# Connected Roads: Plan & Policy

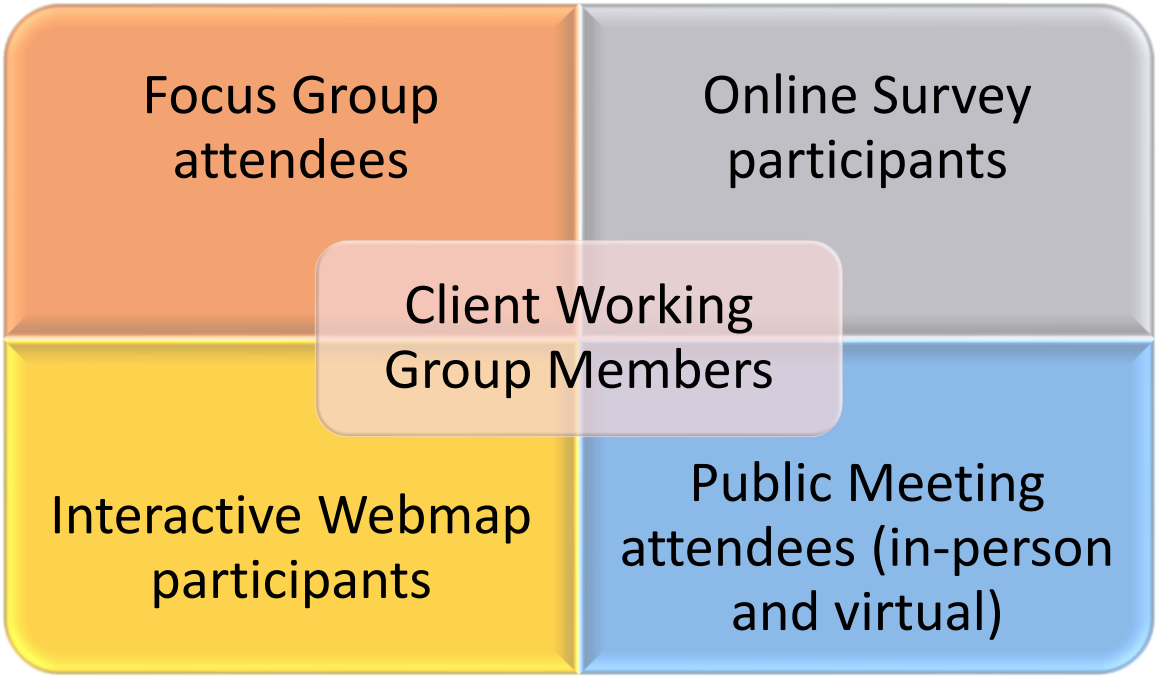
JUNE 2023

Town of Chapel Hill, NC

Stantec

# Acknowledgements

The Project Team would like to thank individuals who shared their time, experience, vision, issues, and potential strategies for this Connected Roads Planning Process, notably:



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# Connected Roads

## What is a Connected Roads Plan?

This *Connected Roads Plan* intends to improve overall quality of living while advancing the Complete Community strategy and overarching Town of Chapel Hill ('the Town') goals. Through this process, the Town is proactively working towards improved street connectivity. This includes emphasizing community needs while accounting for future growth and redevelopment and focusing on roadway connections primarily as portions of new development projects. Integrating mobility connections into site plans while focusing on specific Town growth areas will create a more connected, inclusive community. This Plan **does not** anticipate constructing new road connections outside of development or redevelopment projects.

