KITTELSON & ASSOCIATES

FAYETTEVILLE COMPREHENSIVE TRANSPORTATION PLAN

FAYETTEVILLE, NC

April 2024

Inside front cover

Page Intentionally blank

Fayetteville Comprehensive Transportation Plan

Fayetteville, NC

Prepared for:
City of Fayetteville
339 Alexander Street
Fayetteville, NC 28301

Prepared by:
Kittelson & Associates, Inc.
272 North Front Street, Suite 410
Wilmington, NC 28401
910.475.1789

Tara Hofferth, PE
Senior Engineer

Zachary Bugg, PhD, PE
Associate Engineer

Project Number 272110.001

April 2024

Page Intentionally blank

CONTENTS

LIST OF FIGURES

LIST OF TABLES

APPENDICES

Page intentionally blank.

Section 1
Executive Summary

EXECUTIVE SUMMARY

Fayetteville has recently experienced several severe flooding events and is at risk of more flooding in the future. The Cape Fear River, which runs along Fayetteville's eastern border, has swelled on multiple occasions, causing damage to nearby residences and properties. During flood events, automobile crashes, utility maintenance and repairs, and other major incidents, transportation access to some communities with a single point of access has been reduced such that some people cannot reach their homes, evacuate, or be reached by emergency responders. This concern about resiliency and safety was the core driver for analyzing street connectivity in Fayetteville.

Figure 1: Flooding in Fayetteville
(Source: Fayetteville Police Department, WorldPress.com)

The lack of street connectivity in Fayetteville also decreases access for people walking and biking, which may be especially impactful to the mobility of residents who do not have access to a vehicle. There is also a need to think more strategically about the function and operation of the existing corridors in Fayetteville's transportation network. This was recommended in the recently completed Fayetteville Area Metropolitan Planning Organization's (FAMPO) Congestion Management Process. The City of Fayetteville (the City) is looking to understand where corridor deficiencies exist, where performance is acceptable, and which corridor projects should be part of the Capital Improvement Program.

With these challenges in mind and building upon momentum from regional planning efforts, the City set out to develop a Comprehensive Transportation Plan (CTP). This CTP responds to community concerns and provides an effective blueprint for identifying, funding, and implementing transportation projects in Fayetteville in the years to come. The scope for this effort includes data collection, street connectivity analysis, strategic corridor analysis, connectivity and corridor project recommendations, and public and agency engagement. This report summarizes the work performed, including the analysis methodology, data collection, engagement, and corresponding findings and results.

This CTP includes short- and long-term solutions for providing additional street connectivity and resiliency while improving the form and function of existing infrastructure. The City conducted a Transportation Connectivity Analysis and a Strategic Corridor Analysis to identify opportunities for better connecting the street grid in Fayetteville while better leveraging the connectivity that does exist. A total of 17 new street connections have been identified as high-priority and recommended for implementation to improve resiliency of the street network and to expand multimodal access. Additionally, a series of multimodal improvement projects were recommended along 15 City-maintained corridors to address safety and mobility. Upon approval of the CTP, the project recommendations should be progressed through the project delivery process, including additional community engagement, environmental permitting, engineering design, and elected official approval.

Section 2
Connectivity Analysis

CONNECTIVITY ANALYSIS

Transportation in the City of Fayetteville is generally characterized by local streets and cul-de-sacs that lack connectivity between subdivisions. Traditional urban grid streets in Fayetteville constitute less than seven percent of the City's total area. Instead, the City's major arterial roadways radiate out from the urban core, and residential streets typically branch out from those spines and dead end at creeks, railroads, or backyards. As a result, a handful of well-connected City streets must carry high traffic volumes and serve many needs.

The City of Fayetteville identified 231 subdivisions in Fayetteville that are greater than 10 acres in size with just one access point. Disconnected neighborhoods discourage active modes of transportation, lack resiliency during flood events, lengthen emergency response times, and increase vehicle miles travelled. Traveling between neighborhoods in Fayetteville might require miles of out-of-direction travel on high speed, high volume arterial streets. Multimodal connectivity is limited, with many residents not able to reach bus stops, schools, or key community destinations by walking or biking, even when those destinations are not physically far away. This lack of connectivity can be especially impactful during flooding events, when communities may be cut off from key access, resources, and emergency response procedures.

To address safety concerns related to the lack of street connectivity in Fayetteville, the City performed a connectivity analysis to identify potential connections that improve transportation resiliency in the city.

SCOPE OF WORK

The Connectivity Analysis included the following tasks:

1. Steering Committee Coordination
2. Data Collection
3. Initial Assessment
4. Project Ranking and Prioritization
5. Project Recommendations
6. Development Code Review

STEERING COMMITTEE COORDINATION

As part of this effort, the project team worked closely with a Steering Committee comprised of City Staff to collect data, develop performance metrics, and review possible connections. This Steering Committee consisted of Staff from Public Services, Development Services, Emergency Response (Police and Fire), and the City Manager's Office. Through bi-weekly progress meetings and periodic work sessions, the Committee provided technical reviews and feedback at critical stages of the project. They relayed local context, emphasized potential implementation obstacles, and provided information regarding ongoing development projects. Other City staff including stormwater management were also engaged at relevant points throughout the study to collect feedback and provide an overview of the project.

DATA COLLECTION

The Steering Committee identified 231 subdivisions in the city that are greater than 10 acres in size with only one access point. As shown in Figure 2, these subdivisions are spread throughout the city, but they are particularly concentrated further from the urban core, especially in the southwest and northernmost parts of the city. The subdivisions are also typically concentrated around major arterials, railroad lines, and environmental features.

To identify potential street connections, the following data were collected:

- Street Classification[1]
- Average Annual Daily Traffic (AADT) (collectors and arterials)[2]
- Sidewalk/trail network
- Transit stops
- Emergency response areas[3]
- Schools[3]
- Major employers
- Parks/community centers[3]
- Environmental Justice performance measures[4]

All data collected and analyzed is included in the Map Package in Appendix A.

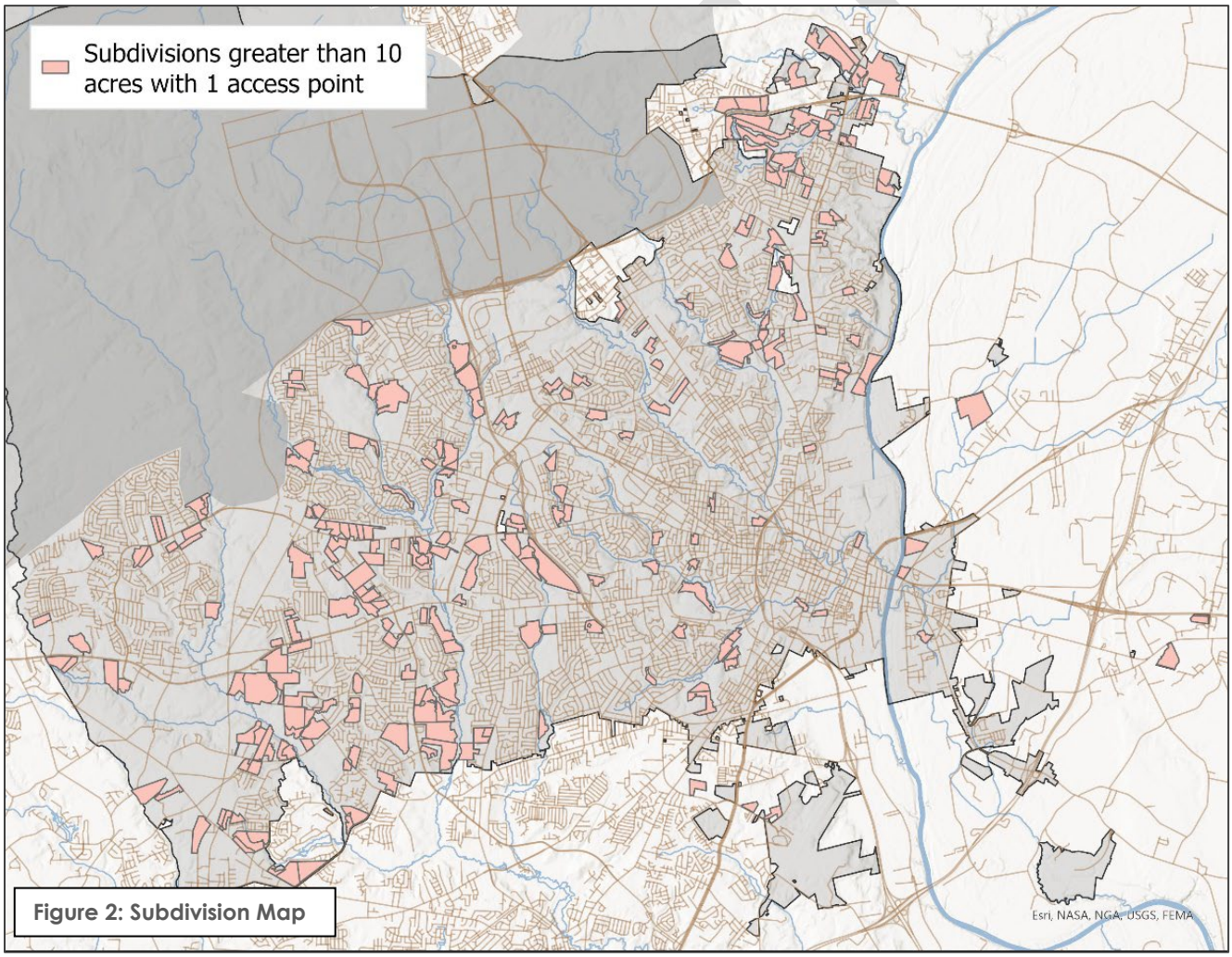


Figure 2: Subdivision Map

[1] https://www.arcgis.com/apps/mapviewer/index.html?layers=029a9a9fe26e43d687d30cd3c08b1792
[2] https://ncdot.maps.arcgis.com/apps/webappviewer/index.html?id=964881960f0549de8c3583bf46ef5ed4
[3] https://faync.maps.arcgis.com/apps/webappviewer/index.html?id=96218c70ff034bddb548bb567b904123
[4] https://ncdot.maps.arcgis.com/apps/instant/sidebar/index.html?appid=4175345664ac4e10b14466223758406f

INITIAL ASSESSMENT

To begin an assessment of the 231 subdivisions, a prioritization methodology was developed to identify the most impactful potential connections. This involved establishing performance metrics and using them to systematically narrow the list of subdivisions and identify potential connections.

