

Technical Memorandum

December 12, 2023

Project# 272110.001

To: Sheila Thomas-Ambat, PE, CCM, CFM
City of Fayetteville
433 Hay Street
Fayetteville, NC 28301

Cc: Gerald Newton, DEL, AICP; Chester Green II; and Clayton Deaton

From: Zachary Bugg, PhD, PE; Tara Hofferth, PE; and Amelia Martin, PE

RE: Fayetteville Comprehensive Transportation Plan – Development Code Review

INTRODUCTION

As part of the connectivity analysis and recommendations development being completed for the Fayetteville Comprehensive Transportation Plan, Kittelson & Associates, Inc. (Kittelson) has completed a review of the City's development code to identify existing requirements related to neighborhood street connectivity and access. Following this review, Kittelson developed proposed modifications and updates to the City's development code to address any gaps in the regulations related to street connectivity.

EXECUTIVE SUMMARY

Kittelson conducted a comprehensive review of Fayetteville's code, along with a peer review of three North Carolina cities: Winston-Salem, Cary, and Wilmington. These cities were selected due to their similar populations and varied locations across the state. Recommended adjustments to the City's development code include the following:

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, Kittelson 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 is 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.**

CODE ANALYSIS

The format of this memorandum includes a summary of each section of existing Fayetteville code and challenges, a comparison with peer cities' codes, and recommendations for implementation in Fayetteville.

Kittelson began its review of the City's existing code primarily with Part II: Code of Ordinances. Particular attention was paid to the following Chapters:

- Chapter 16: Motor Vehicles and Traffic
- Chapter 24: Streets and Sidewalks
- Chapter 30: Unified Development Ordinance

Sections of the code most relevant to neighborhood street connectivity and access are summarized for each topic. All sections of the code relating to street connectivity and access are included in **Appendix A**. In general, Kittelson found the code is quite robust in its requirements for residential developments.

Codes for three peer North Carolina cities were reviewed, including Winston-Salem, Cary, and Wilmington. These cities were selected due to their similar populations and varied locations across the state. These cities represent a cross-section of North Carolina's metropolitan areas, ranging from suburban extensions of more populous cities to the largest cities in their respective regions.

Based on Kittelson's review of Fayetteville and peer cities, some adjustments could be made to the City's code to improve connectivity, as outlined below.

Street Connectivity Index

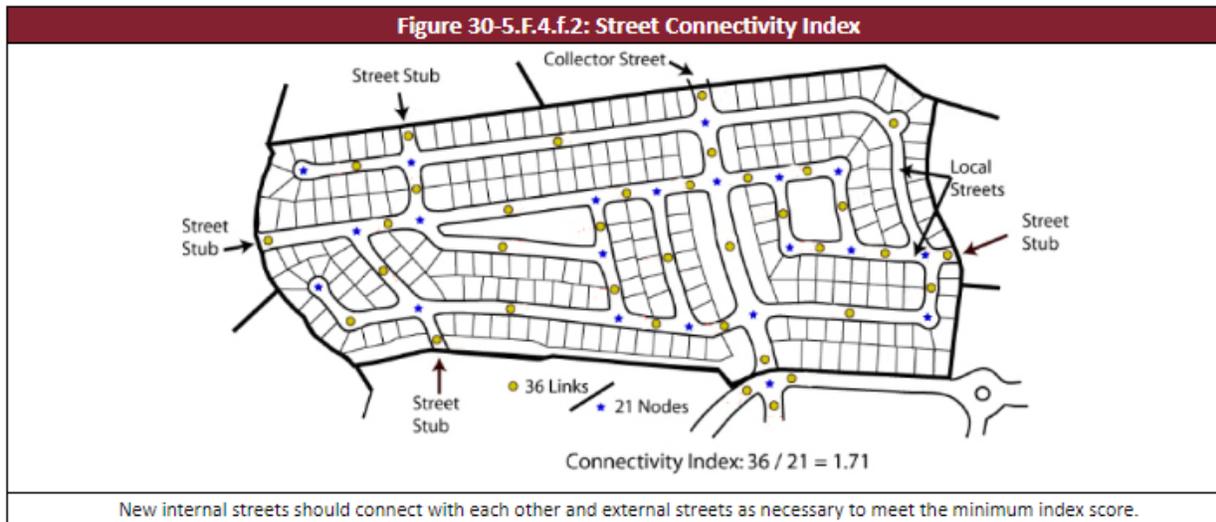
The Street Connectivity Index is designed to ensure adequate connectivity within a subdivision's street network and with surrounding subdivisions. It compares the ratio of links (which are defined by having

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.

