

RALEIGH URBAN DESIGN CENTER

REPORT 01:

MIDTOWN WATERFRONT DISTRICT



SUMMER 2020

PROJECT BRIEF

This report is a complementary document for the Midtown-St. Albans Area Study which encompasses a larger area. The purpose of this urban design study is to envision the area as it redevelops in the future with a focus on green infrastructure and placemaking.

RALEIGH URBAN DESIGN CENTER

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URBAN DESIGN REPORT

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EXECUTIVE SUMMARY
Ecologically-Oriented Development

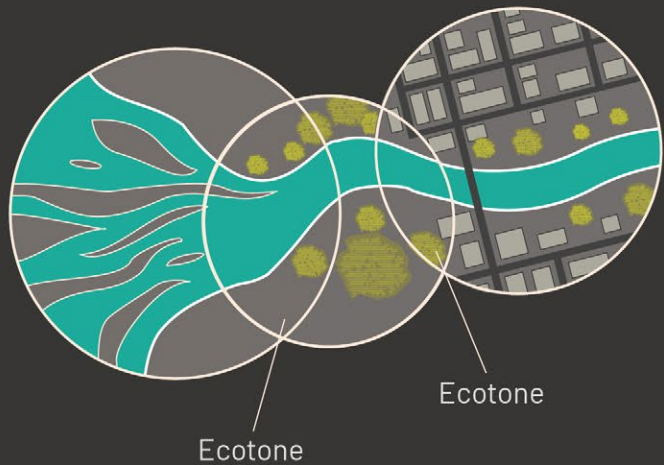
Ecologically-Oriented Development conceptualizes the built environment through the lens of the natural environment. Rather than imposing built form and infrastructure onto landscapes, severely altering them in the process, ecologically-oriented development considers ways in which the natural and designed can coexist and address the needs of the city together.

The area referred to as the Midtown Waterfront District is a prime area to apply this development strategy. The development in the area is high, however, the risks posed by strained ecological systems have already threatened the success of the area. There is an opportunity for the district to redevelop in a way that enhances the site's ecological features and .

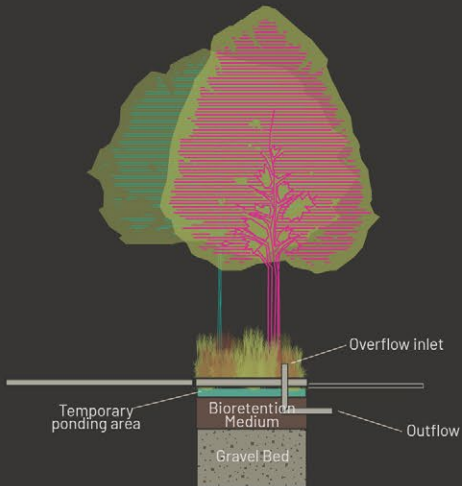
Flooding is a prime example of a risk intensified through development in this area. The large amount of impervious surface combined with the strain on Crabtree Creek due to its sizable drainage area have caused the creek’s health to deteriorate. This greatly increases flood risk that, given repercussions of the climate crisis, will only get more intense over time.

This report highlights a vision for this area that prioritizes the creek as both an ecological system in need of repair and a future amenity for the community that would be unique for Raleigh. The Midtown Waterfront District exemplifies an urbanism where the natural and built have a mutualistic relationship.

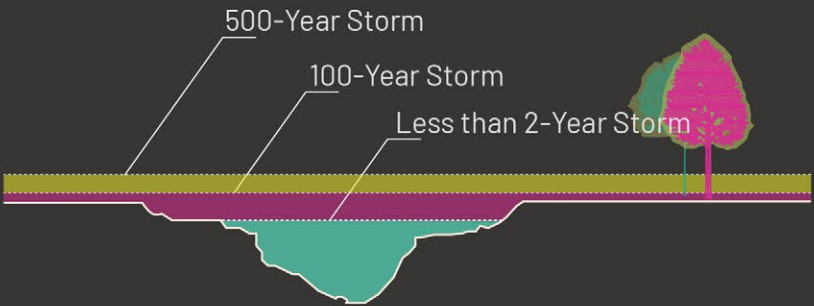
01. VISUAL DICTIONARY



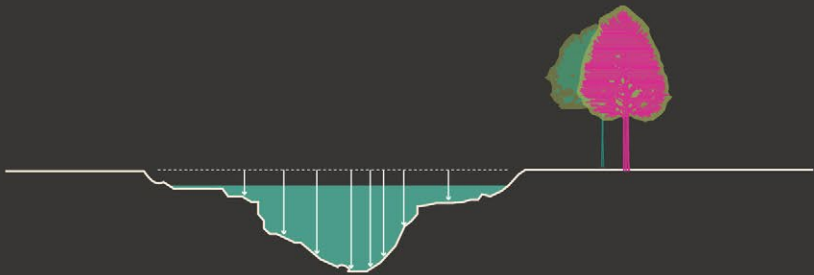
ECOTONE
A transition zone between two or more distinct ecosystems



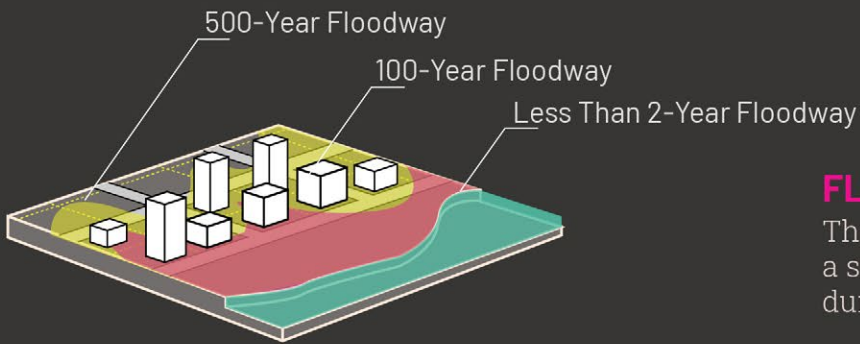
BIORETENTION CELL
A type of green infrastructure that uses landscape elements to allow stormwater runoff to infiltrate soil



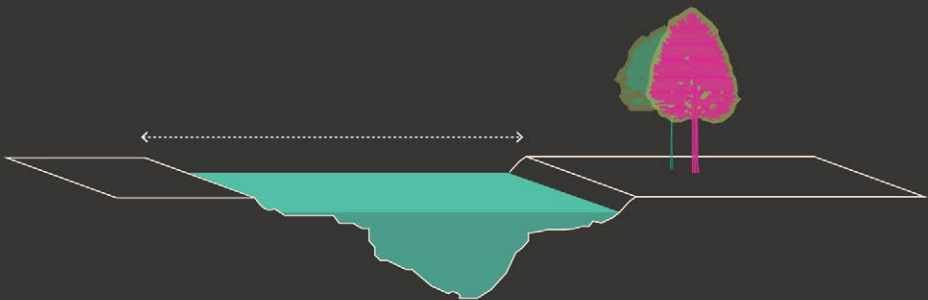
XXX- Year Storm
A 100-year storm refers to a storm event that has a 1-in-100 chance of occurring during any given year.



BANKFULL DEPTH
The vertical distance between the channel bed and the water surface of a completely full channel



FLOODPLAIN
The low-lying area adjacent to a stream bed prone to flooding during storm events



BANKFULL WIDTH
The width of a stream channel at the point where water would escape into the floodplain if water level increased

02. EXISTING CONDITIONS

Existing Development

Most of the site is currently used for retail and industrial activities. The site area north of Six Forks Road is predominately industrial with some office uses, retail, and a small portion designated infrastructure & transportation. South of Six Forks Road, retail is the primary land use designation, with some small areas designated office, industrial, or vacant. A small square along Atlantic Avenue is designated parks & greenway.

Midtown is currently characterized by large box store developments and shopping centers. Costco anchors the southern portion of the site, and grocery stores like Trader Joes and the newly-opened Wegmans occupy the northern half. The shopping center to the north of the site has a mix

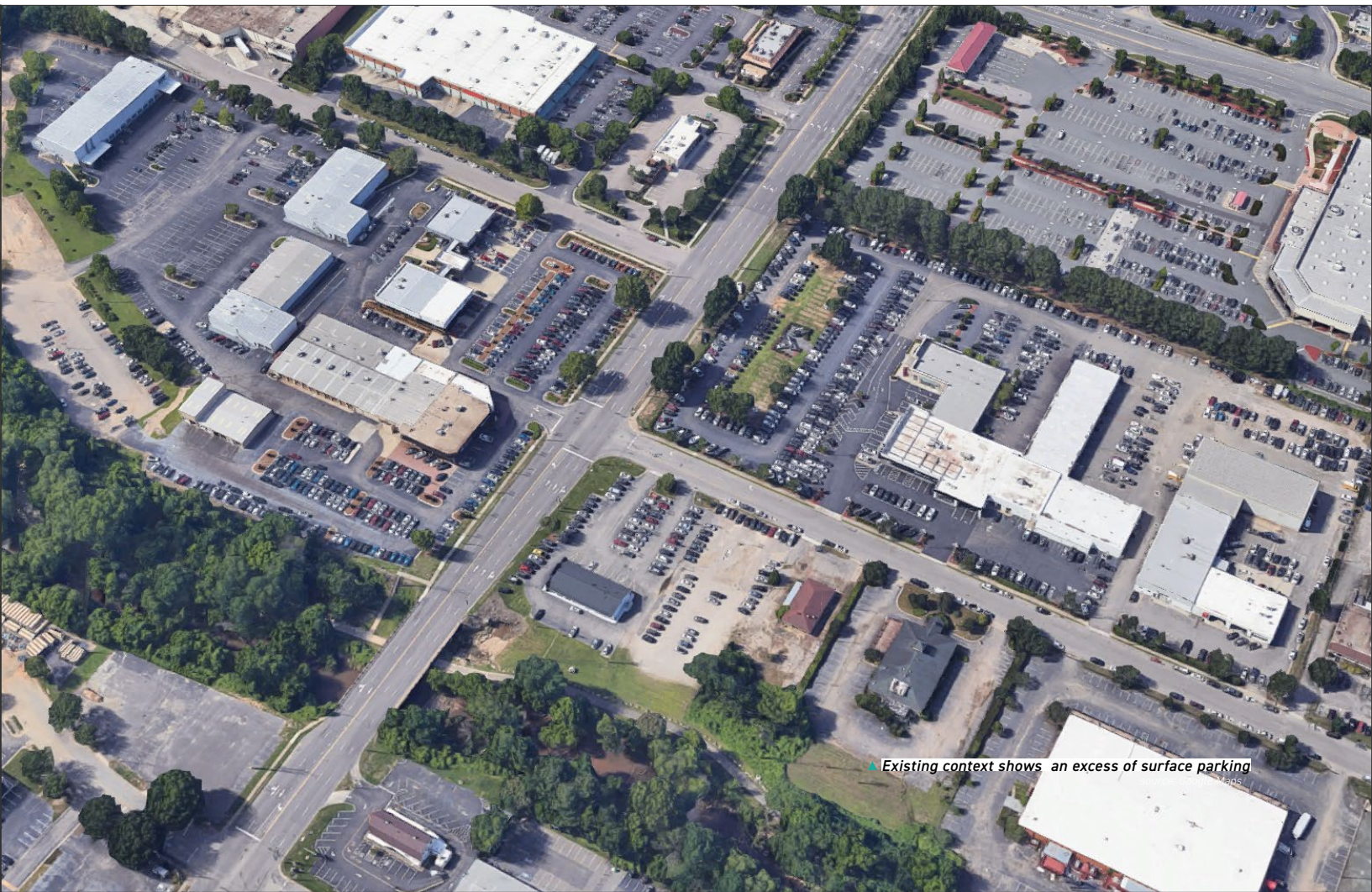
of large retail box stores such as Staples and fast casual dining options. South of Six Forks Road, there are a mix of car dealerships and auto supply shops among other retail, dining options, and fast food.

In the wake of the new Wegmans grocery store in Midtown, land purchases and new development plans have begun to take shape recently for much of the area. The shopping center currently occupied by Lifetime Fitness, retail, and restaurant spaces was purchased earlier this year with plans for redevelopment to remodel the center and bring new retail options and restaurants. A Hampton Inn is currently under construction behind the new Wegmans. The Wegmans is the anchor of the new

development, Midtown East, serving as the center of anew shopping center and parking deck being developed. This new shopping center will be home to Club Pilates, Drybar, Rowhouse, Cava, Maple Street Cafe, and Nekter Juice Bar, as well as other retail, businesses, and restaurants. The current site of Sears has been sold to a developer with plans to create a 7-story apartment complex. I-440 is slated for improvements in late 2020 at the interchange with Wake Forest Road. NCDOT has plans to include a diverging diamond to reduce traffic congestion, add sidewalks, and create safer crossings for pedestrians.