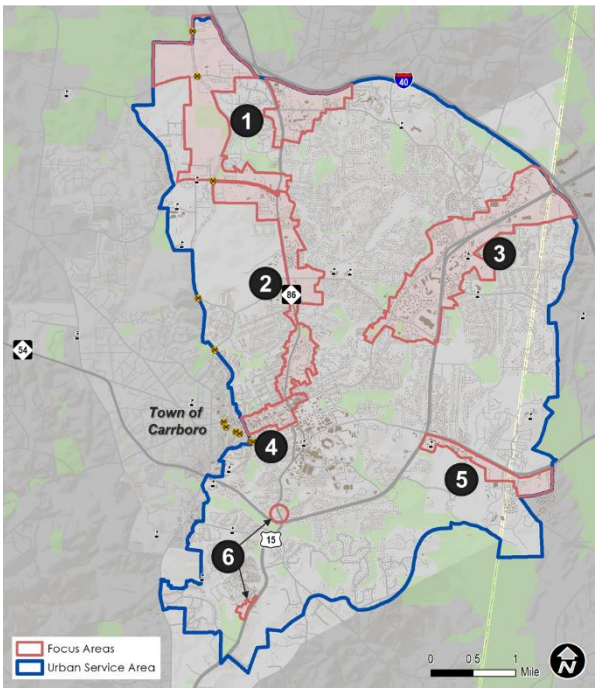



**Figure 1: Focus Areas of Future Growth**

The Town aims to improve connectivity and safety for local trips by focusing on connecting streets as a part of new development. In identifying new connections and policy improvements, the Town considers road safety, pedestrian and bicycle safety, accessibility, and convenience. Addressing resident concerns of effects on their community, the *Connected Roads Plan and Policy* implements strategies to address increased local traffic through avoidance, reduction, and mitigation of potential impacts.

The Town seeks to establish a consistent approach to planning for and facilitating local street connections. Relying on best practices to make connections for all modes of travel is very important to the success of this Plan.

For additional clarification:

- The Town *will not impact* structures in order to connect streets
- The Town *will not independently pursue connections* outside of development projects

### What is connectivity?

Streets provide a critical role in movement of people, goods, and services within and throughout our community. All public streets are part of the Town's mobility network, including off-road trails and easements. How well our streets CONNECT TO EACH OTHER involves the quality, quantity, and directness of intersections within a street network. More specifically, connectivity relates with:

- Increasing the number of alternative (or parallel) routes within a network (**Quantity**)
- Enhancing mode choice, within a network (**Quality**)
- Minimizing the total trip length (miles or minutes) within a network (**Directness**)

## Complement to Town Vision & Goals

The topic of roadway connectivity has been mentioned previously, both within Town departments and from the outside development community. The Town desired a consistent approach that was supported by best practices and involved perspectives from emergency service providers. Aligning the needs for connected roads with the vision and goals of other Town initiatives was essential to this Plan's success.

The *Connected Roads Plan and Policy* reflects the Town's mission statement for a proactive, collaborative approach to improving our shared community, in addition to the Chapel Hill 2020 Community Vision.

> *"Learning, serving and working together to build a community where people thrive."*
> *— Town of Chapel Hill Mission Statement*
>
> *"Chapel Hill will be a multicultural university town where each day* ***celebrates connections and choice****; where* ***a dynamic downtown and networked community inspire connection****s among people, ideas, the region, and the world; where innovation, technology, discovery, learning, and the arts continually animate a town* ***alive with choices, options, and opportunities to live, work, play, and prosper.****"*
> *— Chapel Hill 2020 Community Vision*

Combining the *Chapel Hill 2020 Community Vision* with the Town Council's Focus Areas, there is a direct relationship and reinforcement of the need for a strong commitment to a connected roadway network:

- Connected Community: Increased roadway connections allow for more direct travel.
- Environmental Stewardship: More direct route choices reduced overall travel time and trip distance, which *indirectly* reduces vehicle idle times and emissions.
- Healthy and Inclusive Community: Walking and biking are more likely within a well connected roadway network, and being more physically active contributes to improved personal health.
- Safe Community: Fewer vehicle crashes occur when traffic is distributed within a network (i.e., lower exposure rates).


— Town of Chapel Hill Town Council Focus Areas

## Complete Community Framework – *How does this relate?*

With a focus on housing affordability, choice, and inclusivity, The Town's initiative for a Complete Community Strategy (adopted by Town Council in December of 2022) parallels the principles of the Connected Roads Plan and Policy. For more information on the Complete Community Strategy, visit: Complete Community | Town of Chapel Hill, NC

COMPLETE COMMUNITY STRATEGY

# Benefits of Connectivity

Rather than widening existing arterials to support greater traffic capacity, this Plan focuses on smaller, shorter, local roadway connections. This provides the ***opportunity*** to balance traffic more evenly and provide extended options for multimodal travel.