Existing Code & Challenges

The code includes provisions intended to ensure traffic dispersion and connectivity for subdivisions and private residential developments. Of particular note is the Street Connectivity Index, shown in **Figure 1**.

Figure 1: Street Connectivity Index



DISTRICT WHERE DEVELOPMENT IS PROPOSED	MINIMUM CONNECTIVITY INDEX SCORE
SF-15, SF-10, BP, LI, HI	1.40
SF-6, MH, PD-EC	1.50
MR-5, OI, NC, LC, MU, CC, PD-R, PD-TN	1.60

In considering the Street Connectivity Index, it is not clear how minimum connectivity scores were determined. Limitations arise from the binary classification of points as links or nodes and the potential for manipulation by modifying the number of blocks within the subdivision relative to the number of stub streets or access points.

Peer City Code Review

Peer cities in North Carolina employ similar Street Connectivity Indexes and have comparable or lower minimum connectivity scores. Winston-Salem's Unified Development Ordinance (UDO) and Cary's Land Development Ordinance (LDO) establish a minimum index of 1.2 (Winston-Salem/Forsyth County Unified Development Ordinance 7.4.3 B. 2.a. and Cary Land Development Ordinance 7.10.3 (A) (1)). Wilmington's Land Development Code (LDC) sets a minimum index comparable to Fayetteville's at 1.4 (Wilmington Land Development Code Sec. 18-378).

Recommendations

In order to remain consistent with peer cities and limit the burden on Fayetteville municipal staff, further modifications to Fayetteville's Street Connectivity Index are not advised at this time.

Street Stub Connections

Street stub requirements are designed to ensure connectivity with future subdivisions and developments that occur on adjacent parcels. In this memo, 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.

Existing Code & Challenges

The code lacks requirements to connect stub streets between developments, which is exacerbated by local courts not requiring stub street connections. Another challenge is that Fayetteville's Unified Development Ordinance (UDO) 30-2.C.5.b.d stipulates any development employing street stubs is moved to the "Major Site Plan" category. This category has more requirements and possibilities to be denied than a "Minor Site Plan" of the same size. This category also requires the developer to host a neighborhood meeting with the impacted residents (UDO 30-2.B.6.c.d), adding further administrative burdens for projects which intend to improve connectivity.

The incentive structure in which courts and the code do not require stub street connections, coupled with any incidental hurdles associated with hosting a neighborhood meeting and being reclassified as a "Major Site Plan," severely reduces the chances that new developments will connect to existing developments. These factors have contributed to a prevalence of disconnected subdivisions across the city, limiting access for both personal transportation and emergency vehicles.

Peer City Code Review

Winston-Salem generally requires stub streets on each side of a development. UDO 7.4.3.A.8 requires stub streets *"on each side of a development to allow for future interconnectivity to adjacent tracts of land when they develop."* The number of required stub street connections is based on the dimensions of the development and the surrounding topography, and *"[d]epending on the length of a side, more than one stub street may be required."*

Cary does not appear to stipulate the number of required stub street connections for a given development. However, LDO 7.10.3 has a stated intent *"to improve access/egress for Town neighborhoods, provide faster response time for emergency vehicles, and improve the vehicular and pedestrian connections between neighborhoods."*

Wilmington generally requires that new developments connect to existing stub streets on adjacent developments. LDC Sec. 18-523 D. states that streets *"shall be interconnected and shall connect with adjacent streets external to the subdivision to provide multiple routes for pedestrian and vehicle trips from, to, and within the subdivision."*

Recommendations

To reinforce the importance of stub street connections and to provide access between subdivisions, Kittelson recommends adding to 30-6.A.4.a.3. Cul-de-Sac and Street Stubs:

- *“Where a development adjoins unsubdivided or undeveloped land, stub streets within the new subdivision shall be extended to meet block length requirements (See 30-5.F.5)”*
- *“Stub streets must be extended to the boundary of the adjacent area to the point where the connection to the anticipated street is expected.”*
- *“If a stub street exists on an abutting property, the street system of any new development must connect to the stub street to form a through street.”*

Design Adjustment Process

The design adjustment process can allow exemptions to stub street requirements.

Existing Code & Challenges

Fayetteville's code does not require that new developments connect to existing stub streets.