PERFORMANCE METRICS

In coordination with the Steering Committee, several performance metrics were identified in the form of objectives to address the goals of the Connectivity Study. These performance metrics were used to collect appropriate data and to identify potential street connections.

The performance metrics included the following:

- Increasing safety and resiliency during flooding and other emergency events,
- Serving residents equitably,
- Identifying feasible street network connections,
- Providing multimodal connectivity and prioritizing active transportation options, and
- Improving access between residents and key community destinations.

METHODOLOGY

Based on the performance metrics, the project team worked with the Steering Committee to prioritize the largest subdivisions with the greatest number of households. As shown in Figure 3, the subdivision list was narrowed down to subdivisions meeting either of the following criteria:

- Greater than 25 acres with more than 25 households
- Less than 25 acres with more than 200 households,

This screening resulted in a shorter list of 100 subdivisions for more detailed analysis.

The following information was documented for each of those subdivisions:

- Name of collector or arterial providing access,
- AADT of that collector or arterial[2],
- Number of households in the subdivision,
- NCDOT Transportation Disadvantaged Index[4],
- Median household income within the subdivision.

The team then calculated the maximum distance by taking the shortest path following the existing road connections from any residence within the subdivision to each of the nearest features:

- Arterial/Collectors
- Bus Stops
- Sidewalk
- Schools

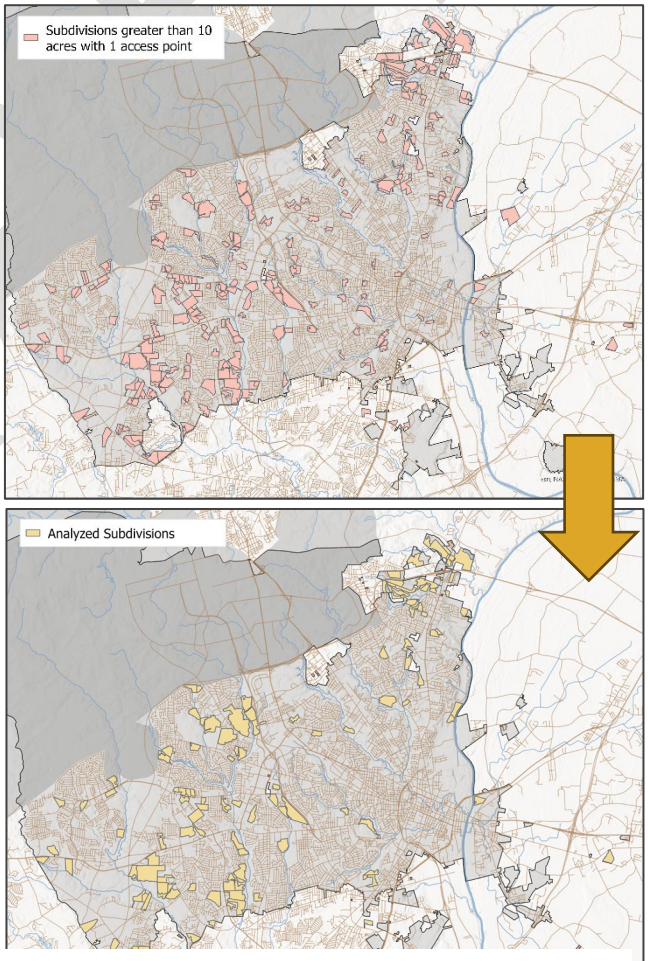


Figure 3: Analyzed Subdivisions

- Commercial Uses
- Parks and Community Centers
- Fire Stations

For each subdivision, up to two (2) potential street connections were identified by using Google Earth Imagery to draw reasonable conclusions about where additional street connectivity would add the greatest value in an equitable and feasible way. For some subdivisions, there was only one (1) logical connection that would significantly reduce the distance between the furthest residence and the nearest key destination. For a few subdivisions, there were several potential connections that might add value. In total, 175 total possible connections were identified.

Refer to Appendix B for the Connection Spreadsheet containing these potential connections.

EXAMPLE

One example that demonstrates the application of this methodology is the Buckhead subdivision, located along the All American Freeway between Cliffdale Road and Raeford Road. This subdivision includes 231 households with a singular access point to the arterial network via the connection of Ferncreek Drive to Raeford Road. The freeway, Buckhead Creek, and a railroad line create barriers between Buckhead and neighboring subdivisions. Figure 4 shows where the Buckhead subdivision is located in Fayetteville and how various barriers obstruct connectivity.

Many of the individual project scores that are described in the following section are based upon calculating the distance from residences within a subdivision to nearby emergency services and community resources. Nearby bus stops and commercial and community land uses along Cliffdale Road are not accessible to the residents in Buckhead. Additionally, while the fire station is physically close, the accessible emergency route to some residences in Buckhead is much longer due to out-of-direction travel. Providing a connection from the northern point of the subdivision to Cliffdale Road would connect residents to those nearby resources and provide resiliency during emergencies. In fact, it would reduce the furthest distance to the arterial and sidewalk networks each by a mile and the furthest distance to a bus stop by a half mile. It would reduce the furthest distance to a school by over a mile and to commercial land uses by nearly half a mile. Most significantly, a street connection at the northern end of the Buckhead subdivision would decrease the farthest distance from a residence to the fire station by more than 2 miles, with the potential to greatly reduce emergency response time as a result. The second access point could provide access to the families in this subdivision in the event that Ferncreek Drive is closed.

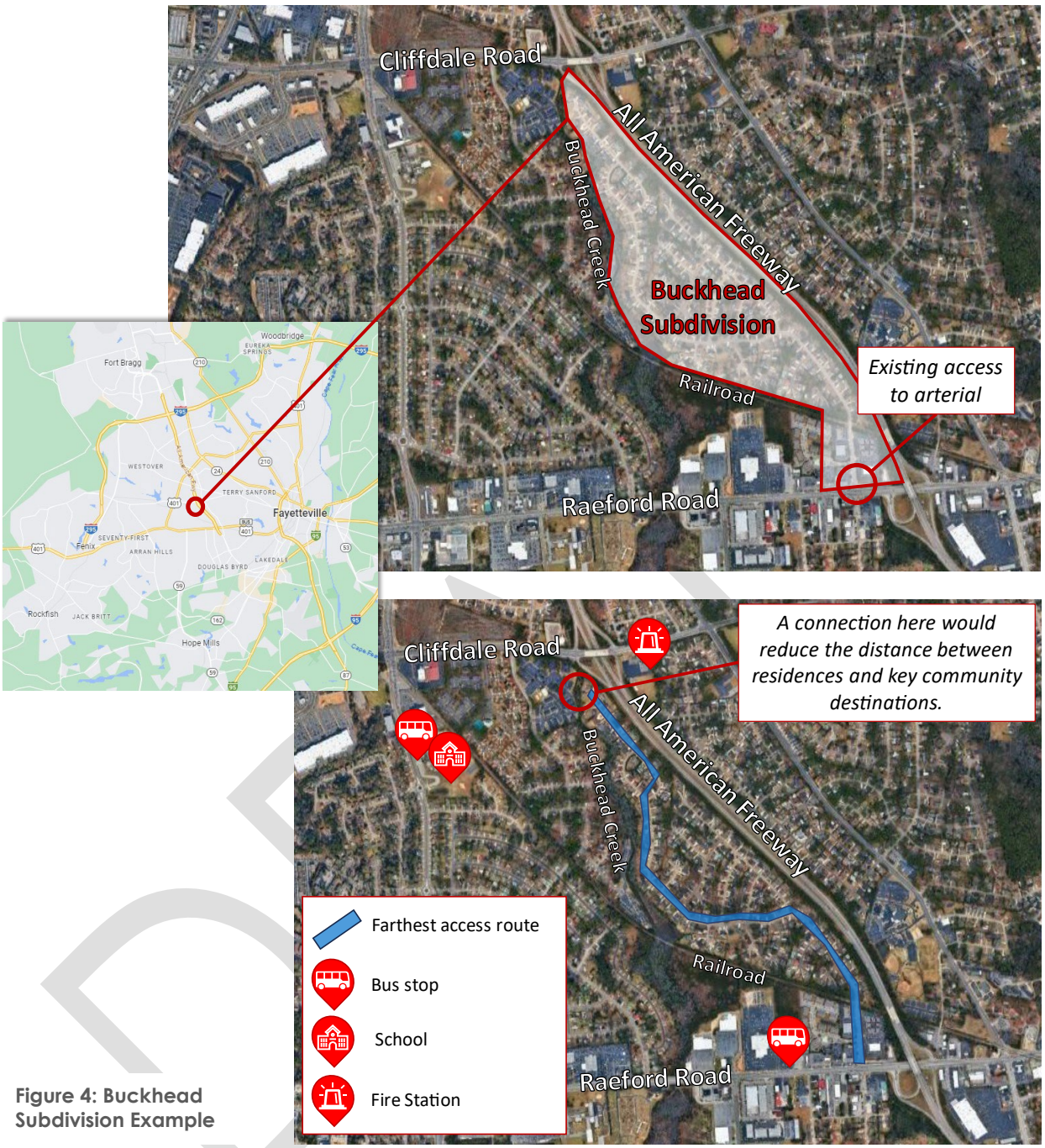


Figure 4: Buckhead Subdivision Example

PROJECT RANKING AND PRIORITIZATION

The performance metrics used to identify street connections also served as the foundation for ranking them. A series of five (5) scores were assigned to each potential connection, including 1) a resiliency score, 2) an equity score, 3) a feasibility score, 4) a multimodal access score, and 5) a community access score. Details for each of these calculations are provided in the following sections.

