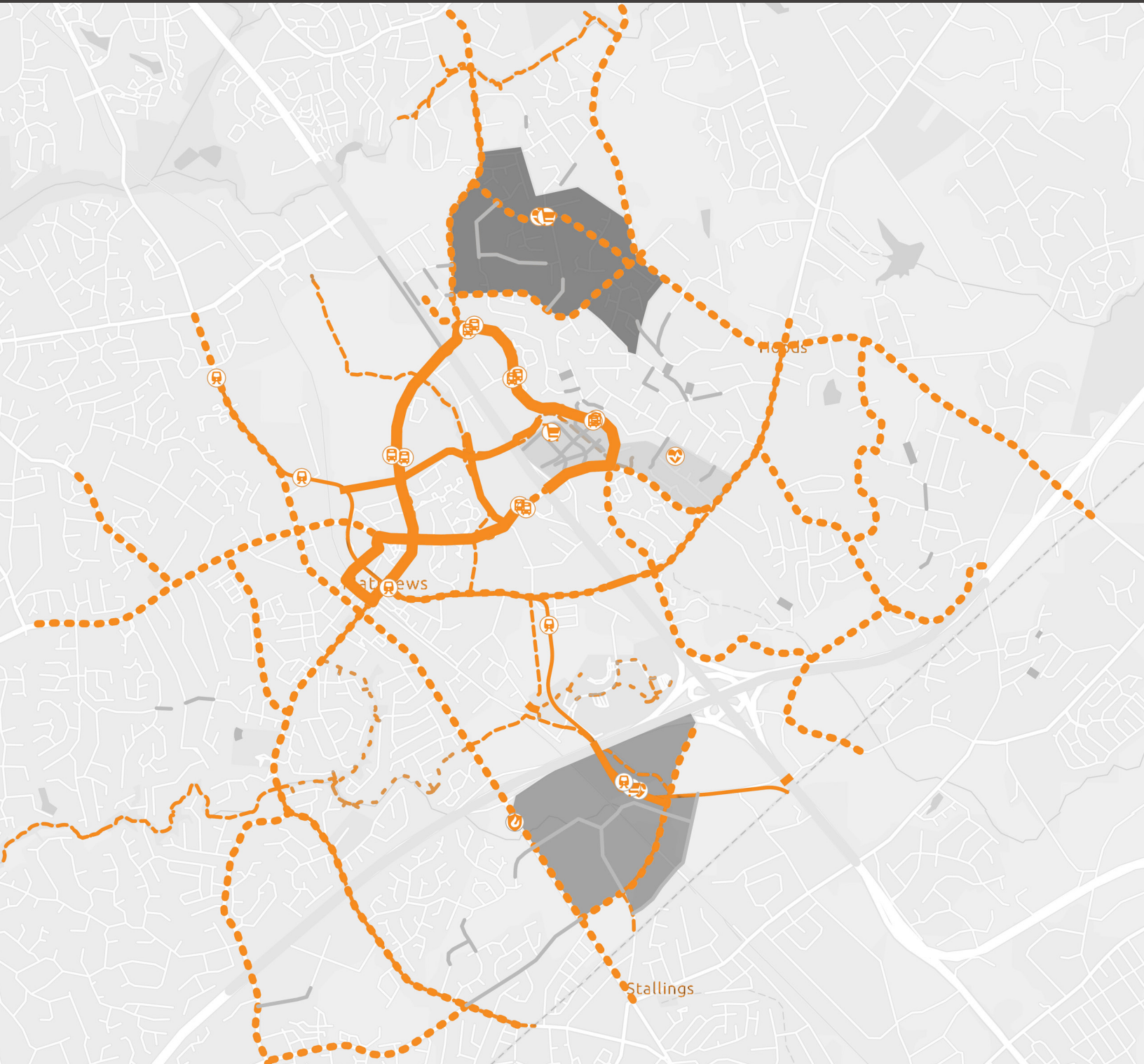


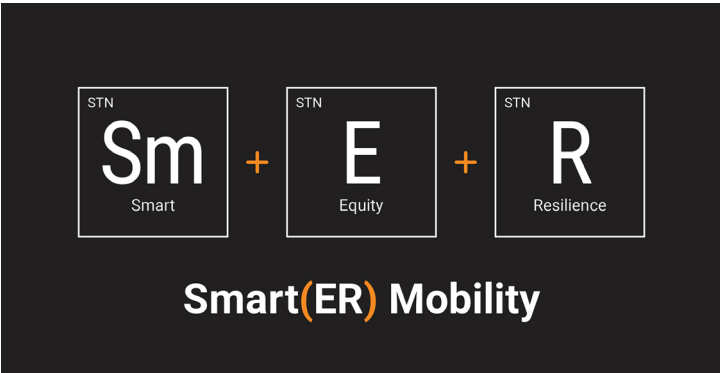
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Equitable SimCity Sandbox Design Competition