Peer City Code Review

In Winston-Salem, subdivisions are exempted from street stub requirements if *“terrain features or existing development would make a future connection prohibitive”* (UDO 7.4.3.A.8).

Cary employs neighborhood classifications as a basis for stub street exemption criteria. In all cases, per LDO 7.10.3 (D) (2), *“[p]edestrian and bicycle connections, and utility stubs and connections shall continue to be required.”* Exemptions may be granted if the adjacent subdivision lacks paved streets or unpaved rights-of-way that touch the subdivision being developed. In cases where emergency access is limited by such a lack of connectivity, *“an emergency access connection to the [adjacent] neighborhood must be provided,”* per LDO 7.10.3 (D) (2) (b) 2. In cases where emergency access is sufficient, these requirements are removed. Developers can elect to provide stub streets to the boundaries of the disconnected subdivisions, but, per LDO 7.10.3 (D) (2) (b) 1, if these connections are not made, *“a connectivity index less than 1.2 may be approved by the Planning Director.”* In case of modification of minimum connectivity index, per LDO 7.10.3 (A) (1), *“a six (6)-foot pedestrian trail shall be provided to link any cul-de-sacs within a residential development in which the required connectivity index has been modified.”*

Wilmington exempts new developments from stub street requirements if at least one of the following conditions is met per LDC Sec. 18-523 D.4:

1. The adjacent property is an extant residential subdivision with lots no larger than 20,000 square feet and no accommodations for stub streets have been made;
2. The adjacent property has been protected from development through conservation easements or ownership that precludes development;
3. Or if officially documented natural water courses or wetlands, or slopes greater than 10 percent, exist between the subject site and adjacent sites.

Recommendations

The City should minimize exemptions from stub street requirements during development review processes. This can be achieved by increasing the burden of proof needed for exemptions, such as the exemptions outlined in the Wilmington code. Given its vagueness, the City might consider eliminating or modifying this text under item 2: “or ownership that precludes development.”

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.

Existing Code & Challenges

The code includes provisions for the number of access points for developments, which is intended to provide for more traffic dispersion and encourage subdivision connections. The Minimum Number of Access Points is shown in **Figure 2**.

Figure 2: Minimum Number of Access Points

Table 30-5.F.6: Required Access	
DEVELOPMENT TYPE	MINIMUM NUMBER OF ACCESS POINTS
RESIDENTIAL USE TYPES (# OF UNITS)	
80 or fewer	1
81–160	2
161 +	3
ALL OTHER USE TYPES (TOTAL ACRES)	
Less than 5 acres	1
5–20 acres	2
more than 20 acres	2 + 1 per every additional 20 acres

While the Minimum Number of Access Points requirement should accommodate development connectivity, the code does make exceptions to this requirement. Per Part II, Chapter 30, Article 30-5.F.6.c:

“Development shall be exempted from these standards if it is demonstrated the following conditions apply:

- 1. No other street access points can be located due to existing lot configurations, absence of connecting streets, environmental, or topographic constraints;*
- 2. NCDOT will not authorize the required number of entrances; or*
- 3. Alternative access can be provided in a manner acceptable to the City that is supported by a transportation impact analysis.”*

Note that this section went into effect on November 18, 2013. From conversations with City staff, the first exemption requires a fairly high burden of proof. The second exemption is the type most frequently sought, generally in application to commercial developments. Residential subdivisions are generally limiting access by interpreting the term “unit count” loosely, and lots are often being developed with multiple attached units (townhomes). Applications are being approved based on the number of lots, but plan revisions increasing density for each lot are then not triggering a review of the required access points.

The code also includes provisions that safeguard fire access. Notably this excerpt from Part II, Chapter 30, Article 30-5.A.11.a:

“Where streets or right-of-way provide insufficient access for fire fighting, unobstructed fire lanes with a minimum width complying with the current adopted version of the North Carolina State Fire Code shall be provided adjacent to a structure’s primary entrance in accordance with the City’s fire code. In no instance shall this standard waive the requirement for primary drive aisles constructed in accordance with Section 30-5.A.11.e, Primary Drive Aisles, when these drive aisles are required by this Ordinance.”

Peer City Code Review

Winston-Salem does not appear to require a specified number of access points, but its code states that, during the initial development process, *“An unlimited number of building permits may be conditionally issued for land parcels adjacent to a public street that is not maintained by either the City of Winston-Salem or NCDOT” (UDO 7.4.2 B.2.)*.

