

BESSEMER CITY GREENWAY FEASIBILITY STUDY

DOWNTOWN TO OATES CREEK

Bessemer City
NORTH CAROLINA
City with a Heart

CAROLINA THREAD TRAIL

KITTELSON & ASSOCIATES

March 2023

ACKNOWLEDGMENTS

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SECTION 1

EXECUTIVE SUMMARY

SECTION 1
EXECUTIVE SUMMARY

PLANNING PROCESS

Bessemer City, in partnership with the Carolina Thread Trail, is planning for the construction of an approximately 3.2-mile greenway connecting Downtown Bessemer City to the Southridge Business Park and the City of Gastonia. This segment is part of a broader network of over 1,600 miles of connected trails planned across the 15-county Carolina Thread Trail region.

Over the course of a six-month planning process, the Bessemer City Greenway Feasibility Study team completed field observation, research, and analysis to determine a preferred alignment for what will be Bessemer City's most significant greenway.

Study Kickoff
September 2022

Existing Conditions Analysis & GIS Webmap
September to October 2022

Development of Preliminary Alignment Alternatives
October 2022

Alternatives Review with Bessemer City and Carolina Thread Trail Staff
October to November 2022

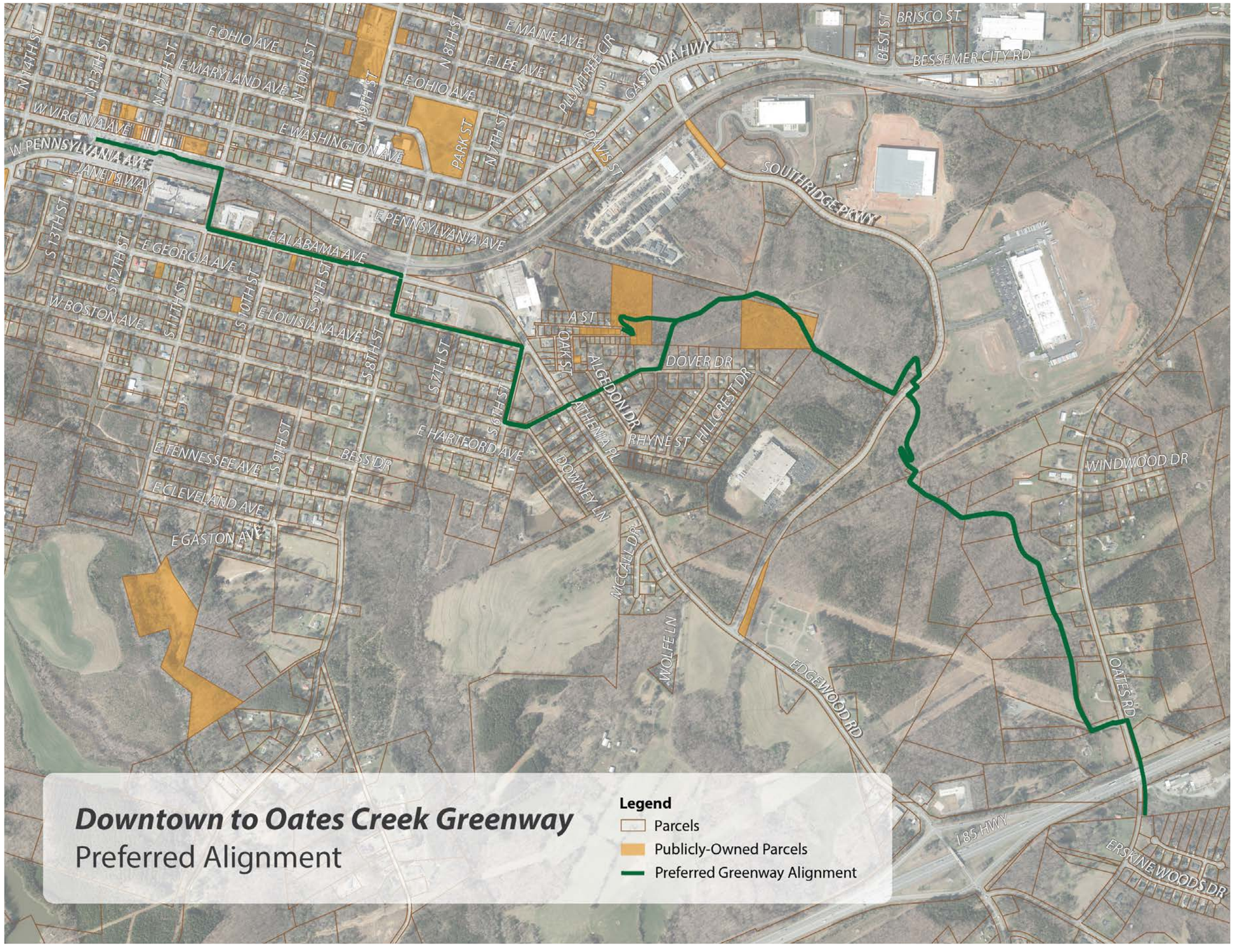
Field Walk
December 2022

Selection of Preferred Alternative & Preparation of Final Study
December 2022 to February 2023

NEXT STEPS FOR IMPLEMENTATION

1. Coordinate ASAP with ongoing infrastructure and development projects.
2. Name the greenway, generate public support, and build champions.
3. Adopt the alignment & reflect it in local land use plans and development ordinances.
4. Develop a phasing, property acquisition, & maintenance strategy.
5. Pursue design funding.
6. Pursue construction funding.
7. Build & celebrate Bessemer City's transformative, new community asset!

PREFERRED ALIGNMENT



The preferred alignment for the Bessemer City Greenway connects Uptown Park (on W Virginia Ave.), through the Osage Mill redevelopment project, across Alabama Ave./Athenia Pl., and along sewer easements through the Southridge Business Park to the Gastonia City Limits at Oates Creek.

PREFERRED ALIGNMENT SNAPSHOT

1
RAILROAD CROSSINGS
(via an existing underpass)



3.2 miles
TOTAL DISTANCE
(approximate)



11
STREET CROSSINGS



12 feet
RECOMMENDED GREENWAY WIDTH
(with 8-foot neighborhood connectors)



5 **PROPOSED TRAILHEADS /NEIGHBORHOOD CONNECTIONS**



2 **PUBLIC SPACE IMPROVEMENTS / “POCKET PARKS”**



NAMING AND BRANDING OPPORTUNITIES

Celebrating the greenway vision with a compelling name and brand will be an important part of the implementation phase of this project. This study provides three initial ideas based on conversations with city staff about Bessemer City’s history and identity.

These options include:

1 **Yellow Jacket Trail**

YELLOW JACKET TRAIL

2 **Mountainview Greenway**

MOUNTAIN VIEW GREENWAY

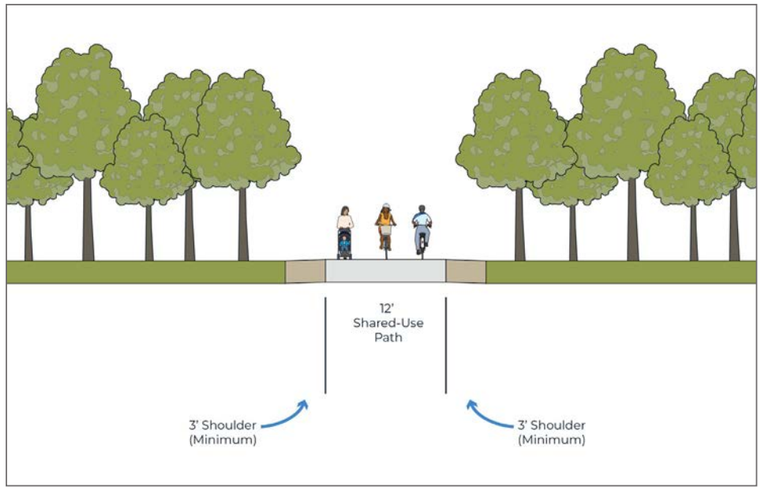
3 **Iron Trail**

IRON TRAIL

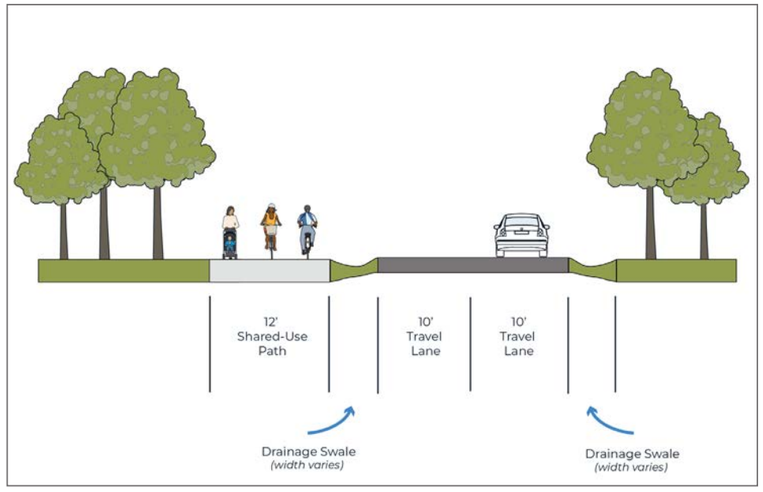
The next step will be to engage with the community to hear their ideas for a trail name and brand. (Also see page 43.)

TYPICAL SECTIONS

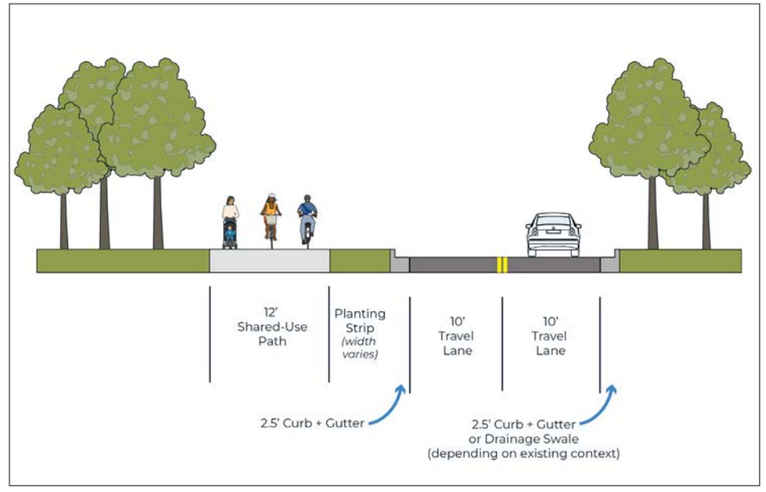
Type A
Off-Street Greenway



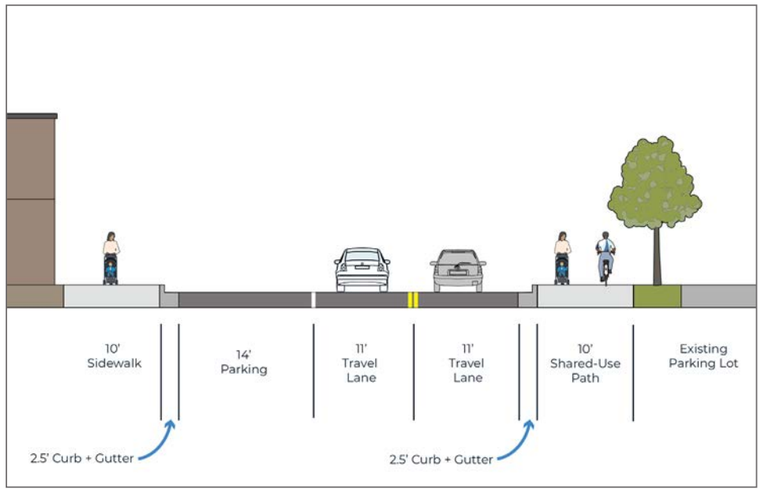
Type B
On-Street Greenway with Swale



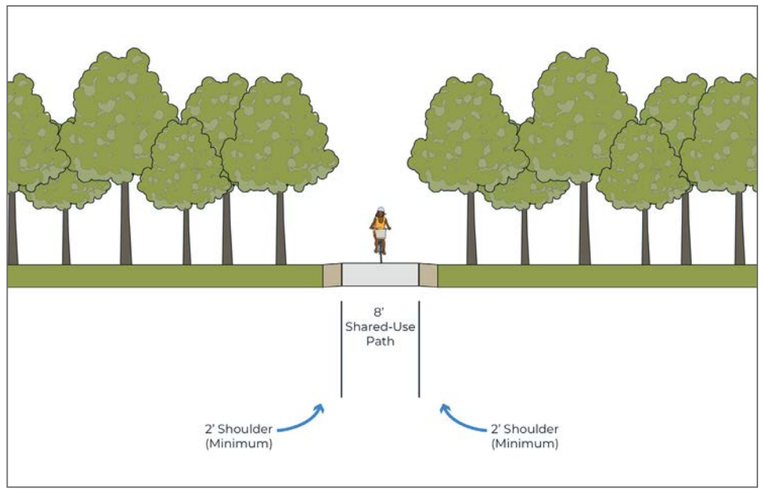
Type C
Off-Street Greenway with Planting Strip



Type D
Off-Street Greenway at Back-of-Curb
(Constrained Section on Virgina Avenue near 12th Street)



Type NC
Neighborhood Connector



Typical sections illustrate recommended design details for the preferred alignment, including greenway width, graded shoulder width, anticipated drainage (swale vs. curb and gutter), and anticipated adjustments to current infrastructure (i.e., sidewalks, planting strips, etc.). (Also see pages 25-26.)

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SECTION 2

EXISTING CONDITIONS

SECTION 2
EXISTING CONDITIONS

The feasibility study began with an evaluation of existing conditions. The study team established a GIS webmap comprised of parcel data from Gaston County, contours, utility easements, sewer and water pipelines, flood zones, points of interests, existing and recommended city sidewalks, recommended multi-use paths, North Carolina Department of Transportation (NCDOT) 2020-2029 State Transportation Improvement Program (STIP) projects, and the Carolina Thread Trail alignment.

The study team also reviewed the Bessemer City Pedestrian Plan Update and recommendations from the Gaston-Cleveland-Lincoln Metropolitan Planning Organization (GCLMPO). After developing potential alignment alternatives, the team completed a site visit of the study area to make observations of potential constraints, challenges, and opportunities.

