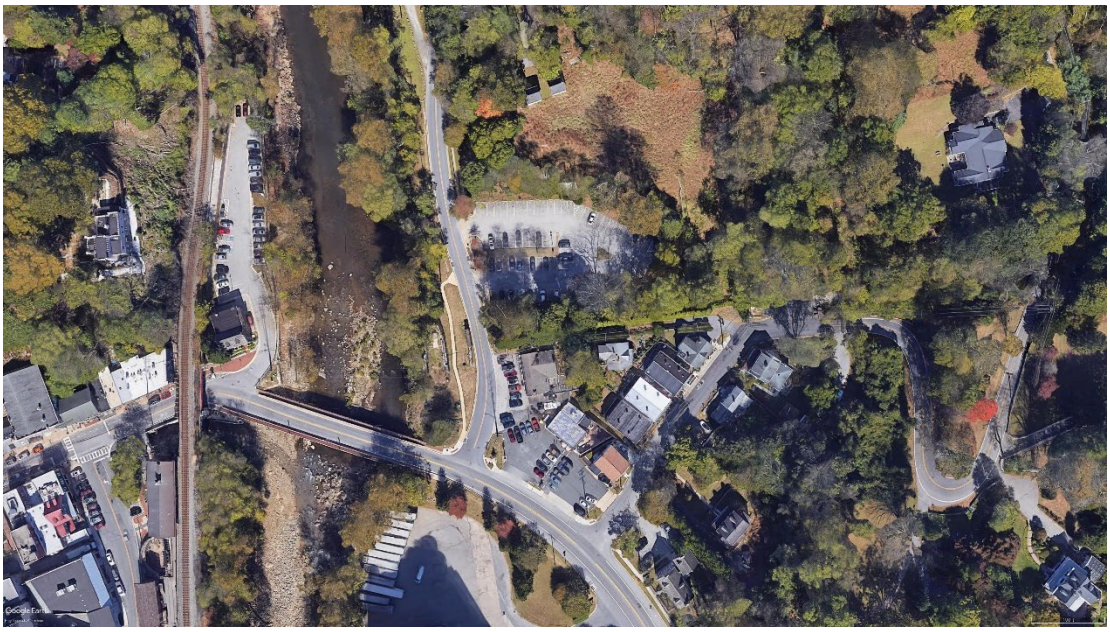


Figure 28: Map of Lot A (center of the image) with surrounding context (Google Earth).

Figure 29: Map of Howard County Courthouse parking lot (North) with surrounding context (Google Earth).

These three parking lots have the most potential for new, diverse housing types in the area. All three are located in much more private areas, slightly off of Main Street, than Lot D. The varying sizes of these lots creates the opportunity for a diverse range of housing types at varying scales. One concern with the creation of housing is the replacement of parking in each area. With the removal of surface lots, parking will have to be integrated into each housing block, while still providing a similar amount of parking opportunities for visitors of Ellicott City. The removal of the surface lots also leads to great opportunities to create more private green spaces and parks for the residents of these locations, so they have access to both public and private amenity spaces around Main Street.

The final site that presents a great opportunity to introduce new hosing is the Wilkins Rogers Mill facility. This large factory is an iconic landmark of the east entrance to Ellicott City. Home to the last commercial grain mill in Maryland, this building has been passed along to various milling companies for over one hundred years and had most recently been operated by Wilkins-Rogers Inc. before they announced in 2020 that they were shutting down operations and relocating[34]. With this building acting a symbol of Ellicott City's storied past, it would be a disservice to the community to let it fall to the wayside. This is a potential opportunity for adaptive reuse interventions. The existing structure and bay organization create a potential for this building to be used as an apartment complex. The massive size relative to its context, as well as its prime location overlooking the river and acting as a gateway from the east make this site very intriguing (Figure 30). The close proximity to the river could lead to some hazards, but it does sit several feet up from the riverbank, sparing it from any major damage from flooding over the years. The site is relatively flat, made up mostly of impermeable parking space. There are opportunities to reduce some of the surface parking and introduce garages within the building, due to organization of the tiered massing structure (Figure 31). This is very promising site for an adaptive reuse project, with strong adjacencies to many locations around lower Main Street.