Cary has provisions within its code specifying a minimum number of access points based on the number of units in the development. LDO 7.10.3 (B) (2) states that *“Any development of more than one hundred (100) residential units or additions to existing developments such that the total number of units exceeds one hundred (100) shall be required to provide for vehicular and pedestrian access to at least two (2) public streets unless such provision is modified pursuant to Section 3.19.1.”*

Wilmington does not appear to quantify access point minimums, but its code states that *“[s]ubdivisions shall be designed to accommodate and allow unobstructed ingress and egress of all emergency vehicles and equipment in order that emergencies for life and property safety may not be unnecessarily delayed” (LDC Sec. 18-403)*.

Recommendations

Another limitation of the code language is the loose interpretation being used for the term “unit count.” To clarify this requirement and ensure better traffic dispersion for developments, Kittelson recommends basing the residential access point thresholds on the number of housing units, assuming each lot will be developed with up to two attached units. Utilizing the single- and multifamily trip generation rates in the latest edition of *Trip Generation*, published by the Institute of Transportation Engineers (ITE), the updated residential access thresholds in Table 30-5.F.6 are recommended as follows:

Table 1. Revised Minimum Number of Access Points for Residential Developments

Development Type	Minimum Number of Access Points
56 or fewer	1
57 - 112	2
113 or more	3 or more

Per discussions from the City attorney, the NC state legislature recently passed a new session law 2023-137, Section 26.(a) G.S. 160D-702(c):

“(c) A zoning or other development regulation shall not do any of the following:

- (1) *Set a minimum square footage of any structures subject to regulation under the North Carolina Residential Code for One- and Two-Family Dwellings.*
- (2) *Set a maximum parking space size Require a parking space to be larger than 9 feet wide by 20 feet long unless the parking space is designated for handicap, parallel, or diagonal parking.*
- (3) *Require additional fire apparatus access roads into developments of one- or two-family dwellings that are not in compliance with the required number of fire apparatus access roads into developments of one- or two-family dwellings set forth in the Fire Code of the North Carolina Residential Code for One- and Two-Family Dwellings."*

With respect to item (3) above, it is important that the proposed changes to the code specify that the new access requirements be tied to connectivity, not specifically to fire apparatus access.

Pedestrian and Bicycle Access

Requirements for pedestrian and bicycle connectivity are intended to facilitate safe and efficient multimodal travel.

Existing Code & Challenges

City code requirements for pedestrian and bicycle access address requirements for the special condition of cul-de-sacs but do not generally address the need for developers to build sidewalks in residential areas. Based on discussions with City staff, it has also been noted that obtaining a driveway permit does not require developers to build sidewalks in residential areas.

Peer City Code Review

Peer cities have more robust requirements for pedestrian and bicycle connections between and within subdivisions. Winston-Salem UDO 7.4.1 requires improvements *"sufficient to serve both existing and projected pedestrian, transit, and cyclist needs."*

Cary's LDO 7.10.4 (A) (1) states that *"[s]idewalk shall be required on one (1) side of all local and private streets in residential developments outside of a mixed-use center"* and that in *"property located within Mixed Use Overlay Districts, sidewalk shall also be provided on both sides of all local and private streets."*

Wilmington requires *"a continuous internal bicycle/pedestrian path"* connecting to an assortment of amenities, including nearby public sidewalks, buildings on the site, adjacent properties' pathways, adjacent public/civic uses, and adjacent transit facilities (LDC Sec. 18-494).

Recommendations

To clarify pedestrian connectivity and the need to provide sidewalks, Kittelson recommends adding the following to 30-5.F.9.b and 30-6.A.3.e.1 Sidewalks:

- *"Pedestrian access routes between buildings and public rights-of-way shall be physically separated from vehicular surface areas, except where required to cross a drive aisle; such crossings shall be perpendicular wherever practicable."*

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.

Existing Code & Challenges

Fayetteville UDO 30-5.F.4.a.7. permits the creation of private streets with the requirement that except for the provision allowing vehicular gates on private streets, *“private streets shall be built to the same standard as public streets.”* It also requires that a homeowners' association be established for the maintenance of such streets. Finally, it requires that access be granted to *“any governmental agency, personnel, or equipment”* in order *“to accomplish or fulfill any service or function for which the agency is responsible.”* These regulations have resulted in subdivisions and other residential complexes that limit pedestrian, bicycle, and vehicle access.

Peer City Code Review

Winston-Salem permits private streets *“in PRDs at the discretion of the Planning Board”* but states that *“public streets may be required to ensure adequate street connectivity”* (UDO 5.2.66 H.3.).