RESILIENCY SCORE

The primary goal of this study is to shorten emergency response routes by adding connections between first responders and residences. Part of that goal is to increase the number of access points to allow people to swiftly mobilize and/or maintain access during emergency events. The Resiliency Score was developed through several factors with input from the Steering Committee:

- **The extent to which access to major arterials and collectors is improved.** The arterial network provides access to major highways and the broader transportation network and thus can connect people to vital resources during an emergency. Connections that greatly reduce the distance between residences and the arterial network received higher Resiliency Scores, as described below:
    - If the reduced distance to arterial is 0 miles, a score of 0 was assigned.
    - If the reduced distance to the arterial is between 0 and 0.5 miles, a score of 1 was assigned.
    - If the reduced distance to the arterial is between 0.5 and 1 mile, a score of 2 was assigned.
    - If the reduced distance to the arterial is between 1 and 1.5 miles, a score of 3 was assigned.
    - If the reduced distance to the arterial is greater than 1.5 miles, a score of 4 was assigned.
- **The extent to which access to the nearest fire station is improved.** Connections that greatly reduce the distance between residences and fire stations received higher Resiliency Scores, as described below:
    - If the reduced distance to the fire station is 0 miles, a score of 0 was assigned.
    - If the reduced distance to the fire station is between 0 and 0.5 miles, a score of 1 was assigned.
    - If the reduced distance to the fire station is between 0.5 and 1 mile, a score of 2 was assigned.
    - If the reduced distance to the fire station is between 1 and 1.5 miles, a score of 3 was assigned.
    - If the reduced distance to the fire station is greater than 1.5 miles, a score of 4 was assigned.
- **The number of access points per person in the subdivision**, with the intention of prioritizing connections that add an access point where there are many households relying on one or few points of egress and ingress. The number of households in a subdivision was initially obtained from City parcel mapping and then compared with an estimate using Google Earth imagery. Connections in subdivisions with fewer access points per person received higher Resiliency Scores, as described below:
    - If the residential units per access point is less than 100, a score of 0 was assigned.
    - If the residential units per access point is between 100 and 200, a score of 1 was assigned.
    - If the residential units per access point is between 200 and 300, a score of 2 was assigned.
    - If the residential units per access point is between 300 and 400, a score of 3 was assigned.
    - If the residential units per access point is greater than 400, a score of 4 was assigned.
- **The potential to connect otherwise disconnected areas outside of the subdivision**. This score was measured on a binary scale as follows:
    - If the connection is not made to / from a disconnected area, a score of 0 was assigned.
    - If the connection is made to / from a disconnected area, a score of 4 was assigned.
- **The potential vulnerability of the subdivision to flooding as measured based on previous flooding events**. This Flood Awareness Score prioritizes subdivisions with a greater history of flooding, as described below:
    - If the access road has no reported history of flooding, a score of 0 was assigned.
    - If the access road has a reported history of minor flooding (maintaining access to emergency vehicles), a score of 2 was assigned.
    - If the access road has a reported history of major flooding (restricting access to emergency vehicles), a score of 4 was assigned.
- **The potential vulnerability of the subdivision to flooding as measured based on the floodway of nearby water bodies**. This Neighborhood Flood Score prioritizes subdivisions with a greater potential for flooding, as described below:
    - If the access does not fall within a 500-year flood plain, a score of 0 was assigned.
    - If the access falls partially within a 500-year flood plain, a score of 1 was assigned.
    - If the access falls fully within a 500-year flood plain, a score of 2 was assigned.
    - If the access falls partially within a 100-year flood plain, a score of 3 was assigned.

- If the access falls fully within a 100-year flood plain, a score of 4 was assigned.
- If the access falls partially or fully within a floodway, a score of 5 was assigned.

- **The extent to which the connection creates access and resiliency for future development**. This score was measured on a binary scale as follows:
  - If the connection does not provide access for future development, a score of 0 was assigned.
  - If the connection does provide access for future development, a score of 4 was assigned.

Overall, a total score of 0 to 29 was assigned to each connection point based on the resiliency metrics.

EQUITY SCORE

The Equity Score is intended to prioritize connectivity in historically disadvantaged communities in Fayetteville. The North Carolina Department of Transportation (NCDOT) Transportation Disadvantage Index (TDI) Tool[5] is one factor used to develop this score. The TDI "visualize[s] transportation disadvantage and the disproportionate impact of transportation barriers on communities of color, as well as help[s] inform policies, planning, and project development decision making." The TDI estimates a level of disadvantage based on household access to a car, income, mobility impairment, concentration of youth and senior populations, and race, as shown in Figure 5.

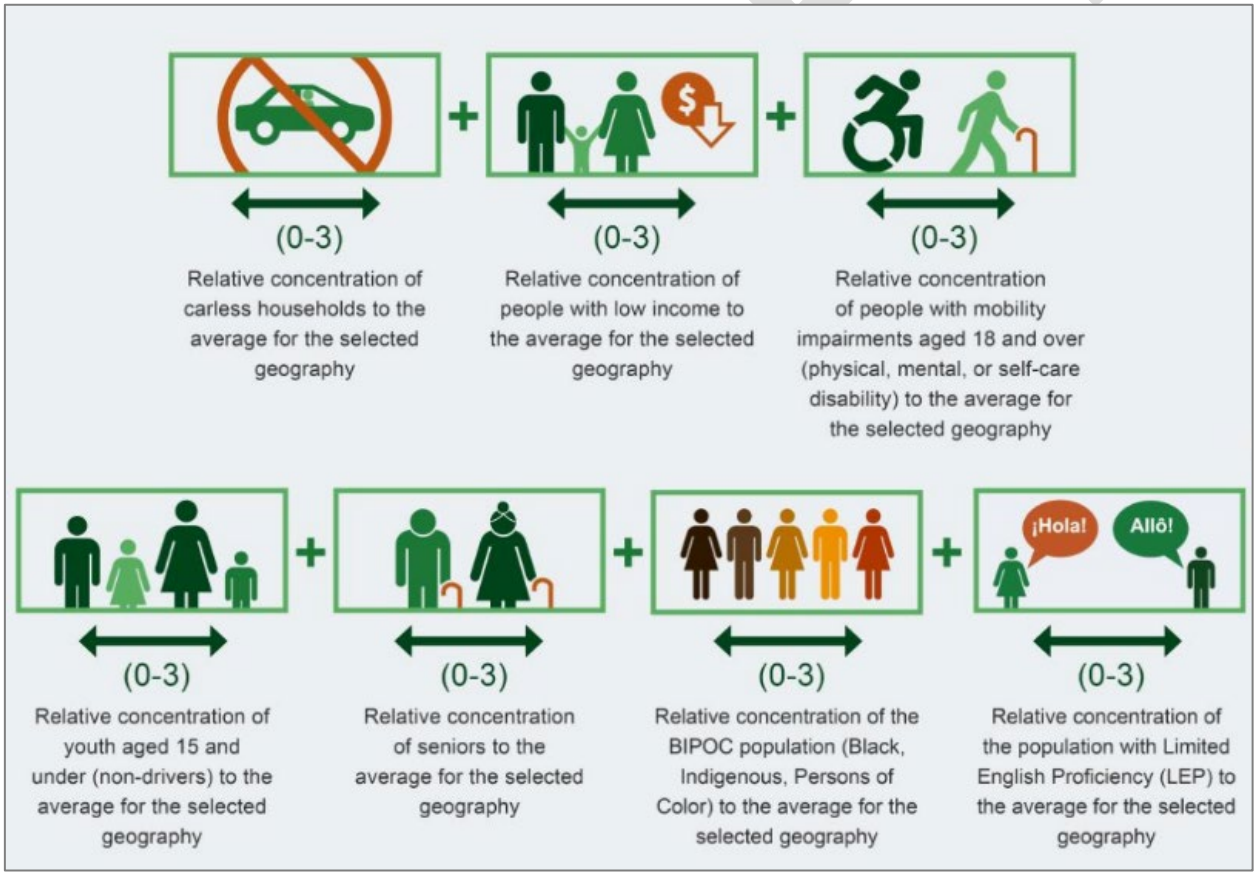


Figure 5: TDI Metrics

The **TDI Map**[4] is shown below in Figure 6. Communities with a higher TDI Index Score are estimated to have higher transportation disadvantage and thus, should be prioritized for improved connectivity under the goals of this task. As such, the Equity Score involved providing a higher ranking to subdivisions within areas with higher TDI scores, as described below:

- A connection within an area with a TDI score less than 10 received a score of 0.
- A connection within an area with a TDI score between 10 and 12 received a score of 1.
- A connection within an area with a TDI score between 12 and 14 received a score of 2.
- A connection within an area with a TDI score between 14 and 16 received a score of 3.
- A connection within an area with a TDI score greater than 16 received a score of 4.

Figure 6: TDI Map

The Equity Score also includes **median household income**. This data was obtained from the U.S. Census Bureau. The median household income (HHI) at the centroid of the subdivision was used. A higher Equity Score value is assigned to subdivisions with lower median household incomes, as described below:

- A connection within an area with median HHI greater than $63,000 received a score of 0.
- A connection within an area with median HHI between $53,000 and $63,000 received a score of 1.
- A connection within an area with median HHI between $43,000 and $53,000 received a score of 2.
- A connection within an area with median HHI between $33,000 and $43,000 received a score of 3.
- A connection within an area with median HHI less than $33,000 received a score of 4.

Overall, a total score of 0 to 8 was assigned to each connection point based on the equity metrics.

FEASIBILITY SCORE

The purpose of the Feasibility Score is to prioritize connections that may have a greater chance of implementation due to lower potential cost and constraints. By prioritizing more feasible connections, the

City may be able to implement more projects quickly to increase resiliency and access in residential communities. The feasibility score was calculated using two factors:

- The **"barrier to access"** assigns a score based on the feature that is currently creating a lack of connectivity. The connections were assigned a score of 0, 1, or 2, with 0 being assigned to the least feasible connections and 2 being assigned to the most feasible connections. Thus, connections with no barrier to access received a score of 2. Connections that require removal of a gate, impacts to a utility easement, or a bridge over a creek, railroad, or highway received a score of 1 to deprioritize them as compared to connections without any current, physical barriers. Connections that might involve taking houses or buildings were given scores of 0.
- The **"cost and constructability"** considers whether the construction is anticipated to involve building out a bicycle / pedestrian connection vs. a full vehicular connection and whether a bridge, culvert, or retaining wall might be needed. While no detailed cost estimation was performed at this stage of the assessment, connections that were initially deemed to have potentially lower construction costs and impacts received a higher Feasibility Score, as described below:
    - If the connection is for vehicular and multimodal traffic and a structure is required, a score of 1 was assigned.
    - If the connection is for vehicular and multimodal traffic and no structure is required, a score of 2 was assigned.
    - If the connection is for bicyclists and pedestrians only and a structure is required, a score of 3 was assigned.
    - If the connection is for bicyclists and pedestrians only and no structure is required, a score of 4 was assigned.

Overall, a total score of 1 to 6 was assigned to each connection point based on the feasibility metrics.