[34] (Mirabella 2019)

Figure 30: Map of Wilkins Rogers Mill site with surrounding context (Google Earth).

Figure 31: Image of the tiered massing and organization of the Wilkins Rogers Mill building (Google Earth).

Main Street

With the locations of all of these interventions scattered around Ellicott City, there is an opportunity to tie all of these projects together with a redesign of Main Street itself. As the primary artery of circulation for this area, having an efficient and sustainable street is vital to the resiliency of this area. One of the major causes of the ferocity of the floods is that Main Street itself acts as an impermeable funnel which channels water at a high speed where it eventually wreaks havoc upon the lower end of the site. A redesign of the materiality and organization of Main Street, based upon Tactical Urbanist principles, could help to minimize some of these issues.

Even though it acts the primary circulation pathway, Main Street is a rather narrow road. In most areas it fluctuates between 45-60 feet. Some sections of the street, mainly along the lower area, feature street parking on each side, with two lanes in the center, and 8-foot sidewalks on either side (Figure 32). While this makes for a narrow experience, some changes can be enacted to make it more efficient. In order to minimize the amount of runoff, the street parking lanes could be redesigned to feature permeable pavers or asphalt, which would absorb some of the water so less gets channeled down the street. The addition of greenery would also add to the overall experience and aid in carbon sequestration. There are currently no street trees or plantings along Main Street. In order to aid in the bankability of Ellicott City, there may also be room to add bike lanes on Main Street, specifically if the amount of street parking is reduced to account for more space. These Tactical Urbanist

principals, when applied to a streetscape, can enhance the overall human experience, and allow Main Street to act as a more optimized connection element that ties all of these new spaces together.