▲ Renderings for Midtown East Development.



▲ Existing context shows an excess of surface parking

02. EXISTING CONDITIONS

Existing Infrastructure

The site is connected to I-440 on the northern side and bounded by roadways on all sides.

Train tracks border the eastern side, and the main thoroughfares of Six Forks Road and Wake Forest Road cut through the interior of the site. Much of the site is impervious, covered by roads, big box format buildings, and surface parking lots. City stormwater infrastructure serves most of the site, connecting to the major areas of the site with the bulk of the infrastructure clustered around Wake

Forest Road (see map image). Additionally, sewer lines cover the site, connecting existing buildings to the network (see map image).

Currently, the site is largely defined by three street types; interstate highway, arterial roads, and connector streets. I-440 borders the northern perimeter of the site, separated by grade, landscaping, and barriers from the site except for the on-ramps at the intersection with Wake Forest Road. Wake Forest Road is a large arterial road

whose six lanes run north-south, punctuated by traffic lights and crosswalks. Where Wake Forest Road meets I-440, the road jumps up to eight lanes to accommodate heavy traffic. Six Forks Road crosses the site east-west with four lanes plus a central turn lane. Both large roadways have sidewalks on both sides and cross signals for pedestrians. Neither Wake Forest nor Six Forks Roads have bike lanes. Smaller connector streets like Industrial Drive serve the interior of the site

A portion of the Crabtree Creek Trail crosses through the site, connecting the site to the east and west sides of Raleigh through a corridor of active transportation. The greenway is paved, but vulnerable to flooding as it runs alongside Crabtree Creek. There are portions that are also boardwalk but are subject to constant repairs, though rerouting is planned to solve this.



120
SQUARE MILE
DRAINAGE AREA

64%
IMPERVIOUS SURFACE
COVERAGE IN
DRAINAGE AREA

MIDTOWN WATERFONT DISTRICT

CAPITAL BLVD.




US 70

I-540

I-440

US 64

MIDTOWN DRAINAGE AREA

-  DRAINAGE BASIN
-  MAJOR HYDROLOGIC FEATURES
-  MAJOR ROADS
-  COUNTY BORDERS

02. EXISTING CONDITIONS

Flood Vulnerability

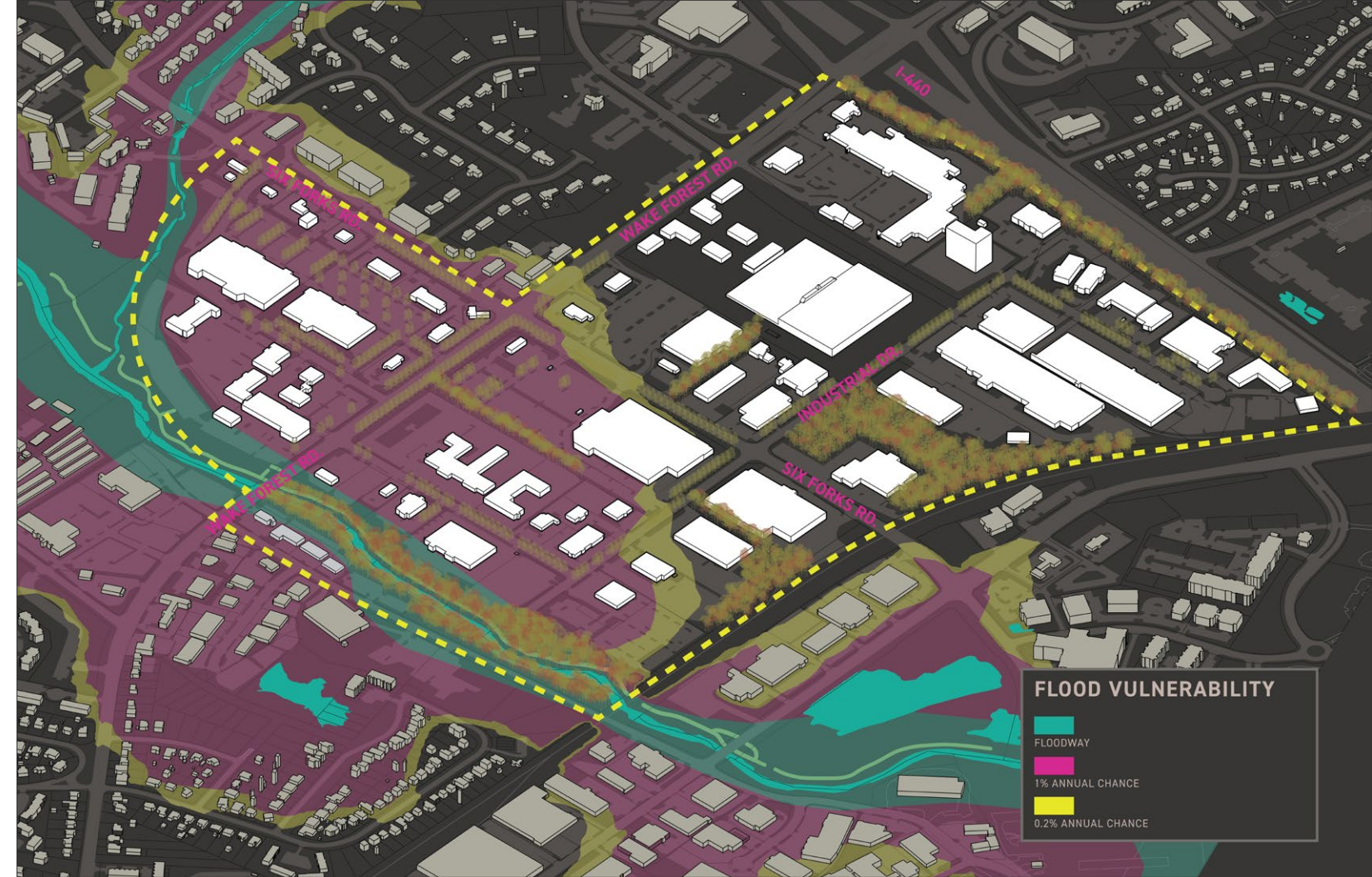
The largest issue facing this area is its vulnerability to chronic flooding. There are many factors that contribute to this vulnerability. Aside from the area being relatively flat, the primary factors at play are the large drainage basin of this portion of Crabtree Creek, the other being the health of the creek in this area.

The drainage basin for this portion of Crabtree Creek is quite large, encompassing 120 square miles of surface terrain upstream. For a natural stream with an undisturbed basin, this surface area wouldn't pose an issue. The problem in this instance is the massive quantities of impervious surface within the drainage basin. Impervious surface fails to both slow down water or allow infiltration. This poses a much larger threat to a stream. When large quantities of water meet streams at a high velocity, the banks begin to erode. This causes the stream to cut into the channel further eventually disconnecting from its natural floodplain entirely. This in turn leads to degradation of the floodplain which further reduces the health of the stream and ecologies dependent on the floodplain. Once this happens, if a stream becomes inundated with enough water it will spill over and flood the area with no protection.

The portion of Crabtree Creek in this area, and likely in other areas as well, is incised. Using regional regression curves and field measurements, it appears to have incised itself nearly 10 feet and has disconnected from its floodplain entirely. The loss of a floodplain is what has caused this area to become so vulnerable to flooding. Looking at existing conditions, the floodway for Crabtree Creek encompasses several buildings and parking

lots. This is not ideal, and the repercussions of an underutilized and underperforming floodway can be seen in the large extent of the 100 year floodplain.