MULTIMODAL ACCESS SCORE

The purpose of the Multimodal Access Score is to provide connectivity that allows people to walk, bike, and take transit to key destinations. There were three (3) factors involved in developing this score for each connection:

- Connections that **greatly reduce the distance between residences and bus stops** received a higher Multimodal Access Score, as described below:
    - If the reduced distance to the bus stop is 0 miles, a score of 0 was assigned.
    - If the reduced distance to the bus stop is between 0 and 0.25 miles, a score of 1 was assigned.
    - If the reduced distance to the bus stop is between 0.25 and 0.5 miles, a score of 2 was assigned.
    - If the reduced distance to the bus stop is between 0.5 and 0.75 miles, a score of 3 was assigned.
    - If the reduced distance to the bus stop is greater than 0.75 miles, a score of 4 was assigned.
- Additionally, connections that **greatly reduce the distance between residences and existing sidewalk** received a higher Multimodal Access Score, as described below:
    - If the reduced distance to the sidewalk is 0 miles, a score of 0 was assigned.
    - If the reduced distance to the sidewalk is between 0 and 0.25 miles, a score of 1 was assigned.
    - If the reduced distance to the sidewalk is between 0.25 and 0.5 miles, a score of 2 was assigned.
    - If the reduced distance to the sidewalk is between 0.5 and 0.75 miles, a score of 3 was assigned.
    - If the reduced distance to the sidewalk is greater than 0.75 miles, a score of 4 was assigned.
- Another factor was to prioritize connections that create **walkability between subdivisions**. For this factor, connections that connect two residential subdivisions received a score of 2, while connections that do not connect two residential subdivisions received a score of 0.

Overall, a total score of 0 to 10 was assigned to each connection point based on the multimodal access metrics.

COMMUNITY ACCESS SCORE

The Community Access Score is intended to prioritize connectivity between residents and the resources they need and use daily. Higher Community Access Scores were awarded to connections that greatly reduce the distance between residences and the following resources:

- **Schools**,
- **Parks** or **community centers**,
- **Commercial uses**, such as grocery stores, pharmacies, and restaurants,

Each score was calculated as follows:

- If the reduced distance to the community place is 0 miles, a score of 0 was assigned.
- If the reduced distance to the community place is between 0 and 0.25 miles, a score of 1 was assigned.
- If the reduced distance to the community place is between 0.25 and 0.5 miles, a score of 2 was assigned.
- If the reduced distance to the community place is between 0.5 and 0.75 miles, a score of 3 was assigned.
- If the reduced distance to the community place is greater than 0.75 miles, a score of 4 was assigned.

Overall, a total score of 0 to 12 was assigned to each connection point based on the community access metrics.

OVERALL SCORE

After each individual score was developed for each possible connection, the scores were totaled and normalized by dividing by the average possible score under each category. Initially, each individual score was weighted by 20 percent, but through further evaluation and discussions with the Steering Committee, it was determined that a greater weight should be given to the resiliency metric. As such, the resiliency score was given a weight of 50 percent, while the other scores were given weights of 12.5 percent. The scores were then summed across all five categories. Refer to the Connections Spreadsheet in Appendix B for the ranked connections and their corresponding scores.

HIGH-SCORING CONNECTIONS

After ranking the 175 connections based on the performance metrics and corresponding scores, the team reviewed the highest scoring connections with the Steering Committee to confirm that the results met the City's expectations and aligned with localized challenges and public comments. The City set a threshold total score of 0.44 or more to be considered "high-scoring". This eliminated all but the 38 highest connection points, which is approximately the top 20%. This number is a reasonable list of projects for implementation and cost analysis.

Of those top 20% of connections, some were not advanced because of one or more issues raised from City staff such as the following:

- The connection would join privately-maintained streets,
- The connection would not join to the larger street network,
- The connection was partially outside the City limits, and/or
- The connection could be consolidated with one or more other high-scoring connections.

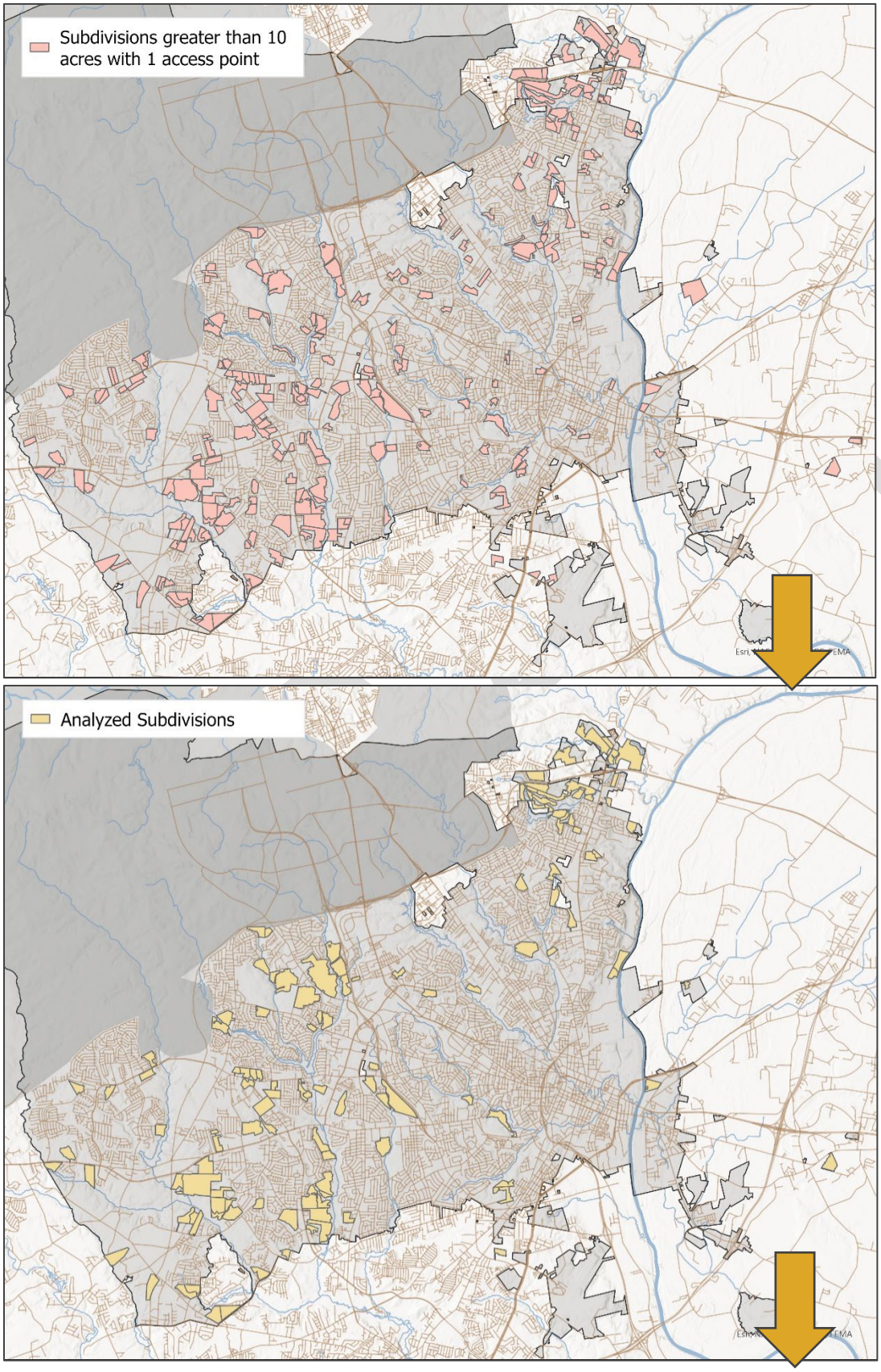
The project team and Steering Committee also considered how the connections might pair with the strategic corridors identified as part of the Strategic Corridor Analysis, which is described later in this report. Table 1 shows the high-scoring connections, as well as which connections were not moved forward based on the criteria above. Figure 7 displays the high-scoring connections that were ultimately moved forward to concept design and cost estimation.

The full list of 175 potential connections is included in Appendix B.

Table 1: High-Scoring Connections

Rank	Subdivision / Connection Name	City Council District	Final Score	Steering Committee Recommendation
1	Creeks Edge Townhomes Connection 1	7	0.72	Move forward to next step.
2	Creeks Edge Townhomes Connection 2	7	0.70	Remove as Connection 1 is recommended for this community.
3	Lexington Woods Connection 1	2	0.65	Remove as community is a minor annexed exclave with no contiguous connection to City Limits.
4	Robinwood / Robinhill Estates Connection 1	6	0.64	Move forward to next step.
5	King's Grant 429 Units Connection 1	1	0.61	Move forward to next step.
6	Mckinley Reserve Connection 1	3	0.58	Keep as score speaks to need for project. Multiple single-access communities would be connected with this option, impacting approximately 411 units.
7	Lafayette Plantation MHP Connection 2	7	0.58	Keep as score speaks to need for project and could potentially connect to Aftonshire Drive (another single-access community).
8	Robinwood / Robinhill Estates Connection 2	6	0.57	Remove as Connection 1 is recommended for this community.
9	Liberty Hill Connection 1	1	0.57	Move forward to next step.
10	King's Grant 113 Units Connection 2	1	0.56	Move forward to next step.
11	Cross Creek MHP Connection 1	7	0.54	Move forward to next step.
12	Stewarts Creek Connection 1	4	0.52	Move forward to next step. Largest single-access community in CTP (1200+ units).
13	Woodchase Connection 1	7	0.52	Move forward to next step.
14	Westshore Connection 1	2	0.52	Move forward to next step.
15	North Ridge Park Connection 1	3	0.51	Move forward to next step. Potential for Public-Private-Partnership (PPP) for connection as developer creates site plan.
16	Hidden Creek Vill Apts Connection 1	7	0.51	Move forward to next step.
17	Lexington Woods Connection 2	2	0.51	Remove as community is a minor annexed exclave with no contiguous connection to City Limits.
18	Carlson Bay Apts Connection 2	7	0.50	Remove as this would be using public funds to create a connection between two private roads.
19	Borden Heights Connection 2	2	0.49	Remove as further development has created additional connectivity, and this community is no longer constrained to a single-access point.
20	Fairfield Connection 2	7	0.49	Move forward to next step. This could ease traffic on Gillis Hill Road and bring traffic calming to Stoney Point Road at Century Circle intersection in anticipation of I-295 opening.
21	Borden Heights Connection 1	2	0.48	Remove as further development has created additional connectivity, and this community is no longer constrained to a single-access point.