Pedestrian Master Plan Recommendations



The project team reviewed the location of existing and recommended sidewalks and multi-use paths in the Bessemer City Pedestrian Plan Update. Alignment options from the Carolina Thread Trail master plan were also examined to further understand prior planning efforts. The variety of options were taken into consideration during the initial creation of alignment alternatives.

Utility Easements & Creeks



Sewer easements are an important aspect of this study. Bessemer City's sewer easements offer ideal corridors for the development of future greenways. They connect neighborhoods, are protected from future development, and provide enough space for a 12-foot greenway with shoulders. Further study of the existing easement language (permissions and restrictions) is needed to determine if the easements, as currently written, allow greenway construction or if some modification/ negotiation with underlying property owners will be necessary.

Topography & Public Property Ownership



Understanding which parcels were publicly-owned assisted the team in evaluating the opportunities for the greenway alignment. Topography was also assessed when choosing the preferred alignment as the study area has several areas of steep slopes that the study team reviewed during the field visit. The team was then able to adjust the alignment based on topography constraints and parcel ownership. Switchbacks will be necessary to accommodate the steep slopes in a few segments of the preferred alignment.

Destinations



Major points of interests were mapped to analyze possible greenway connections. During the field visit and meetings with city staff, the team identified the opportunity to repurpose the existing 11th St. railroad underpass (which is prohibitively narrow for two-way vehicular traffic) as a greenway-only underpass connecting the Osage Mill redevelopment to key destinations around downtown.

Constraints/ Opportunities



1) 11th St. railroad underpass; 2) First Wesleyan Church exercise loop; 3) Building pinch point at Flatrock Woodshop; 4) Awkward intersection at S 6th St., E Georgia Ave., and E Alabama Ave./Athenia Pl.; and 5) E Boston Ave. "Paper Street": Opportunity for greenway and "pocket park" connecting Crescent Dr. and 6th St., 6) I-85 underpass along Oates Rd.



A bridge at the 11th St. railroad underpass provides connection from E Alabama Ave. into downtown Bessemer City on E Virginia Ave.



Flatrock Woodshop's building sits closely to the roadway which constrains the north side of the road to accommodate a greenway.

SECTION 3

ALTERNATIVES & EVALUATION

SECTION 3
ALTERNATIVES & EVALUATION

OVERVIEW

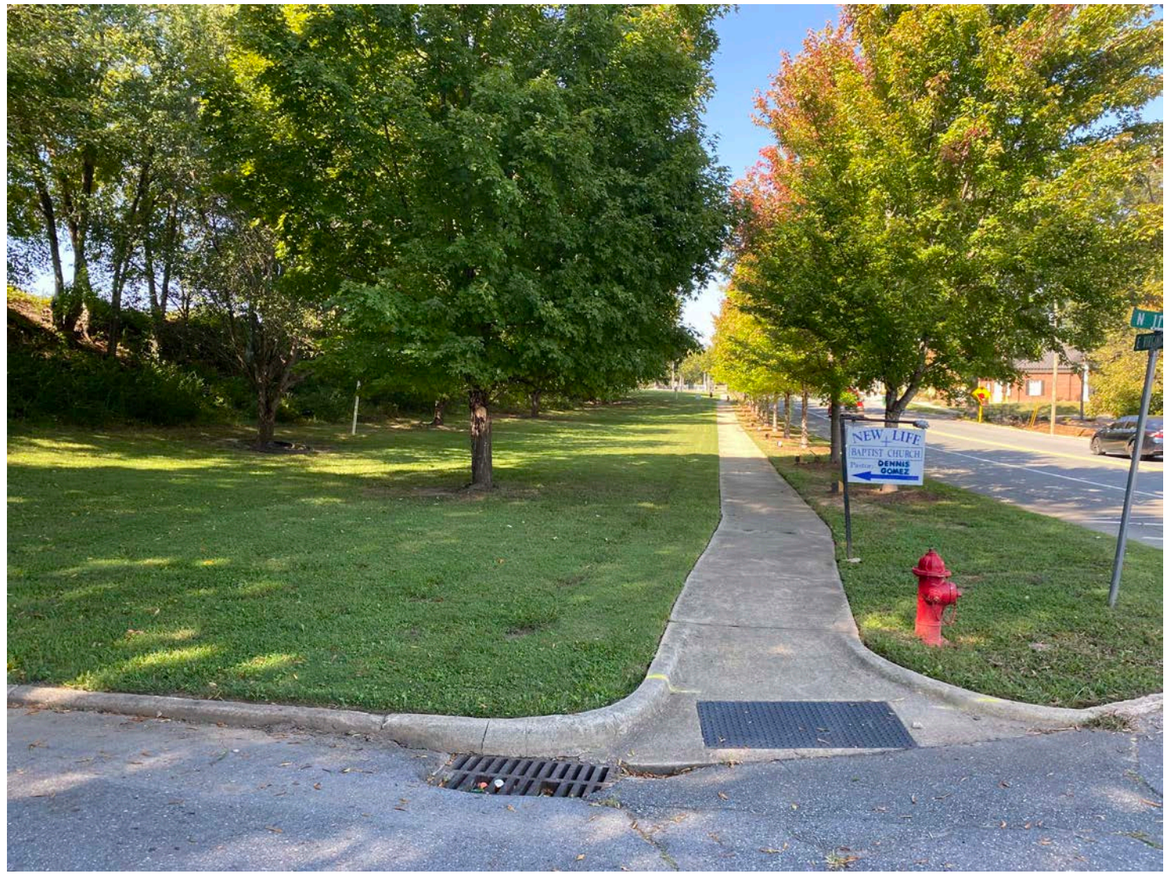
After reviewing the existing conditions, the team laid out several alternatives for the greenway alignment guided by criteria including minimizing potential property impacts, utilizing existing utility easements and publicly-owned properties, avoiding steep slopes, anticipating structures required for trail construction (e.g. retaining walls, culverts, bridges), opportunities to develop trail access points, (parking areas and neighborhood connections), and connections to potential amenities.

The team evaluated these alternatives through a GIS mapping analysis and a field walk with Bessemer City and Carolina Thread Trail Staff. (See photos on next page.)





The I-85 underpass on Oates Rd. has enough width for a greenway, providing a direct connection to Gastonia, southeast of Bessemer City.



A view of E Virginia Ave. at 11th St. (looking west), where the existing sidewalk can be widened to accommodate a 12-foot greenway.



A view of Southridge Pkwy. (looking south) at the location of a potential trailhead and street crossing. A pedestrian refuge island, crosswalk, advance pedestrian warning signs, and pedestrian hybrid beacon (PHB) or rectangular rapid flashing beacon (RRFB) are recommended to support a new greenway crossing of Southridge Pkwy. in this location.



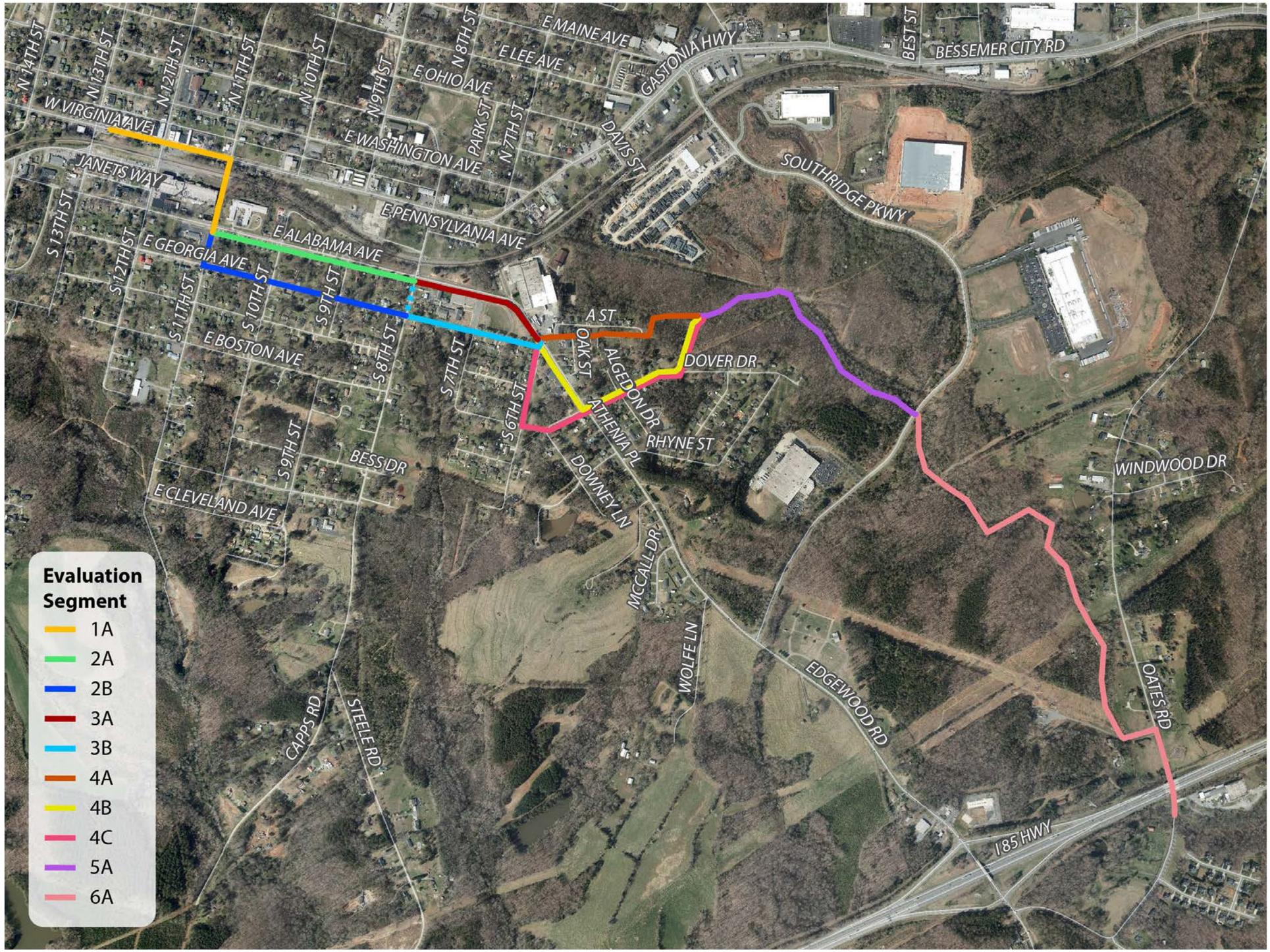
The power station driveway off Oates Rd. provides a location where the greenway can transition from its off-street section at the east end of the alignment.





Existing utility easements provide ample width and right-of-way for off-street greenway segments. Further study of the existing easement language (permissions and restrictions) is needed to determine if the easements, as currently written, allow greenway construction or if some modification/negotiation with underlying property owners will be necessary.

Segment Evaluation Map



The map above shows the different alignment options evaluated using GIS information and constraints/ opportunities identified during the field walk. For some segments (2, 3, and 4), the project team identified multiple potential routes for consideration. For other segments (1, 5, and 6), the team identified one most viable route.

EVALUATION MATRIX

Segment Evaluation Matrix										
	Required	**Select One**		**Select One**		**Select One**			**Required**	**Required**
	1A	**2A**	**2B**	**3A**	**3B**	**4A**	**4B**	**4C**	**5A**	**6A**
Railroad Crossings	1 (via existing underpass)	0	0	0	0	0	0	0	0	0
Major Street Crossings	0	0	0	0	0	0	1	1	1	1
Creek Crossings	0	0	0	0	0	0	0	0	1	4
Private Property Impacts	1	15	24	3	4	15	9	13	3	16
Access to Destinations	Excellent	Good	Good	Good	Good	Good	Good	Good	Good	Good
User Comfort	Good	Good	Good	Good	Good	Good	Good	Good	Excellent	Excellent
Directness of Route (length)	Excellent (0.3 miles)	Excellent (0.4 miles)	Excellent (0.4 miles)	Excellent (0.3 miles)	Excellent (0.3 miles)	Excellent (0.3 miles)	Good (0.5 miles)	Good (0.6 miles)	Good (0.6 miles)	Good (1 mile)
Opportunities/ Constraints	Opportunity to use existing 11th St. railroad underpass; Curb and gutter installation needed	Opportunity to widen existing sidewalk on Alabama Ave.; Curb and gutter installation needed	Curb and gutter installation needed	Pinch point at Flatrock Woodshop building corner; Utility pole relocation needed	Utility pole relocation needed	Switchbacks needed (steep topography); Likely better suited as secondary, neighborhood connector route	Utility pole relocation needed	Opportunity for pocket park / trailhead using Boston Ave. “paper street;” Utility pole relocation needed	Switchbacks needed at Southridge Parkway (steep topography; Existing culvert under Southridge Parkway is too small to carry greenway)	Switchbacks needed (steep topography)

	Fair
	Good
	Excellent

Segment	Extents
1A	E Virginia Ave from S 13th St to S 11th St S 11th St from E Virginia Ave to E Alabama Ave
2A	E Alabama Ave from S 11th St to S 8th St
2B	S 11th St from E Alabama Ave to E Georgia Ave E Georgia Ave from S 11th St to S 8th St
3A	E Alabama Ave/Athenia Pl from S 8th St to S 6th St
3B	(S 8th St from E Alabama Ave to E Georgia Ave) E Georgia Ave from S 8th St to S 6th St
4A	E Georgia Ave from Athenia Pl to Sewer Easement Connection East of Georgia Sewer Easement Alignment from E Georgia Ave to Sewer Easement Fork
4B	Athenia Pl from S 6th St to Dover Dr Dover Dr from Athenia Pl to Sewer Easement Connection north of Center Dr Sewer Easement from Dover Dr to Sewer Easement Fork
4C	S 6th St from Athenia Pl/E Georgia Ave E Boston Ave/Crescent Dr from S 6th St to Athenia Pl Dover Dr from Athenia Pl to Sewer Easement Connection north of Center Dr Sewer Easement from Dover Dr to Sewer Easement Fork
5A	Sewer Easement/Oates Creek from Sewer Easement Fork to Southridge Pkwy
6A	Sewer Easement/Oates Creek from Southridge Pkwy to Power Station Power Station Driveway Power Station Driveway from Sewer Easement to Oates Rd Oates Rd from Power Station Driveway to Oates Creek

The Evaluation Matrix summarizes the team’s finding for the evaluation of each potential greenway segment. This matrix was used to inform the selection of the preferred greenway alignment.