Research on the topic of connectivity suggests…

> *A well-connected network has many short links, numerous intersections, and minimal dead-ends. Where a road connection may not make sense, a pedestrian or bicycle connection may still be considered. As connectivity increases, travel distances decrease and route options increase. The result is more direct travel between destinations and a more accessible system.*
>
> *—Transportation Efficient Communities (TEC)*

## Big Picture: Connected vs. Disconnected Networks

There are general differences between the mobility characteristics associated with a well-connected street network versus a disconnected street network. With possible exceptions, these characteristics are not always present in all street networks.

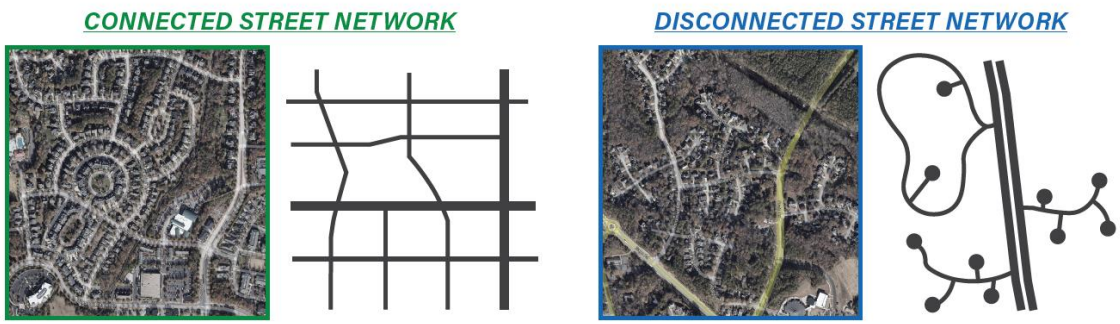



**Figure 2. Examples of Connected vs Disconnected Street Networks**

| Connected Street Network | Disconnected Street Network |
|---|---|
| • Intersections closer together / traffic speed reduction<br>• Direct routes to multiple destinations<br>• Route options increased<br>• Traffic dispersed more evenly<br>• Supports a multimodal biking / walking / transit network<br>• Shorter trip length (miles/minutes) | • Large distance between intersections, pushing them further apart<br>• Indirect (circuitous) routes to reach destinations<br>• Fewer route options to reach destinations<br>• High traffic volume on major arterials<br>• Driving becomes a necessity<br>• Longer trip length (miles/minutes) to reach destination |

Compiled from variety of resources, including:

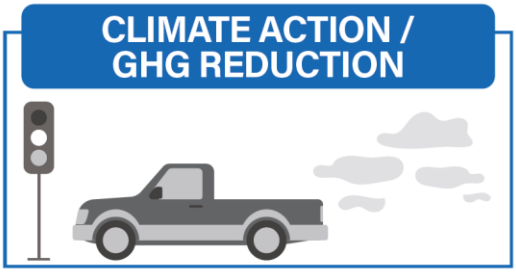
- Litman, Todd (2017), *Roadway Connectivity, Creating More Connected Roadway and Pathway Networks*. (https://www.vtpi.org/tdm/tdm116.htm).
- Taylor, James (2001), Technical Bulletin, Transportation and Community Design: the Effects of Land Use, Density, and Street Pattern on Travel Behavior. (https://www.jtc.sala.ubc.ca/bulletbody.html).
- Congress for the New Urbanism, (2009), *CNU Report – Saving Lives, Time, Money: Building Better Streets.*
- APA PAS Report 515 (2003), *Planning for Street Connectivity.* (https://www.planning.org/publications/report/9026848/)

## Benefits to the Town may include

Research suggests that improving the Town's street connectivity provides many benefits that support Town goals, in particular:


Greater connectivity can **help reduce speeds and crashes** and **support emergency response**.


Better connectivity helps encourage **more biking and walking activity**.

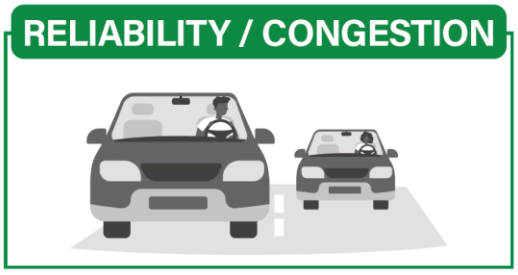



Better street patterns and block structure, **improve community resiliency** and help combat **climate change**.