Cary permits private streets as long as *“[t]he proposed public or private street system [is] designed to provide vehicular and pedestrian interconnections to facilitate internal and external traffic movements in the area,”* per LDO 7.10.3 (B)(1). LDO 8.1.9 (C) (1) (g) states that *“Detached/attached and townhouse dwelling lots shall be served by publicly maintained streets and alleys in accordance with the requirements of the Standard Specifications and Details Manual. Attached use types include duplex, patio, and semi-detached dwellings. Within the transportation network connecting the aforementioned lots to a thoroughfare or collector roadway, there shall be no intervening private streets.”*

Wilmington prohibits private streets *“when street stubs are required to connect to external adjoining stub streets”* (LDC Sec. 18-495. C. 2.).

Recommendations

Kittelson recommends adding access easement requirements to UDO 30-5.F.4.a.7. Stub streets that connect developments should be included in these requirements to ensure adequate street connectivity.

The City might consider editing UDO 30-5.F.4.a.7.c to look similar to this:

UDO 30-5.F.4.a.7.c

Public Access

In any development where private streets are provided, a Final Plat shall be prepared showing the dedication of a public access easement for City approval and recorded with the Cumberland County Register of Deeds, which identifies all private streets. The Final Plat shall include a public access easement such that the public is granted perpetual access over any private streets and a note shall be included indicating that any governmental agency, personnel, or equipment shall be granted access to accomplish or fulfill any service or function for which the agency is responsible. In addition, any agency or organization designated by a governmental agency to perform a designated function shall also retain the same access granted to any governmental agency. It shall be indicated on the Final Plat that the public and any

agency exercising its access rights shall have the same rights and only such liabilities as they would have on any public lands, right-of-way, or easements.

The City may also want to require notes on the plat where public easements are dedicated. For example, a note may be required that says: "No gates or obstructions shall be installed which prohibit or limit public or government agency access within the public access easement." The public access easement should cover the same width that right-of-way does for public streets.

Additional language may also be added to indicate that "where private streets are stubbed to the property line, private streets with dedicated public access easements shall be stubbed to meet the existing connection. Where public streets are stubbed to the property line, public streets with dedicated right-of-way shall be stubbed to meet the existing connection."

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.

Existing Code & Challenges

Section 30-5.F.9.a of Fayetteville code requires sidewalks on both sides of all streets, but it allows for significant exemptions. The code states that "[w]hen an in-lieu fee consistent with the City's fee schedule is determined to be appropriate by the City," sidewalks are not required to be constructed.

Peer City Code Review

In Winston-Salem, when construction of a sidewalk or alternative walkway is unfeasible, a payment in-lieu of construction; the construction of sidewalks in the general vicinity of the project site; or a combination of conventional sidewalk, alternative walkway, and fee-in-lieu will be required (UDO 7.4.1 F.).

Cary allows developers who are required to dedicate or install improvements to submit a payment in lieu of required improvements under certain conditions. Per LDO 8.1.5 (A) (1), the requirement is only waived if it "would not connect with a similar existing or proposed improvement and would not provide any immediate traffic or public safety benefit to motorists, pedestrians, or bicyclists, but will be necessary or desirable to motorists, pedestrians, or bicyclists in the future." Additionally, the full installation and construction costs must be included in the payment.

From our review, Wilmington does not appear to permit payment in lieu of construction of pedestrian and bicyclist facilities or other roadway improvements.

Recommendations

The City might consider making greater use of fee-in-lieu payments as an option for developments in the future when there is additional staff capacity to track and manage that process. In that case, the City could adopt a model similar to Cary, where the fee-in-lieu can be used when benefits of the new infrastructure do not provide immediate traffic or public safety benefit, but will be necessary or desirable in the future.

In the meantime, it is recommended that the City require sidewalk construction even where it is not connected to existing facilities. This will help build out the walkable network in Fayetteville.

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.

Existing Code & Challenges

The City's code does not have strong requirements for annexed ROW to ensure that it meets minimum roadway standards. As a result, City staff report that developers have been or are building substandard private roadways that later become annexed. The resulting annexed streets are not built or rebuilt to City standards.

Peer City Code Review

Winston-Salem states that *"any private street not constructed and maintained to public standards shall be improved to City of Winston-Salem standards"* before being accepted by the City (UDO 7.4.2 D).