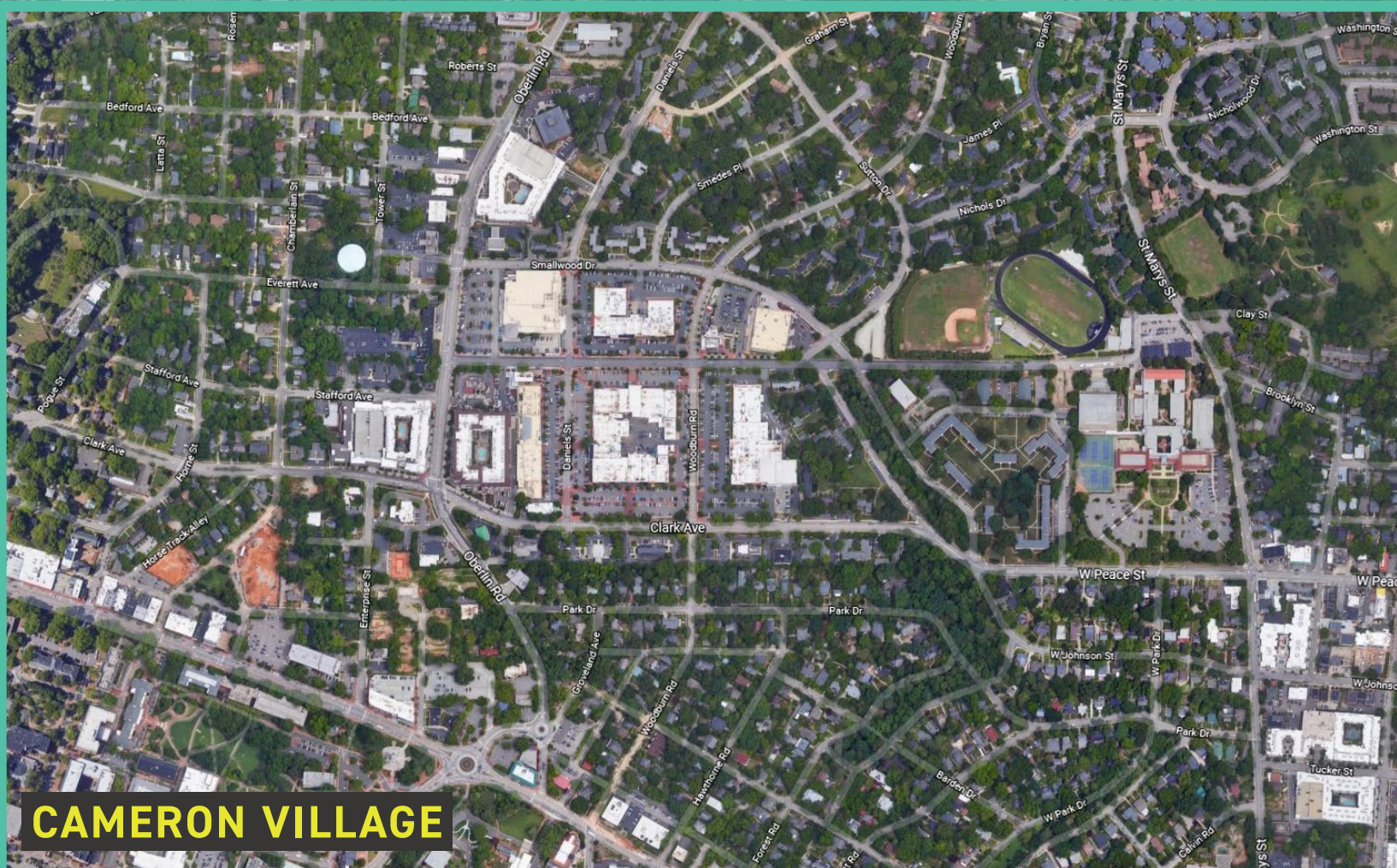
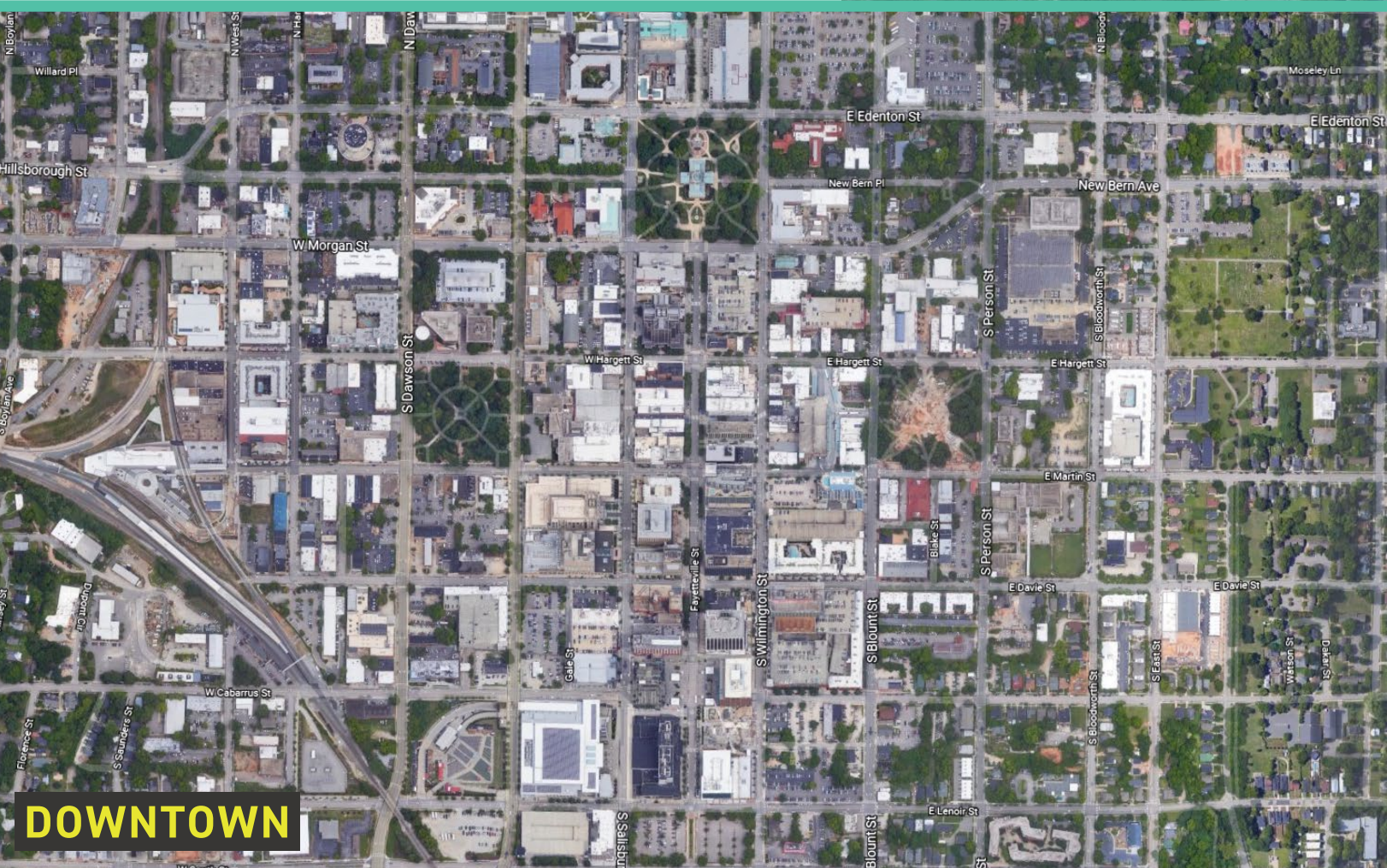
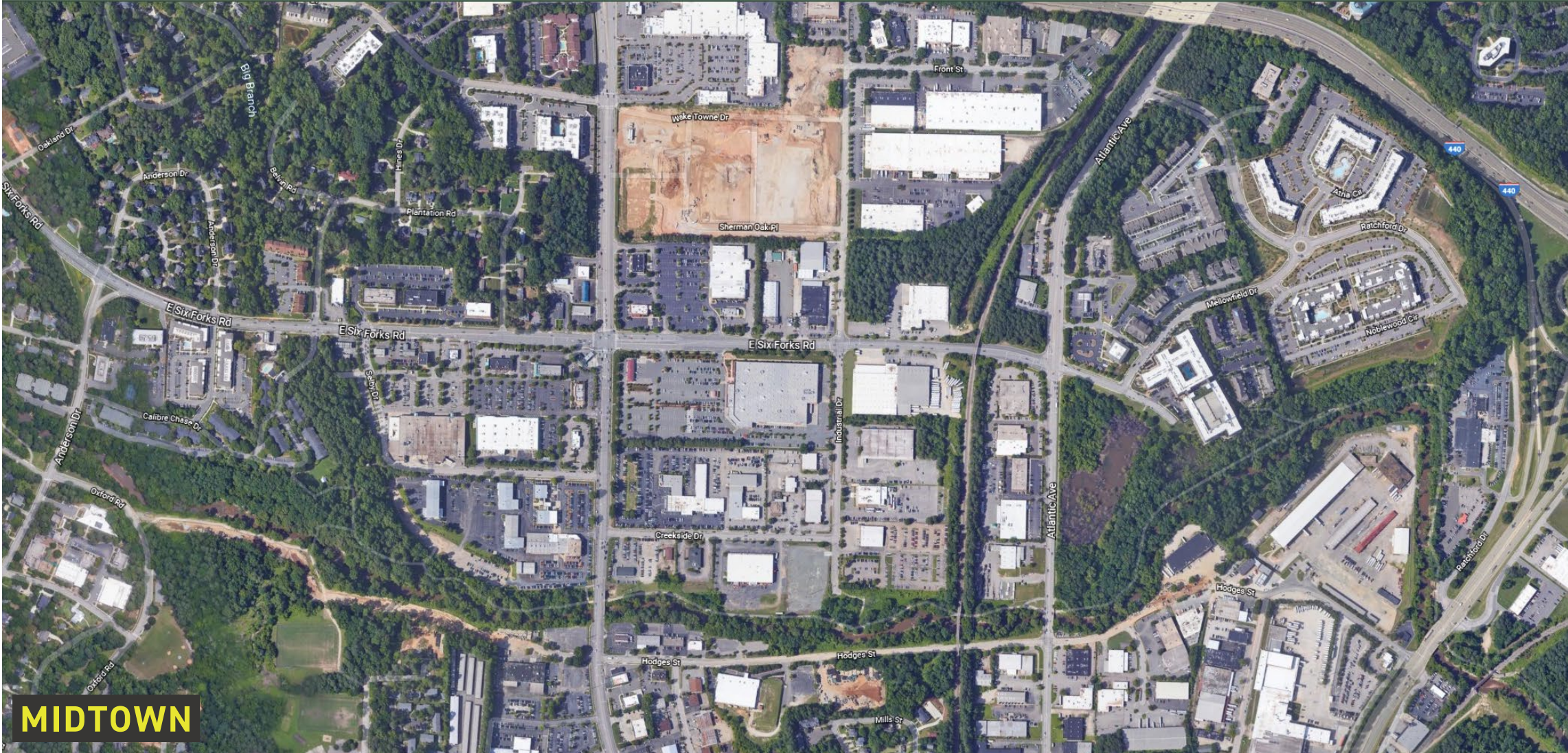
This vulnerability has implications for the area outside of environmental concerns. The impacts of the climate crisis can be seen in storms that are producing more rainfall over shorter periods of time turning the 100-year floodplain into a quasi-floodway that floods more often than its name would suggest. This has led to rising flood repair and flood insurance costs in the area, creating economic barriers to utilizing this area to its fullest. The losses to buildings in the study area in the event of a 100-year storm would total over 5.5 million dollars according to the North Carolina Flood Risk Information System (FRIS). Further, insuring these buildings would result in yearly premium costs to the owner ranging from the mid \$5,000s to the low \$40,000s.



02. EXISTING CONDITIONS

Streets + Scale

Viewed at the same scale you can compare Midtown to other well-known areas of Raleigh - Downtown and Cameron Village. Midtown today has a street network that supports its more industrial use: major streets bisect the area and connect to the highway while minor roads provide internal circulation routes to navigate the areas. Larger block sizes accommodate the space requirements of this type of use. In Downtown and Cameron Village, more urban mixed-use areas of the city, tighter street grids accommodate more density, improve walkability, and better distribute vehicular trips through the areas.