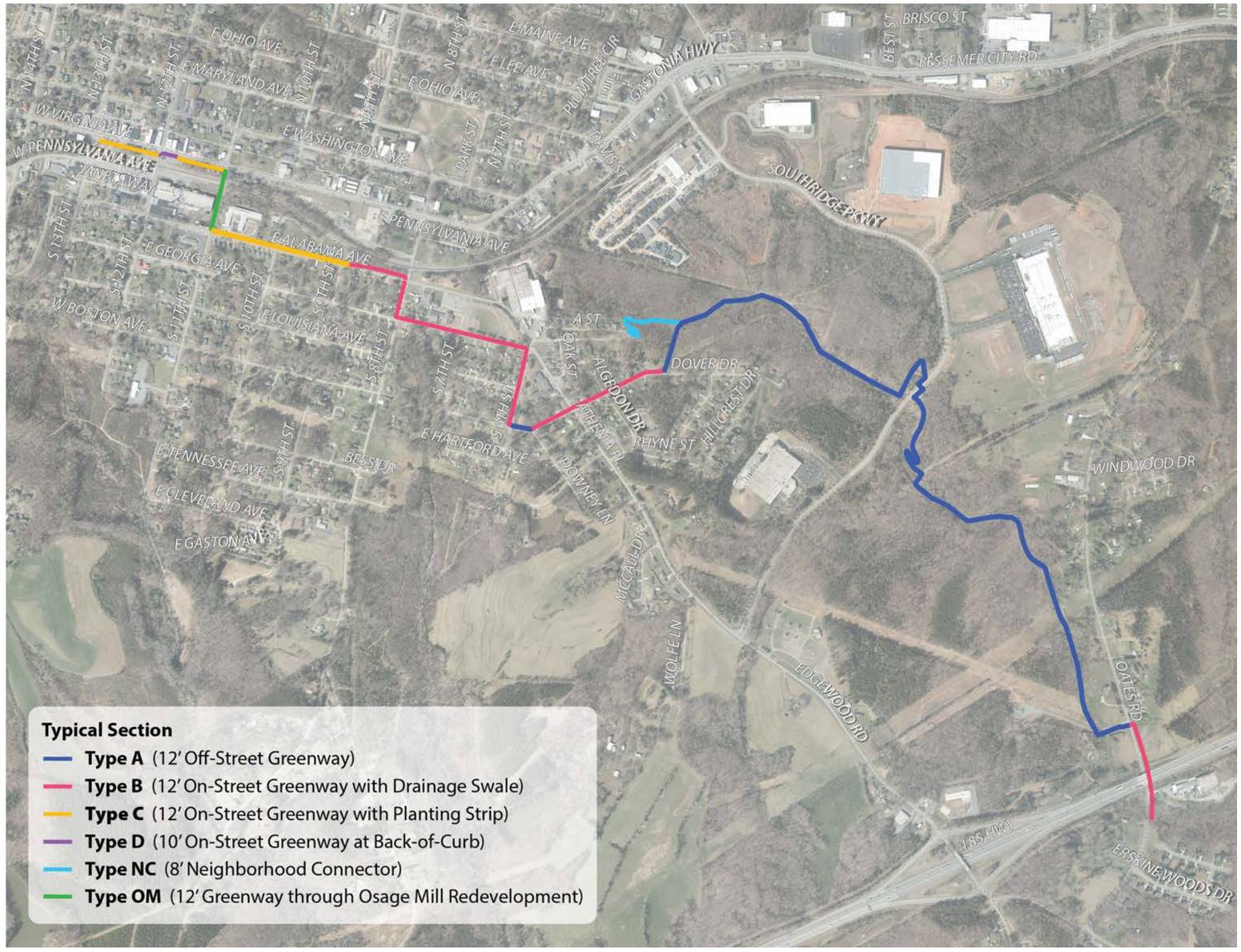
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SECTION 4

PREFERRED ALIGNMENT

SECTION 4
PREFERRED ALIGNMENT

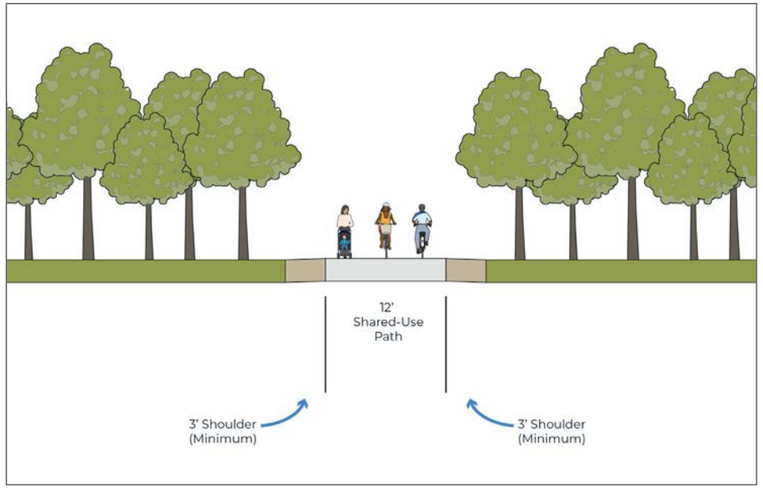
PREFERRED ALIGNMENT OVERVIEW MAP



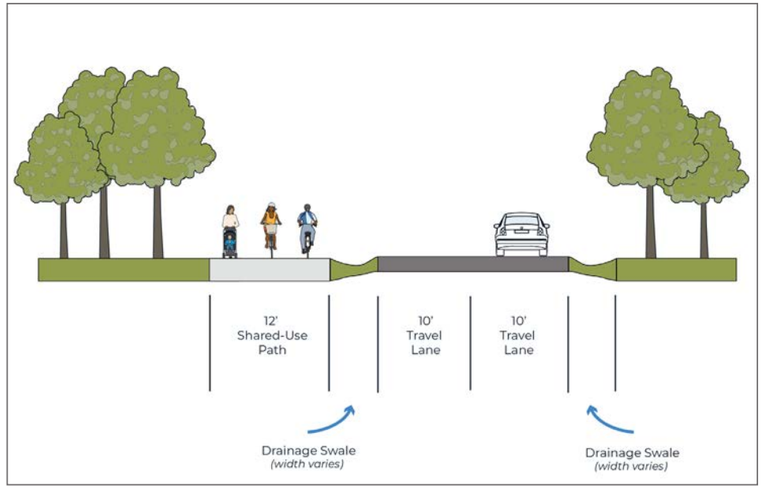
The preferred greenway alignment follows evaluation segments 1A, 2A, 3B, 4C, 5A, and 6A, and includes several different design treatments that are tailored to the context of the changing conditions across the approximately 3.2-mile route. The typical sections on the following pages illustrate these different treatments. Note that the details of greenway Type OM, through the Osage Mill redevelopment, will be coordinated with the pending development.

TYPICAL SECTIONS

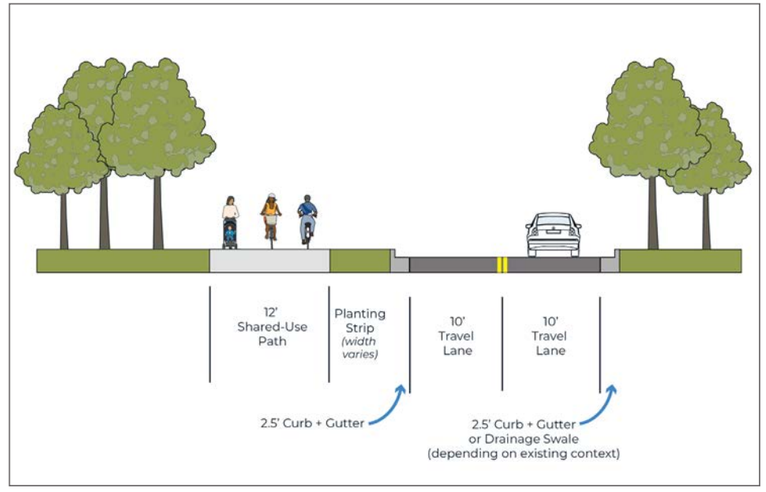
Type A
Off-Street Greenway



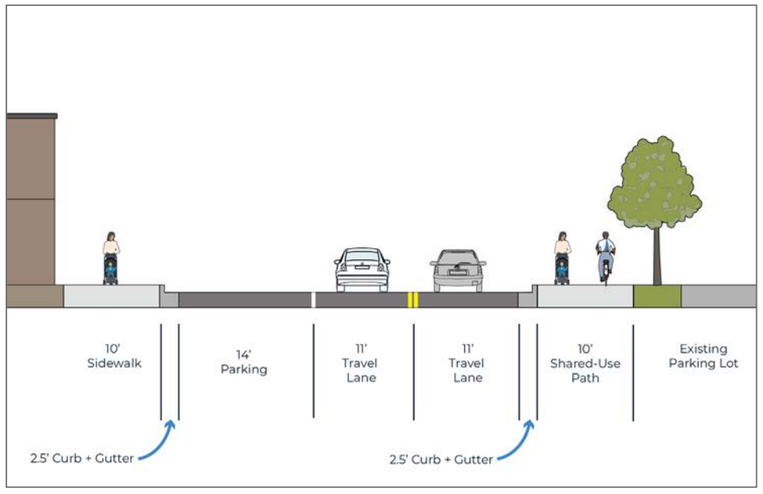
Type B
On-Street Greenway with Swale



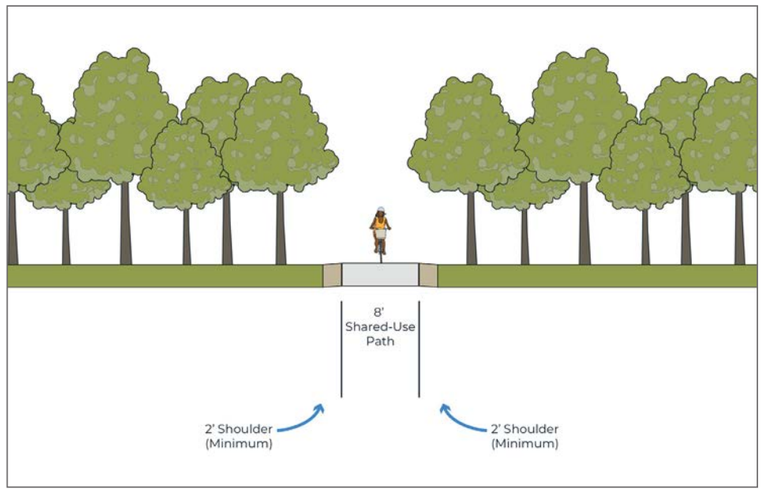
Type C
Off-Street Greenway with Planting Strip



Type D
Off-Street Greenway at Back-of-Curb
(Constrained Section on Virgina Avenue near 12th Street)



Type NC
Neighborhood Connector



Typical sections illustrate recommended design details for the preferred alignment, including greenway width, graded shoulder width, anticipated drainage (swale vs. curb and gutter), and anticipated adjustments to current infrastructure (i.e., sidewalks, planting strips, etc.).



Rendering of pocket park and planned greenway on E Virginia Ave. and along S 11th St. through the railroad underpass. Once through the underpass, the greenway would continue eastward on E Alabama Ave.

RECOMMENDED DESIGN STANDARDS

Greenways can be built in many different configurations. The following standards are recommended to help provide a safe and comfortable experience for pedestrians and cyclists of all ages and abilities.

Path Width

- The recommended minimum path width for the greenway is 12 feet. Where dictated by insurmountable constraints, the greenway may be reduced to 10-feet wide.
- For neighborhood connectors, the recommended minimum width is 8 feet.

Shoulder Width

- A minimum 3-foot-wide shoulder with a recoverable cross slope (no steeper than 1V:6H) should be provided. The shoulder should be clear of obstructions such as landscaping and structures.
- For on-street greenways, planting strips, building setbacks, and/or sidewalk amenity zones can serve this function.
- Where shoulders cannot be provided because of walls, railings, insufficient width, etc., a 2- to 3-foot shy distance should be assumed from any constraints immediately adjacent to the greenway path.

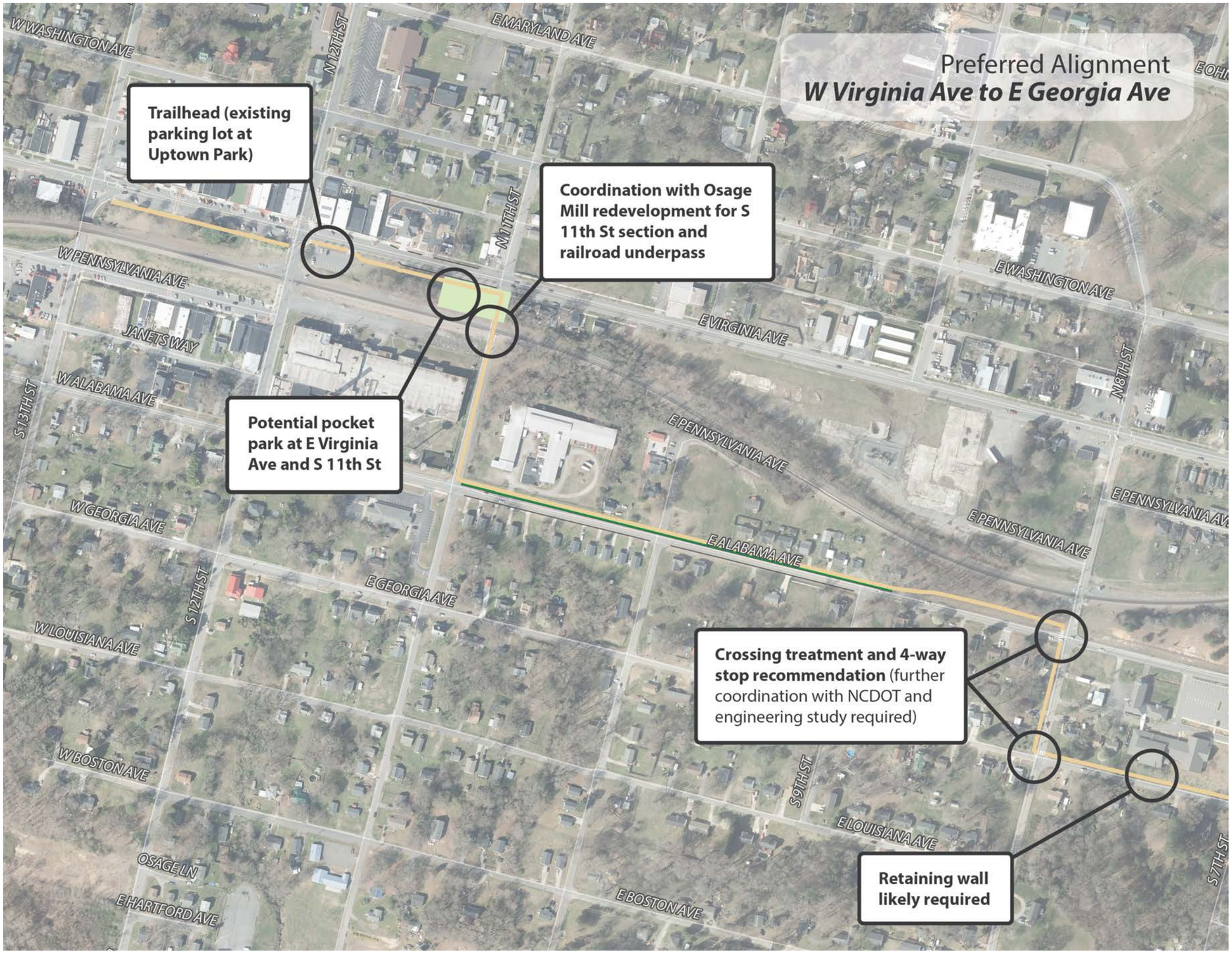
Surface Material

- Off-street greenway segments should be primarily paved in asphalt, except that portions of greenway located within the floodway (or other areas prone to frequent flooding) should be paved in concrete.
- Where concrete is used, saw-cut joints should be installed between panels as opposed to hand-tooled joints to make the greenway surface more comfortable for bicyclists and those using micromobility devices.
- A 12-inch concrete ribbon on either side of an asphalt greenway helps to hold asphalt edges in place and offers an attractive aesthetic.
- Boardwalk should be considered in environmentally sensitive areas such as wetlands or creekside areas with steep stream embankments where “bench grading” for a greenway would be environmentally destructive.