Greater street connectivity can reduce the barrier effect of major arterials and **reconnect marginalized communities**.

## Benefits to residents and neighborhoods may also include

Improved connectivity not only benefits the Town as a full community, but local road connections also *benefit residents and entire neighborhoods*, notably through:




Better street connectivity creates **more options for travel** and helps reduce congestion.


Shorter average trip length translates to better emergency response time.


Connectivity improves accessibility to **jobs, good and services**, and may improve public health outcomes.


Higher connectivity and ease of access makes **visiting friends/neighbors easier** and creates a shared "sense of space and place".

## Outreach Process

**The Town values public participation** in planning efforts. This Plan was guided by a principle of **"listen first, then analyze,"** emphasizing the importance of planning *with* community members, not behind closed doors. This process provided numerous opportunities for residents and stakeholders to contribute their voices, including conducting listening sessions in multiple formats where residents discussed potential connections. Giving choice to public participation allowed for all voices to be heard, contributing their influence on the Plan in the manner they felt most comfortable.

**Focus Group / Stakeholder Discussions:** These 'listening sessions,' held virtually in January of 2023, provided an opportunity to hear from various stakeholders, including:

- Town Council representatives
- emergency services and first responders
- bicycle/pedestrian and transit experts, and
- the development community.

A total of six (6) sessions were scheduled with 23 stakeholder participants, allowing them to steer the conversation towards the topics most relevant to their personal vision or professional community service needs. A digital whiteboard platform (Mural) was utilized for these discussions, so topics were adequately captured and clarified in real time, avoiding the potential for misinterpretation.

**Online Survey:** Initially launched in January 2023, the online survey utilized the QuestionPro platform and received 179 total responses, closing after five weeks in mid-February. Participation information was sent out via Town newsroom notifications, posted to social media platforms including Facebook and NextDoor, and posted on the Town's project webpage (which also launched the survey with a direct link). The full survey summary is included as Appendix B. A second online survey was utilized during the final phase of the process, allowing for public comment on individual connections. Feedback was incorporated into the final table/map of potential connections.

**Interactive Map:** Concurrent with the online survey, an interactive webmap was launched to allow residents to contribute Points of Interest relating to: Traffic Congestion, Safety Hazards, New Connections needed, or Other(s). A total of 78 points of interested were provided, with New Connections (41%) being the most frequent item added. Participants could also include a text comment with each point for clarification or description.

**Public Meetings:** Two rounds were facilitated:

The first round was held in January and February of 2023, with an in-person meeting on Thursday 1/19/2023 at the Town Public Library and a follow up virtual meeting held on Wednesday 2/1/2023 using the Zoom platform. This initial round of public meetings focused on the overall objective, potential benefits, and identifying resident issues and concerns with a connected streets network.

The second round was held in April of 2023, with an in-person meeting on Monday 4/10/2023 at the Town Public Library, with a follow up virtual meeting held on Tuesday 4/18/2023 using the Zoom platform. This second round of public meetings focused on the feedback received from Town residents, the generalized process for screening potential connections, and the draft table / map of potential locations.

## Key Takeaways

Key takeaways emerged from resident and stakeholder conversations. Themes were identified and utilized to prioritize needed connections, both generally (policy) and specifically (locations).

Takeaways are summarized below:

1. ***No buildings or residences should be directly impacted.***
2. Residents value walkability and safety above other themes.
3. In the near term, prioritizing connections to the greenway network is important.
4. Residential cul-de-sac streets should be *solely* bicycle/pedestrian connections, with emergency service access as possible.
5. Traffic noise and/or speeding cars are paramount concerns for residents.
6. For consistency, this policy should align new connections and priorities with the Complete Community strategy.