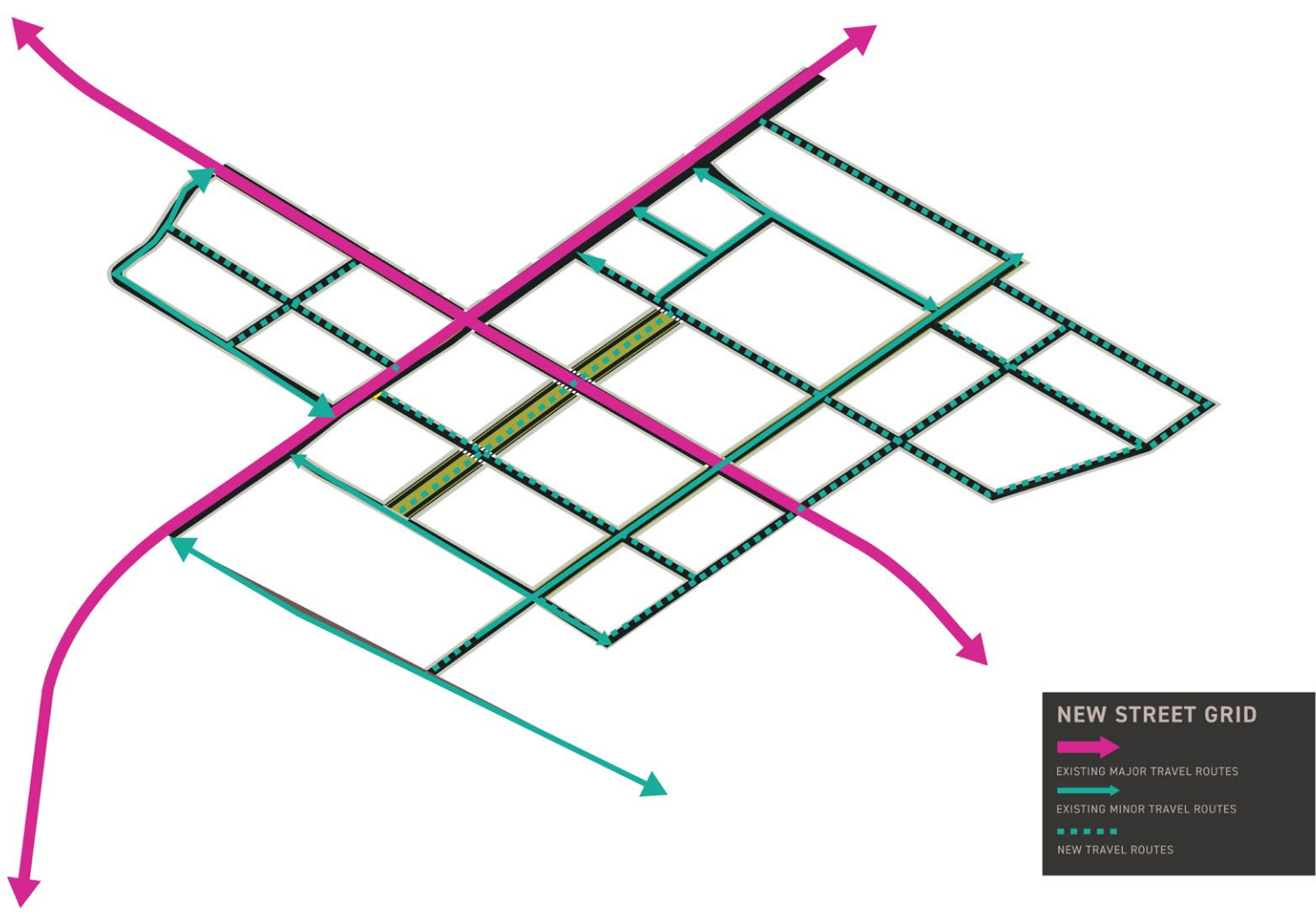


03. CIRCULATION

Establishing A Street Grid

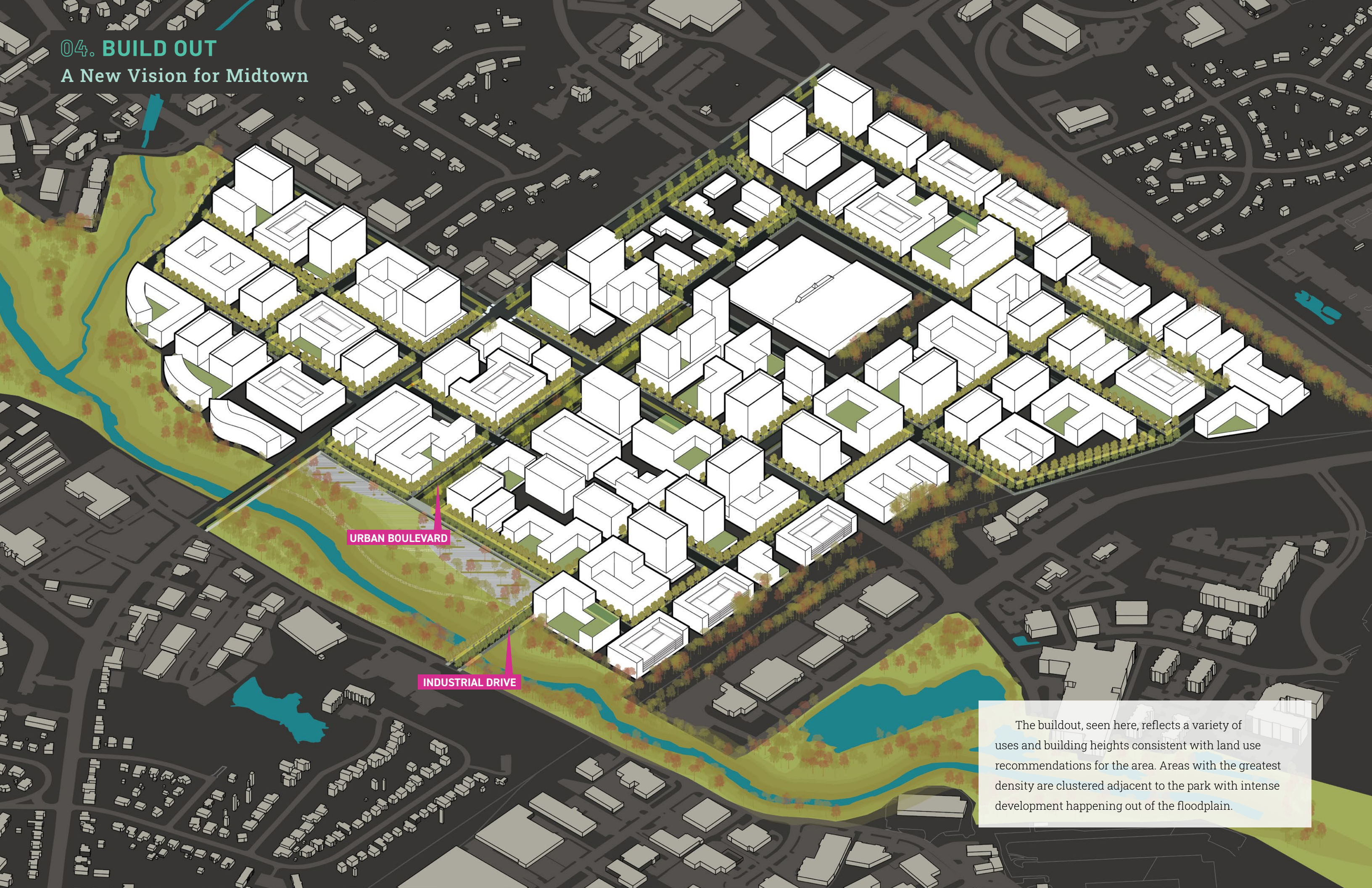
A successful street network is key to the organization of this area: it establishes a framework for future development, and provides a consistent, legible, and hierarchical street grid of an urban environment. The street grid replicates the urban blocks found in Downtown Raleigh which produces blocks that are roughly 450' x 450'. The two primary streets that run through the study area are Wake Forest Rd. and Six Forks Rd. These two create strong north/south and east/west connections that create the basis for the grid. The proposed street network seen below formalizes traffic patterns seen in the area where drivers use large spans of parking lots to navigate the area as opposed to the smaller and more disparate streets. The primary proposed

street type for the new streets is the Main Street, Parallel Parking type found in the UDO 8.4.5-D. There are two notable exceptions. The first is the redesign of Industrial Drive, found on the eastern portion of the study area. This street would be a new typology, a Green Infrastructure/Low Impact Development (GI/LID) street. This street type uses the Main Street, Parallel Parking as a template but includes bike lanes as well as additional areas within the right-of-way to treat stormwater runoff. The other, referred to as an Urban Boulevard, features a much wider than typical right-of-way with an activated median space.



04. BUILD OUT

A New Vision for Midtown

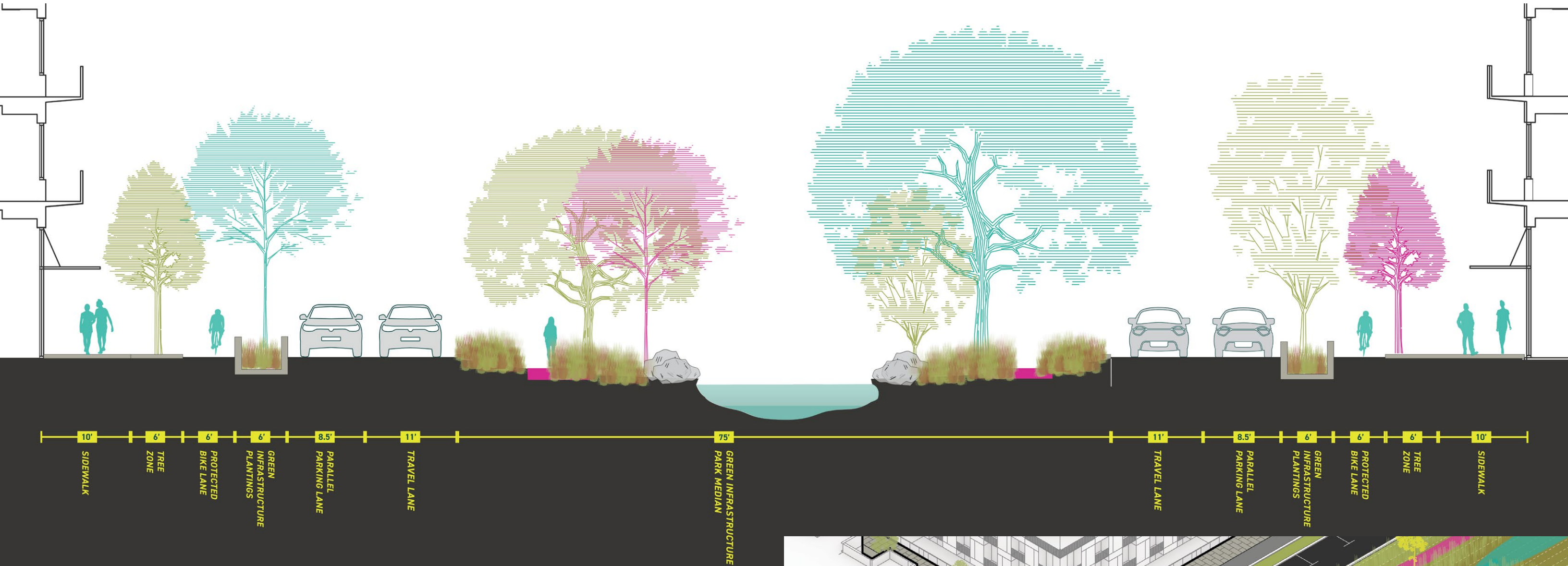


URBAN BOULEVARD

INDUSTRIAL DRIVE

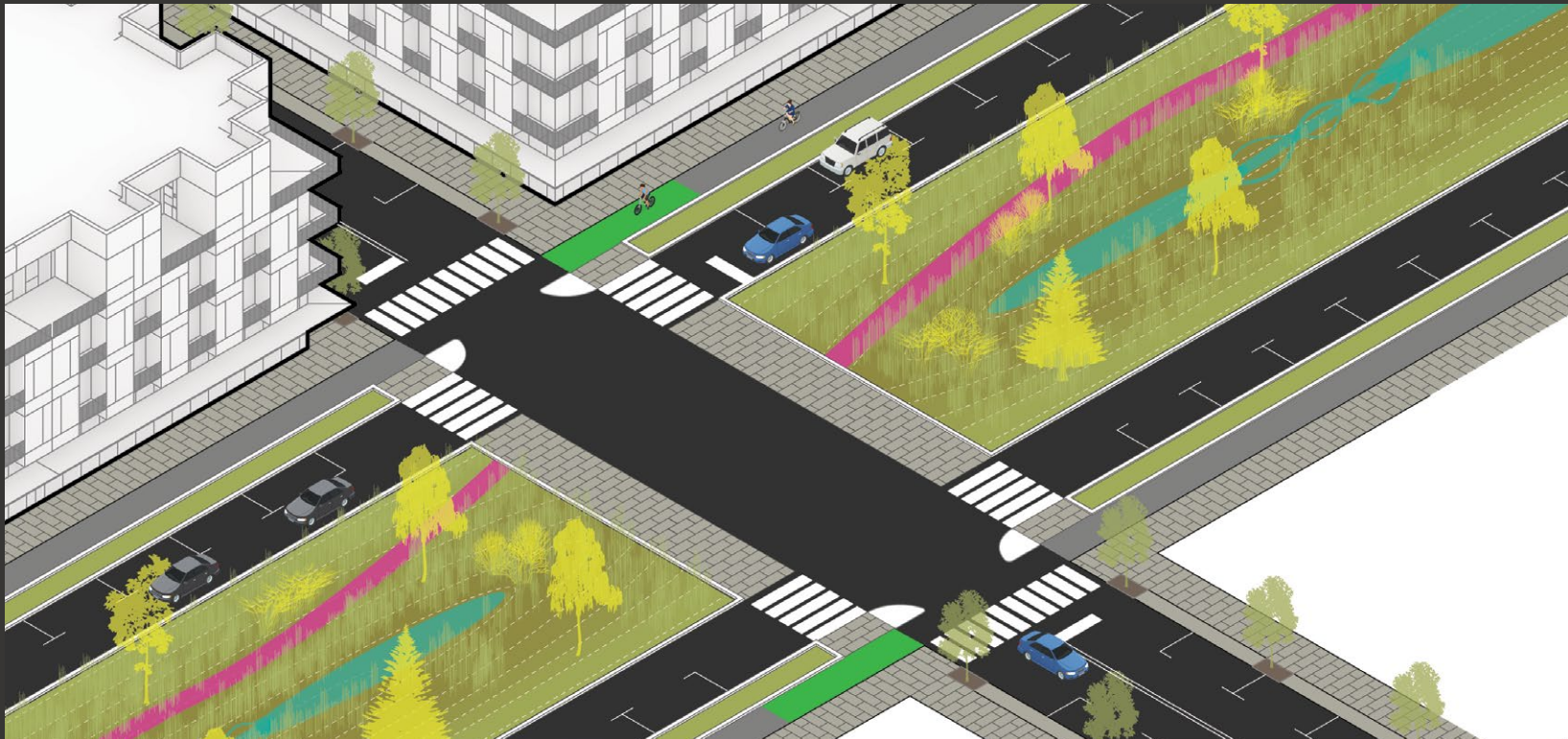
The buildout, seen here, reflects a variety of uses and building heights consistent with land use recommendations for the area. Areas with the greatest density are clustered adjacent to the park with intense development happening out of the floodplain.

05. GREEN INFRASTRUCTURE
Urban Boulevard

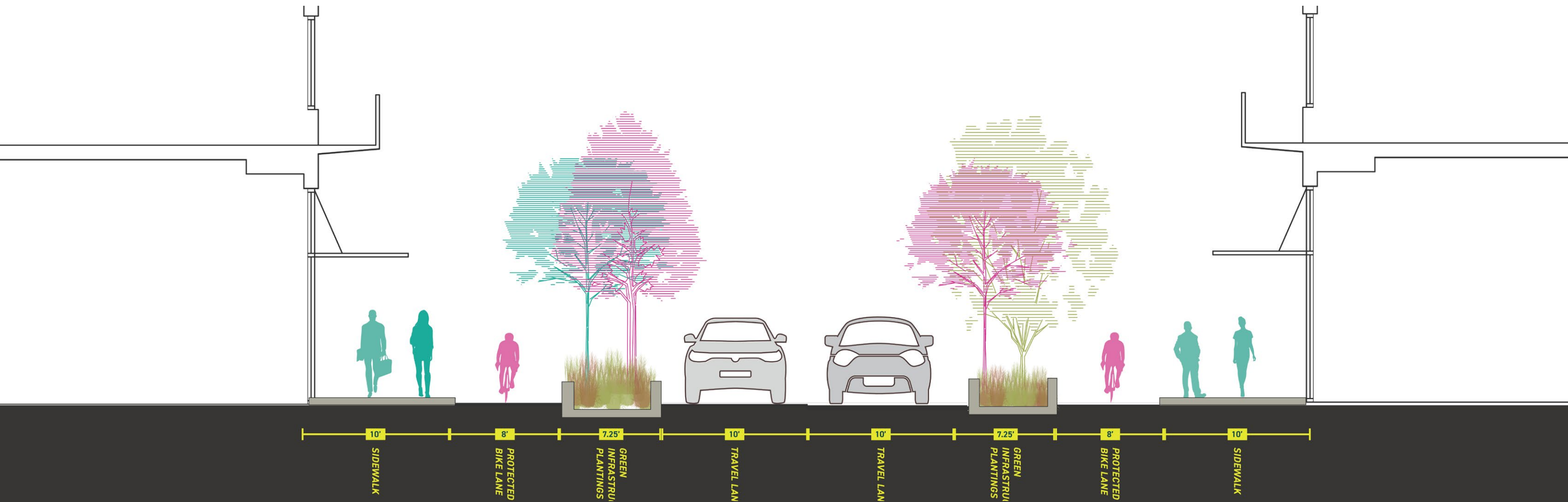


The Urban Boulevard is an old concept, found in historic places like Boston's Commonwealth Avenue, and in new locations, like New York's Hudson Boulevard. Similar examples can be found in Raleigh, but typically in residential neighborhoods, such as Roanoke Park and Fallon Park in the Five Points neighborhood, and Forest Park in the Cameron Park neighborhood. The approach taken in this proposal is to create an urban boulevard strategy that incorporates GI/

LID. A section for the Urban Boulevard can be seen above. The primary driver of the design is the creation of capacity for Crabtree Creek. In a flood event, water could move into the medians of the Urban Boulevard to treat and infiltrate some of the inundation. To accomplish this goal, the activated median could include interventions such as constructed wetlands or bioretention cells, which are landscaped depressions that allow stormwater runoff to infiltrate soil.