Cary *"reserves the right to hold or revoke building permits or Certificates of Occupancy and withhold or revoke development plan approvals until the required Publicly-maintained improvements have been completed"* (LDO 8.1.8 (D)).

Wilmington *"city council shall not accept the dedication of such lands and facilities until it determines, based upon recommendation of the city engineer, that ... All lands and facilities have been inspected and approved by the city engineer or impacted departments of the city"* (LDC Sec. 18-596 A.).

Recommendations

It is recommended that requirements be added to Fayetteville's code to stipulate that annexed roads must be improved to Fayetteville's standards before being accepted by the City. This is similar to Winston-Salem's existing code requirements.

NEXT STEPS

As part of the Comprehensive Transportation Plan, Kittelson is also providing a connectivity analysis that will result in a list of several recommended projects to improve connectivity between neighborhoods and address emergency access. The code review recommendations described in this memorandum are intended to proactively address connectivity and resiliency for new or redeveloped developments within the City.

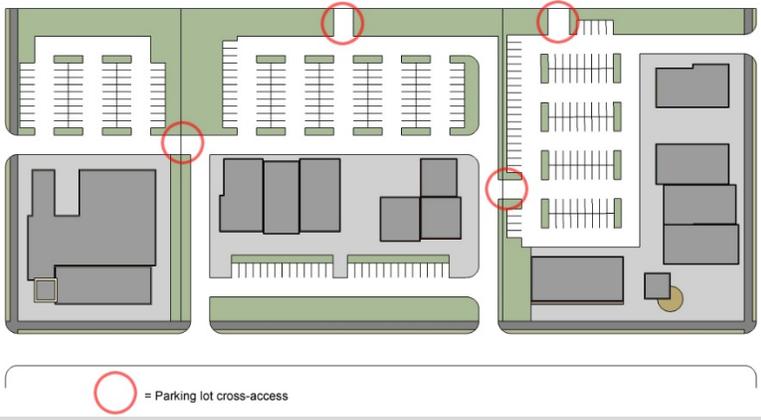
REFERENCES

1. Institute of Transportation Engineers. *Trip Generation, 11th Edition*. Institute of Transportation Engineers: Washington, DC, 2021.

2. Fayetteville, North Carolina, Code of Ordinances, 2023.
3. Winston-Salem/Forsyth County, North Carolina, Unified Development Ordinance, 2023.
4. Town of Cary, North Carolina, Land Development Ordinance, 2023.
5. Wilmington, North Carolina, Land Development Code, 2023.
6. Raleigh, North Carolina, Unified Development Ordinance, 2023.

Appendix A
City of Fayetteville Development Code
Connectivity and Access Excerpts

Table A2. City of Fayetteville Development Code Connectivity and Access Excerpts

Section of Code	Topic	Text
Part II, Chapter 24, Sec. 24-102	Driveways	<p>The most current edition of the manual entitled "Policy on Street and Driveway Access to North Carolina Highways," adopted, and made effective, by the North Carolina Department of Transportation, to the extent that such manual pertains to all driveways in urban areas, is hereby adopted and made effective for all driveways within the city, and each and all of the standards and requirements and regulations and provisions contained in such manual shall be applicable to such driveways, and such driveways shall conform to and with such manual; and such manual, to the extent defined, is hereby adopted and incorporated herein by reference.</p>
Part II, Chapter 30, Article 30-5.A.3.f	Cross-access	<p>All development except single-family attached or detached dwellings and two- to four-family dwellings shall be designed to allow for cross-access to adjacent compatible development in accordance with the following standards:</p> <p>a. Limited to Two Parcels Cross-access ways shall be designed and located based on the standards of this section, but in no case shall a development be required to provide cross-access to more than two adjacent parcels.</p> <p>b. Future Stubs Required A connection for future parking lot cross-access shall be provided to all adjacent vacant land zoned MR-5 or within a Business or Planned Development zoning district. Development subject to these standards shall be designed to provide future cross-access in at least one location while remaining in compliance with all landscaping and stormwater standards.</p> <p>c. Minimum Width Cross-access ways shall allow for two-way traffic between parcels through the use of a single drive aisle with a minimum width of 20 feet, or through two one-way aisles, each with a minimum width of ten feet.</p> 
Part II, Chapter 30, Article 30-5.A.11.a	Fire/Emergency access	<p>Where streets or right-of-way provide insufficient access for fire fighting, unobstructed fire lanes with a minimum width complying with the current adopted version of the North Carolina State Fire Code shall be provided adjacent to a structure's primary entrance in accordance with the City's fire code. In no instance shall this standard waive the requirement for primary drive aisles constructed in accordance with Section 30-5.A.11.e, Primary Drive Aisles, when these drive aisles are required by this Ordinance.</p>
Part II, Chapter 30, Article 30-5.F.1.e	Fire/Emergency access	<p>Purpose and Intent: "Assure safe access to and from streets by emergency vehicles"</p>
Part II, Chapter 30, Article 30-5.F.4.d	Cul-de-sac/Street stubs	<p>Cul-de-sac and Street Stubs: "Street stubs longer than 150 linear feet shall include a paved hammerhead turnaround or cul-de-sac that meets the city's minimum standards and shall be located within the dedicated right-of way or easement" "except where allowed as part of a Special Use Permit, cul-de-sac streets shall not extend for more than 800 feet as measured from the center of the cul-de-sac turn around to the nearest right-of-way boundary of the adjoining street right-of-way intersection" "In no case shall a cul-de-sac serve more than 25 lots in a development."</p>