22	Hidden Creek Vill Apts Connection 2	7	0.48	Remove as Connection 1 is recommended for this community.
23	River Bluff Connection 1	2	0.47	Remove as the entire area is flood-prone (as opposed to just the single-access road) and future development may offer another connection to Middle Road.
24	Raeford Crossing Connection 1	7	0.47	Remove as a gated connection already exists on Tareyton Road.
25	Mckinley Reserve Connection 2	3	0.47	Remove as this connection has been combined with McKinley Reserve Connection 1.
26	Oakdale Connection 2	5	0.47	Remove as Connection 1 is recommended for this community.
27	Cross Creek MHP Connection 2	7	0.47	Remove as this would be using public funds to create a connection between two private roads.
28	Hidden Lake Apts Connection 2	7	0.46	Remove as this would be using public funds to create a connection between two private roads.
29	Hidden Lake Apts Connection 1	7	0.46	Remove as this would be using public funds to create a connection between two private roads.
30	Astoria At Hope Mills Apts Connection 1	2	0.46	Remove as connection would be primarily outside of City Limits and create a connection to a private park. If future developments are annexed into City, then options can be explored.
31	Rivercliff Connection 1	2	0.46	Remove as the proposed connection would likely not resolve trains blocking the crossing, or the road and community flooding simultaneously. Future development may offer another connection to Ramsey Street.
32	Raeford Crossing Connection 2	7	0.46	Remove as a gated connection already exists on Tareyton Road.
33	Astoria At Hope Mills Apts Connection 2	2	0.45	Remove as connection would be primarily outside of City Limits and create a connection to a private park. If future developments come and are annexed into City then explore options.
34	Oakdale Connection 1	5	0.45	Move forward to next step.
35	Crystal Lake Apts Connection 1	3	0.45	Remove as this would be using public funds to create a connection between two private roads.
36	Buckhead Connection 1	9	0.45	Move forward to next step.
37	North Hills Connection 1	3	0.44	Move forward to next step.
38	Karen Lake Condos Connection 2	4	0.44	Remove as this would be using public funds to create a connection between two private roads.


Subdivisions greater than 10 acres with 1 access point
Analyzed Subdivisions

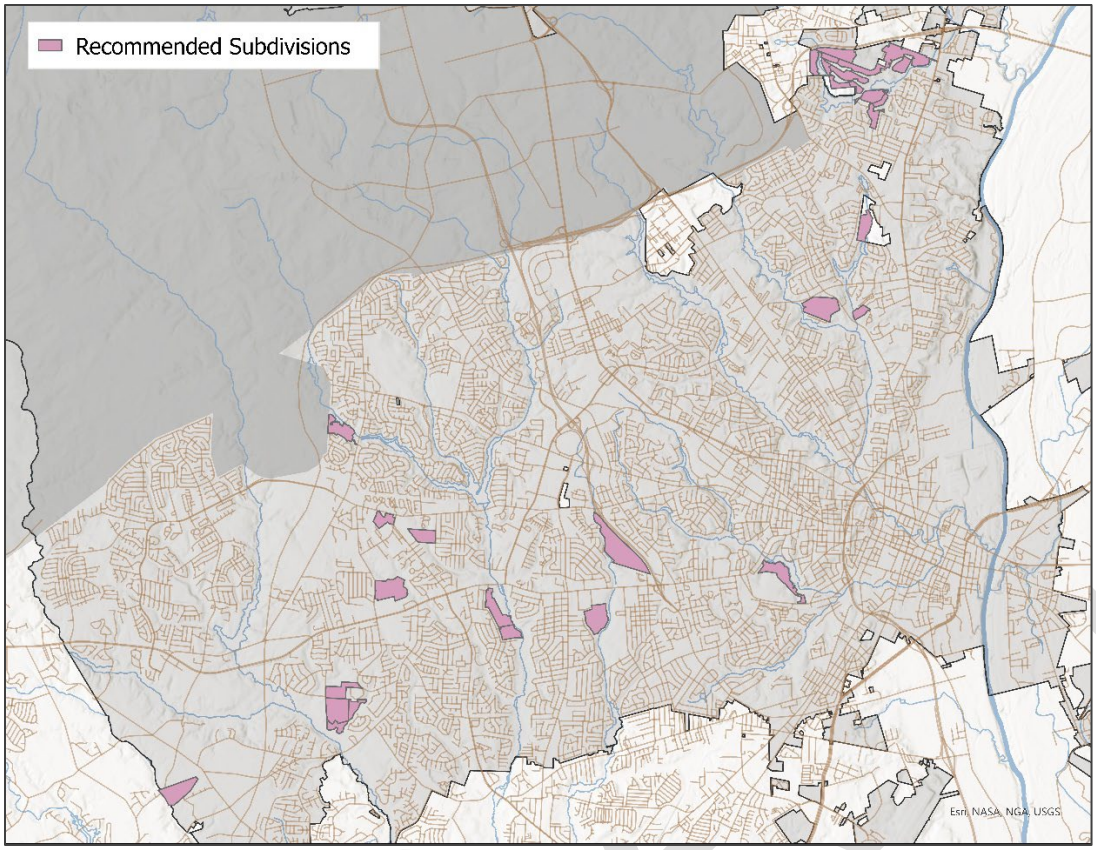


Figure 7: High Scoring Connections

PROJECT RECOMMENDATIONS

The project team developed conceptual renderings and cost estimates for the high-scoring connections. Refer to Appendix C for the Connectivity Cut Sheets, which include the concept graphics, cost estimates, and select details about each potential connection.

CONCEPTUAL RENDERINGS

The approach to develop these concepts involved the following:

- Developing them based on known and available information,
- Considering the most feasible fit within existing topography and environmental features,
- Best minimizing infrastructure needs and reducing construction and maintenance costs, and
- Best avoiding existing buildings and property impacts.

For vehicular connections, typically a full residential street section was provided, including 27-feet from back of curb to back of curb, a 2.5-foot planting strip, and 5-foot sidewalk on each side. The concepts consider potential culvert crossings, bridges, utility conflicts, and traffic control configuration. Some connections are proposed in phases to reduce costs and impacts as part of a single project. Phases are numbered according to a logical progression of infrastructure build out. Further design details will be needed to verify feasibility and configuration of these connections in subsequent stages of implementation.

Location 1 – Creek's Edge
To create connectivity in the Creek's Edge subdivision area, a street connection over Beaver Creek is recommended. This connection from Blairwood Drive to Birch Road would likely require a bridge or culvert over the creek. Utility access and conflicts will also need to be considered.

Location 2 – Robinwood / Robinhill Estates
Robinwood is a large, disconnected subdivision in southwest Fayetteville. This street provides redundancy by connecting Applewhite Road to Graham Road. This connection is proposed near a creek. Potential flooding and environmental impacts should be evaluated during design.

Location 3 – King's Grant
To better connect the King's Grant subdivision, new street connections are recommended from Nottingham Drive to Cherrystone Drive and to Cooper Road. A T-intersection is recommended with stop control on Nottingham Drive. A potential culvert is needed to carry Nottingham Drive over the creek.

Location 4 – McKinley Reserve
Improving connectivity in the McKinley Reserve area is recommended to be accomplished in 3 phases. First, a connection from Hilliard Drive to Oakmount Circle is recommended. This may require a culvert over the stream as well as consideration of an existing gas line. Under Phase 2, a connection from Hilliard Drive to Idlewild Drive and Crystal Drive is recommended. This will provide connectivity out to McArthur Road. Lastly, a street connection can be made from McKinley Drive to the new street connection constructed in Phase 1.

Location 5 – Lafayette Plantation MHP
This proposed connection will link two residential subdivisions and provide additional access out to Raeford Road. It is anticipated that that this short connection between Aftonshire Drive and Wildwood Drive can be made without impacts to existing structures.

Location 6 – Liberty Hills
Improved connectivity in the Liberty Hills subdivision area is recommended in 3 phases. First, a connection is recommended from the new development to Farmers Road. This may require a culvert and may result in significant property impacts for a residence at the end of Farmers Road. For phase 2, a bicycle and pedestrian path is recommended from the new development to Pine Forest High School. This would involve carrying the connection under I-295 via an existing culvert. Lastly, it is recommended that the new connection also be connected to Burnside Place.

Location 7 – King's Grant 2
This connection is recommended from Little Bridge Road to Waterbury Drive. A potential culvert is needed. As part of Phase 2, the new street connection can be connected to Rempstone Lane. A potential bridge or box culvert may be needed to accommodate this new roadway.

Location 8 – Cross Creek MHP
This proposed street extension would provide access between the Cross Creek Mobile Home Park and Bunce Road, which provides connectivity to the arterial street network. While property takes will be required, it is anticipated that the connection can be made without impacts to existing structures. This street connection might provide access for additional development in this area.

Location 9 – Stewarts Creek
This short connection between Glen Reilly Drive and Willowbrook Drive provides network redundancy for the Stewarts Creek subdivision. The existing fence will require removal. Stop control might be needed at the T-intersection to facilitate safe movements through the subdivisions.

Location 10 – Woodchase
It is recommended that Pebblestone Drive be connected to Strickland Bridge Road. The roadway can be shifted to avoid the stormwater pond. The landscaped median that is existing on Pebblestone Drive could be continued. Pending an engineering study, the new connection will be controlled by a stop sign (two-way stop-control) at the new intersection at Strickland Bridge Road.

Location 11 – Westshore
This street is proposed between Longleaf Drive and Weiss Avenue to provide access out to Robeson Street. The design will need to consider the utility facility as well as any environmental features. Ideally, the new connection would create a four-legged intersection with Fledger Street.

Location 12 – North Ridge Park
To better connect the North Ridge Park subdivision, a street connection is recommended from Plantation Road to Rosehill Road, with added connectivity to Rock Creek Lane and Mount Rainer Drive. Additional analysis is needed to determine lane configuration at the intersection with Rosehill Road. A portion of this connection could be carried out via private development.

Location 13 – Hidden Creek Village Apartments
This street connects Cuffey Loop to Bunce Road. The connection can be designed to create a four-legged intersection, which may result in impacts to the adjacent property. Intersection control and configuration should be further analyzed in design.

Location 14 – Fairfield
The Fairfield subdivision is currently disconnected by a railroad line. This street provides connectivity between Caithness Drive and Stoney Point Road, which provides access to the regional arterial street network. The connection should be designed to intersect Stoney Point Road at Century Circle to create a four-legged intersection. This street will provide access and connectivity for future development in this area.