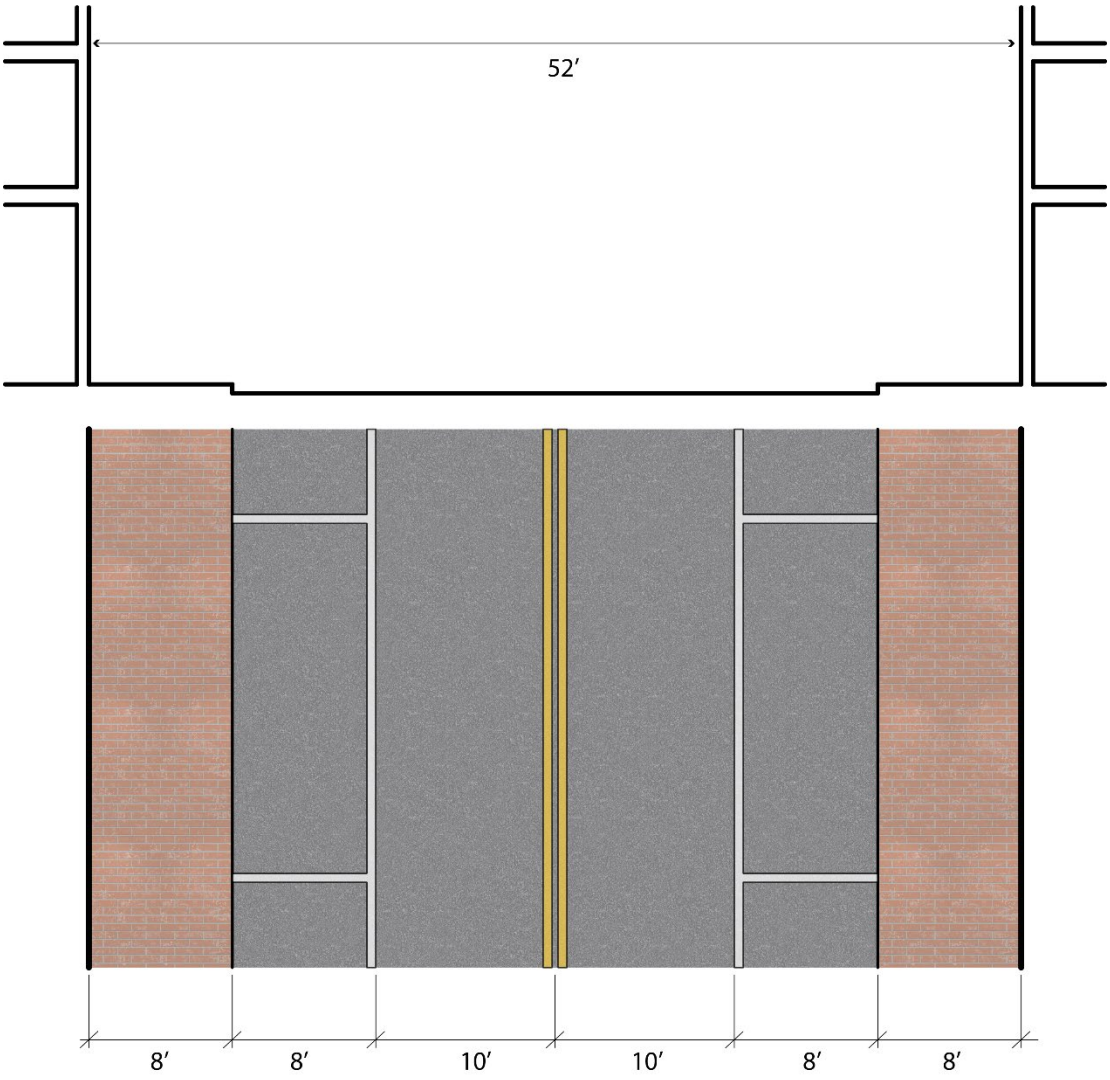


Figure 32: Average street section of Main Street showing driving lanes, parking, and sidewalk width (Graphic created by Author).

Chapter 7: Final Design

Introduction

Due to the iterative nature of the design process, as this project progressed, some of the goals and themes of this thesis were reevaluated in order to uncover the optimal solution to heal Ellicott City. Some of the original themes still persisted, however. One in particular being the preservation of the historic architectural character that gives the town its distinct charm and makes it a tourist destination. Changes and additions to the design should not negatively impact existing spaces and only build upon architectural design principals and styles present in the area. Another persistent theme was the idea of resiliency. While some of the research background focused on economic resiliency, much of the new design implementations build upon themes of sustainability, particularly with the management and control of water movement in order to protect Ellicott City from dangerous flood conditions.

With this increased focus on sustainability, a new theme and goal emerged, which is the reimagining of impermeable surfaces to be used in a more efficient manor to limit the capacity and velocity of runoff. While this thesis document contains a focus on materiality at the tactical urbanist level, the final design proposes material changes to increase permeability at the macro level of an entire site. This all came together in a design which turns the negative connotation of water in Ellicott City to a positive idea associated with new amenity spaces for the community.

Background

Rather than a string of sites along Main Street that had been previously postulated, this new design formed primarily at a single site: Lot D. This site turned out to be quite advantageous to foster resiliency and reduce the impact of runoff down towards lower Main Street. Lot D was chosen for a few reasons. The first was its size and sheer impermeability within the greater impermeable fabric of Ellicott City (Figure 33). The second was its location and interaction with the system of tributaries which lead into the Patapsco. Two of the major tributaries, the Tiber and the Hudson, which snake through and under the built environment all along Main Street, have a connection point directly in the center of Lot D in an open stream channel (Figure 34).

Figure 33: Diagram showing the impermeability of Lot D (Graphic created by Author).

Figure 34: Figure Ground showing the existing buildings around Lot D, as well as the two tributaries intersecting in an open river channel (Graphic created by Author).

The site itself is also fairly bowl shaped, bordered on the north, east, and west by Main Street and two side streets at about 10 feet of elevation. To the south is a steep hillside with single family residencies at about 20 feet of elevation (Figure 35). This bowl-shaped topography causes Lot D to act almost as a funnel, catching a massive amount of runoff which is channeled into the existing riverbeds where high speed water conditions can cause disastrous effects on lower Main Street. This river channel in particular is the cause of the unsafe conditions on the lower Main Street site where four buildings are being demolished. These factors, along with Lot D's advantageous location at the heart of Ellicott City, make it an opportune location for

new development that can minimize the harmful effects of water while fostering new programmatic spaces for the community.