<p>Part II, Chapter 30, Article 30-5.F.4.f.1</p>	<p>Internal connectivity</p>	<p>Internal Street Connectivity “Minimum Connectivity Index Score Required Except in the AR and DT-1 or DT-2 districts, all development shall achieve an internal street connectivity score in accordance with Table 30-5.F.4.f, Minimum Street Connectivity Index:” See Figure 30-5.F.4.f.2: Street Connectivity Index</p> <div data-bbox="621 380 1448 716"> <p>Figure 30-5.F.4.f.2: Street Connectivity Index</p> <p>Connectivity Index: 36 / 21 = 1.71</p> <p>New internal streets should connect with each other and external streets as necessary to meet the minimum index score.</p> </div> <div data-bbox="621 762 1448 884"> <p>Table 30-5.F.4.f: Minimum Street Connectivity Index</p> <table border="1"> <thead> <tr> <th>DISTRICT WHERE DEVELOPMENT IS PROPOSED</th> <th>MINIMUM CONNECTIVITY INDEX SCORE</th> </tr> </thead> <tbody> <tr> <td>SF-15, SF-10, BP, LI, HI</td> <td>1.40</td> </tr> <tr> <td>SF-6, MH, PD-EC</td> <td>1.50</td> </tr> <tr> <td>MR-5, OI, NC, LC, MU, CC, PD-R, PD-TN</td> <td>1.60</td> </tr> </tbody> </table> </div>	DISTRICT WHERE DEVELOPMENT IS PROPOSED	MINIMUM CONNECTIVITY INDEX SCORE	SF-15, SF-10, BP, LI, HI	1.40	SF-6, MH, PD-EC	1.50	MR-5, OI, NC, LC, MU, CC, PD-R, PD-TN	1.60										
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<p>Part II, Chapter 30, Article 30-5.F.4.f.4</p>	<p>Pedestrian/Bicycle access</p>	<p>“A right-of-way 20 feet wide for pedestrian/bicycle access between a cul-de-sac head or street turnaround and the sidewalk system of the closest adjacent street or pedestrian pathway (as shown in Figure 30-5.F.4.f.4, Pedestrian Connections) shall be required whenever the city manager determines a proposed cul-de-sac or street turnaround:</p> <ol style="list-style-type: none"> 1. Is in close proximity with significant pedestrian generators or destinations such as schools, parks, trails, employment centers, or similar features; or 2. Creates an unreasonable impediment to pedestrian circulation. <p>b. This pedestrian connection shall count as a connection for the purpose of calculating the connectivity index.</p> <p>c. A pedestrian/bicycle access shall not be required between a new subdivision and a street within an adjacent residential subdivision platted more than 12 months prior thereto”</p>																		
<p>Part II, Chapter 30, Article 30-5.F.6.a</p>	<p>Vehicle access</p>	<p>“Unless exempted in accordance with subsection (c) below, all developments shall provide access from the development to the street system outside the development in accordance with Table 30-5.F.6, Required Access”</p> <div data-bbox="621 1314 1549 1598"> <p>Table 30-5.F.6: Required Access</p> <table border="1"> <thead> <tr> <th>DEVELOPMENT TYPE</th> <th>MINIMUM NUMBER OF ACCESS POINTS</th> </tr> </thead> <tbody> <tr> <td colspan="2" style="text-align: center;">RESIDENTIAL USE TYPES (# OF UNITS)</td> </tr> <tr> <td>80 or fewer</td> <td>1</td> </tr> <tr> <td>81–160</td> <td>2</td> </tr> <tr> <td>161 +</td> <td>3</td> </tr> <tr> <td colspan="2" style="text-align: center;">ALL OTHER USE TYPES (TOTAL ACRES)</td> </tr> <tr> <td>Less than 5 acres</td> <td>1</td> </tr> <tr> <td>5–20 acres</td> <td>2</td> </tr> <tr> <td>more than 20 acres</td> <td>2 + 1 per every additional 20 acres</td> </tr> </tbody> </table> </div>	DEVELOPMENT TYPE	MINIMUM NUMBER OF ACCESS POINTS	RESIDENTIAL USE TYPES (# OF UNITS)		80 or fewer	1	81–160	2	161 +	3	ALL OTHER USE TYPES (TOTAL ACRES)		Less than 5 acres	1	5–20 acres	2	more than 20 acres	2 + 1 per every additional 20 acres
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<p>Part II, Chapter 30, Article 30-5.F.6.b</p>	<p>Vehicle access</p>	<p>“Nothing in this section shall limit the total number of streets providing access to the street system outside a development, or exempt a development from meeting all applicable external street connectivity standards.”</p>																		
<p>Part II, Chapter 30, Article 30-5.F.6.c</p>	<p>Vehicle access</p>	<p>“Development shall be exempted from these standards if it is demonstrated the following conditions apply:</p> <ol style="list-style-type: none"> 1. No other street access points can be located due to existing lot configurations, absence of connecting streets, environmental, or topographic constraints; 2. NCDOT will not authorize the required number of entrances; or 3. Alternative access can be provided in a manner acceptable to the City that is supported by a transportation impact analysis.” <p>Note: section 30-5.F.6 Development Entry Points went into effect 11/18/2013</p> 																		