Location 15 – Oakdale
This connection filles the gap in Watauga Road, providing access between the Oakdale subdivision and Hope Mills Road. There may already be right-of-way to achieve this connection, which will streamline delivery. A connection to Odon Drive is also proposed to provide additional access and connectivity in this area. That street would T into Watauga Road with stop control.

Location 16 – Buckhead
A connection is recommended from the Weaverhall Drive cul-de-sac to the apartment complex driveway. The connection would need to be designed and constructed to minimize impacts to houses. A potential culvert is needed over Buckhead Creek. A gate can be provided if this access were designated as an emergency access only.

Location 17 – North Hills
It is recommended that McChoen Drive be connected to Country Club Drive. Additional consideration is needed to determine potential utility impacts and lane configuration at the intersection.

Additional King's Grant Connections

The preliminary concept for this connection was shared with members of the King's Grant community for review prior to the completion of this report. The community acknowledged the location and offered two additional connections as alternatives if the initial connections (Location 3 and Location 10) could not be implemented:

Location 3A – A street connection can be made between King's Creek Drive to Iverleigh Circle to provide redundancy to the access provided by Shawcroft Road. This connection requires crossing the golf course and thus, coordination with the King's Grant Golf and Country Club will be applicable.

- Location 3B – Another connection option is between the King's Grant Golf and Country Club House and Coronation Drive. This will also provide additional access out to Ramsey Street. Coordination with the Golf Course is applicable. There may also be environmental and structural considerations related to College Lake.

Conceptual renderings for these locations are provided in Appendix C.

COST ESTIMATION

A conceptual-level cost estimate was calculated for each connection to provide an order of magnitude of cost for construction of the high-scoring connections. The cost estimates for the recommended connectivity projects are provided in Table 2.

Cost estimate assumptions included the following:

- Right-of-way cost of $30,000/acre,
- Year 2023 construction quantity costs (with minimal consideration for inflation),
- Costs are independent of other planned or programmed improvements (such as roadway resurfacing), and
- Allowances (as a percentage of the overall project cost estimate) were assumed rather than developing detailed quantities estimated for some items.

Table 2: Cost Estimates for High-Scoring Connections

Subdivision Name / Phase	Design / Construction Management Cost	Right-of-Way Cost	Construction Cost	30% Contingency	Total Estimated Cost
1 - Creeks Edge Subdivision	$903,000	$43,750	$2,257,330	$961,230	$4,165,310
2 – Robinwood / Robinhill Estates					
3 - Kings Grant Subdivision	$276,000	$22,750	$689,710	$296,540	$1,285,000
4 - McKinley Reserve Subdivision	$1,018,400	$573,500	$2,545,250	$41,241,160	$5,378,310
5 – Lafayette Plantation MHP					
6 - Liberty Hills Subdivision	$1,151,400	$70,000	$2,877,990	$1,229,840	$5,329,230
7 - Kings Grant 2 Subdivision	$1,024,400	$57,750	$2,560,730	$1,092,880	$4,735,760
8 – Cross Creek MHP					
9 – Stewarts Creek					
10 – Woodchase Subdivision	$338,000	$1,400	$844,970	$355,320	$1,539,630
11 – Westshore					
12 - North Ridge Park Subdivision	$981,200	$87,500	$2,452,550	$1,056,380	$4,577,630
13 – Hidden Creek Village Apartments					
14 – Fairfield					
15 – Oakdale					
16 - North Hills Subdivision	$88,400	$875	$220,800	$93,030	$403,105
17- Buckhead Subdivision	$120,800	$375,000	$301,810	$239,290	$1,036,900
Total					**$28,450,935**

The shorter connections and those that are for bicyclists and pedestrians only are estimated to be the least expensive, while the longer connections and those involving bridges are estimated to be the costliest. Costs are broken down by phase as applicable.

DEVELOPMENT CODE REVIEW

As part of this task, the team also reviewed the City's unified development ordinance, with the intention of understanding how the current code may perpetuate a lack of multimodal connectivity in Fayetteville. The team compared key code requirements in the City of Fayetteville to code requirements for other cities in North Carolina of similar sizes. The code was reviewed with a focus on connecting neighborhoods, providing multimodal access to community resources, and shortening emergency routes.

The main topics of concern include:

- Street Connectivity Index
- Stub Street Requirements
- Design Adjustment Process
- Access Points Requirements
- Pedestrian and Bicycle Access
- Public and Private Streets
- Fee-In-Lieu
- Annexation

At the City's direction, three peer cities were also reviewed to compare with code requirements in each area of focus. The municipal codes for the following cities were reviewed given their similar size (the City of Fayetteville's current population is approximately 210,000) and location within North Carolina:

- Wilmington, NC (population 115,000)
- Cary, NC (population 175,000)
- Winston-Salem, NC (population 250,000)

A summary of these findings and recommended modifications is provided below. Refer to Appendix D for the more detailed Development Code Review Memorandum and specific code references.

EXISTING CODE REVIEW

Overall, the existing City Code does not successfully require green fill, nor infill developments, to provide nor meet stub streets to/at property lines. This results in a lack of publicly accessible multimodal connectivity between subdivisions. Residential subdivision developments also generally do not provide enough access points for operational and emergency needs. In some cases, access configuration is established before the parcel is annexed, limiting the City's ability to require connective design. Furthermore, private streets without public access easements are contributing to the disconnected network.

RECOMMENDED MODIFICATIONS

Below is a high-level list of focus areas that were initially explored and compared with peer city municipal codes:

1. **Street Connectivity Index:** The Street Connectivity Index is designed to ensure adequate connectivity within a subdivision's street network and with surrounding subdivisions. It compares the ratio of links (which are defined by having nodes on one or both ends and include stub streets and roadway sections) to nodes (intersections, cul-de-sacs), with a higher value indicating better connectivity. After exploring potential changes to minimum connectivity index scores, the team determined that current scores are comparable to peer cities. Modifications to the Street Connectivity Index are not recommended.

2. **Street Stub Connections:** Street stub requirements are designed to ensure connectivity with future subdivisions and developments that occur on adjacent parcels. A stub street is defined as a preexisting street to which a new street could connect, while a street stub is a proposed

improvement intended to provide such connectivity. Additions to 30-6.A.4.a.3. Cul-de-Sac and Street Stubs are recommended.

3. **Design Adjustment Process:** The design adjustment process can allow exemptions to stub street requirements. Minimizing exemptions from stub street requirements and increasing the burden of proof needed is recommended.

4. **Access Point Requirements:** Access point requirements are intended to ensure that emergency vehicles can safely and efficiently access subdivisions and that trip generation demands can be met. One limitation of the code language is the loose interpretation for the term "unit count". Basing thresholds on trip generation rather than unit counts is recommended.

5. **Pedestrian and Bicycle Access:** Requirements for pedestrian and bicycle connectivity are intended to facilitate safe and efficient multimodal travel. Additions to 30-5.F.9.b and 30-6.A.3.e.1 Sidewalks are recommended.

6. **Public and Private Streets:** Public and private street regulations are designed to facilitate barrier-free connectivity for emergency vehicles and neighbors while allowing privacy for residents. Additions to require access easements on some private streets are recommended.

7. **Fee-in-Lieu:** In cases where immediate construction of pedestrian/bicycle facilities and other improvements are infeasible, fee-in-lieu regulations are intended to allow for future construction of these improvements. Adopting a fee-in-lieu model similar to Cary is recommended in the future.

8. **Annexation:** When roadway standards differ across municipal boundaries, annexation regulations are key safeguards of the quality of the new jurisdiction's roadway and transportation network. Adding requirements that annexed roads be improved to Fayetteville's standards is recommended.

CONCLUSION AND NEXT STEPS

The City of Fayetteville has a unique opportunity to address connectivity issues and create more sustainable, active, and affordable transportation options. This can be achieved through both building vital connections that reduce vehicle miles travelled, reduce emergency response times, and serve pedestrians and bicyclists as well as modifying the development code to ensure that private construction is also expanding rather than limiting transportation access. The methodology developed within this study is intended to be repeated as additional resources become available to provide connectivity improvements, thereby identifying additional high-scoring connections to move forward in the project development process.

A critical next step for advancing the recommendations identified in this report is to engage with community members and local elected officials. This report is intended for a broad audience so that the study purpose and need, goals, scope, methodology, assumptions, and recommendations can be easily relayed. Given the multiple points of sensitivity surrounding further infill of the existing street network, including construction and right-of-way costs, environmental constraints, and the implications of connecting adjacent neighborhoods, it is important to approach each community affected by the connectivity study recommendations early and thoughtfully. The conceptual designs and associated cost estimates discussed in the results are intended to be a starting point for these discussions, and the ultimate project recommendations may differ significantly based on community input.

Section 3

Strategic Corridor Analysis

STRATEGIC CORRIDOR ANALYSIS

The City of Fayetteville undertook a detailed assessment of a series of City-maintained roadways to assess existing and future transportation performance and to identify strategic improvements. This strategic corridor analysis included a three-stage process to identify streets that do not meet intended performance, consider tools that might improve multimodal safety and mobility, and to develop a plan for implementation.

The strategic corridor analysis was structured similarly to the methodology utilized for the 2045 FAMPO Congestion Management Process, which was completed in 2022 and focused on NCDOT-maintained roadways. The City is looking to understand where corridor deficiencies exist, where performance is acceptable, and which corridor projects should be prioritized as part of the Capital Improvement Program.

Corridor-specific projects are focused on the following issues:

- Reducing traffic congestion and improving traffic safety,
- Improving pedestrian and bicycle safety and access,
- Improving and expanding transit service, and
- Addressing access at at-grade rail crossings.

Corridor recommendations were identified through engaging with the steering committee, building upon recommendations made in previous plans, and performing extensive analysis of existing infrastructure. Strategies focus on regional connectivity, multimodal access, and coordination with corridor land use.

SCOPE OF WORK

The Strategic Corridor Analysis included the following tasks:

1. Steering Committee Coordination
2. Study Area Development
3. Data Collection
4. Project Identification and Prioritization
5. Project Recommendations

STEERING COMMITTEE COORDINATION

Consistent with the connectivity analysis, the project team worked closely with the same Steering Committee comprised of City Staff to perform this task. Through bi-weekly progress meetings and periodic work sessions, the Committee provided technical reviews and feedback at critical stages of the project. The Steering Committee relayed local context, provided technical oversight, and emphasized potential implementation obstacles with regards to identifying deficiencies, considering tools, and drafting recommendations.