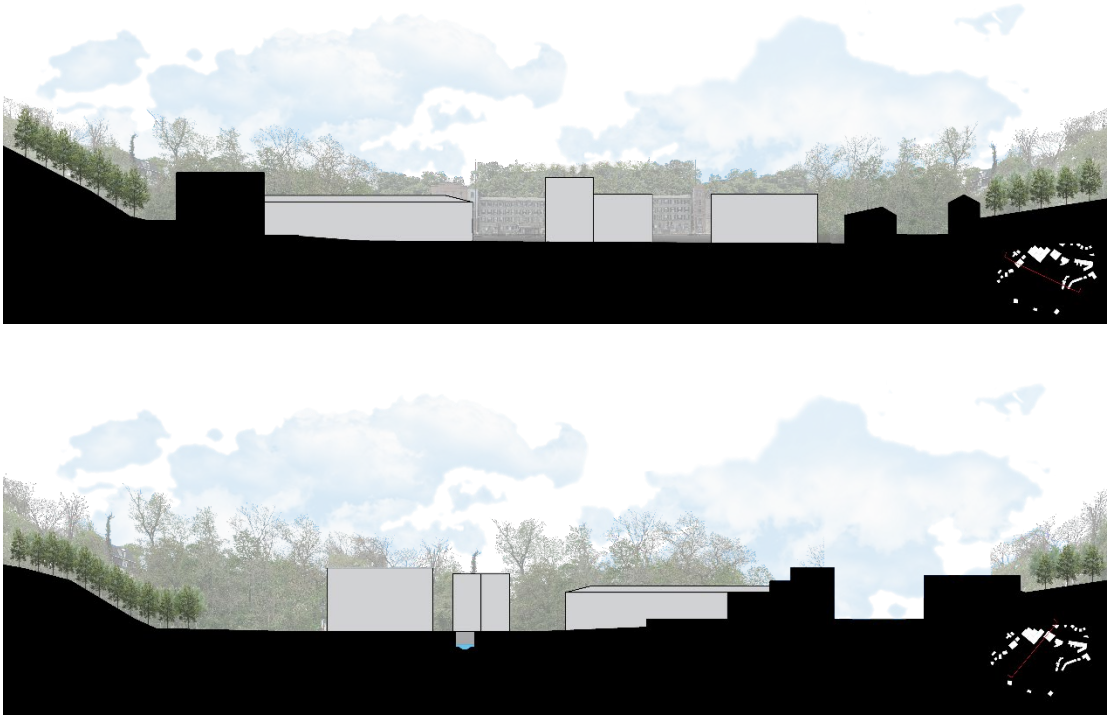


Figure 35: Existing sections of Lot D (Graphic created by Author).

Ellicott City Wetland

The existing conditions were all factors in the development of a new redesign of the Lot D site. The new Lot D site is articulated at a variety of scales, from urban planning, to landscape design and mechanics, and finally the individual building design. All of these elements come together to create a rich new amenity space for the community, which manages the flow of water, provides new programmatic spaces,

and builds upon existing dynamic exterior spaces and buildings that are currently present on the site.

The initial level of design involves a new master plan of the Lot D site (Figure 36). This new plan retains all of the existing buildings and plazas on this site, while introducing a series of new buildings that complete the street edge and extend development along the south edge of the site. This new plan builds upon and extends existing plaza spaces and street connections to create a walkable and vibrant new development immediately off of Main Street. All of these new buildings and plaza spaces are situated around the main feature of this redesign, the new Ellicott City Wetland.

Figure 36: New urban plan for Lot D (Graphic created by Author).

With this design, the impermeable surface of Lot D has been completely replaced by an open amenity space of natural topography. Within this topography, the river channel has been replaced by a series of water retention basins. These basins are all connected, and they allow the existing two rivers to snake through the space at low speeds. During a flood event, these basins can hold a large deluge of water running off of the surrounding area and then slowly release that water downstream at a more manageable speed. The basins were organized based on the existing axis created by the buildings to the north. This entry into the site is extended through the wetland where a pathway descends into the basin area, making the site walkable for pedestrians so the wetland can be used as a teaching tool of sustainability for the community. The walkway leads to a viewing platform in front of the central connection basin, which features a monument dedicated to those who lost their lives in the floods. Beyond the monument, to the south is a more natural, swamp-like wetland that catches runoff from the hill. This wetland contains two flexible-use pavilions for events, as well as a series of walking trails that snake through the wetland environment.