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ABOUT US

The strength of the connection between mobility, land use and infrastructure define the potential of communities, and influencing that relationship requires a deliberate, professionally sound approach. The **Smart(ER) Mobility** approach is one that puts people at the core of that approach. By putting Resilience and Equity in focus, we confront the challenges defining the future of our society, including climate change, addressing the equity gaps and investing in infrastructure that is ready for the future. **The path forward is not one without the personal car, but it is one that addresses the fragility of a community tied exclusively to it.** The solutions to mobility will range from transit, to sidewalks, to protected bike lanes and crosswalks—we must look at land use and understand how technology will influence it all. **Prioritizing future infrastructure investments to support people-first solutions is the core of a Smart(ER) Mobility approach.** Our team is excited to present that approach here for the ITE Equitable Sim City Sandbox Competition.

INTRODUCTION

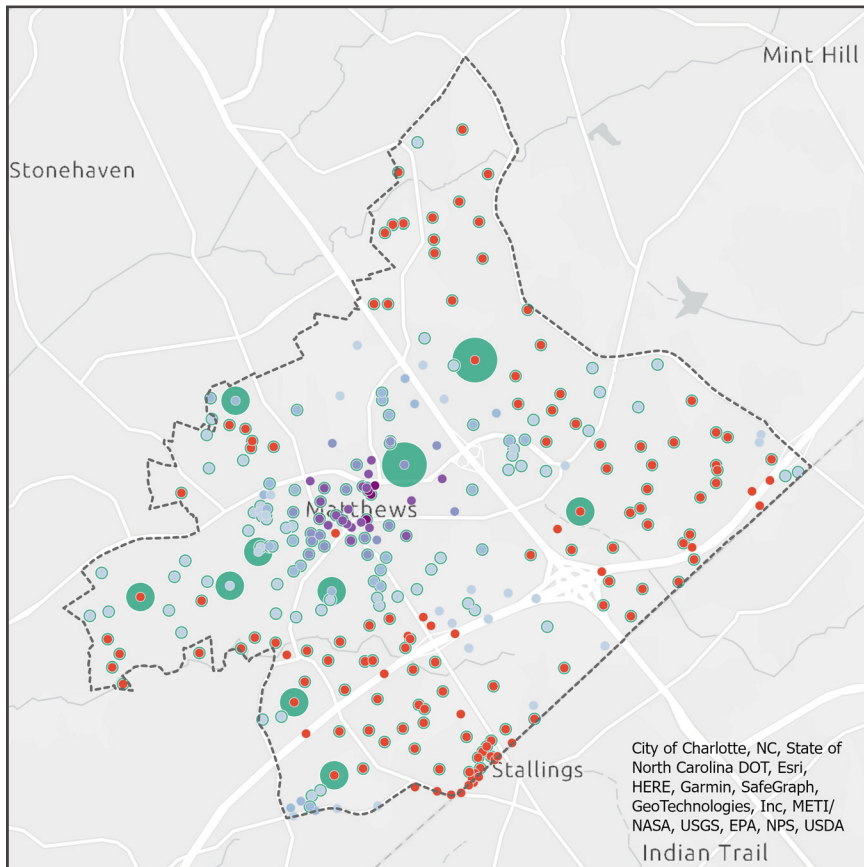
Matthews, a community on the outskirts of the Charlotte metropolitan area, must account for 23,000 new residents.

Growth of this nature is staggering, and forces communities of any size to consider its future vision, values, goals, and identity. Where are all of these people going to live? How will they travel, and how can Matthew's mobility network support this growth, connect residents to jobs, community services, and the activities of daily living? Imbuing all of these concerns is the question prominent on the minds of many: how can all of this, any of this, be accomplished while improving equitable access for

all residents? How can it continue to remain a vibrant, affordable place while accommodating new growth? How can new developments be designed so that owning a vehicle is not a prerequisite to accessing opportunities and amenities such as jobs, healthcare, schools, and healthy foods?

Accomplishing this task requires a focus on equity. It requires reconsideration of mobility options to prioritize safety, reliability, convenience, and affordability. It requires attentiveness to the places people want to go and the social connections they value. It requires grounding of solutions in community values and building from needs. It demands the wise leveraging of emerging technologies to break down barriers, and the integration of policy, planning, design to merge land use decisions with transportation investments. For us at Stantec, it requires a Smart(ER) approach to mobility, and to communities.

PROBLEM



In Matthews, transportation equity is defined by which side of the road—**or roads**—you live on. Mobility score, an index of a neighborhoods connectivity and mobility options, shows that equitable outcomes differ greatly between downtown Matthews and neighborhoods east of Independence Boulevard or south of I-485.