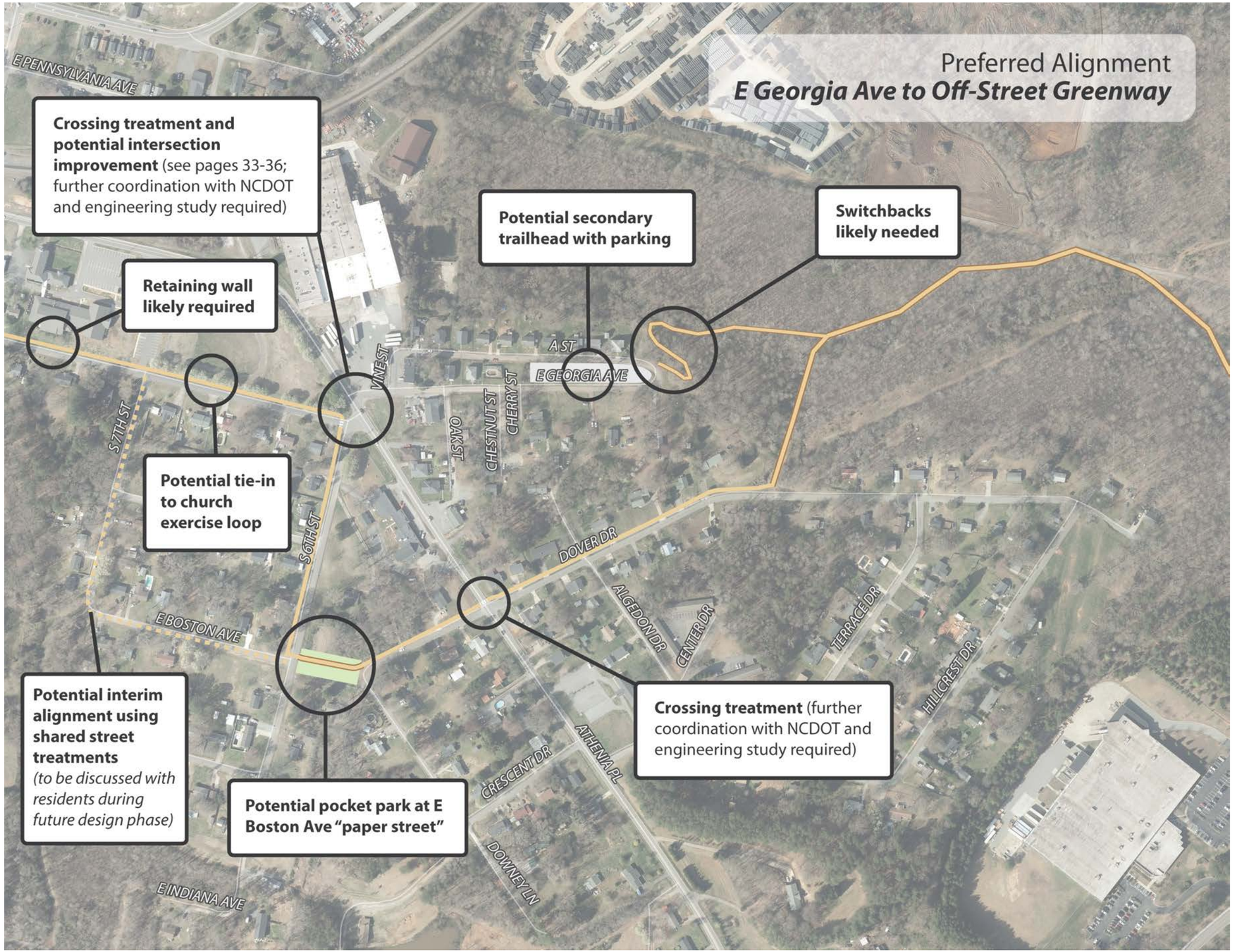
Wayfinding and Pavement Markings

- Wayfinding signage should be provided at every street crossing and turn in the greenway alignment. The best practice for wayfinding signage is to include a greenway marker/logo as well as destination-based distance signage (e.g. “Osage Mill - 0.6 miles”) to help greenway users navigate.
- Special attention should be paid to segments of greenway adjacent to a street. In that “sidepath” context, it is easy for users to mistake a greenway for a wide sidewalk that is not a part of the primary greenway path and not intended for all greenway user types (bicycles, scooters, and other micromobility devices). Common techniques to help distinguish a greenway from simply being a wide sidewalk include:
  - Use frequent signage to help identify the sidepath as a greenway.
  - Use different surface materials than typical concrete. For example, asphalt with a 12-inch concrete ribbon on both sides helps to distinguish on-street greenways from sidewalks.
  - Stripe a centerline to indicate directionality. This helps to communicate the path as a greenway and promote good passing behavior by greenway users. If maintenance of a greenway centerline is a concern, consider striping a centerline for just the first 20 feet on either side of each commercial driveway and intersection. That treatment provides similar advantages at a lower maintenance cost than a continuous centerline treatment.

CONCEPT PLAN

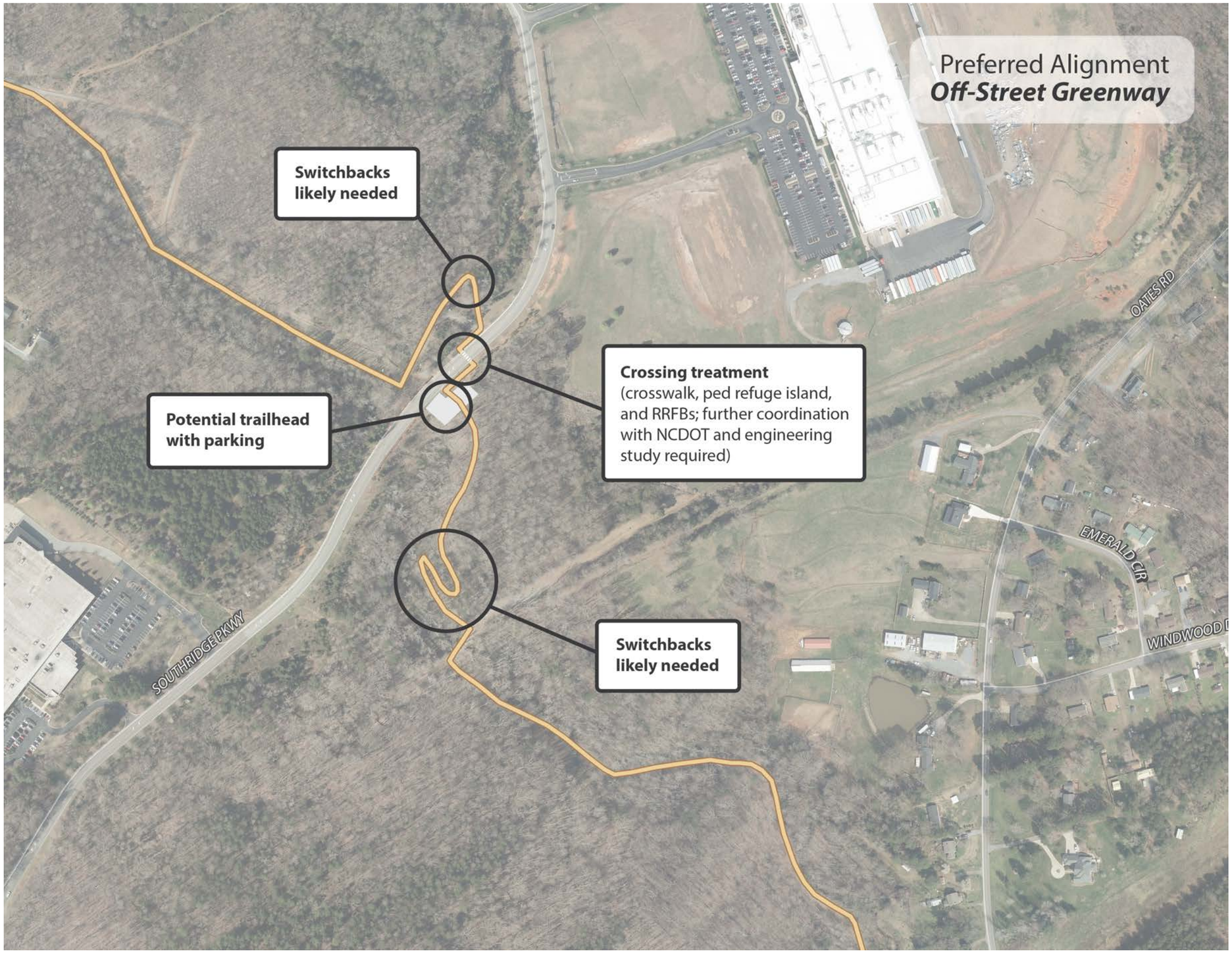


The west end of the greenway alignment begins in downtown at Uptown Park and runs along W Virginia Ave. before traversing several residential streets. Key recommendations include converting the entirety of S 11th St. between E Alabama Ave. and E Virginia Ave. into a greenway segment and converting two intersections along S 8th St. from two-way to four-way stops.



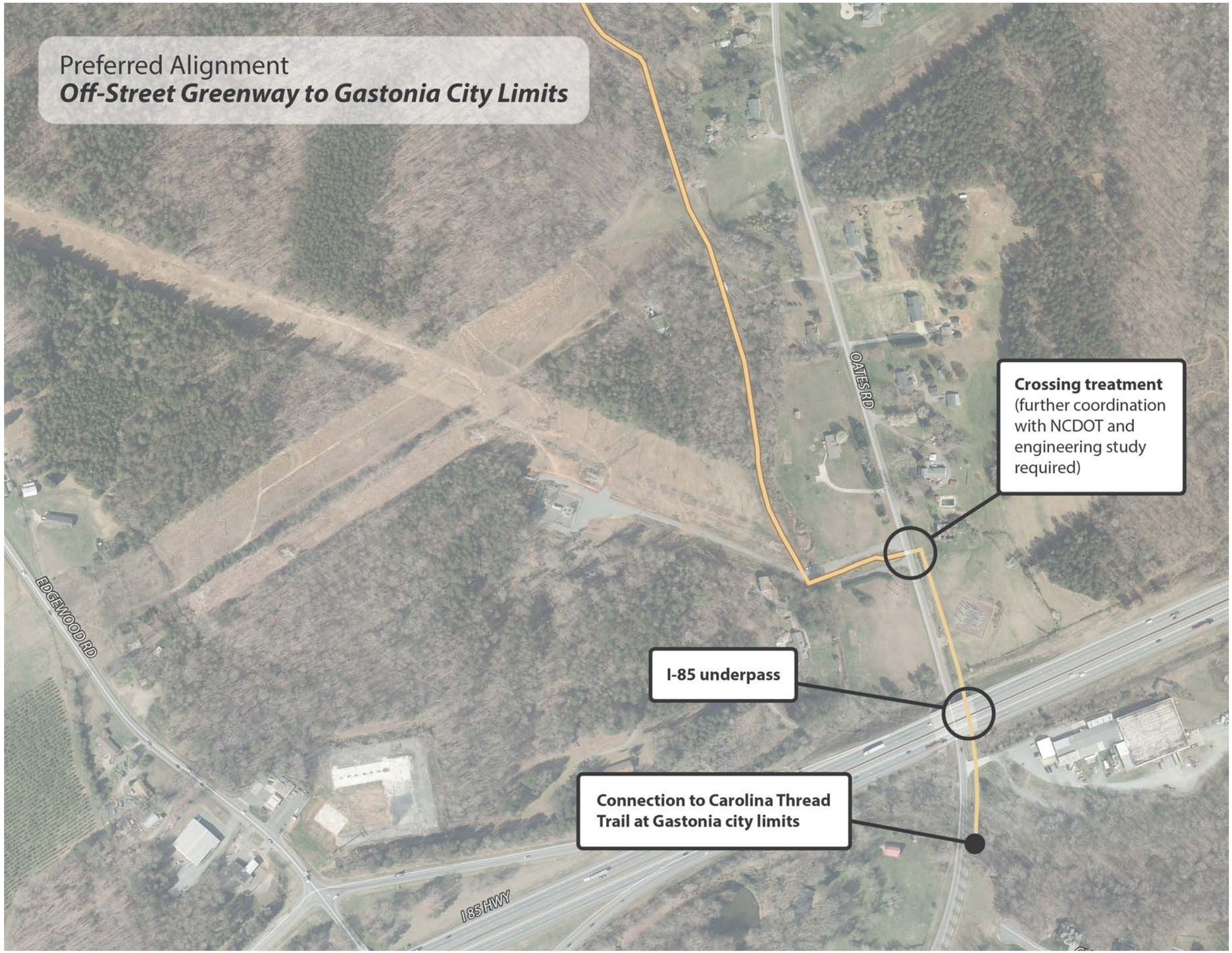
This segment of the greenway runs along several residential streets before transitioning to an off-street section north of Dover Dr., following existing sewer easements.