Figure 37: Diagram showing existing buildings and new spaces organized around the wetland park (Graphic created by Author).

The wetland basins were also designed at a higher level of scale, in order to fully realize the mechanics which would allow them to hold and release water through the site. Along the path of the rivers, each consecutive basin is lowered about six inches to one foot below the previous basin, to allow for the slow movement of water along the site (Figure 38). Between each basin is a connection point which allows water to move from one basin to the next (Figure 39). The connection features a narrow opening aligned with the floor of each basin which allows for the slow transfer of water between basins when the river is at its typical low condition. As water levels rise, only a small amount of water can drain through this connection at a time, thus trapping the majority of water where it is held in the basin. Near the top of this connection is another larger pipe, which acts as a spillover point to allow water to drain to the next basin as water levels reach the basin's capacity. This spillover point also contains microturbines that generate energy for the area during high water level

events. The slow drainage of these basins creates a staggered effect in which one basin fills before the next, leading to a slower release of water downstream. These basins are also filled with vegetation that assists in the slowing of water speed while acting as a filter to remove toxins. All of these elements work in conjunction to protect lower Main Street from the sheer volume of runoff it experiences currently.

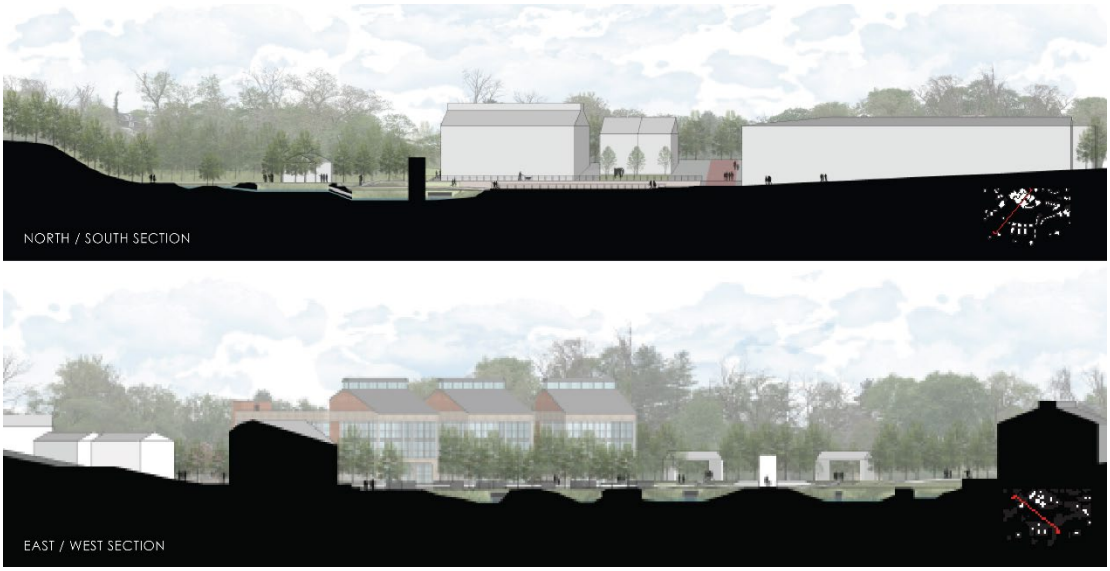


Figure 38: Sections cut through new site wetland basins showing subtle topography changes (Graphic created by Author).