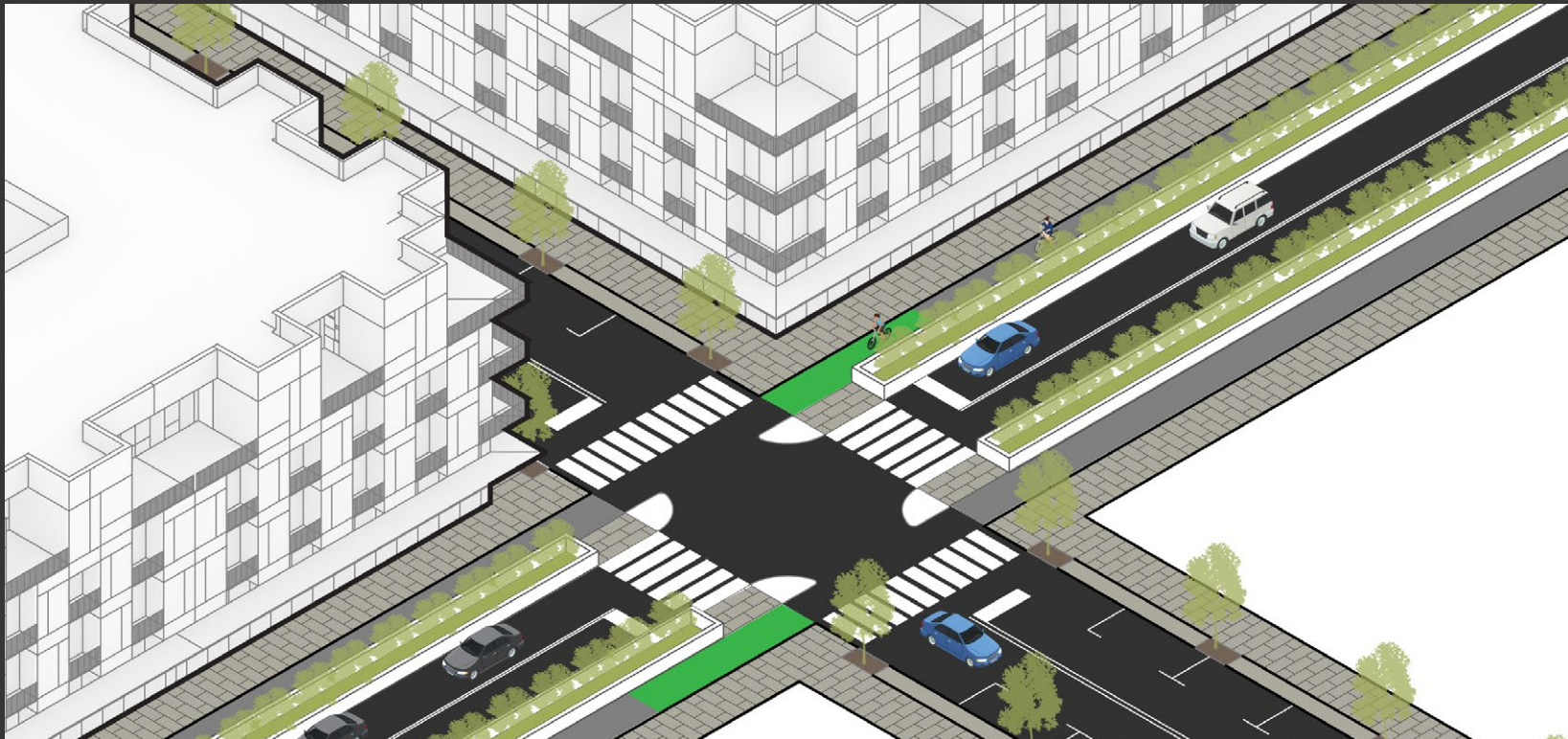


05. GREEN INFRASTRUCTURE
Industrial Drive



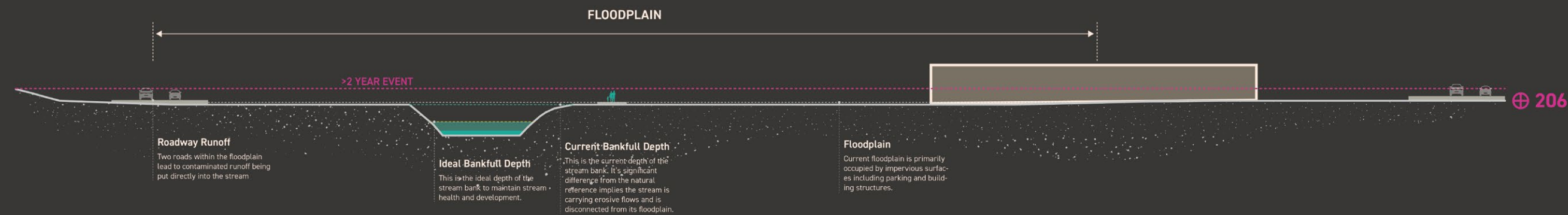
The redesign of Industrial Drive achieves two goals. The first is to manage stormwater more effectively across the area and reduce strain on Crabtree Creek. This is accomplished by the inclusion of large planting zones devoted to green infrastructure. These planting zones are wider than the typical minimum planting zone included with new streets. These zones would replace the

typical street tree zone and would serve as a buffer between vehicular traffic and bicycle/pedestrian traffic. The second design goal was to provide an additional connection from the northern portions of the study area to the Crabtree Creek Park and Greenway. The new Industrial Drive would feature protected bike lanes on each side of the road that would connect to the greenway.



05. GREEN INFRASTRUCTURE

Crabtree Creek Restoration



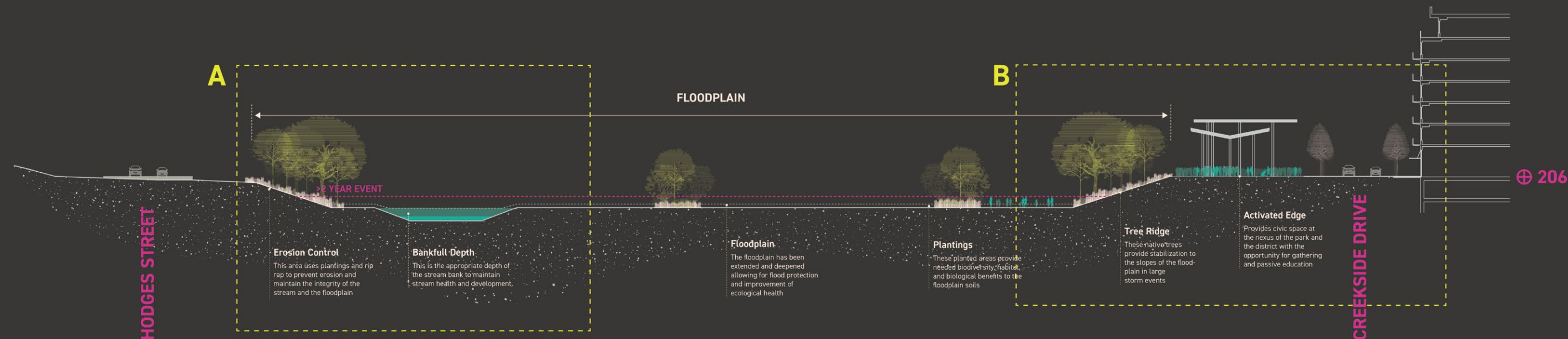
EXISTING CONDITIONS

The first step in restoring Crabtree Creek's health and functionality is undoing the incising activity and connecting it back to a functional floodplain. As seen in the sections below, this can be done without making large landform alterations to the study area. This restoration process involves reducing the bank full depth back to what it would be naturally and using the difference in elevation from this process to create the floodplain. In this

scenario the floodplain varies from 200 feet in total width to 550 feet in width. These restoration metrics are based off of regional regression curves for North Carolina, these curves use healthy natural streams to provide design criteria for restoring streams.

The expansion of the floodplain and a variable width provides a large area for water storage in heavy rain events and an area for filtration in

smaller events that overtop the banks but don't pose the risk of a flood. This also provides restored habitat for both plants and animals native to the area. Long term success of a restoration project like this would require portions of the creek also in poor health to undergo similar redesigns. Otherwise, this portion might eventually regress into incisive habits.