- *A "paper street" at E. Boston Ave. connects the greenway between 6th St. and Crescent Dr. and provides an opportunity for a pocket park with amenities like a small playground, a bicycle repair station and parking, drinking fountains, and a picnic shelter.*
- *A neighborhood connector would provide access to the main greenway from A St. and E Georgia Ave., where a secondary trailhead, parking area, and small playground could be placed within several city-owned parcels.*
- *The recommended greenway crossing treatment at Athenia Pl. is a marked crosswalk with a pedestrian hybrid beacon (PHB) or rectangular rapid flashing beacon (RRFB). (Further engineering study and coordination with NCDOT is needed to verify this crossing recommendation.)*



Entirely off-street, with the exception of a crossing on Southridge Pkwy., this section of the greenway generally follows existing utility easements and Oates Creek.

- *A trailhead and parking area on Southridge Pkwy. at the crossing location would provide a key access point for greenway users.*
- *The recommended greenway crossing treatment at Southridge Pkwy. is a pedestrian refuge island with a marked crosswalk and a pedestrian hybrid beacon (PHB) or rectangular rapid flashing beacon (RRFB). (Further engineering study and coordination with NCDOT is needed to verify this crossing recommendation.)*
- *Switchbacks are likely needed in two locations due to steep topography.*



The east end of the greenway continues to roughly follow existing utility easements before running along Oates Rd. and terminating south of I-85 at Oates Creek and the Gastonia city limit.

- *The recommended greenway crossing treatment at Oates Rd. is a marked crosswalk with a pedestrian hybrid beacon (PHB) or rectangular rapid flashing beacon (RRFB). (Further engineering study and coordination with NCDOT is needed to verify this crossing recommendation.)*
- *An existing underpass at I-85 provides a crucial opportunity for a tie-in between Bessemer City and Gastonia as part of the larger Carolina Thread Trail vision for multi-jurisdictional connection. There appears to be enough width between the existing bridge columns and the sloping abutment on the east side of Oates Rd. to accommodate the greenway.*

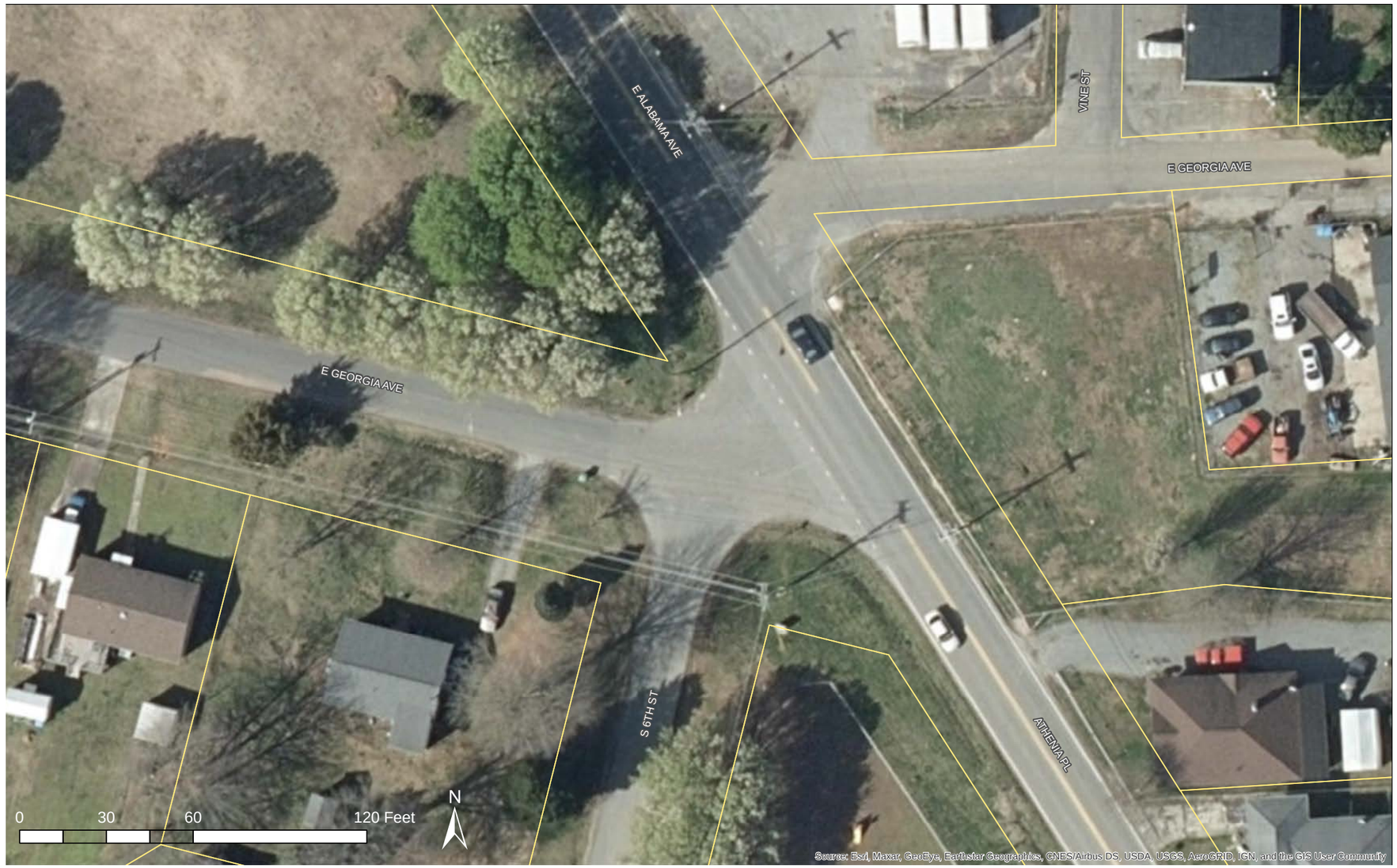
6TH ST./GEORGIA AVE./ALABAMA AVE./ATHENIA PL. INTERSECTION CONCEPTS

The intersection of 6th St. / Georgia Ave. / Alabama Ave. / Athenia Pl. is a particularly challenging spot along the preferred greenway alignment. The existing conditions create a challenging scenario for all users – drivers, pedestrians, and bicyclists. Bessemer City staff noted this intersection as a location of particular interest. The concepts illustrate some potential options for improvements that would help make vehicle movements more predictable and support the safety of all users by eliminating potential conflicts for drivers and greenway users.

(NOTE – The concepts are not dimensioned design drawings. They are simply intended to illustrate preliminary ideas for potential improvements. Further survey, design, and coordination among Bessemer City and NCDOT staff is required to determine the preferred greenway orientation and intersection treatments at this location.)

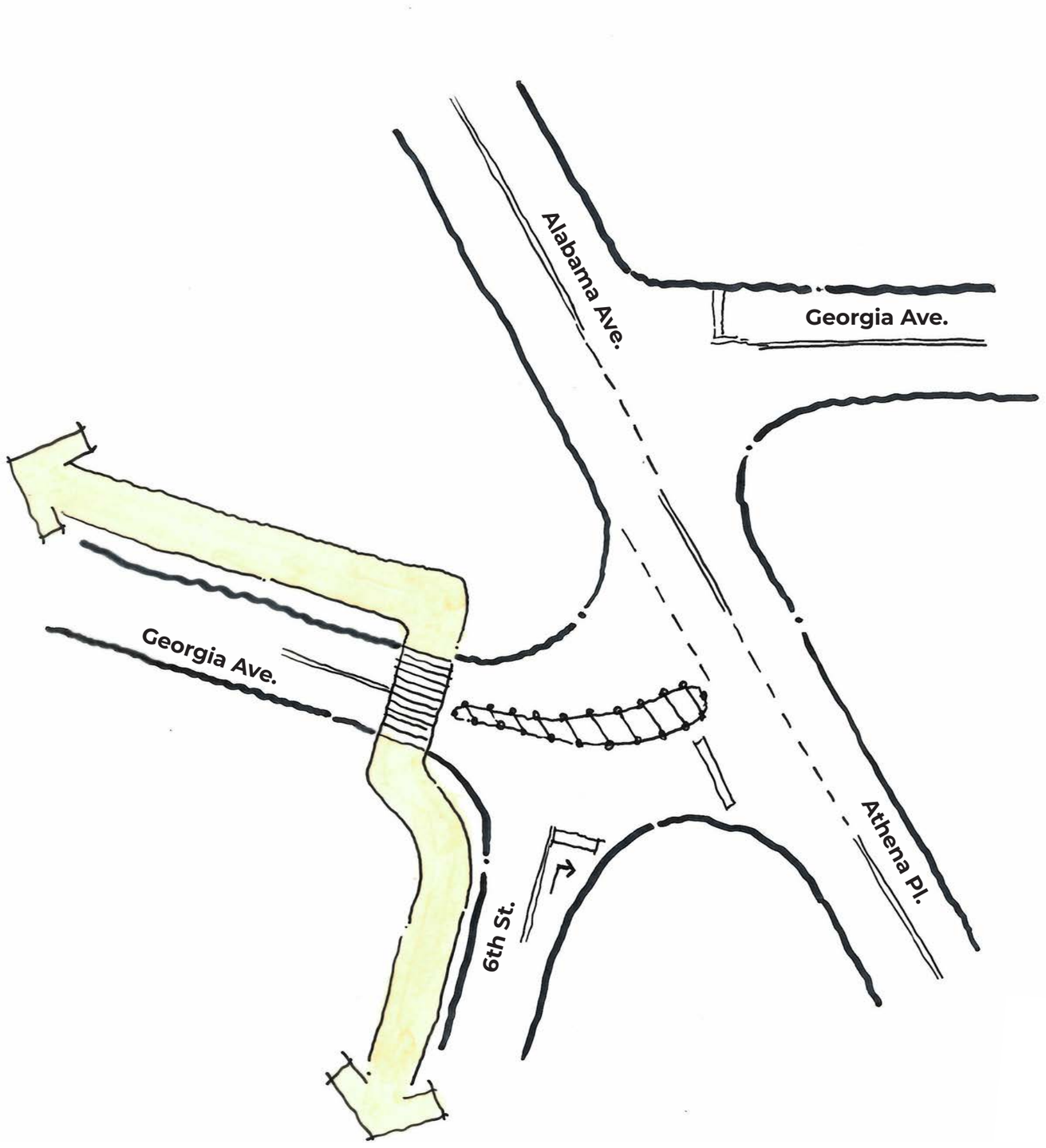
Existing

- Awkward geometries create confusion for drivers
- All streets and all approaches are two-way, creating lots of potential turning movement conflicts



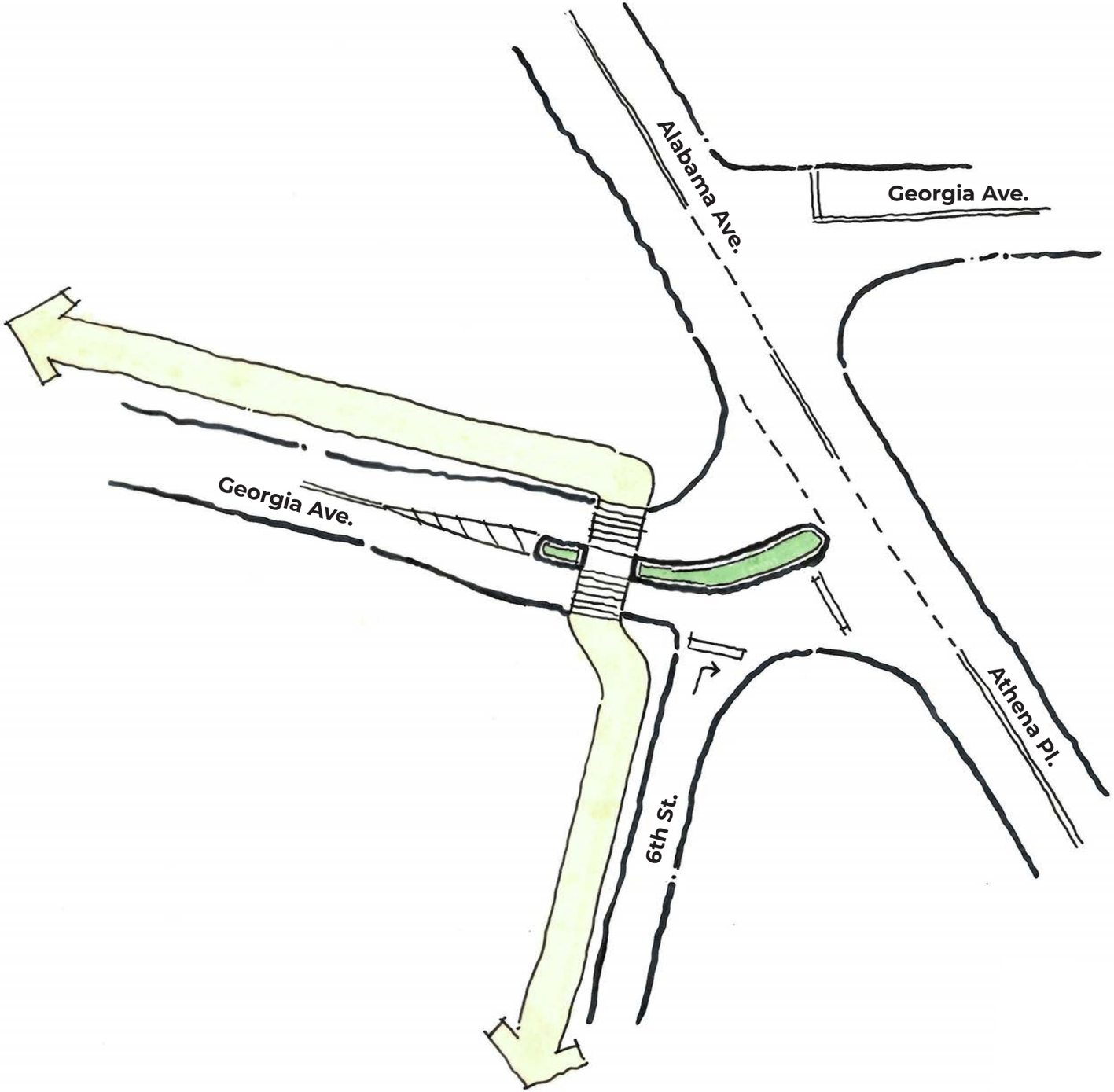
CONCEPT 1
“PAINT-AND-POST”