BASELINE MOBILITY SCORE

- 0
- 1 - 3
- 4 - 6
- 7 - 9
- 10 - 12
- 13 - 14

BASE HOMES

- 1 - 250
- 250 - 500
- 500 - 750

City of Charlotte, NC, State of North Carolina DOT, Esri, HERE, Garmin, Safe Graph, GeoTechnologies, Inc, METI/ NASA, USGS, EPA, NPS, USDA

Existing Conditions



1. HOUSING OPTIONS ARE MISMATCHED TO RESIDENTS' NEEDS.

Matthews currently relies on low-density, single-family housing in the majority of the town. "Missing Middle" housing types, such as duplexes, triplexes, and townhomes, are not allowed in the single-family housing areas, which restricts many households from large portions of Matthews. The town also has a very low vacancy rate, so new developments and policy changes need to happen to support the town's projected population growth. As the population grows and land becomes scarcer, it will be vitally important to ensure that there is access to affordable housing.



2. MATTHEWS' STREET NETWORK DRIVES UP THE COST OF LIVING.

Matthews' mobility network is defined and constrained by I-485 and US 74/Independence Boulevard, which divide the community into quadrants. With limited connections between the quadrants, residents' access to community resources, like parks and greenways, or activities of daily living like grocery shopping, depends on availability within quadrants and safe, multimodal mobility networks on which to travel. Near downtown Matthews, access to these resources is abundant. Outside downtown, however, this changes dramatically. Lacking a car, residents find it a challenge to access resources in a direct, convenient manner – affording comfortable living only to those with greater financial means.

WHAT IS EQUITABLE FOR MATTHEWS?

Vision Statement

An equitable Matthews is a town where people with a range of incomes, educational backgrounds, races, ethnicities, and ages have opinions in where they live and how they choose to travel. Once a person makes Matthews their home, they should be able to stay for the rest of their lives and raise their families, assured that their community provides the opportunities they need to grow and prosper.

GOALS

- 1. Address disparity in mobility, through increasing transportation options.*
- 2. Address low density development, through a balance of new development and infill.*
- 3. Support market driven change through setting the conditions for that change to occur without displacing those that live there now.*

HOW TO MEASURE SUCCESS

- 1. Increase in the number of houses that can access destinations through multiple modes.*
- 2. Over a third of new housing should be provided within existing communities.*
- 3. Large new development areas should target low/single use commercial or greenfield/brownfield sites.*

APPROACH



The land use approach for Matthews relies on **four distinct strategies** that allow for incremental steps while also taking advantage of development opportunities as they arise. The **first strategy** relies on policy changes that reduce the overall land devoted to single-family housing. Duplexes and Accessory Dwelling Units (ADUs) should be allowed by right throughout the town, and fees and taxes for ADUs should be decreased to reduce any barriers to adding ADUs on a property. For properties within one mile of frequent transit, fourplexes are permitted if the fourth unit is affordable. By allowing an additional housing unit on single-family properties, the town can increase its availability of affordable rental housing while also providing a new way for existing homeowners to earn income on their property. We anticipate that these policy changes will accommodate approximately 25 percent of the future population growth.

The three remaining strategies look to targeted development areas to create complete community nodes. While these areas will necessarily be higher density than existing parts of Matthews, we do not envision buildings taller than six stories. We plan for residential transition buildings such as townhomes and two- to three-story apartments between existing neighborhoods and the new, higher density spaces. Additionally, all new development will be required to have at least ten percent of its units affordable. The approach relies on spreading affordable housing units across the town rather than isolating them in a few buildings, as everyone should be able to benefit from new amenities and opportunities as they develop across Matthews. By creating new development nodes outside of downtown Matthews, while also prioritizing connections to downtown and high frequency transit, this plan allows Matthews to grow into a place with a series of town centers that provide easier access to amenities and services without requiring residents to cross major highways.



Just as a community's mobility network should complement its land uses and work to accomplish the community's broader goals and vision for itself, the mobility approach for Matthews complements the four broad land use strategies above with three big moves:

- **Lean into I-485 and US 74/Independence Boulevard as regional thoroughfares**
- **Create a network of multimodal corridors to form a web of connected, Complete Streets**
- **Shorten the distance to key resources and services with new connections**
- **Use smart mobility solutions to expand the reach of current and future transit options.**

To create a more efficient and productive transportation network, the plan explores the use of an access management policy to create two roadway types to align with the two primary travel needs: (1) high efficiency regional mobility from place to place and (2) safe accessibility within a community. High-efficiency regional thoroughfares are to include US 74/Independence Boulevard, already designated as Future I-74 and a freeway, and are intended to service greater regional access to employment centers for all Matthews residents. Safe, multimodal corridors within Matthews via a connected network of Complete Streets collectors improve accessibility for vulnerable users, alternative modes of transportation, and community residents who may lack reliable access to motor vehicles. A new transit service connects the plan's growth nodes within and across the town, while microtransit and shared mobility services will expand the reach of transit service deeper into the community it is intended to serve.