Part II, Chapter 30, Article 30-6.A.4.a.1.a	Street connections	Where new streets extend existing adjoining streets, their projections shall be at the same or greater width, but in no case less than the minimum required width shown in Table 30-6.A.4, Street Right-of-Way Widths. Proposed streets shall conform to the Master Thoroughfare Plan and the Feeder Street System Plan as adopted by the City Council, as well as the internal and external connectivity requirements in Section 30-5.F, Community Form Standards. Nothing in this section shall require the actual paved street cart way width to extend to the limits of the right-of-way width.
Part II, Chapter 30, Article 30-6.A.4.a.3	Cul-de-sac/Street stubs	Cul-de-sac streets shall not be more than 800 feet in length and shall have at the closed end a paved turnaround with a minimum radius of 37 feet for single-family residential and 45 feet for multi-family residential or commercial. Street Stubs longer than 150 linear feet shall include a paved hammerhead turnaround or cul-de-sac that meets the City's minimum standards and shall be located within the dedicated right-of-way or easement. (See Section 30-5.F.4(d))
Part II, Chapter 30, Article 30-6.A.4.c.2.d.2.D	Vehicle access	A road maintenance agreement acceptable to the City of Fayetteville which identifies the responsibilities for the maintenance of the access road and clearly states that the City of Fayetteville is not responsible for maintenance of the road shall be prepared and recorded in the Office of the Register of Deeds of Cumberland County. In addition, a notation must appear on the recording instrument stating that the easement or right-of-way is to provide permanent egress, ingress and utility access for all lots served by the right-of-way or easement.
Part II, Chapter 30, Article 30-6.A.4.c.3.a-c	Vehicle access	<p>a. The access road shall be located within a recorded easement or right-of-way.</p> <p>b. The access road and other circulation elements including sidewalks and loading access shall be constructed to the standards established by the City of Fayetteville through the site plan review process taking into account projected vehicular and pedestrian traffic characteristics and volumes for the non-residential development being served by the access road.</p> <p>c. A road maintenance agreement acceptable to the City of Fayetteville which identifies the responsibilities for the maintenance of the access road and clearly states that the City of Fayetteville is not responsible for maintenance of the road shall be prepared and recorded in the Office of the Register of Deeds of Cumberland County. In addition, a notation must appear on the recording instrument stating that the easement or right-of-way is to provide permanent egress, ingress and utility access for all lots served by the right-of-way.</p>
Part II, Chapter 30, Article 30-6.B.4.b.5	Easements	Easements over the common areas for access, ingress, and egress from and to public streets and walkways and easements for enjoyment of the common areas and for parking areas shall be granted to each owner of a building site.