- All streets remain two-way
- Northbound 6th St. becomes right turn only
  - Eliminates some potential conflicts
- “Paint-and-post” median
  - Helps to make vehicle movements more predictable
  - Calms traffic
- Least challenging/expensive to implement
  - Does not require changes to existing pavement or roadway geometry



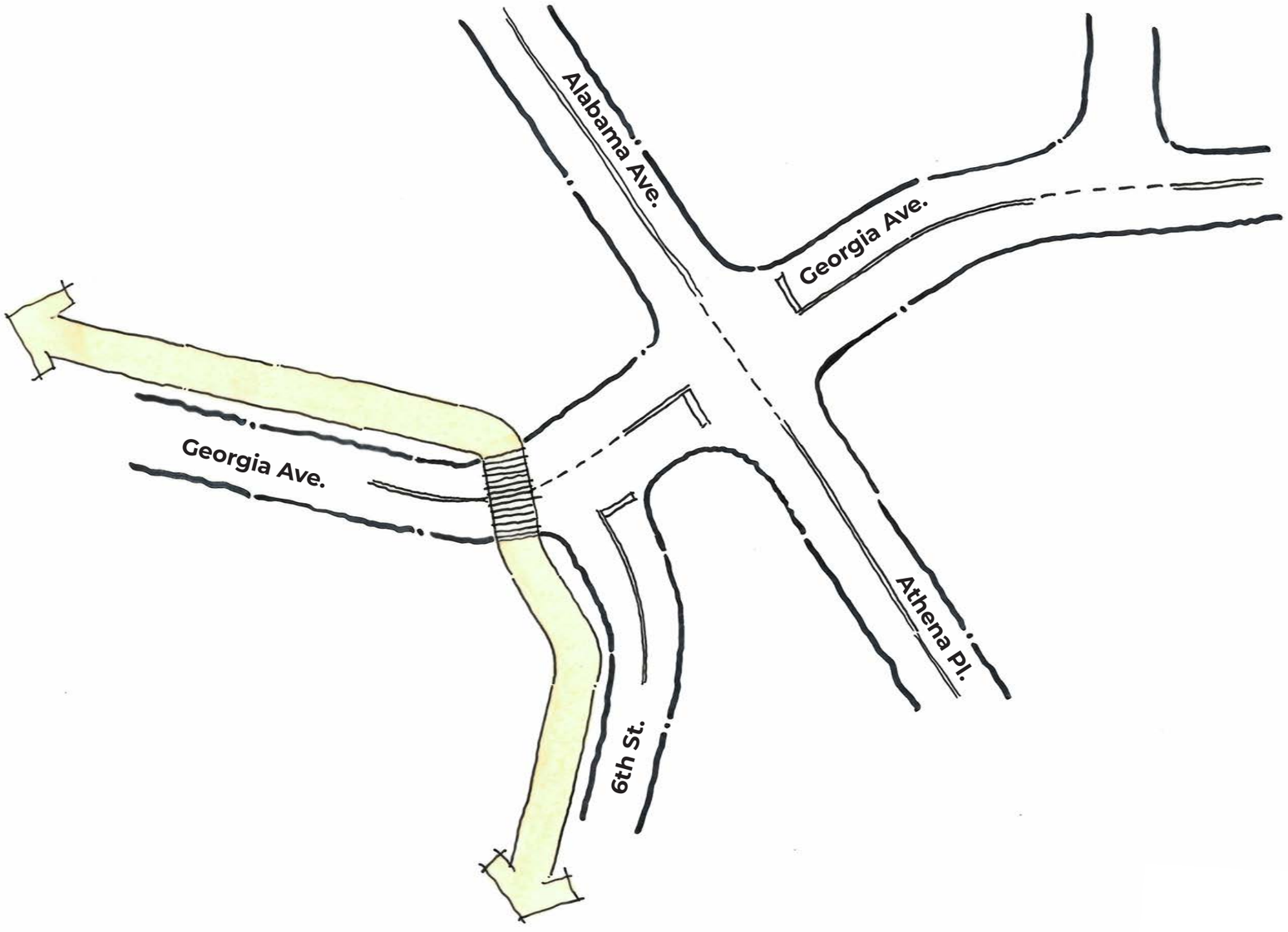
CONCEPT 2
CONCRETE MEDIAN

- 6th St. becomes one-way northbound from Boston Ave. to Georgia Ave.
  - Eliminates some potential conflicts
  - Creates more room to accommodate greenway along those two blocks
  - Allows curb extension to help support greenway crossing of Georgia Ave.
  - New travel pattern may require out-of-direction travel for a small number of drivers
- Concrete median
  - Helps to make vehicle movements more predictable
  - Calms traffic
  - Allows greenway users to cross Georgia Ave. in two stages
  - Offers space for landscaping
- More challenging/expensive than Concept 1
  - Requires some changes to Georgia Ave. (small widening to accommodate concrete median and lane tapers near 6th St.)



CONCEPT 3
GEORGIA AVE. REALIGNMENT

- Georgia Ave. is realigned across Alabama Ave. to eliminate offset intersections
  - Makes vehicle movements more predictable
  - Preserves two-way travel on all streets (NOTE – Converting northbound 6th St. to a right turn only at Georgia Ave. would help to eliminate more potential conflicts)
- Most challenging/expensive to implement
  - Requires significant changes to roadway geometry on both sides of Alabama Ave.
  - Requires right-of-way acquisition from adjacent parcels
  - Recommend installing new sidewalks on all approaches and a pedestrian crossing on Alabama Ave. if this option is pursued
  - Recommend discussing right-of-way preservation strategy with NCDOT if this is the desired option



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SECTION 5

NEXT STEPS FOR IMPLEMENTATION

SECTION 5

NEXT STEPS FOR IMPLEMENTATION

This section identifies some action steps that local leaders should take to pursue the implementation of the Downtown to Oates Creek Greenway.

Action Steps

1

Coordinate ASAP with ongoing infrastructure and development projects.

- There are several ongoing projects along the identified preferred alignment with implications for the design/construction of the Downtown to Oates Creek Greenway. The Osage Mill redevelopment near downtown is an especially important example because of the implications it has for constructing the greenway along the existing 11th St. right-of-way and rail underpass.
- City staff should identify funded/active projects (public and private) along the preferred alignment. Staff should meet with representatives from those projects to inform them about the greenway, ensure those projects do not inhibit or preclude future greenway construction, and where possible, pursue implementation of greenway segments (even very short segments) through these projects.

2

Name the greenway, generate public support, and build champions.

- Now that the most feasible alignment has been identified, City staff should develop a strategy for building public enthusiasm and support for the future greenway. The upcoming ribbon cutting for Stinger Park (anticipated in Spring 2023) could be a good opportunity to introduce the future greenway as the next big thing for parks, recreation, and active transportation in Bessemer City.
- Staff should be open to the possibility that public input may result in changes to the preferred alignment that is pursued in future design/construction work.
- As a part of building public support and local champions, staff should work with elected officials and community representatives to select a name a develop an exciting brand/logo for the future greenway. (See “Naming and Branding” on page 42 for a few early ideas.)

3

Adopt the alignment and reflect it in local land use plans and development ordinances.

- Bessemer City should formally adopt the preferred alignment and publish it on their website. Adoption by City Council will put the City in a better position apply for grant funding.
- To fully capitalize on an adopted alignment, City Council should take the additional step of adopting updates to their local land use plan and development ordinances that require adjacent developers to allocate space and construct the greenway. Local officials should consult with the City Attorney and staff planners to ensure these regulations are written and implemented correctly.
- The Board of Directors of Carolina Thread Trail and the Gaston County Commission should amend the Thread Trail’s Master Plan for Gaston County to reflect the alignment this study proposes.

4

Develop a phasing, property acquisition, and maintenance strategy.

- After the first 3 steps are completed, staff should focus on determining answers to the following questions:
  - Is phasing necessary/desirable? If so, what segments should be pursued first?
  - How will staff pursue property acquisition?
  - Who will maintain various segments once complete?
- Coordination with partners like NCDOT, the City of Gastonia, Gaston County, the GCLMPO, and the Carolina Thread Trail will be important to inform the answers to the questions above.
- Staff should work with the City Attorney to confirm what easement/property acquisition needs there are for segments of greenway that will run through private property along existing utility easements. Once the City knows the full extent of the property acquisition needs along the corridor, staff should prepare a strategy and cost estimate for purchasing necessary easements/right-of-way.
- It is helpful to identify the preferred maintenance approach early. This may change over time, but clearly identifying the responsible agency for maintenance will allow staff to plan for greenway design, construction, and maintenance in long range plans.

5

Pursue design funding.

- After phasing is determined, the City should begin allocating funds toward project design. Where possible, local funds should be used to fund 100% design of key segments. Having completed project designs with full cost estimates will put local leaders in a better position to pursue funds for “shovel-ready” projects.
- Where necessary, local funds should be used as a match to pursue state/federal grant funding to support 100% design of key segments. GCLMPO and Carolina Thread Trail staff will be a useful resource for helping City staff keep up with various state/federal funding opportunities.

6

Pursue construction funding.

- In the initial phases of project design (25% and beyond), City staff will get a clearer picture of the cost to build the greenway. Some sections of greenway may be able to move forward through local funds. Some may require additional funds from state and federal sources.
- GCLMPO is an important resource to help pursue state/federal funds. GCLMPO staff are best equipped to help get the greenway onto the state’s Transportation Improvement Program and to keep track of additional grant funding sources that may be available through the federal government (e.g., various Infrastructure Investment and Jobs Act (IIJA) programs).
- Private funding may also be available. The Carolina Thread Trail is an important resource for this.

7

Build and celebrate Bessemer City’s transformative, new community asset.

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SECTION 6

NAMING AND BRANDING

SECTION 6
NAMING AND BRANDING

YELLOW JACKET TRAIL

Yellow Jacket Trail

The Yellow Jacket Trail name and logo expands upon Bessemer City's bee theme. Bees are a part of the community's identity from several school mascots to downtown murals. This name/branding is also complementary to Stinger Park, and major park and recreation investment set to open in Spring of 2023.

MOUNTAIN VIEW GREENWAY

Mountain View Greenway

Crowders Mountain can be seen in the distance from downtown Bessemer City and from several points on the proposed greenway alignment. The communities of Bessemer City and Kings Mountain are known for being gateways to Crowders Mountain State Park and Kings Mountain State Park areas. This name/logo option celebrates that identity and recognizes that greenway provides opportunities for possible future connection to trails in Crowders Mountain State Park through the Carolina Thread Trail.

IRON TRAIL

Iron Trail

Bessemer City has a unique history associated with manufacturing and iron smelting. The city gets it's name from the "Bessemer Process" which was the first process for inexpensively producing steel on an industrial scale. Combined with the city's tagline a "City with a Heart," this logo/name scheme brings together two important pieces of the city's identity.

APPENDICES

BESSEMER CITY GREENWAY FEASIBILITY STUDY

DOWNTOWN TO OATES CREEK - MARCH 2023

APPENDIX A

OPINION OF PROBABLE CONSTRUCTION COST

	PS&E/CONST MGMT	R/W	CONSTRUCTION	30% CONTINGENCY	TOTAL
Streetside Greenway (from NW project limit at 13th St./W. Virginia Ave. to utility easement at 301 Dover Dr.)	$1,004,000	$1,800,000	$2,509,660	$1,594,100	**$6,907,800**
Creekside Greenway (from utility easement at 301 Dover Dr. to SE project limit at Oates Creek)	$675,800	$0	$1,689,383	$709,560	**$3,074,700**
Neighborhood Connector (from main alignment to A St./E. Georgia Ave.)	$112,200	$0	$280,149	$117,710	**$510,100**

A concept-level opinion of probable construction costs (OPCC) was prepared internally by the consultant team for the preferred alternative based on design expert opinion. ***Note that this is not a detailed cost estimate based on any engineered plans. The final cost of project design, right-of-way, and construction will change*** as unit costs and property acquisition costs fluctuate, as the design develops, and as additional information is obtained from topographic survey, boundary survey, geotechnical investigations, utility coordination, right-of-way negotiations, and environmental services.

A summary table of the OPCC is shown above. The full OPCC is shown on the following page.

The following are a list of major assumptions involved in preparing the OPCC:

- Year 2023 unit prices were incorporated without consideration for inflation.
- No total takes or major structural impacts were assumed.
- Allowances (as a percentage of the overall project cost estimate) rather than detailed quantities were estimated for some items such as mobilization, traffic control, erosion control, earthwork, landscaping, and signage.
- Path width corresponds to the typical section in the report. Path pavement section is 4” of asphalt over 4” of aggregate. Parking lot pavement section is 5” of asphalt over 8” of aggregate.
- Sidewalk widening will include demolition of existing sidewalk and installation of new sidewalk.
- Project does not include lighting for the path.
- Proposed Right-of-way is an allowance based on the planning concept, but particularly anticipated on Dover Drive and on Crescent Drive.
- Right-of-way costs are shown at $30 per square foot at this planning stage.
- Right-of-way for the Creekside sections are assumed to be within the existing utility easements as a permitted use. Staff should work with the City Attorney to confirm the validity of this assumption. (See “Next Steps for Implementation” on page 39.)
- Costs for both “Pocket Parks” (at Virginia/11th and E Boston/6th) are given as an allowance as details of the parks are not defined.
- 300 linear feet of 11th Street underpass to be overlaid with 2 inches of asphalt.
- Pedestrian-activated Rectangular Rapid Flashing Beacons (RRFBs) are proposed at the Dover/Athenia intersection, at the Southridge Parkway crossing, and at the Oates Road crossing.
- Utility poles are anticipated to be relocated along Dover Drive and along Oates Road, at $15,000 per pole.
- Pedestrian bridge is proposed east of Southridge Parkway at 100 feet long by 16 feet wide.
- Existing utility easement culverts will need to be extended to accommodate the path.
- Project does not include crossing Oates Creek at the end of the alignment.
- Costs were prepared independently of any other planned or programmed improvements such as roadway resurfacing or maintenance.