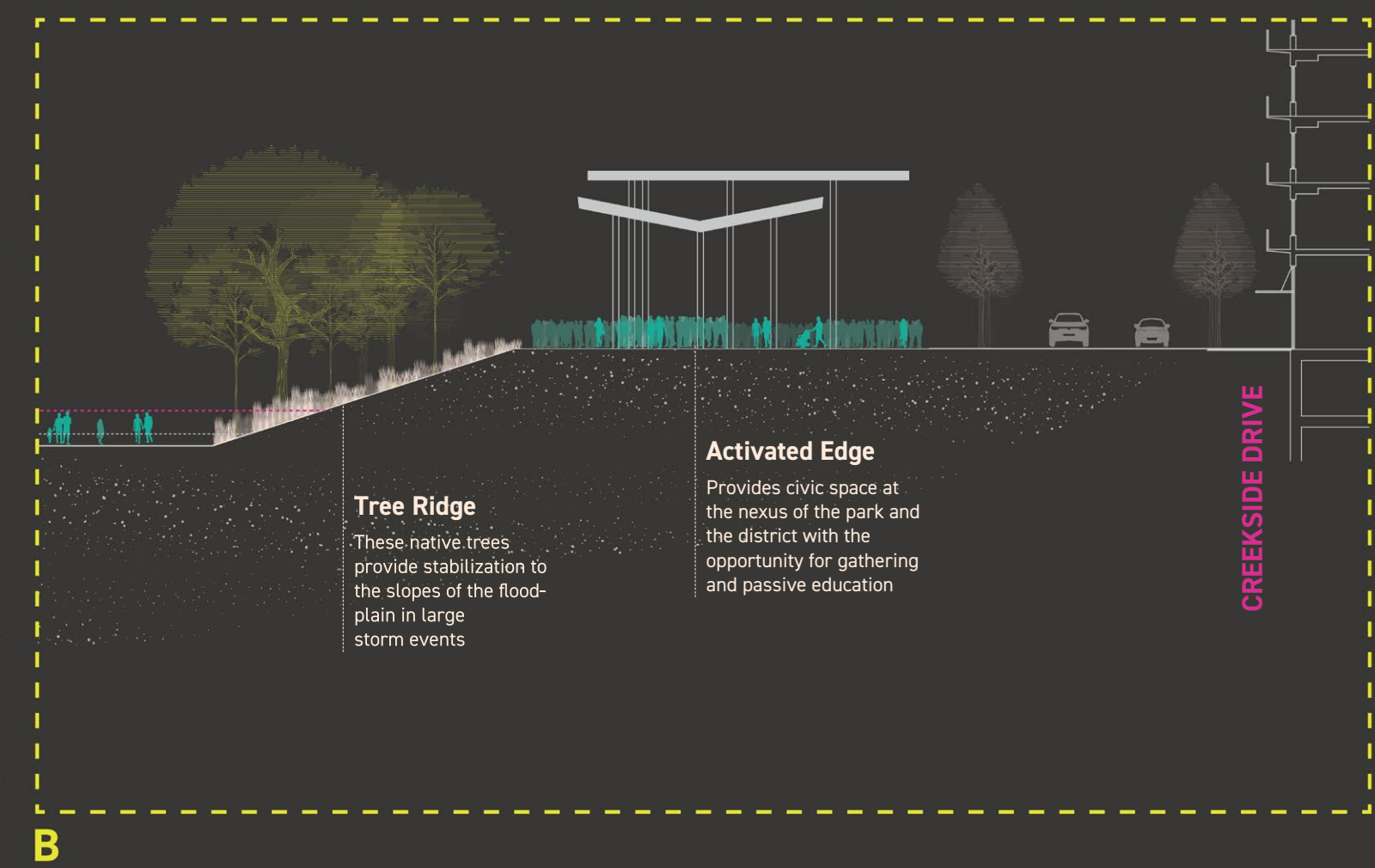
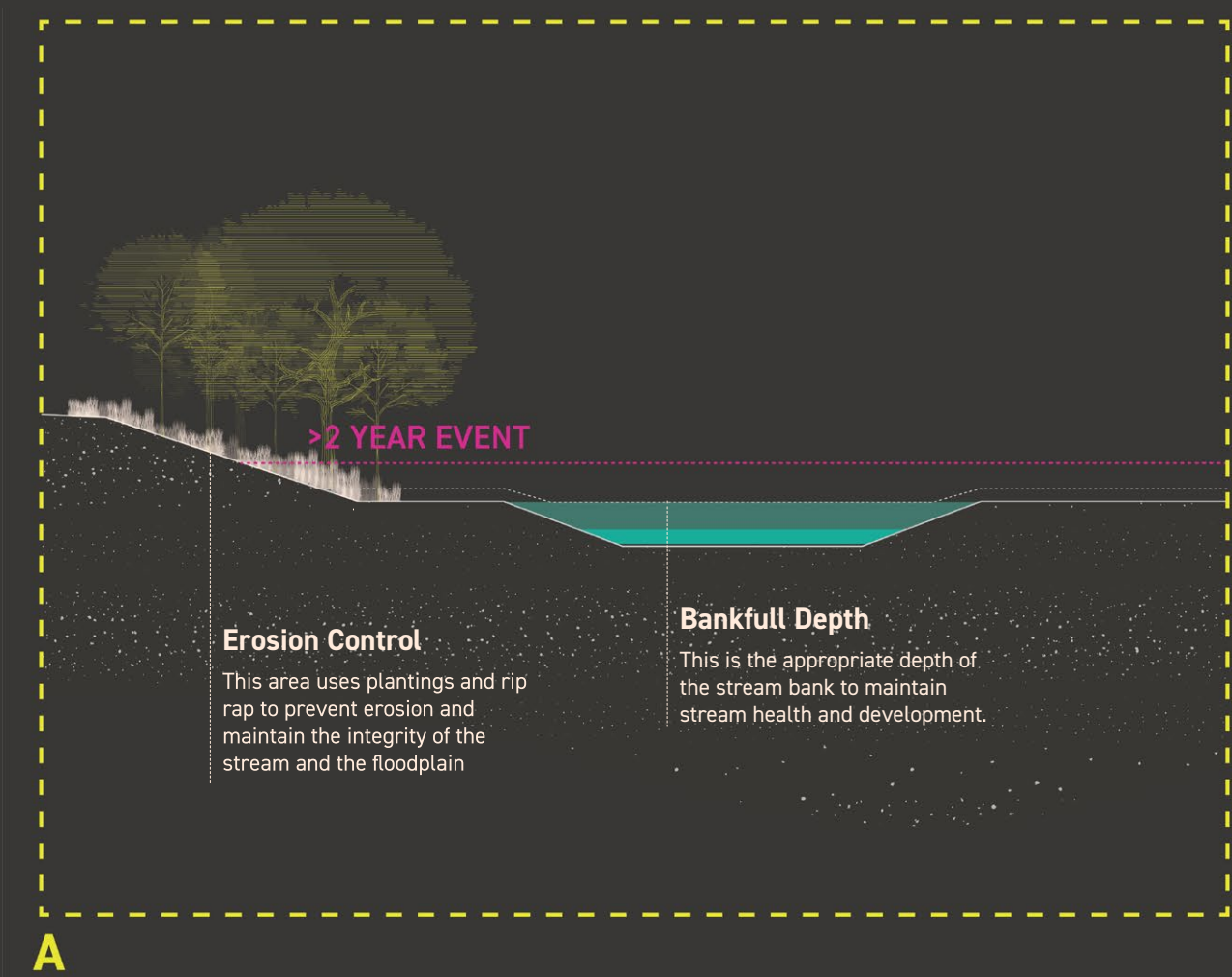
PROPOSED CONDITIONS

06. PLACEMAKING

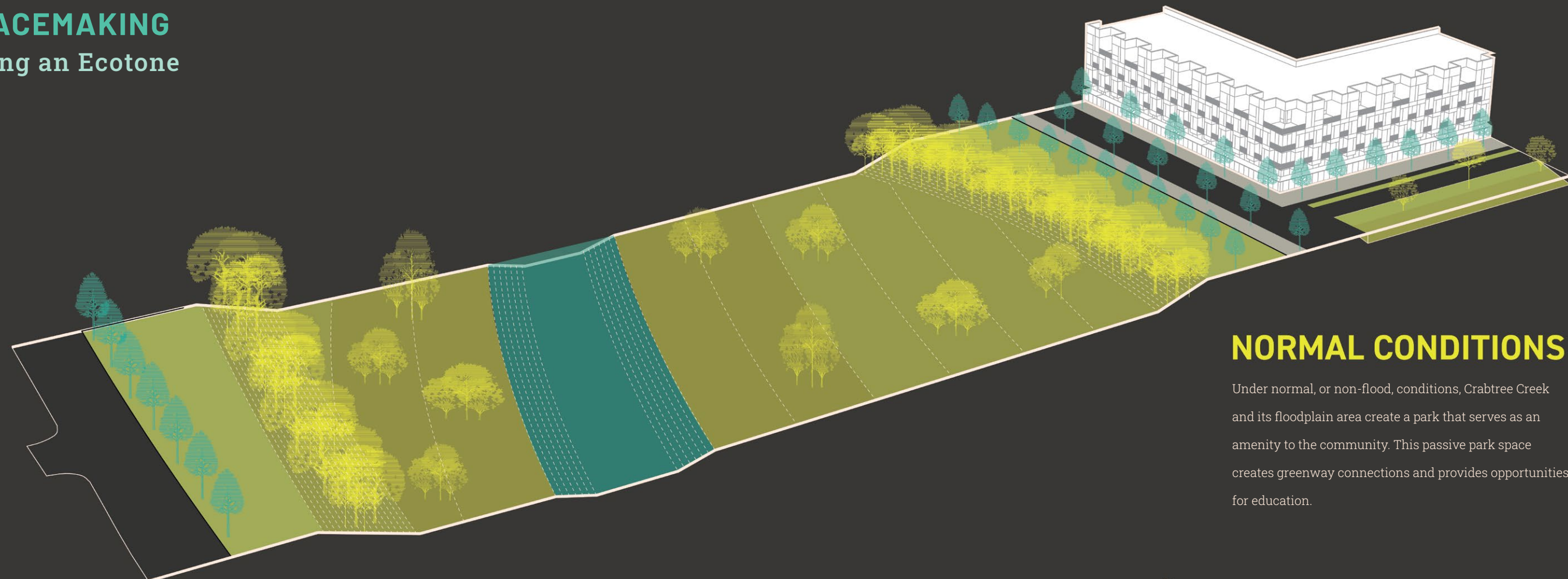
Activating an Ecotone

A new floodplain which would be a large expanse of design open space, offers the opportunity to consider a new typology of parks. A park that can be flooded and require little maintenance or spending to recover after a flood event. This is what is proposed for Crabtree Creek Park. There is already a portion of greenway running through the floodplain so the opportunity for programming within the park becomes more valuable. Low impact designs that are heavily reliant on landscaping and less so on architectural features are desirable in this portion of the park. Architectural features would compact the soil and compromise the integrity of the floodplain. Relying more on landscaping and smaller interventions

like providing furnishings that wouldn't be damaged by inundation would both activate the space and provide additional ecological benefits to the floodplain. Outside of the floodplain, more traditional park features could be incorporated with a focus still on the ability to outlast a flood. Several other parks that were studied as part of the design process for this project featured permeable paving and reliance on canopies rather than full buildings for activities that might require shelter.

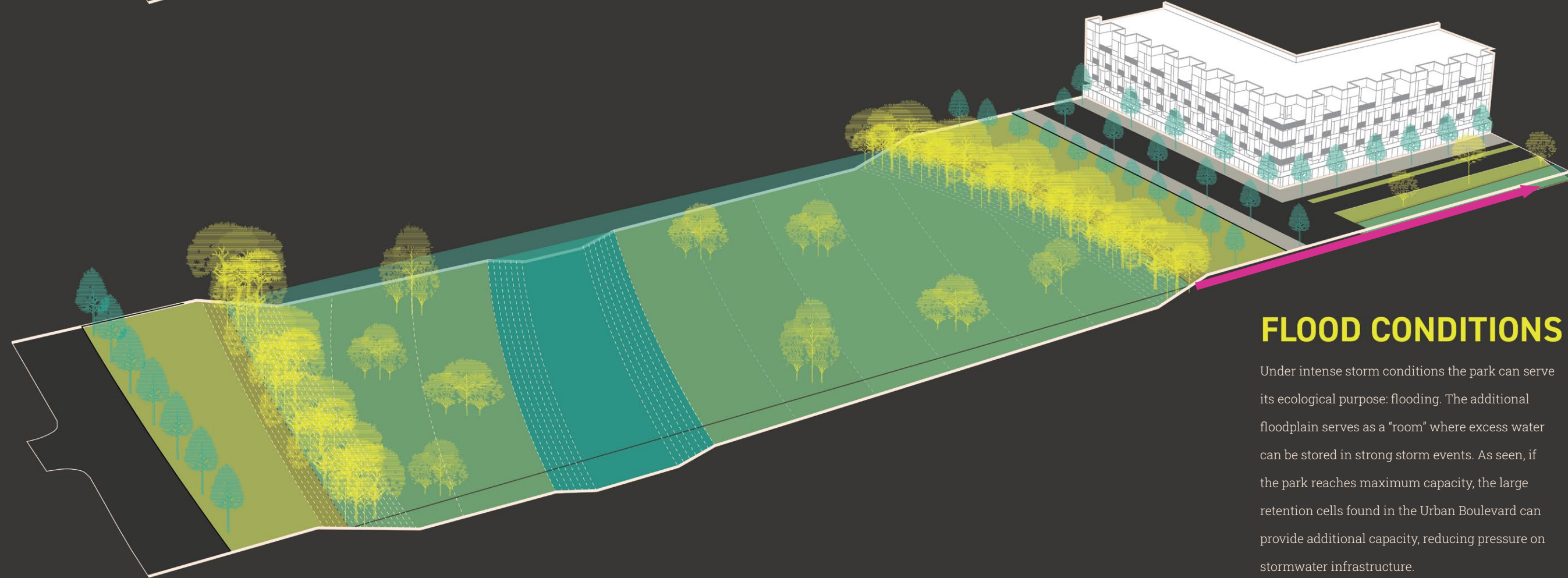


06. PLACEMAKING
Activating an Ecotone



NORMAL CONDITIONS

Under normal, or non-flood, conditions, Crabtree Creek and its floodplain area create a park that serves as an amenity to the community. This passive park space creates greenway connections and provides opportunities for education.



FLOOD CONDITIONS

Under intense storm conditions the park can serve its ecological purpose: flooding. The additional floodplain serves as a "room" where excess water can be stored in strong storm events. As seen, if the park reaches maximum capacity, the large retention cells found in the Urban Boulevard can provide additional capacity, reducing pressure on stormwater infrastructure.

07. PARK CONCEPTS

Passive Use

Definition:

Passive use refers to non-consumptive activities such as wildlife observation, conservation/preservation of resources, education, walking, biking, picnicking and people watching. Providing passive uses ensures the least impact on the floodway ecosystem.

Primary Goals:

Enhance aesthetics, provide and protect a biodiverse floodway and floodplain, filter and store flood waters, and serve as a buffer and connector between sensitive ecosystems and more active uses.