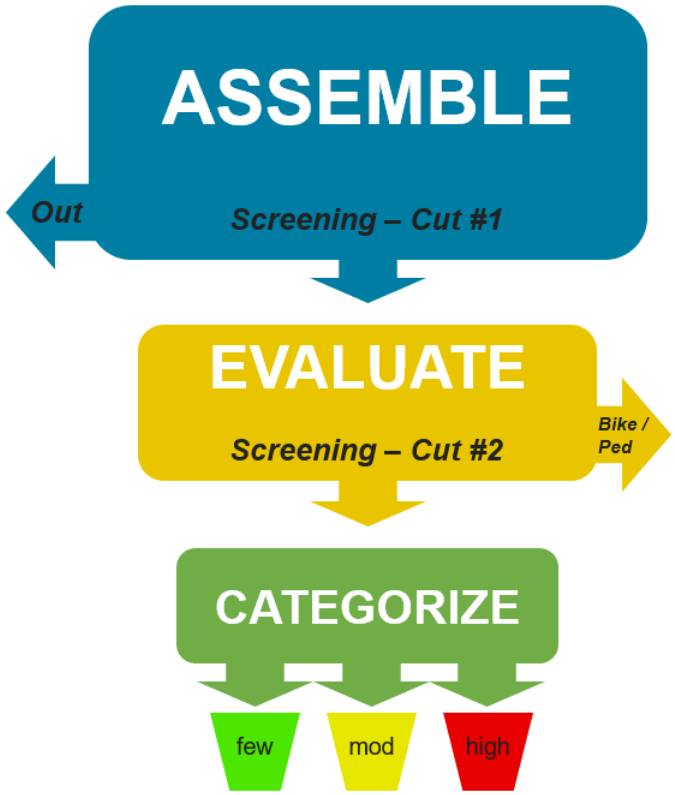

**Figure 3: Outreach Process Images**

## Screening Potential Connections

### Process

With input from the community and research on best practices, the project team devised a consistent and transparent process to arrive at potential future local road connections.

This process has three steps: Assemble, Evaluate, and Categorize.



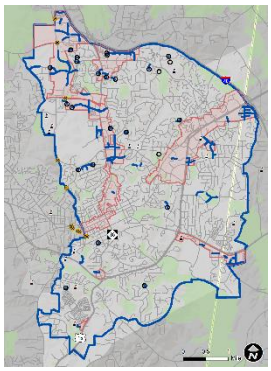

✓ **Feasibility:**
the potential project is functionally possible to construct; emphasizing *objective* constraints only.

✓ **Reasonability:**
the potential project is accepted by community members, and within budgetary constraints; emphasizing *subjective* constraints that can be mitigated through engineering design.

✓ **Constructability:**
the relative measure of *ease or difficulty* that is anticipated during construction of a potential project.

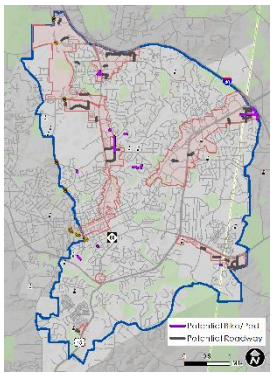
**Figure 4. Diagram of Screening Process, and Definitions for each of the Three (3) Steps**

### Step 1 – Assembly:



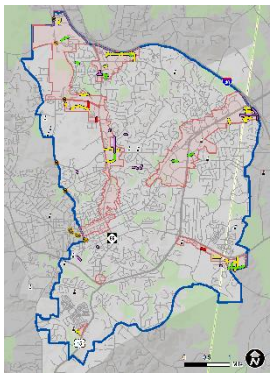
To assemble all potential connections within the existing transportation network, we cast a large net to engage the public. Listening sessions were an important part of identifying connections, emphasizing use of the Interactive Map and feedback from focus group discussions and public meetings. Once assembled, each connection was screened for its **feasibility,** eliminating those with potential impacts to structures (buildings or residences), or other clear-and-obvious challenges.

### Step 2 – Evaluation:



Potential remaining connections were examined in more detail to assess its **reasonability** as a potential roadway connection. Criteria for reasonable roadway connections included geographical constraints like proximity to perennial or intermittent streams or riparian buffers, flood hazards, or steep topography, as well as potential impacts to shared community properties like adjacent cemeteries or historic places. The six (6) focus areas were also used to screen for potential bicycle or pedestrian only connections, and connections *outside* of the identified high(er) growth areas were classified as a better fit for bike-ped over roadway improvements.