STUDY AREA DEVELOPMENT

The Steering Committee identified forty-two (42) corridors in the City for evaluation. These corridors are owned and maintained by the City of Fayetteville. Concerns have been raised about them through public feedback and/or previous planning and project implementation efforts. The corridors also have four (4) or more vehicular lanes or they have two (2) vehicular lanes that are frequently congested. In many cases, these corridors are important connections in the transportation network, linking collector and arterial streets and providing access to key destinations. Given this connectivity, they serve many needs and modes, including both local access as well as through traffic. They also provide mobility for vehicles and emergency services as well as buses, bicyclists, and pedestrians. Table 3 includes the list of identified corridors.

Table 3: Identified Corridors

ID	Corridor Name	Corridor Extents	
		From	To
1	Rosehill Rd	Ramsey St	Country Club Dr
2	Fort Bragg Rd	Bragg Blvd	Oakridge Ave
3	Sycamore Dairy Rd	Morganton Rd	Bragg Blvd
4	McPherson Church Rd	Raeford Rd	Skibo Rd
5	Village Dr	Ireland Dr	Robeson St
6	Hay St	MLK	Winslow St
7	Person St	Otis Jones Pkwy / Bow St	S Eastern Blvd
8	Cain Rd	Bragg Blvd	Pamalee Dr
9	Helen St	Cain Rd / Pamalee Dr	Johnson St
10	Purdue Dr	Raeford Rd	Village Dr
11	Campground Rd / Ruritan Dr	Glensford Dr	Morganton Rd
12	Jasper St / Topeka St	Murchison Rd	Corrinna St
13	Cliffdale Rd	Raeford Rd	Two Bale Ln
14	Two Bale Ln	Raeford Rd	Cliffdale Rd
15	Boone Trl Ext	Cumberland Rd	Village Dr
16	Stamper Rd	Fort Bragg Rd	Cain Rd
17	Elm St	Bragg Blvd	Rodgers Dr
18	Red Tip Rd	Glensford Dr	Skibo Rd
19	Freedom Pkwy	Skibo Rd	Cliffdale Rd
20	Camden Rd	Cumberland Rd	Winslow St
21	Langdon St	Murchison Rd	Ramsey St
22	Walter Reed Rd	Owen Dr	Melrose Rd
23	Roxie Ave	Raeford Rd	Boone Tr
24	Blount St	Robeson St	Gillespie St
25	Filter Plant Dr	Bragg Blvd	Murchison Rd
26	Cumberland St	Murchison Rd	Ramsey St
27	Hillsboro St	Rowan St	Ramsey St
28	Oakridge Avenue	Hay St	Woodland Dr
29	Arsenal Ave	Broadfoot Ave	Myrover St
30	Branson St	Broadfoot Ave	Bradford Ave
31	Coventry Rd	Camelot Dr	Ireland Dr
32	Waters Edge Dr / McFayden Dr / Offing Dr	Cliffdale Rd	Morganton Rd
33	Kincross Ave	Strickland Bridge Rd	Bingham Dr
34	Deep Creek Rd	Clinton Rd	Cade Hill Ave
35	Clearwater Dr	Daughtridge Dr	Country Club Dr
36	Shawcroft Rd	Hampton Ridge Rd	Ramsey St
37	McBain Dr / Pinecrest Dr (Corridor)	Raeford Rd	Morganton Rd
38	W Rowan St	Oakridge Ave	Bragg Blvd
39	Johnson St	Bragg Blvd	Helen St
40	Rim Rd (Cliffdale Rd northward)	Cliffdale Rd	Brookshire St
41	Morganton Rd	Ingleside Dr	Reilly Rd
42	Old Wilmington/B St	S Eastern Blvd	Grove St

DATA COLLECTION AND ANALYSIS

A series of data was compiled, mapped, and analyzed for each of the study corridors, and in some cases, for the broader transportation network. The following data was collected and/or developed for the strategic corridor analysis:

- Traffic volumes
- Number of travel lanes
- Posted speed limits
- Vehicular Crashes
- Bicycle / Pedestrian Crashes
- Sidewalks and trails
- Community resources such as schools, parks, and recreation centers
- Marked pedestrian crossings
- Transit stops and routes

In addition to the raw data listed above, the following performance measures were calculated from existing data and summarized for each corridor:

Intersection level of service (LOS) corresponds to the average delay of all automobile movements at a signalized intersection[5]. Typically, intersections are designed to experience LOS D or better during the peak 15 minutes of the peak hour. The Highway Capacity Manual (HCM) Quick Estimation Procedure was utilized to estimate the LOS at each major intersection along the study corridors and identify "Hot Spots," or intersections with estimated LOS E or F. This procedure is a simplified, spreadsheet-based methodology that allows a large number of intersections to be analyzed for failing traffic operations using link-level volume to capacity estimation as follows:

- Year 2019 AADTs were obtained from the NCDOT website.
- Link level volume factors (K and D) were estimated and applied to the AADTs to estimate directional hourly volumes.
- The percent of approaching traffic turning left or right was estimated at major intersections to calculate directional hourly through-movement volumes.
- At major signalized intersections, estimated signal cycle lengths and effective green times were applied to calculate through-movement capacity, and then the volume-to-capacity ratio and control delay was calculated using HCM formulas.
- Other factors such as posted speed limit, intersection density, and driveway density were used to calculate the average running speed between major intersections.
- The LOS was then calculated using the ratio of the average running speed to the posted speed limit (assumed free flow speed), per the HCM procedure.

City traffic services staff assisted with a review of the assumed signal timings and other inputs for the analysis noted above.

Bicycle level of traffic stress (LTS) is used to evaluate bicyclists' perceived safety and comfort on roadway segments, intersection approaches, and unsignalized crossings. Using this approach, a street network can be classified into four levels of stress, ranging from low stress (LTS 1) to high stress (LTS 4). Each successive stress level is associated with a decreasing proportion of the population that would be comfortable using the facility. For example, 60-70 percent of the population, including children, is willing to use an LTS 1 facility, but less than five percent will use an LTS 4 facility. The LTS methodology used for this project focused on

[5] Highway Capacity Manual, 6th Edition, Transportation Research Board of the National Academies: Washington, DC, 2015.

three criteria for evaluating traffic stress on bicyclists: street width (number of lanes), the posted speed limit, and land use, with the consideration that commercial driveways experience much more turning traffic than residential driveways, creating more potential conflicts for bicyclists.

Transit propensity is a measure of which areas in the City where transit ridership demand may be most concentrated. For this study, several types of demographic data were used to collectively identify transit propensity, including areas:

- with high population density,
- where more than 10 percent of households do not own a vehicle,
- near employers,
- near schools, and
- near community resources such as libraries and community centers.

Refer to Appendix A for the package of maps developed for the CTP.

PROJECT IDENTIFICATION AND PRIORITIZATION

A series of performance measures were identified for this strategic corridor analysis and were used to develop and assess project alternatives in accordance with the goals and objectives of this CTP. A three-stage process was utilized to screen and develop project recommendations using these performance measures:

- Stage 1 – Identify Deficient Locations
- Stage 2 – Cluster and Rank Locations
- Stage 3 – Identify Project Recommendations

To understand where the greatest needs were, the team performed a series of calculations for each corridor. Table 4 includes the metrics analyzed, as well as the criteria for designating a corridor as being deficient and/or having a deficiency. For some metrics, a value above the average of the study corridors is considered deficient. For other metrics, the criterion is based on best practices and/or desired outcomes.

Table 4: Deficiency Metrics

Metric:	Deficiency Identified if:
Number of bicycle / pedestrian crashes per mile (2007-2021)	Greater than average* (2.9 crashes per mile)
Number of motor vehicle crashes per mile (2018-2022)	Greater than average (45.8 crashes per mile)
Number of crossings per mile	Fewer than 6 crossings per mile
Percent of sidewalk missing	Greater than 0% of sidewalk is missing
Bicycle Level of Traffic Stress (BLTS)	Greater the BLTS 2
Current Level of Service (LOS) Hot Spot	LOS E or LOS F
Future Level of Service (LOS) Hot Spot	LOS E or LOS F
Public Feedback received	Identified by Steering Committee as a public concern
At-Grade Rail Crossing	Greater than 0 at-grade rail crossings
Transit Propensity	Within or adjacent to a transit-supportive area (See map of Transit Propensity in Appendix A)

*Average refers to the mean value of the 42 study corridors

To develop a list of implementable projects and address the corridors with the greatest need, the corridors were ranked based on the number of deficiencies identified for them. Corridors listed in Table 3 with at least 5 of the deficiencies outlined in Table 4 are prioritized for improvement. Corridors with at least 7 deficiencies identified are considered the highest priority. Fifteen (15) corridors rank highly enough to be prioritized for improvement, as shown below in Table 5.

The corridors were further prioritized using a scoring system which utilizes the deficiency metrics outlined in Table 4, and demographic data including employment density, population density, household income, and zero car households. The prioritized list of corridors is shown in Table 5 below. A corridor profile for each of the identified corridors summarizing the data and performance metrics is included in Appendix E.

Table 5: Ranking of Priority Corridors

Priority	ID	Corridor Name	Corridor Extents	
			From	To
1	1	Rosehill Rd	Ramsey St	Country Club Dr
2	4	McPherson Church Rd	Raeford Rd	Skibo Rd
3	3	Sycamore Dairy Rd	Morganton Rd	Bragg Blvd
4	5	Village Dr	Ireland Dr	Robeson St
5	26	Cumberland St	Murchison Rd	Ramsey St
6	21	Langdon St	Murchison Rd	Ramsey St
7	42	Old Wilmington/B St	S Eastern Blvd	Grove St
8	31	Coventry Rd	Camelot Dr	Ireland Dr
9	12	Jasper St / Topeka St	Murchison Rd	Corrinna St
10	24	Blount St	Robeson St	Gillespie St
11	27	Hillsboro St	Rowan St	Ramsey St
12	23	Roxie Ave	Raeford Rd	Boone Tr
13	34	Deep Creek Rd	Clinton Rd	Cade Hill Ave
14	13	Cliffdale Rd	Raeford Rd	Two Bale Ln
15	38	W Rowan St	Oakridge Ave	Bragg Blvd

PROJECT RECOMMENDATIONS

A corridor improvement toolkit was developed to envision a menu of treatments that might be applied to address safety and mobility concerns along the corridors prioritized for improvement. These tools focus on reducing traffic congestion and improving traffic safety, improving pedestrian and bicyclist safety and access, improving transit service, and improving access at at-grade rail crossings. The toolkit was discussed with the Steering Committee to ensure that strategies address the City's concerns, are operationally feasible, and are consistent with other transportation improvements being carried out in Fayetteville. Refer to Figure 8 below.