Design Guidelines/Best practices:

Edges and Boundaries

- Provide elevated areas for passive participants to view activity and natural features
- Clearly designate areas where it is safe and unsafe for pedestrians to access the stream and trail
- Create transparent buffers that separate conflicting activities and uses and protect the floodplain
- Any greenway along the floodplain should be designed to integrate seamlessly with adjacent uses and densities

Conservation and Preservation

- Use appropriate and diverse species of native and non-native plants that will enhance the natural habitat
- In order to offset an increase in flood waters that may result from development near

the floodplain, public spaces should be absorbant and able to function as sponges/containers in wet conditions and places for people in dry conditions

- Topography should fluctuate to create diverse micro-climates that capture, filter and buffer both people and environment-focused areas



▲ Buffalo Bayou Trail in Houston, TX. The design blurs and expands adjacent amenities by providing safe areas for observation and interaction with natural resources directly adjacent to development. h-gac.com



▲ Historic Fourth Ward Park in Atlanta, GA. The park's 2-acre lake also acts as a stormwater retention pond. This design feature solved flooding issues that plagued the Old Fourth Ward. beltline.org



▲ Corktown Common in Toronto, ON. "The riverside prairie portion of the park, with its minimal, passive programming, is designed to accept floodwater, whereas the west-facing side is designed to remain dry, with 9 higher acres of space for recreational activities."

07. PARK CONCEPTS

Active Use

Definition:

Active functions include consumptive uses such as sports fields, biking/walking, playgrounds, outdoor theaters, commercial activity and other programmed events.

Primary goals:

Create important infrastructure for greenway redevelopment and investment that supports entertainment, recreation, economic development opportunities, and multimodal connectivity between open space and activity hubs. Designing active spaces helps define edges and nodes and encourages smart growth and development. These areas should act as a transition between more dense urban development and the floodplain.

Design Guidelines/Best Practices:

Street Edges and Transportation

- Ensure there are safe and convenient bicycle and pedestrian access points from development/connecting streets to the greenway trail.
- Create universal streets or green fingers that run perpendicular to and connect to the greenway - these streets should be designed as canal streets or absorbant streets and incorporate green infrastructure that helps mitigate flooding impact.
- Where these green fingers intersect the greenway, special areas should be designated that preserve the view of the greenway/natural resource including: plazas, overlooks and public art.
- Align the greenway trail with the

curvilinear manner of the resource so that views to the stream/floodplain are preserved.

- Vary elevations of paths to separate uses and incorporate views to both active and passive spaces.

Built Environment

- Orient buildings so that facades don't turn their backs to green space/trails - instead, create active spaces and transitions.
- Existing and new buildings should be flood-proof using strategies such as: dry flood proofing, wet flood proofing, temporary floodwalls, and elevated and floating buildings.

Wayfinding and Marketing

- Street and greenway signage should clearly indicate entrances to greenway and connections to points of interest.
- Gather data to understand pros and cons of floodplain interventions before and after strategies are implemented.
- Explore options for incentivizing innovative floodplain mitigation strategies through grants, pilot projects and private-public partnerships.



▲ New Belgium Brewery in Asheville, NC / Located along the French Broad River, the brewery has high visibility from nearby streets. The site focuses on supporting the environment as well as Asheville's bike culture. greenbuilt.org



▲ Tanner Springs Park in Portland, OR. Active/passive spaces are layered on top of rainwater infiltration and detention wetlands.



▲ Manayunk Canal Towpath in Philadelphia, PA / Buildings embrace the greenway and incorporate active and passive spaces.



▲ Climate Tile Project in Copenhagen, DK. An example of how streets or "green fingers" that abut a floodplain area can incorporate permeable surfaces that capture/filter excess water and help naturally recharge aquifers. <http://theconversation.com>

08. FUNDING + IMPLEMENTATION

Land Acquisition + Financing Tools

Introduction:

The ideas and strategies set forward in this report are visionary in nature and as such require non-traditional approaches to implementation and financing. This scale of land assembly and installation of infrastructure and open space is not common in North Carolina or the US. The enabling statutes for municipalities are restrictive in North Carolina, and some of the methods discussed below may require additional enabling authority.

These strategies represent land assembly and financing tools that operate with cooperation and incentive. As such, a high degree of community engagement would be involved in any of these assembly mechanisms, which has the long-term benefit of creating greater acceptance of a development project. The Midtown Waterfront District is one of many visionary plans currently proposed for Raleigh, and can be a template for achieving innovative planning concepts in the future. New and innovative ideas for planning, design, and development are critical to the success of the city. Likewise, new and innovative ideas for implementation and financing of these plans are critical and should be discussed further.

Land Readjustment:

Land Readjustment is a tool for land assembly that can aid in redevelopment for areas with fragmented ownership. LR provides a means to acquire land and reestablish a logical land use pattern while using limited public funds. Unlike compulsory land acquisition methods such as eminent domain, LR requires voluntary participation of landowners, allowing them to

retain ownership if they wish after redevelopment.

LR relies on principles of economies of scale to work profitably for all parties. By pooling land resources, landowners can glean more value out of their land than they could as an individual property. Additionally, pooling land reduces the cost burdens of redevelopment, re-parceling, and adding infrastructure. Pooled land allows for larger-scale uses that can better meet the needs of the urban area. LR is a powerful tool for combating sprawl, overcoming tangled ownership mosaics that make development of a single plot impractical, and for redevelopment after a natural disaster has disrupted the built pattern. From a municipal perspective, LR can be attractive to the local government as well. LR projects are a good way to get value capture for financing critical infrastructure projects that achieve long and short-term goals for the area. For example, a need for new or updated streets that might not have been possible with an existing parcel arrangement or required too high a capital investment on the municipality can be accounted for during the LR process. In these scenarios, cities can incentivize allotment of land to infrastructure by providing height or density bonuses, so developers are getting more value out of a smaller land allotment.

LR can also provide an opportunity for more thoughtful development of open space and opportunity to protect or restore ecologically sensitive areas. LR projects typically have a master planning component, during which landowners and other stakeholders collaborate and develop a comprehensive vision for the area, if one does not already exist through municipal planning efforts.

The ability to reconfigure land and ownership also provides opportunity to move development out of ecologically sensitive areas while also allowing for improvement of these areas.

In addition to the economic, development, and environmental benefits, LR can also be used as a tool to provide affordable housing. In the adjustment process, land can be set aside for the development of affordable housing by the public sector. The reduction in upfront capital requirements associated with land acquisition and reorganization also allows more room in development budgets for construction of affordable housing units by the private sector. When combined with other incentives and bonuses, these positive effects can be amplified.

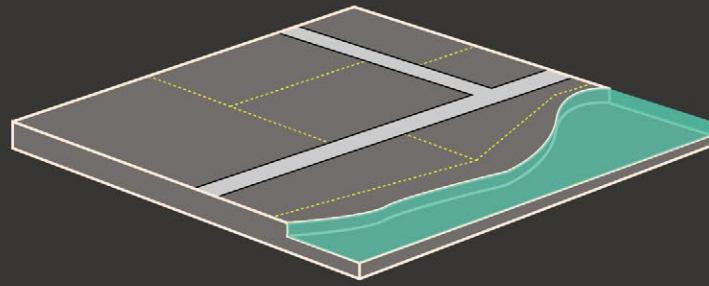
LR provides opportunity for democratic governance within large urban redevelopments as well. These large urban development projects are often associated with displacement and antagonism between private citizens, the development community, and the local government. Because the LR process is conducted as a public-private partnership planning effort, stakeholders therefore have role, not only in collaboration, but also in voting for final approval. Parties typically involved in LR projects include formal landowners, renters, government agencies, and developers. Land readjustment gives all parties a voice in the process, and as a result, can build good will between groups that in other cases might be at odds. This positive public engagement can build greater political will and acceptance for the final development.

Graduated Density Zoning:

Graduated Density Zoning is another form of voluntary land assembly that allows denser development than would be possible with individual parcels. This mechanism has a lot in common with Land Readjustment but differs primarily in how land assembly is incentivized and how development occurs.

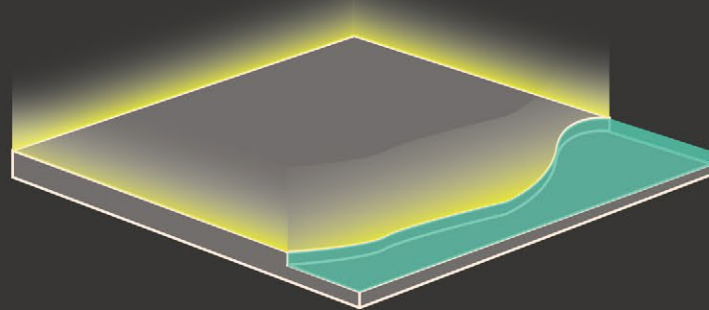
Pooling land creates higher property values and greater opportunity for development for individual owners. Because the process is voluntary, not all property owners of the targeted district are required to participate, but the process creates strong incentive for participation as any holdouts will see significant loss in the opportunity for shared profit from redevelopment of a larger site. Graduated Density Zoning uses opportunity cost as a powerful incentive.

Like Land Readjustment, Graduated Density Zoning relies on all property owners participating to work, but unlike LR, it can use zoning as a powerful incentivizing tool for redevelopment. Municipalities can use zoning to allow greater housing density on larger sites in the targeted area, thus creating more development potential when land owners pool their adjacent properties. Greater development opportunity brings in higher property value per square foot, creating an incentive for developers to assemble larger swaths of land, and land owners an incentive to sell their land for redevelopment. Voluntary participation in land assembly also helps build political will, as neighbors that would have opposed development on an adjacent parcel can not only move elsewhere, but also profit significantly in the process.



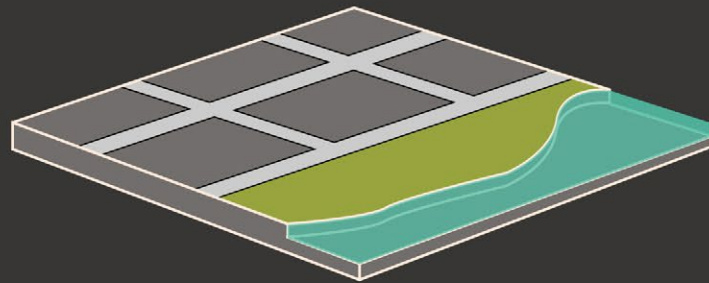
01. INITIATION

A majority of land owners must voluntarily participate in a land readjustment scheme.



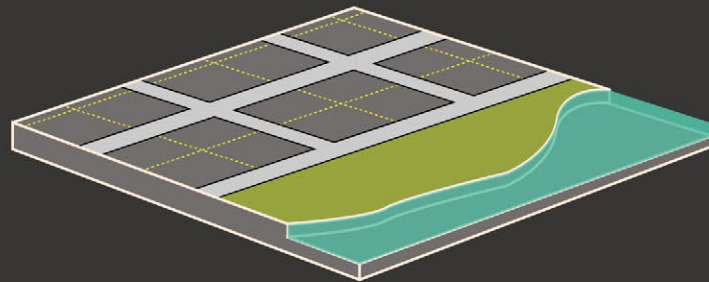
02. DECLARATION

A development agency uses enabling authority to create boundaries for re-parceling and planning phases.



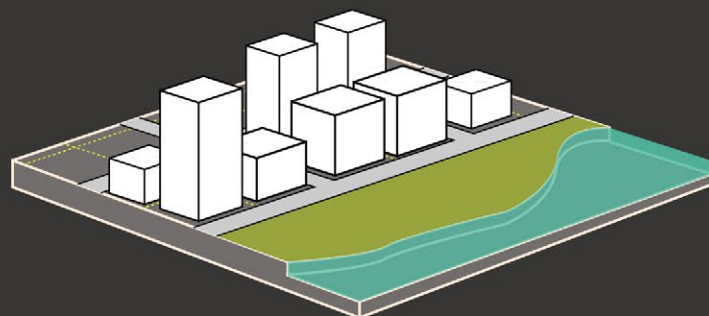
03. MASTER PLAN

A master plan is established and infrastructure and open spaces are built.



04. ALLOCATION

The future land value after adjustment is projected and land is allocated back to land owners.



05. DEVELOPMENT

With new infrastructure and street network patterns, development can occur

Transfer of Development Rights:

Transfer of Development Rights (TDR) is a zoning technique used to aid in land conservation by redistributing development to create patterns of open space and density. Land with conservation value can be protected by shifting development that would have occurred there to an adjacent area that can better accommodate growth and density. The conserved land is the 'sending site,' and the land that gets developed in its stead is the 'receiving site.' Any development on the sending site is then permanently restricted, creating a conservation area.