### Step 3 – Categorization:



Connections passing both tests were considered feasible and reasonable as potential new roadways. As a final step for prioritization, we examined the **constructability** of each connection, categorizing each as **Few Constraints, Moderate Constraints, or High Constraints** based on the relative number of factors that each connection overlapped, or the *relative* ability to avoid or minimize potential impact. High constraint segments were considered to involve several engineering design challenges (notably bridges, culverts, or topography that would require substantial earthwork).

This *Connected Roads Plan and Policy* is a **living document**. Recommendations from the Plan are intended to change over time as new information is obtained, development site plans are submitted for review, or Town capital projects for maintenance or enhancements are implemented. To view the current status of the Connected Roads Plan implementation, or review additional resources, visit the Connected Roads Plan website.

A table of potential connection projects may be found in the appendices to this Plan (May 2023).

## Implementation Strategy

As an initial step to **identify and organize** the need for future road connections, no immediate construction is associated with this Plan and Policy. Private development projects are expected to initiate *most of* these potential connections, and the Town is adopting this Plan for proactive transparency for current and future property owners.

Bicycle and Pedestrian connections, identified through Step 2 Evaluation, will be integrated with the existing Mobility and Connectivity Plan. These individual projects should be considered for funding prioritization separately from private development. Incorporating these multimodal projects into consideration for funding pools like the Regional Flexible Funding pool from the Durham-Chapel Hill-Carrboro Metropolitan Planning Organization is a logical next step, particularly for potential projects that provide a new walk/bicycle connection, rather than improving an existing connection.

Additional considerations for project implementation include the following, in no order of importance:

- **Integration** of these potential street connections with Town initiatives, plans, and studies to reinforce the needs, locations, and benefits of a connected mobility network. Primary plans, strategies, and policies may include:
    - Complete Community Strategy
    - Future Land Use Plan
    - Traffic Calming Policy
    - Vision Zero Policy
    - Mobility and Connectivity Plan (walking and biking)
    - Short Range Transit Plan
- **Reviewing site plan submittals,** emphasizing partnership opportunities with the private sector development community, and mutually beneficial objectives for quality design and construction:
    - Considerations for logical termini at existing intersections, or following existing right-of-way or easements
    - Flexibility for shifting or altering the proposed roadway alignment to meet the potential future grade or internal street network
    - Traffic Impact Analysis (TIA) process
    - Existing street stubout locations
    - Public-owned properties (Town, County, University of North Carolina)
- **Coordinate project** with Town of Chapel Hill Public Works or North Carolina Department of Transportation (NCDOT) capital project planning:
    - Coordinating utility or service upgrades for multiple projects to be planned, designed, and constructed simultaneously with any street connection opportunity
- **Identified connections** within the 'Few Constraints' category, otherwise known as the "*low hanging fruit*" opportunities, represent this highest potential for implementation

## Possible Barriers

There are a large number of potential barriers toward implementation to be considered, notably:

- **Private ownership** of a majority of these potential street connection locations
- **Timing** of future capital project planning that may dictate or delay connectivity
- **Presence of underground utilities** or natural features that limit construction
- **Proximity to streams** or stormwater drainage systems, particularly the designated riparian buffer areas (less than 50-feet from an identified blueline stream)
- Addition of **impervious surfaces** (pavement, curb and gutter, sidewalks) within watersheds
- Connections with existing **NCDOT-maintained roadways** may cause additional design considerations for traffic or signal operations
    - Potential for **new traffic signal warrants analysis**
    - Potential for review of **new curb cuts** for roadway connections
- **Increasing costs** of construction materials, or labor, that have been influenced by inflation
- **Organized community opposition**

Unanticipated barriers represent the true unknowns for project implementation. Planning is merely the first step in the plan-design-construction process, and each phase identifies *additional* unidentified barriers.

# Policy Considerations

The planning process also involved a review of the Town's Code of Ordinances, particularly its Land Use Management Ordinance (LUMO), to understand how connections are addressed in current development regulations and other supporting policies. While the Town's LUMO is generally supportive of the greater level of connectivity explored in this planning process, it offers few specific standards and requirements for how that connectivity is achieved during the development process. Town policy documents including the 2050 Future Land Use Map (FLUM) and Mobility and Connectivity Plan provide some guidance, though these may conflict with other site-based development controls, such as stormwater management, natural resource protection, and accessibility.