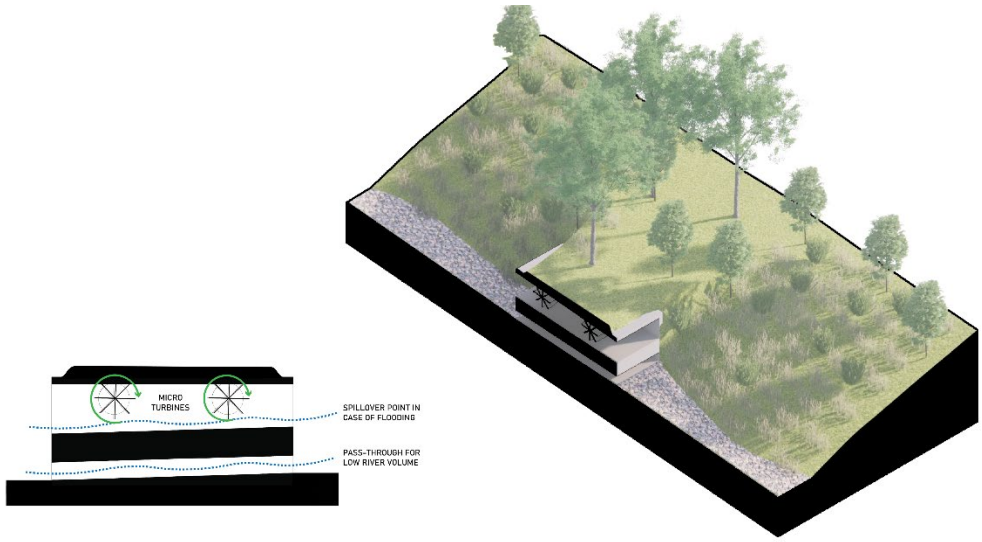


Figure 39: Section through connection point of two pools showing the lower pipe and spillover point (Graphic created by Author).

The final level of design for this site happens at the building scale. The new site plan features several new retail spaces, event spaces, and a marketplace, which fills a vital programmatic need of a walkable community (Figure 40). The main area of design focus, however, was in the inclusion of three new live/work modules to the south, overlooking the wetland park. These buildings feature flexible apartment units to the south, filling a programmatic gap in terms of housing diversity, and open, flexible office spaces to the north (Figure 41). Amongst the three buildings, there are 36 units, with 12 of them being ground floor 2-bed units, and 24 lofted units above. The office spaces overlook the wetlands, and each building has a ground floor space which opens up to a plaza to bring about engagement with the community (Figure 42). The building designs are all styled after mill and industrial typologies seen in

Ellicott City. The sloped roofs allow for water collection both for urban farming irrigation and as a celebratory moment in a fountain centralized at each plaza. The three buildings are all connected via a below grade parking deck which provides access to residents while allowing the hillside topography to continue between each building and allow drainage into the wetland.

Figure 40: Program of new buildings on the site (Graphic created by Author).

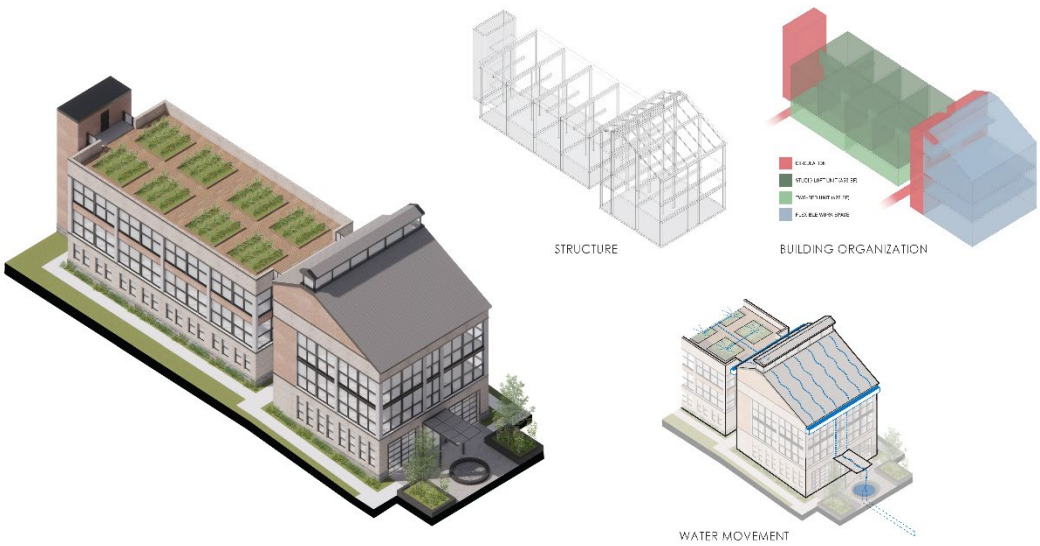


Figure 41: Axonometric diagrams of the new live/work buildings (Graphic created by Author).