Bessemer City Greenway

Bessemer City, NC

Project No. 27843

Engineer's Opinion of Probable Construction Costs

Prepared by: Josh Hurst, P.E.

March 3, 2023

		1 - Streetside			2 - Creekside			Alternate A - Neighborhood Connector		
	This Estimate has a Rating of:	**2C**	*(See rating scale guide below.)*		**2C**	*(See rating scale guide below.)*		**2C**	*(See rating scale guide below.)*	
	ITEM	UNIT	QUANTITY	UNIT PRICE	TOTAL COST	QUANTITY	UNIT PRICE	TOTAL COST	QUANTITY	UNIT PRICE	TOTAL COST
	Mobilization / Construction Surveying	LS	1	$206,000.00	$206,000.00	1	$139,000.00	$139,000.00	1	$23,000.00	$23,000.00
	Traffic Control	LS	1	$35,000.00	$35,000.00	1	$23,000.00	$23,000.00	1	$4,000.00	$4,000.00
	Erosion Control	LS	1	$123,000.00	$123,000.00	1	$82,000.00	$82,000.00	1	$17,000.00	$17,000.00
	Removal of Structures and Obstructions	LS	1	$47,000.00	$47,000.00	1	$32,000.00	$32,000.00	1	$6,000.00	$6,000.00
	Clearing and Grubbing	LS	1	$42,000.00	$42,000.00	1	$28,000.00	$28,000.00	1	$5,000.00	$5,000.00
	Regular Excavation	CY	9,800	$50.00	$490,000.00	6,533	$50.00	$326,666.67	1,333	$50.00	$66,666.67
	Parking Lot - Aggregate Base Course, 8"	TON	0	$40.00	$0.00	436	$40.00	$17,440.00	847	$40.00	$33,880.00
	Path - Aggregate Base Course, 4"	TON	2,345	$40.00	$93,786.00	3,126	$40.00	$125,048.00	319	$40.00	$12,760.00
	Path - 4" Asphalt Asphalt Surface Course	TON	2,372	$110.00	$260,876.00	3,162	$110.00	$347,834.67	323	$110.00	$35,493.33
	Concrete Median	SY	125	$150.00	$18,750.00	150	$110.00	$16,500.00	0	$110.00	$0.00
	Retaining Wall	SF	1,500	$65.00	$97,500.00	0	$65.00	$0.00	0	$65.00	$0.00
	Asphalt Concrete Surface Course, 2"	TON	97	$110.00	$10,648.00	97	$110.00	$10,648.00	188	$110.00	$20,704.44
	Asphalt Concrete Base Course, 3"	TON	0	$105.00	$0.00	145	$105.00	$15,246.00	282	$105.00	$29,645.00
	Culvert Extension	LF	0	$250.00	$0.00	60	$250.00	$15,000.00	0	$250.00	$0.00
	Pedestrian Bridge	SF	0	$200.00	$0.00	1,600	$200.00	$320,000.00	0	$200.00	$0.00
	RRFB	EA	1	$30,000.00	$30,000.00	2	$30,000.00	$60,000.00	0	$30,000.00	$0.00
	Pocket Park (at both Virginia/11th and E Boston/6th)	SF	37,000	$10.00	$370,000.00	0	$10.00	$0.00	0	$10.00	$0.00
	Storm Drainage 15" RCP Pipe	LF	2,000	$150.00	$300,000.00	80	$150.00	$12,000.00	0	$150.00	$0.00
	Storm Drainage Structures	EA	20	$10,000.00	$200,000.00	4	$10,000.00	$40,000.00	0	$10,000.00	$0.00
	Landscaping, Complete	LS	1	$25,100.00	$25,100.00	1	$19,000.00	$19,000.00	1	$3,000.00	$3,000.00
	Pavement Markings	LF	3,000	$ 5.00	$15,000.00	2,000	$ 5.00	$10,000.00	1,200	$ 5.00	$6,000.00
	Signage, Complete	LS	1	$ 25,000.00	$25,000.00	1	$ 5,000.00	$5,000.00	1	$ 2,000.00	$2,000.00
	Water, Sewer, and Franchise Utility Relocations	LS	1	$ 120,000.00	$120,000.00	1	$ 45,000.00	$45,000.00	1	$ 15,000.00	$15,000.00
	TOTAL CONSTRUCTION COST				$ 2,509,660			$ 1,689,383			$ 280,149
	ENGINEERING, R/W, CEI										
	Engineering (PS&E)	LS	20%	$ 2,509,660.00	$502,000.00		$ 1,689,383.33	$337,900.00		$ 280,149.44	$56,100.00
	Potential New Right-of-Way Needed	SF	60,000	$ 30.00	$1,800,000.00	0	$ 30.00	$0.00	0	$ 30.00	$0.00
	Construction Management & Inspection	LS	20%	$ 2,509,660.00	$502,000.00		$ 1,689,383.33	$337,900.00		$ 280,149.44	$56,100.00
	ENGINEERING, R/W, CEI SUBTOTAL				$ 2,804,000			$ 675,800			$ 112,200
	TOTAL ENGINEERING, R/W, CEI, AND CONSTRUCTION SUBTOTAL				$ 5,313,660			$ 2,365,183			$ 392,349
	30% Contingency				$ 1,594,100			$ 709,560			$ 117,710
	TOTAL ESTIMATED ENGINEERING, R/W, CEI, AND CONSTRUCTION COST				$ 6,907,800			$ 3,074,700			$ 510,100

Scope Accuracy:

Level 1: Project scope well understood and well defined.

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; Unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%.

Level C: No engineering performed. Educated guesstimating. Limited technical information available and/or analysis performed. Project Development and Construction Contingencies should be selected appropriately by Project Manager. Contingency may range up to 50%.

APPENDIX B

RECOMMENDATIONS FOR OSAGE MILL REDEVELOPMENT PLAN

The study team reviewed the Osage Mill redevelopment plans for consistency with the City's desire to accommodate a greenway connection through the site. Preliminary findings and recommendations are as follows, along with three options for altering the current redevelopment plans to accommodate the greenway.

Preliminary Findings & Recommendations

1

The portion of the site in question is currently a public right-of-way for 11th St. The City has a special interest in accommodating multimodal transportation needs, in coordination with the planned greenway, through this public corridor. The plans as currently drawn do not serve that interest.

2

We recommend a minimum greenway width of 12' through the site along the City's existing right-of-way from the 11th St. underpass to Alabama Ave. A 12' minimum greenway width is consistent with typical design standards for shared-use paths that are expected to carry bi-directional pedestrian/bicycle travel. A 12' minimum width is also consistent with other segments of the Carolina Thread Trail.

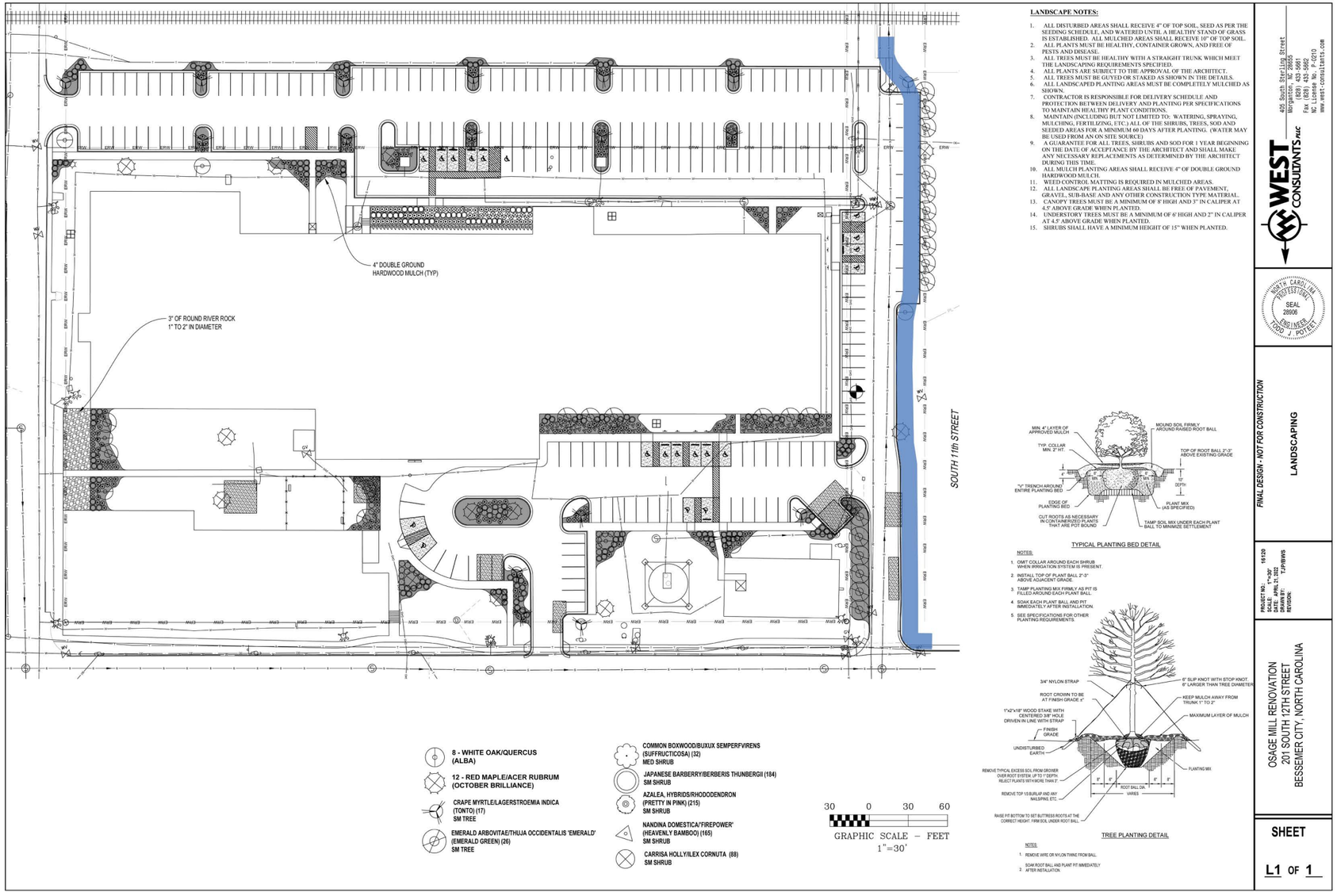
3

There may be a temptation to leave the plans as is, for the sake of expediency, and use the parking lot drive aisle as the primary greenway connection between the 11th St. underpass and Alabama Ave. We do not recommend this. That configuration would not meet the all-ages-and-abilities user type that the Carolina Thread Trail is intended to serve. It would introduce conflicts between greenway users and vehicles in the parking lot that would discourage greenway use and impede safety. We believe it is in the best interests of the City and its residents to ensure that a separate greenway path is accommodated through the Osage Mill redevelopment along the existing 11th St. right-of-way.

4

We have identified 3 possible options for accommodating the greenway through the Osage Mille redevelopment. Explanations and corresponding plan markups are attached. Our team recommends Option 1 as the least disruptive option to the existing Osage Mill redevelopment plans.

OPTION 1 (RECOMMENDED)



LANDSCAPE NOTES:

1. ALL DISTURBED AREAS SHALL RECEIVE 4" OF TOP SOIL, SEED AS PER THE SEEDING SCHEDULE, AND WATERED UNTIL A HEALTHY STAND OF GRASS IS ESTABLISHED. ALL MULCHED AREAS SHALL RECEIVE 10" OF TOP SOIL.
2. ALL PLANTS MUST BE HEALTHY, CONTAINER GROWN, AND FREE OF PESTS AND DISEASE.
3. ALL TREES MUST BE HEALTHY WITH A STRAIGHT TRUNK WHICH MEET THE LANDSCAPING REQUIREMENTS SPECIFIED.
4. ALL PLANTS ARE SUBJECT TO THE APPROVAL OF THE ARCHITECT.
5. ALL TREES MUST BE GUYED OR STAKED AS SHOWN IN THE DETAILS.
6. ALL LANDSCAPED PLANTING AREAS MUST BE COMPLETELY MULCHED AS SHOWN.
7. CONTRACTOR IS RESPONSIBLE FOR DELIVERY SCHEDULE AND PROTECTION BETWEEN DELIVERY AND PLANTING PER SPECIFICATIONS TO MAINTAIN HEALTHY PLANT CONDITIONS.
8. MAINTAIN (INCLUDING BUT NOT LIMITED TO: WATERING, SPRAYING, MULCHING, FERTILIZING, ETC.) ALL OF THE SHRUBS, TREES, SOD AND SEEDED AREAS FOR A MINIMUM 60 DAYS AFTER PLANTING. (WATER MAY BE USED FROM AN ON SITE SOURCE)
9. A GUARANTEE FOR ALL TREES, SHRUBS AND SOD FOR 1 YEAR BEGINNING ON THE DATE OF ACCEPTANCE BY THE ARCHITECT AND SHALL MAKE ANY NECESSARY REPLACEMENTS AS DETERMINED BY THE ARCHITECT DURING THIS TIME.
10. ALL MULCH PLANTING AREAS SHALL RECEIVE 4" OF DOUBLE GROUND HARDWOOD MULCH.
11. WEED CONTROL MATTING IS REQUIRED IN MULCHED AREAS.
12. ALL LANDSCAPE PLANTING AREAS SHALL BE FREE OF PAVEMENT, GRAVEL, SUB-BASE AND ANY OTHER CONSTRUCTION TYPE MATERIAL.
13. CANOPY TREES MUST BE A MINIMUM OF 8' HIGH AND 3" IN CALIPER AT 4.5" ABOVE GRADE WHEN PLANTED.
14. UNDERSTORY TREES MUST BE A MINIMUM OF 6' HIGH AND 2" IN CALIPER AT 4.5" ABOVE GRADE WHEN PLANTED.
15. SHRUBS SHALL HAVE A MINIMUM HEIGHT OF 15" WHEN PLANTED.

TYPICAL PLANTING BED DETAIL

NOTES:

1. OMIT COLLAR AROUND EACH SHRUB WHEN IRRIGATION SYSTEM IS PRESENT.
2. INSTALL TOP OF PLANT BALL 2"-3" ABOVE ADJACENT GRADE.
3. TAMP PLANTING MIX FIRMLY AS PIT IS FILLED AROUND EACH PLANT BALL.
4. SOAK EACH PLANT BALL AND PIT IMMEDIATELY AFTER INSTALLATION.
5. SEE SPECIFICATIONS FOR OTHER PLANTING REQUIREMENTS.