The table below organizes these observations around major topics or themes related to street network connectivity, with potential directions the Town might consider in future plan and updates to the LUMO.

## Matrix of Policy Considerations

| Technical Topic/Theme | How the LUMO currently addresses this topic | How other Town policy documents currently address this topic | Potential modifications and revised approaches the Town may consider |
|---|---|---|---|
| **Numeric or Quantitative Standards for Block and Connection Dimensions** | No specific standards are currently defined in the LUMO for features commonly used in other municipal codes, such as block dimensions or connectivity ratio indices | Town policies broadly support connectivity, but do not define specific standards or approaches for how to achieve it | With a robust approach to promoting connectivity suggested in other Code and Policy recommendations, an alternative approach to measuring new connectivity, such as an index ratio, may not be necessary, and may leave the Town with more flexibility to achieve connections through the development process. However, numeric measurements can be useful to ensure that connectivity is required, and a ratio of external access points to lots or units of development might also be considered. |
| **Adherence to Thoroughfare or Network Plans** | Thoroughfare plans are not mentioned specifically in the Code of Ordinances, nor is there a more general reference to transportation plans (such as the Town's Mobility and Connectivity Plan) that define long-term street networks. | FLUM identifies specific connections in the Plan's six Focus Areas, emphasizing connections to and from major corridors (example: north and south Martin Luther King Jr. Boulevard) and as parallel streets providing local circulation (example: US 15-501 and NC 54 Focus Areas). | The Town should consider setting specific connectivity targets or requirements for the Plan's Focus Areas. The connections illustrated in these Focus Areas seem to provide parallel streets to major thoroughfares (which could be codified as maximum block depth along corridors before parallel streets are provided) or regularly-spaced cross streets (which could be codified as a limitation on driveway cuts on between public street intersections on main thoroughfares).<br><br>The LUMO's detailed standards for parking lot design could be revised to include design standards for aligning and 'upgrading' drive aisles of parking lots for more functional public streets. |

| Technical Topic/Theme | How the LUMO currently addresses this topic | How other Town policy documents currently address this topic | Potential modifications and revised approaches the Town may consider |
|---|---|---|---|
| **Connectivity of Bicycle and Pedestrian Systems** | These systems "*shall be extended to the extent practicable.*" Compliance with all existing and future Town bicycle and pedestrian systems is also specifically mentioned. Bicycle and pedestrian connections do not need to be limited to streets ("*to the vicinity of vehicular access points*"). | *The Mobility and Connectivity Plan* sets the clearest definition of network connections to be made throughout the Town, though it does not include streets specifically. | The Town should consider updating the LUMO to define design standards for trail and greenway connections as part of subdivisions and new development. This relates with Section 4 Access and Circulation of the Town Design Manual. |
| **Stubouts and other means of connecting current to future development** | Stubouts are required, though specific standards are not fully defined.<br><br>LUMO states that "*Subdivision shall provide for the projection of streets into such unsubdivided areas*" and "*Parcels shall be arranged to allow the opening of future streets and logical further subdivision*."<br><br>There is an exception for floodplains, topography, and other natural features (though these do not have clear definition in the Ordinance). | | LUMO may be revised to speak more directly to functional classification of streets, or at least the practical function of streets internal to subdivisions and developments to give an overall priority to where stubout connections should be made.<br><br>The Town may consider incentives, bonuses, and approaches to encourage use of stubouts to accommodate modes at the most practical streets (streets with vertical and horizontal curves that are easier for transit operations and bicycle and pedestrian facilities).<br><br>This makes possible long-term connectivity throughout the town, not only on minor streets in subdivisions, which can adversely increase neighborhood traffic instead of focusing through traffic on streets where calming strategies could be applied more successfully. Going beyond the Town working with development applicants to understand site-specific constraints and alternatives, LUMO should also set specific criteria where connectivity is expected. This includes more clearly defining the acceptable parameters for narrowing streets between subdivisions or changing the character of streets when connections are made. |
| **Compatibility of connected streets between subdivisions** | Widths must be preserved, or an appropriate transition must be provided when a street is continued at a different width/design than the original street segment from which a connection is extended. *"Existing streets in adjoining areas shall be continued and shall be at least as wide as such existing streets and in alignment therewith."* | | |