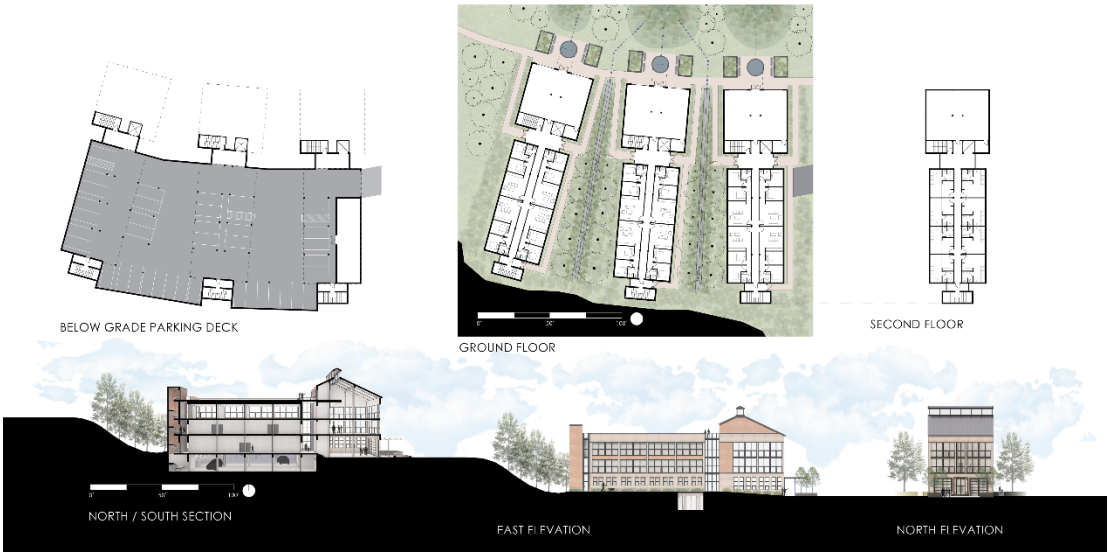


Figure 42: Plans, sections, and elevations showing the design of the new live/work buildings (Graphic created by Author).

One additional aspect of this design happens back at the macro level of Ellicott City. With such a prominent parking lot being replaced by a wetland, that existing parking occupancy must be met if Ellicott City is to still be a tourist

attraction. Due to its proximity to Lot D, Lot F is the best opportunity for replacement parking (Figure 43). Lot D's existing occupancy of 240 spaces, while Lot F contains 58 spaces. At Lot F's current size, a four-story parking garage at this site could cover the total occupancy of both existing lots. In order to further eliminate runoff, this parking garage could also be fitted with a green roof that could absorb some of the runoff, which at the current site would run directly into the Hudson tributary just south of Lot F. This new parking garage would be only a 3–5-minute walk from Lot D, which makes it a suitable replacement while adhering to the overarching principals of this thesis.