The land owner sells development rights to a project developer on another site a market-determined price point. The owner of the sending site may retain ownership of their land and continue to glean value from its natural resources. The land owner or developer of the receiving site gains greater height and density allowances with the purchase of TDR credit, and thus, greater profit from development.

TDR is most common in cities that use Floor-Area-Ratio (FAR) as the primary entitlement tool. Because FAR establishes developable square footage for each site, transferring that square footage to other sites is a fairly straight forward and equitable process. Raleigh does not regulate density, but instead the number of floors allowed to be developed, which makes implementing TDR more challenging under our zoning regulations.

City Initiated Planned Development Rezoning:

Another option that could, along with additional incentives, allow for enhanced development with infrastructural and open space improvements is the use of a Planned Development. In this scenario, the city could create a Master Plan for the area that includes much of the design proposals featured in this report. This could provide a template for development that, if used, would come with incentives including height, density, and/or use bonuses. If a developer were to pursue this course, the city would gain its desired infrastructure and amenities and the developer would gain the aforementioned incentives and would not have to go through a rezoning or extended master planning process. There would still be an option for the developer to use the base zoning as their requirements and not follow the master plan of the PD. Overall, this option provides maximum flexibility to the developer but could allow for a scenario where development that is not congruous with the design opportunities and enhancements found in this report.

FEMA Buyout:

Through its Hazard Mitigation Grant Program, the Federal Emergency Management Agency (FEMA) offers property buyouts for properties in the floodplain that experience nuisance flooding. Money is allocated to the state through the grant, this money can cover 75% of cost while state and/or local money covers the remaining cost. Once purchased the property must be converted into open space. While this process usually prioritizes homeowners, buyouts of non-residential land

are not prohibited and could be an option for several parcels within the study boundary. Using buyout funding for these properties could offset the economic burden the cyclic flooding of these sites poses. Projects that are submitted for funding but not selected in a first round are kept on file in the event that more funding becomes available. Using property buyouts could significantly offset the cost of converting flood prone property along Crabtree Creek into a floodable park. While this might be an unconventional use of a program that is typically used in Coastal Areas, the degree to which flooding has become a problem along this portion of Crabtree Creek warrants consideration of this funding source. Parcels that could potentially be acquired through a buyout are highlighted in the map below.

Tax Increment Financing:

Tax Increment Financing (TIF) is a public financing tool to incentivize development through funding public infrastructure improvement within a clearly defined district. When paired with land assembly tools, TIF districts can lay the foundation to create a new network of roads, sidewalks, open space areas, and water infiltration systems to support a new pattern of development. A TIF is a form of debt financing, meaning a bond is used initially to fund redevelopment in a defined area which gets paid back over time with tax revenue from the district receiving the improvements.

Over a fixed period of time, the tax revenue—typically property tax—from a created tax district is earmarked to finance infrastructure and development within that district. The tax rate at

the beginning of the TIF period is frozen for the duration. Often, a TIF is used when redevelopment cannot be attracted otherwise. To use TIF districts to fund projects in areas that are not blighted, the improvements made through diverted taxes must be of public benefit beyond the bounds of the tax district.

With enabling legislation, local municipalities can create TIF districts to boost development for the public good. In 2004, North Carolina voted for a constitutional amendment to allow Tax Increment Financing throughout the state, called ‘project development financing’. Though the state statute enables TIF districts, cities in North Carolina often opt for synthetic TIFs. A synthetic TIF is essentially the same as a traditional TIF, except that instead of using the increased tax revenue to pay back the bond or loan, the city uses installment financing with the pledge of a security interest from the underlying asset that is being financed. The increased tax revenue generated from the greater property values once the district has been improved are used to repay the loan rather than as security for the loan.

Though not commonly used in the state, TIFs are a popular financing tool in cities across the United States. The City must define the area that will have property taxes diverted from the general city fund. The duration of the TIF must be defined as well. TIFs often capture tax revenue for a 20 or 30-year period. The revenue collected over the defined period is used to service bonds taken out at the beginning.

TIFs are a valuable financing tool for projects that have benefits citywide. Paired with other

mechanisms such as land readjustment, a TIF district could finance the necessary infrastructure and improvements after re-parceling is achieved. The financing tool can also lay the groundwork for redevelopment from the private sector with the proper public infrastructure base.

09. FLOODPLAIN DEVELOPMENT REGULATIONS

Local Regulations

Floodway:

No encroachments unless the encroachment (fill, new construction, substantial improvements, structures, manufactured homes) would not:

- Adversely affect channel and drainage capacity.
- Redirect base or future condition flood velocities onto adjacent properties.
- Increase base flood or future condition flood levels.
- Store chemicals harmful to human, animal or plant life.
- House solid waste disposal facilities, salvage yards or hazardous waste.

The following USES are allowed in the floodway:

- Farming, nurseries, wildlife sanctuaries, game preserves.
- Lawns, gardens, parking and play areas
- Golf courts, tennis courts, picnic grounds, parks, greenways, bikeways, hiking trails, open space and other similar recreational uses.
- Any other use not employing a structure and not subject to floating away during a flood.
- Any use employing a structure as long as its foundation and supports are located outside the floodway area and any overhang is elevated above the 500-year flood depth.

Existing structure restrictions in the floodway:

- No existing structure within a floodway shall be considered a nonconforming structure and may be repaired or improved

provided that construction will not: enlarge foundation area within the floodway, enlarge the surface area perpendicular to the direction of flow of the watercourse.

- If an existing structure is damaged it may be repaired provided that: there is no increase in structure-floodway overlap, the repairs incorporate flood-proofing measures.
- Additions may be made to an existing structure if: design receives recommendation and approval from the Corp of Engineers and the Federal Emergency Management Agency (FEMA) stating that the addition will not increase flood levels during base flood conditions.

Future Hazard Areas:

The following uses are prohibited:

- Storing or processing chemicals or items that could be caustic during flooding
- Housing solid waste disposal facilities, salvage yards or hazardous waste
- Any structure or encroachment, within 90% of the distance of the outer limits of the flood hazard soils, that increases the base or future flood conditions by more than 1/2 foot (unless watercourse drains an area less than 1 square mile)

The following uses are allowed below the regulatory flood elevation:

- Any use permitted in the floodway
- Non-residential and residential accessory structures if lowest floor (including

basement) is elevated to at least the regulatory flood protection elevation or the building plans are certified by an engineer to withstand flooding forces associated with a 100-year flood (UDO Sec. 11.4.6)

- Underground storage, foundations and supports which are watertight and designed to withstand flooding forces associated with a base or future conditions flood

The following uses are allowed above the regulatory flood elevation:

- Structures and manufactured homes that comply with (UDO Sec. 11.4.6)
- Structures on fill, as long as the top of fill is at or above 1 foot below the regulatory flood protection elevation and fill extends 15 feet in all directions from the structure
- Open storage of materials on fill at or above 1 foot below the regulatory flood protection elevation

Limits of development - Lot coverage cannot be more than 50% of the fringe or future conditions flood area located on that lot with the following exceptions:

- Use is permitted in floodways
- It is a ground-level loading or parking area
- The lot is 1/2 acre or less and recorded before May 2, 2006
- The existing or approved structure was permitted before May 2, 2006 - repairs may be made to a pre-approved structure through administrative approval or variance as long as land use, footprint and

base flood levels remain the same

- City Council may approve a variance to the 50% lot coverage provision if adherence will result in unnecessary hardship and the general intent and purpose of the variance is in harmony with the intent of the provision and public safety/welfare are assured

Streets in Floodprone Areas

- Any street, driveway or associated bridge or culvert, crossing a watercourse shall be constructed to City standards and as close to perpendicular to natural buffer yard as possible
- A crossing located in a floodprone area draining less than 1 square mile and/or not shown on a FEMA map may increase flow levels and flood area for a 10-100 year flood or redirect floodwaters IF the following are met: flood easements adequate to contain the increased flow are submitted to the City and land within the designated easements are used as flood storage areas
- If a crossing is located in a floodprone area draining 10 acres or more it must pass the 100 year flood crest and not increase the elevation of the 10-100 year flood crest
- If a street or driveway crossing a watercourse is in a drainage area that exceeds 1 square mile, the maximum rise allowed for the 100-year floodplain shall not exceed 1 foot above the base flood elevation
- Base flood elevations for return periods less than 100-years may exceed 1 foot as long as

the amount over 1 foot is contained on site or limited to flood storage areas shown on a recorded plat

All streets in floodprone areas should provide at least 2 feet of vertical freeboard measured from the 10-year flood crest unless:

- The portions outside of vertical controls act as street transitions or provide sufficient public benefit
- Thoroughfares in floodprone areas would not be overtopped by a 50-year storm, all other streets would not be overtopped by a 25-year storm



Current Policies In Action

Greenways and trails within Raleigh’s network are primarily planned along open space corridors, easements and riparian buffers. They are constructed to facilitate passive, recreational activity that connects users to residential and commercial hubs and protects Raleigh’s sensitive ecosystems. Raleigh doesn’t currently have design guidelines or policies that encourage higher density development that interacts safely with the trail

system or Raleigh’s creeks and floodplains.

09. FLOODPLAIN DEVELOPMENT REGULATIONS
State Regulations

While FEMA requires permits and provides insurance to establish a baseline for floodplain development and flood mitigation, local level requirements can give more specific guidance to reduce flood damage and risk.

Some communities in North Carolina require Elevation Certificates in addition to the federally required permits. The EC is required to verify that the first floor of a building is at or above the BFE to mitigate flood damage. An “as-built” survey is also required to prove that the structure was built as

planned before insurance may be obtained.

A “no impact” certification may also be required to ensure that new development won’t adversely affect neighbors by increasing flood risk for the area with fill or added impervious cover. For North Carolina, it is also required that an engineer or architect review building designs for projects in floodplains to ensure they meet the minimum standards.

09. FLOODPLAIN DEVELOPMENT REGULATIONS

Federal Regulations

Development in and around floodplains increases flood risk by altering water channels and increasing the amount of impervious cover in the watershed area if proper precautions are not taken. Flood mitigation relies on a mixture of tools. At the federal level these tools include permitting, insurance programs, and incentive programs for municipalities to enforce stricter floodplain regulation. At the local level, communities can prohibit development in hazardous areas or code for flood-resistant designs, use funds to acquire buildings in floodplains, and create robust stormwater drainage systems to shrink the floodable area.

A federally issued permit must be acquired prior to any development in a Special Flood Hazard Area (SFHA). For areas that are not identified as SFHA, local communities must require approval process of their own for development in a floodplain.

Federal permits consider:

- Proximity to a mapped FEMA floodplain
- If the site is reasonably safe from flooding
- If the site plan shows the flood zone, a Base Flood Elevation (BFE), and the building location
- Is an improvement or an addition proposed to an existing building?
- If the building and utilities will be properly elevated with a safe foundation

Local reviews of developments slated for floodplains consider many of the same aspects of the building, its proximity to waterways, and its design.

FEMA requires that buildings in a floodplain be elevated above the BFE either atop fill dirt or foundation. Foundations must be floodable, with required crawlspace with net openings of 1 square inch per 1 square foot of interior space. The first floor of buildings must be at or above the BFE.

National Flood Insurance Program (NFIP)

The National Flood Insurance Program (NFIP) is a partnership between the federal government and participating communities as a strategy to reduce the financial hardship of providing disaster assistance. NFIP also sets a national standard for how to regulate new development occurring in a floodplain. Participating communities use FEMA-made flood maps to determine flood-prone areas. Property owners within the mapped floodplains can purchase federal flood insurance. Participating communities are required to create minimum floodplain management regulations to ensure that any development that occurs in flood prone areas adheres to standards that will reduce risk of flood damage.

Community Rating System (CRS)

The CRS is a program run through FEMA that credits NFIP communities if they enforce protective floodplain standards beyond the minimums required federally for NFIP participants. Credits include reducing the flood insurance premiums for property owners in the NFIP area. FEMA's goal is to reduce activity in floodplains that could lead to losses, save taxpayer money, and encourage communities to reduce the impact of flooding events.

CRS offers lowered premiums to incentivize the following community practices:

- Preservation of open space to absorb flooding
- Higher standards for development in floodplains
- Engineering studies and additional flood mapping
- Seek grant funding to mitigate flood risk to flood-prone structures through buyouts and flood reduction practices
- Create robust drainage systems
- Implement flood warning and response programs
- Educate the public about flood risks and the importance of flood insurance

FEMA uses existing-conditions data to determine how development in floodplains is regulated. Communities may choose to regulate development based on future flooding conditions by considering the impact of increased impervious cover through development. It is recommended that the lowest floor be at minimum two feet higher than the highest adjacent topography.