TREE PLANTING DETAIL

NOTES:

1. REMOVE WIRE OR NYLON TWINE FROM BALL.
2. SOAK ROOT BALL AND PLANT PIT IMMEDIATELY AFTER INSTALLATION.

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NORTH CAROLINA PROFESSIONAL SEAL 28606 ENGINEER TODD J. POTTER

FINAL DESIGN - NOT FOR CONSTRUCTION

LANDSCAPING

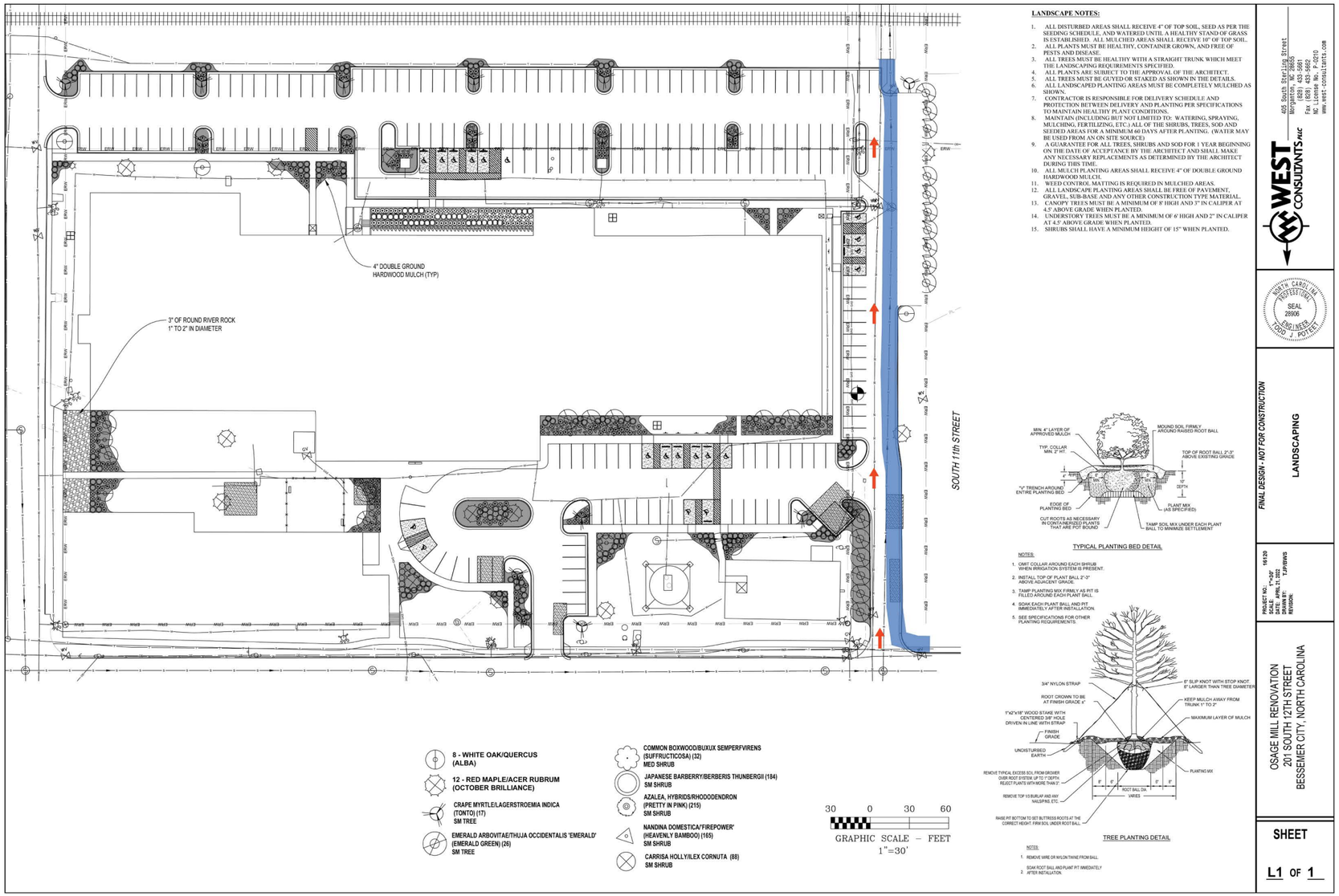
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SCALE: 1"=30'
DATE: JUL 21, 2021
DRAWN BY: TJP/BWS
REVISION:

OSAGE MILL RENOVATION
201 SOUTH 12TH STREET
BESSEMER CITY, NORTH CAROLINA

SHEET
L1 OF 1

- Accommodates the 12' greenway along the eastern edge of the parking lot. (See blue line.)
- Removes 18 parking space from the NE corner of the parking lot. It may be possible to reconfigure that row of parking to gain back 7 to 8 parallel parking spaces along the two-way drive aisle. That would mean a net loss of 10 to 11 spaces.
- The plans show that the developer of the site is planning to build a retaining wall along the eastern edge of the parking lot. This option may require modifying that planned retaining wall.

OPTION 2



LANDSCAPE NOTES:

1. ALL DISTURBED AREAS SHALL RECEIVE 4" OF TOP SOIL, SEED AS PER THE SEEDING SCHEDULE, AND WATERED UNTIL A HEALTHY STAND OF GRASS IS ESTABLISHED. ALL MULCHED AREAS SHALL RECEIVE 10" OF TOP SOIL.
2. ALL PLANTS MUST BE HEALTHY, CONTAINER GROWN, AND FREE OF PESTS AND DISEASE.
3. ALL TREES MUST BE HEALTHY WITH A STRAIGHT TRUNK WHICH MEET THE LANDSCAPING REQUIREMENTS SPECIFIED.
4. ALL PLANTS ARE SUBJECT TO THE APPROVAL OF THE ARCHITECT.
5. ALL TREES MUST BE GUYED OR STAKED AS SHOWN IN THE DETAILS.
6. ALL LANDSCAPED PLANTING AREAS MUST BE COMPLETELY MULCHED AS SHOWN.
7. CONTRACTOR IS RESPONSIBLE FOR DELIVERY SCHEDULE AND PROTECTION BETWEEN DELIVERY AND PLANTING PER SPECIFICATIONS TO MAINTAIN HEALTHY PLANT CONDITIONS.
8. MAINTAIN (INCLUDING BUT NOT LIMITED TO: WATERING, SPRAYING, MULCHING, FERTILIZING, ETC.) ALL OF THE SHRUBS, TREES, SOD AND SEEDED AREAS FOR A MINIMUM 60 DAYS AFTER PLANTING. (WATER MAY BE USED FROM AN ON SITE SOURCE)
9. A GUARANTEE FOR ALL TREES, SHRUBS AND SOD FOR 1 YEAR BEGINNING ON THE DATE OF ACCEPTANCE BY THE ARCHITECT AND SHALL MAKE ANY NECESSARY REPLACEMENTS AS DETERMINED BY THE ARCHITECT DURING THIS TIME.
10. ALL MULCH PLANTING AREAS SHALL RECEIVE 4" OF DOUBLE GROUND HARDWOOD MULCH.
11. WEED CONTROL MATTING IS REQUIRED IN MULCHED AREAS.
12. ALL LANDSCAPE PLANTING AREAS SHALL BE FREE OF PAVEMENT, GRAVEL, SUB-BASE AND ANY OTHER CONSTRUCTION TYPE MATERIAL.
13. CANOPY TREES MUST BE A MINIMUM OF 8' HIGH AND 3" IN CALIPER AT 4.5' ABOVE GRADE WHEN PLANTED.
14. UNDERSTORY TREES MUST BE A MINIMUM OF 6' HIGH AND 2" IN CALIPER AT 4.5' ABOVE GRADE WHEN PLANTED.
15. SHRUBS SHALL HAVE A MINIMUM HEIGHT OF 15" WHEN PLANTED.

TYPICAL PLANTING BED DETAIL

NOTES:

1. OMIT COLLAR AROUND EACH SHRUB WHEN IRRIGATION SYSTEM IS PRESENT.
2. INSTALL TOP OF PLANT BALL 2"-3" ABOVE ADJACENT GRADE.
3. TAMP PLANTING MIX FIRMLY AS PIT IS FILLED AROUND EACH PLANT BALL.
4. SOAK EACH PLANT BALL AND PIT IMMEDIATELY AFTER INSTALLATION.
5. SEE SPECIFICATIONS FOR OTHER PLANTING REQUIREMENTS.

TREE PLANTING DETAIL

NOTES:

1. REMOVE WIRE OR NYLON TWINE FROM BALL.
2. SOAK ROOT BALL AND PLANT PIT IMMEDIATELY AFTER INSTALLATION.

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NORTH CAROLINA PROFESSIONAL SEAL 28908 ENGINEER TODD J. POTEET

FINAL DESIGN - NOT FOR CONSTRUCTION

LANDSCAPING

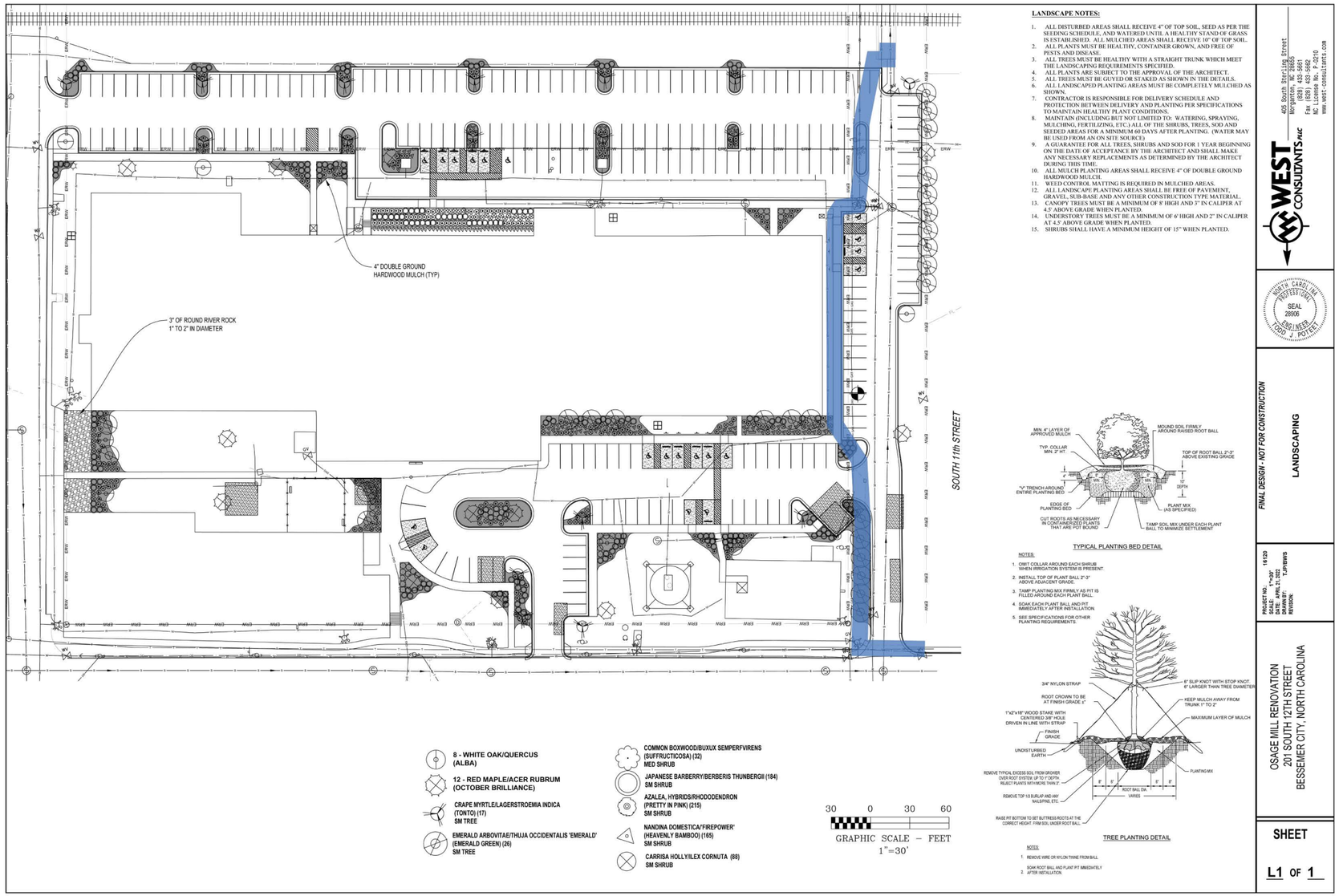
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DATE: APRIL 21, 2022
DRAWN BY: TJP/BWS
REVISIONS:

OSAGE MILL RENOVATION
201 SOUTH 12TH STREET
BESSEMER CITY, NORTH CAROLINA

SHEET
L1 OF 1

- Accommodates the 12' greenway along the eastern edge of the parking lot. (See blue line.)
- The potential advantage of this option over Option 1 is that it keeps the greenway within the footprint of the proposed parking lot and would not require any modifications to the planned grading or retaining wall.
- The disadvantage over Option 1 is that it converts the proposed two-way drive aisle along the eastern portion of the parking lot to a one-way drive aisle. (See orange arrows.) Exiting vehicles would have to use one of the other two driveways.
- It also removes 18 parking space from the northeast corner of the parking lot.

OPTION 3



- Accommodates the 12’ greenway along the eastern building edge. (See blue line.)
- Requires greenway users to cross 4 drive aisles. This is a disadvantage for user safety and comfort over Options 1 and 2.
- Requires widening the sidewalk along the eastern edge of the building from 6’ to 12’. If there are no planned building entrances along this side of the building, this option may be possible without disrupting the proposed parking. If there are planned building entrances along the eastern side of the building, or other constraints that may prevent a 12’ clear width for the greenway, this option would disrupt 18 parking spaces (including 4 handicap spaces) along the eastern edge of the building. Some of these parking spaces may be able to be reconfigured as parallel parking space to mitigate the net loss of parking.
- Other parking lot modifications along the northern edge of the site would be necessary, likely resulting in the loss of 4 additional parking spaces.
- Requires moving a proposed backflow preventer (marked as 4” RPZ on plans). May require modifications to other planned utilities.
- This option is also the most disruptive to the current landscaping plans.

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Bessemer City
NORTH CAROLINA
City with a Heart

CAROLINA THREAD TRAIL

KITTELSON & ASSOCIATES