| Technical Topic/Theme | How the LUMO currently addresses this topic | How other Town policy documents currently address this topic | Potential modifications and revised approaches the Town may consider |
|---|---|---|---|
| **Addressing Increased Neighborhood Traffic** | No specific standards in the Code of Ordinances, although other sections refer to a general desire to limit or restrict added traffic in residential neighborhoods. | The Town's Traffic Calming Installation Criteria define a process for property owner petition for installation of traffic calming measures, and state that the Town will review requests regarding maintaining basic engineering functions (including preservation of emergency response times). The Town will be updating this policy in 2023 to remove the petition process. | Along with its pending update of the traffic calming policy, the Town should consider a more *proactive use* of traffic calming in development review. The Town would review proposed street connections and apply a data-driven approach to traffic calming before construction / retrofits are necessary.<br><br>*See also:* recommendations for stubouts in this matrix. |

## Other General Connectivity-Related Policy Concerns

**Using district-based approaches to connectivity requirements.** As is common in development and subdivision ordinances, the LUMO contains no distinct connectivity requirements for specific zoning districts or conditional zoning provisions, especially regarding responding to desired connectivity objectives in the Future Land Use Map's Focus Areas.

The Town's Future Land Use Map, Guiding Statement 1, Subsection E refers to "*Establishing a 'Connected Community' that includes a tight network of streets and multi-modal paths that are convenient everyday choices*." This is broadly reflected throughout the Future Land Use Map's Land Use Categories and six Focus Areas, with Focus Areas specifically referring to vehicular and/or multimodal connectivity needs.

In response, the Town may consider overlay districts or other special district provisions to set connectivity requirements. This could allow for more specific standards to be set, and enforced, with new development (such as east-west connections in the Future Land Use Map's N. Martin Luther King Jr. Boulevard Focus Area). This may also include more proactive approaches to use of the Town's Traffic Calming Installation Criteria to introduce conditions for proactive installation to limit potential increased neighborhood traffic.

**Alternatives to public right-of-way.** LUMO occasionally refers to vehicular non-access easements; these are sometimes required for ingress and egress to vehicular traffic. The LUMO's standards and requirements for Planned Developments mention these. A statement in Section 6.18 of the LUMO notes that Planned Developments should have direct access and integration with larger transportation networks just like any other subdivision or development but should limit through traffic within neighborhoods. It is unclear how that might be interpreted or enforced with an overall desire for development to contribute to a connected transportation network.

The Code or other official documents used for street and utility design with subdivisions should more clearly identify different opportunities when streets (in conventional) public right-of-way should be used to make connections, or when other treatments (such as easements) would be acceptable as alternatives. Specific conditions or eligibility criteria should be identified for each. The Town might consider these in future LUMO updates, or even in updates to its Public Works Engineering Design Manual.

# Research and References


- APA PAS Report 515 (2003), *Planning for Street Connectivity.* (https://www.planning.org/publications/report/9026848/)
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- Litman, Todd (2017), *Roadway Connectivity, Creating More Connected Roadway and Pathway Networks*. (https://www.vtpi.org/tdm/tdm116.htm).
- Sustain Charlotte, (2017), *Building connectivity back into Charlotte's disconnected neighborhoods.* (https://www.sustaincharlotte.org/connectivityjune2017)
- Taylor, James (2001), Technical Bulletin, Transportation and Community Design: the Effects of Land Use, Density, and Street Pattern on Travel Behavior. (https://www.jtc.sala.ubc.ca/bulletbody.html).
- Zlatkovic, Milan et. al., (2019), *Assessment of effects of street connectivity on traffic performance and sustainability within communities and neighborhoods through traffic simulation.* (https://www.sciencedirect.com/science/article/abs/pii/S2210670718316676)

# APPENDIX

– available digitally—

A. Summary of Focus Group Listening Sessions
B. Summary of Survey Responses
C. Summary of Interactive Map Comments
D. Public Meeting Materials
E. Table of Recommended Connections – Spring 2023