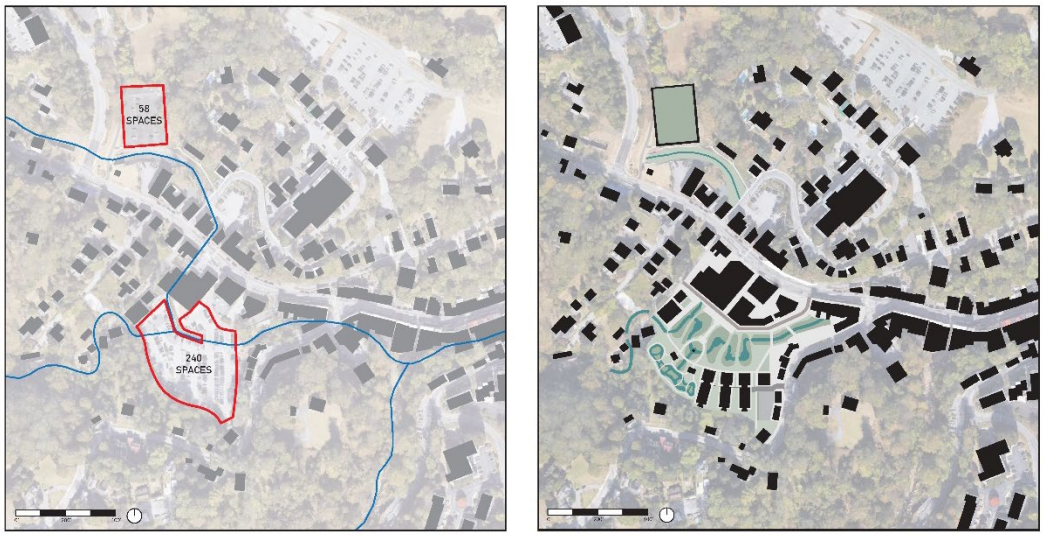
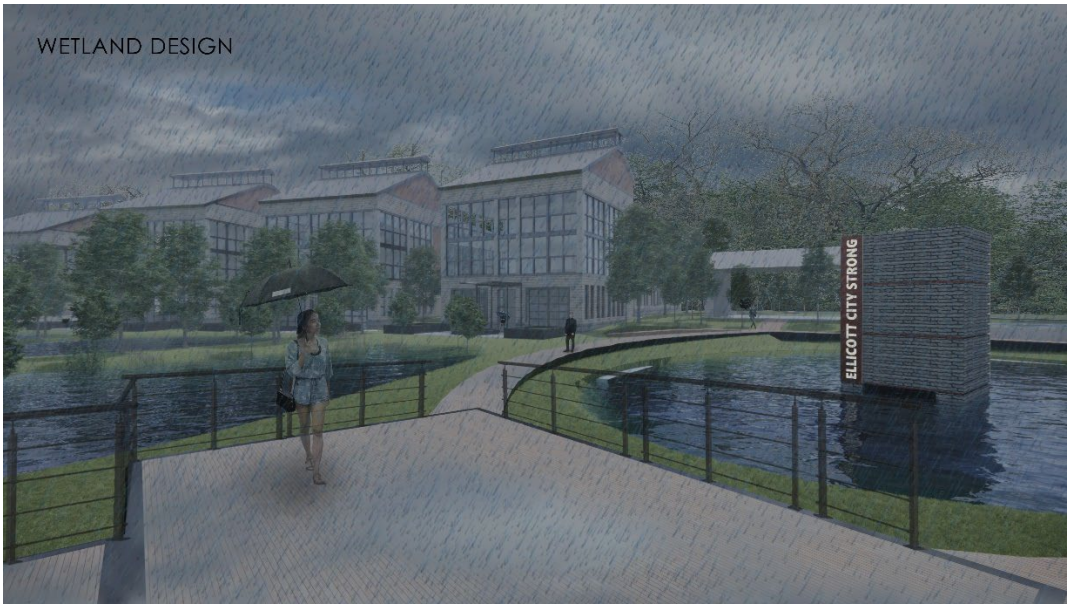


Figure 43: Site plans showing the relationship between Lot D and Lot F (Graphic created by Author).

Conclusion

Overall, the final thesis design captures many of the main points of focus set fourth in this thesis document. All of the existing usable spaces and buildings have

been preserved, while the context surrounding these spaces gets built upon and improved in terms of resiliency and sustainability. The new buildings in this scheme fill some of the programmatic gaps that had been identified through a thorough analysis of Main Street. The new marketplace and retail building improve on the idea of economic resiliency, and the flexible office and workspaces add to the artisan small business culture that makes Ellicott City so alluring for tourists. Additional housing typologies provide opportunities to bring more people into this area, and the building design itself mirrors the industrial building style of the area. Most importantly, the large impermeable parking lot that acts as a funnel into the rivers is replaced with a sponge-like system of wetland basins, which soak up flood waters to provide some relief to the lower Main Street area that has been ravaged by flooding. The creation of this new wetland park could finally give Ellicott City a greater sense of resiliency, turning the town's perception of water from a negative and fearful experience to a positive amenity space focused on safety, growth, and development.


WETLAND DESIGN
ELLICOTT CITY STRONG

Figures 44-47: Perspectives showing views of the wetland from various locations on the site (Graphic created by Author).

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