Reducing Traffic Congestion and Improving Traffic Safety – These treatments focus on improving safety and mobility on 2- to 4-lane undivided streets in Fayetteville. They include low cost, low impact tools that can be applied as part of City funded projects.

Improving Pedestrian and Bicyclist Safety and Access – These treatments are intended to improve multimodal safety and access along corridors and at key intersections. They delineate space for more vulnerable road users and provide separation between higher speed vehicles and pedestrians and bicyclists.

Improving Transit Service – These treatments expand and improve transit service to make transit travel in Fayetteville more convenient, reliable, and comfortable. The toolkit includes both infrastructure as well as programmatic changes to achieve these desired outcomes.

Figure 8: Corridor Improvement Toolkit

Treatments identified in the corridor improvement toolkit were applied to the deficient corridors to identify projects that can improve safety and operations on the roadways in Fayetteville. Table 6 includes the project recommendations. Treatment application considers multimodal needs, operational tradeoffs, maintenance concerns, public familiarity, and Steering Committee feedback.

Table 6: Project Recommendations

Priority	ID	Corridor Name	Recommendation
Highest	1	Rosehill Road	**Traffic:** Road Diet **Bicycle & Pedestrian:** Fill Sidewalk Gaps, Crosswalks, Shared Use Path **Transit:** Improve Bus Stop Crossings & Amenities
	4	McPherson Church Road	**Traffic:** Add Medians / Control Access **Transit:** Improve Bus Stop Crossings & Amenities
	3	Sycamore Dairy Road	**Traffic:** Road Diet **Bicycle & Pedestrian:** Fill Sidewalk Gaps, Crosswalks, Buffered Bike Lanes
	5	Village Drive	**Traffic:** Road Diet **Bicycle & Pedestrian:** Crosswalks, Signalized Pedestrian Crossing, Buffered Bike Lanes **Transit:** Improve Bus Stop Crossings & Amenities
Medium	26	Cumberland Street	**Bicycle & Pedestrian:** Fill Sidewalk Gaps, Crosswalks, Crossing Infrastructure
	21	Langdon Street	**Traffic:** Traffic Calming **Bicycle & Pedestrian:** Crosswalks **Transit:** Consider Added Bus Service
	42	Old Wilmington/B Street	**Traffic:** Traffic Calming, Roundabout **Bicycle & Pedestrian:** Crosswalks **Transit:** Improve Bus Stop Crossings & Amenities
	31	Coventry Road	**Bicycle & Pedestrian:** Sidewalk, Crosswalks, Curb Extensions, Buffered Bike Lanes **Transit:** Improve Bus Stop Crossings & Amenities
	12	Jasper Street / Topeka Street	**Traffic:** Road Diet **Bicycle & Pedestrian:** Crosswalks, Buffered Bike Lanes
Lower	24	Blount Street	**Bicycle & Pedestrian:** Shared Use Path
	27	Hillsboro Street	**Traffic:** Traffic Calming **Bicycle & Pedestrian:** Crosswalks, Crossing Infrastructure, Separated Bike/Ped Connection **Transit:** Improve Bus Stop Crossings & Amenities
	23	Roxie Avenue	**Traffic:** Traffic Calming **Bicycle & Pedestrian:** Curb Extensions, Crosswalks, Sidewalk **Transit:** Bus Stop Crossings & Amenities
	34	Deep Creek Road	**Traffic:** Remove Channelized Right, Traffic Calming **Bicycle & Pedestrian:** Shared Use Path, Crosswalks **Transit:** Improve Bus Stop Crossings & Amenities
	13	Cliffdale Road	**Bicycle & Pedestrian:** Fill Sidewalk Gaps, Crosswalks
	38	W Rowan Street	**Traffic:** Traffic Calming **Bicycle & Pedestrian:** Fill Sidewalk Gaps

EXAMPLE

One example that demonstrates the application of this methodology is for Village Drive, which is a four-lane roadway connecting Robeson Street and Ireland Drive. Owen Drive intersects with Village Drive about halfway along the corridor. Concentrated around the Owen Drive and Village Drive intersection is the Cape Fear Valley Medical Center and a shopping plaza. There are five (5) bus stops located along Village Drive. Refer to Figure 9 below.

Per data analysis, several deficiencies were identified along Village Drive, including high transit propensity, high bicycle level of traffic stress, high vehicular crash frequency, few pedestrian crossings, an at-grade rail crossing, and poor vehicular level of service at the intersection of Village Drive and Owen Street.

The recommended project along Village Drive includes reconfiguring the roadway from 5 vehicular lanes to 3 vehicular lanes. It also incorporates buffered bike lanes and improved sidewalks, pedestrian crossings, and transit amenities. A project here should focus on improvements to the Owen Drive and Village Drive intersection and improving crossings near bus stops. Figure 9 below shows the application of these tools as part of a recommended project along Village Drive.

Figure 9: Village Drive Recommended Project Example

COST ESTIMATION

Planning-level cost estimates were then developed for each of the corridor improvements to assist with project prioritization and implementation. To develop cost estimates for these corridor project recommendations, the following assumptions were made:

- Planning-level costs to provide implementation context
- General value of construction and labor
- No adjustment for future inflation
- Cost of adding or expanding transit service not included

Estimated costs for these corridor improvement projects are included in Table 7.

Table 7: Estimated Corridor Improvement Project Costs

Corridor	Recommendations	Total Cost
1 - Rosehill Rd/ Stacy Weaver Dr	Road Diet, Fill Sidewalk Gaps, Crosswalks, Shared Use Path, Improve Bus Stop Crossings & Amenities	$14,540,00
3 - Sycamore Dairy Rd	Road Diet, Fill Sidewalk Gaps, Crosswalks,	$1,970,000
4 - McPherson Church Rd	Add Medians / Control Access, Improve Bus Stop Crossings & Amenities	$3,060,000
5 - Village Dr	Road Diet, Crosswalks, Signalized Pedestrian Crossing, Improve Bus Stop Crossings & Amenities	$3,680,000
12 - Jasper St / Topeka St	Road Diet, Buffered Bike Lanes,	$940,000
13 - Cliffdale Rd	Fill Sidewalk Gaps, Crosswalks	$50,000
21 - Langdon Rd	Traffic Calming, Crosswalks, Consider Added Bus Service	$380,000
23 - Roxie Ave	Curb Extensions, Crosswalks, Sidewalk, Bus Stop Crossings & Amenities	$3,760,000
24 - Blount St	Shared Use Path	$1,000,000
26 - Cumberland St	Fill Sidewalk Gaps, Crosswalks, Crossing Infrastructure,	$1,270,000
27 - Hillsboro St	Traffic Calming, Crosswalks, Crossing Infrastructure, Separated Bike/Ped Connection, Improve Bus Stop Crossings & Amenities	$1,330,000
31 - Coventry Rd	Sidewalk, Crosswalks, Curb Extensions, Improve Bus Stop Crossings & Amenities	$1,760,000
34 - Deep Creek Rd	Remove Channelized Right, Shared Use Path, Crosswalks, Traffic Calming, Improve Bus Stop Crossings & Amenities	$3,510,000
38 - W Rowan St	Traffic Calming, Fill Sidewalk Gap	$600,000
42 - Old Wilmington/B St	Traffic Calming, Roundabout, Crosswalks, Improve Bus Stop Crossings & Amenities	$5,350,000
Total		**$39,450,000**

CONCLUSIONS

The project list and toolkit developed herein are intended to assist the City with programming and implementing key transportation improvements. This strategic corridor analysis resulted in a list of fifteen (15) projects that the City can implement to address public concerns and improve mobility and access in Fayetteville. The total cost of all projects identified in the Strategic Corridor Recommendations exceeds $39 million. They might be carried out through the City's Capital Improvement Program over a shorter- to longer-term timeline. These projects may also be funded through local, regional, state, or federal grant programs. They might also be coordinated with City maintenance projects, street resurfacing, and/or projects being carried out through other City departments.

A critical next step for advancing the recommendations identified in this report is to engage with community members and local elected officials. This report is intended for a broad audience so that the study purpose and need, goals, scope, methodology, assumptions, and recommendations can be easily relayed. Ultimately, these projects may also require environmental review. Through preliminary and final engineering design processes, recommendations will be refined to best meet the demands, constraints, needs, and opportunities of the community and context through which they are located. Public engagement is anticipated to persist throughout the project delivery process. At various points, City Council approval will be required to advance projects forward.

Conclusions and Future Steps

CONCLUSIONS AND FUTURE STEPS

This CTP is intended to create a framework for the City of Fayetteville to strategically implement projects in the coming years that advance and connect the transportation network. It builds upon previous planning efforts and was guided by a Steering Committee of City Staff thinking about local context and possible implementation pitfalls. It establishes recommendations for new street connections that provide resiliency, code modifications that are achievable with current staff capacity and help the City leverage private investment, and strategic corridor upgrades that provide improved access and mobility.

Future steps consistent with this effort include the following:

- Identify funding sources and coordinate with grant applications,
- Consider synergy with ongoing maintenance and resiliency projects,
- Archive full potential connections list for future project opportunities,
- Perform community engagement through future design processes,
- Designate corridor projects as short-, medium-, and long-term.

REFERENCES

1. NCDOT Functional Classification Map. https://www.arcgis.com/apps/mapviewer/index.html?layers=029a9a9fe26e43d687d30cd3c08b1792
2. NCDOT Annual Average Daily Traffic (AADT) Mapping Application. https://ncdot.maps.arcgis.com/apps/webappviewer/index.html?id=964881960f0549de8c3583bf46ef5ed4
3. Fayetteville City Map. https://faync.maps.arcgis.com/apps/webappviewer/index.html?id=96218c70ff034bddb548bb567b904123
4. NCDOT Transportation Disadvantage Index Map. https://ncdot.maps.arcgis.com/apps/instant/sidebar/index.html?appid=4175345664ac4e10b14466223758406f
5. NCDOT Transportation Disadvantage Index Overview. https://storymaps.arcgis.com/stories/7e3bbd00fe014a77b5f1620334209712

Appendix A – Map Package

Appendix B – Connections Spreadsheet

Appendix C –

Connectivity Cut Sheets & Cost Estimations

Appendix D – Development Code Memorandum

Appendix E – Corridor Profiles & Cost Estimation