PLAN

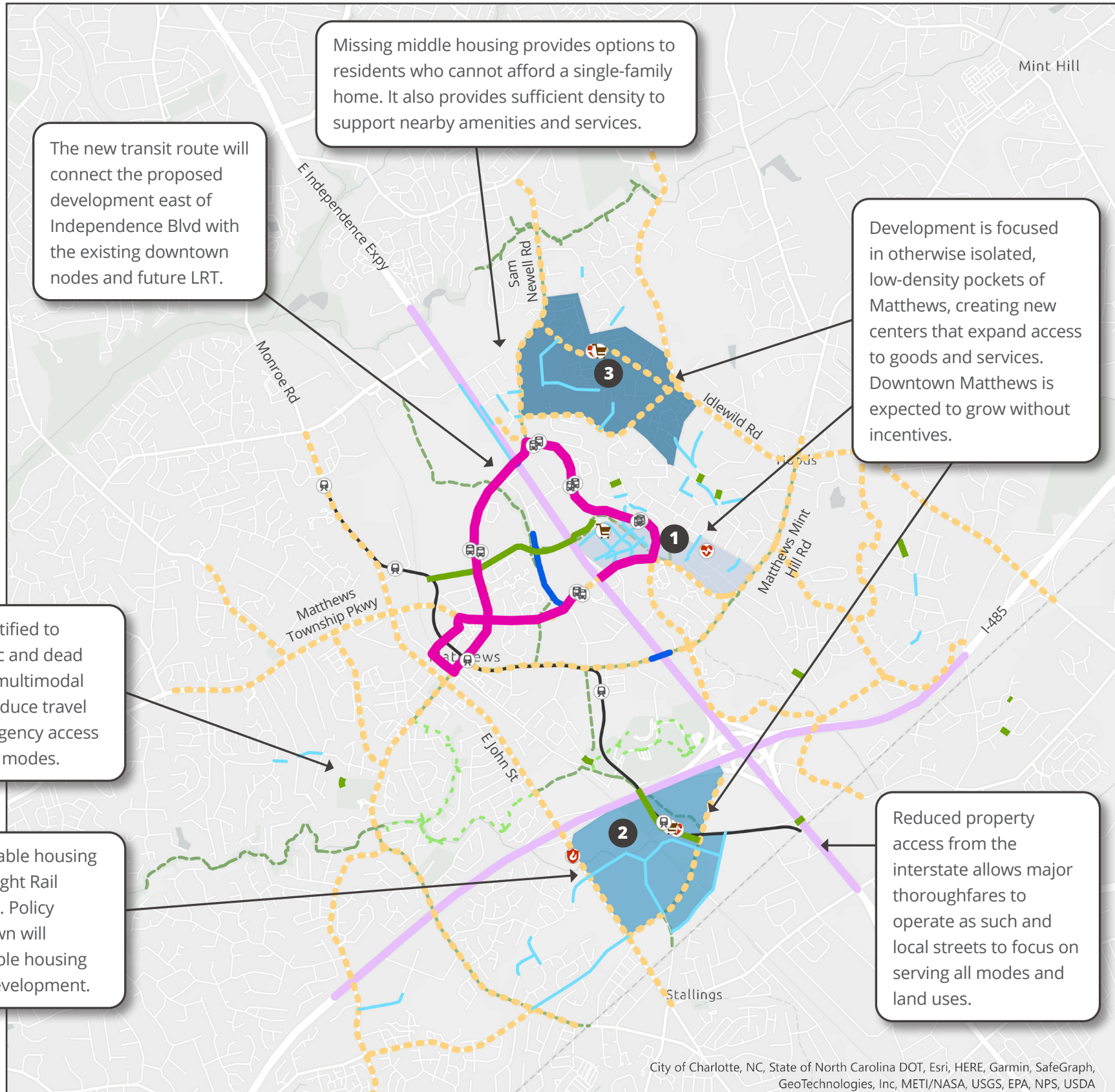
The proposed new transit line connects new development in East Matthews with downtown Matthews and the future LRT station. A more frequent Route 51 connects CPCC to downtown.

Corridors form a connected, continuous multimodal network of Complete Streets, affording safe, direct access to destinations for those traveling on two feet or two wheels.

Microtransit service operates through Matthews for both point-to-point trips as well as expanding transit service area to neighborhoods otherwise distant from current routes and stops.

Opportunities identified to connect culs-de-sac and dead ends will improve multimodal connectivity and reduce travel distances for emergency access vehicles and active modes.

900 units of affordable housing are placed at the Light Rail development node. Policy updates for the town will incentivize affordable housing inclusion in new development.



LEGEND

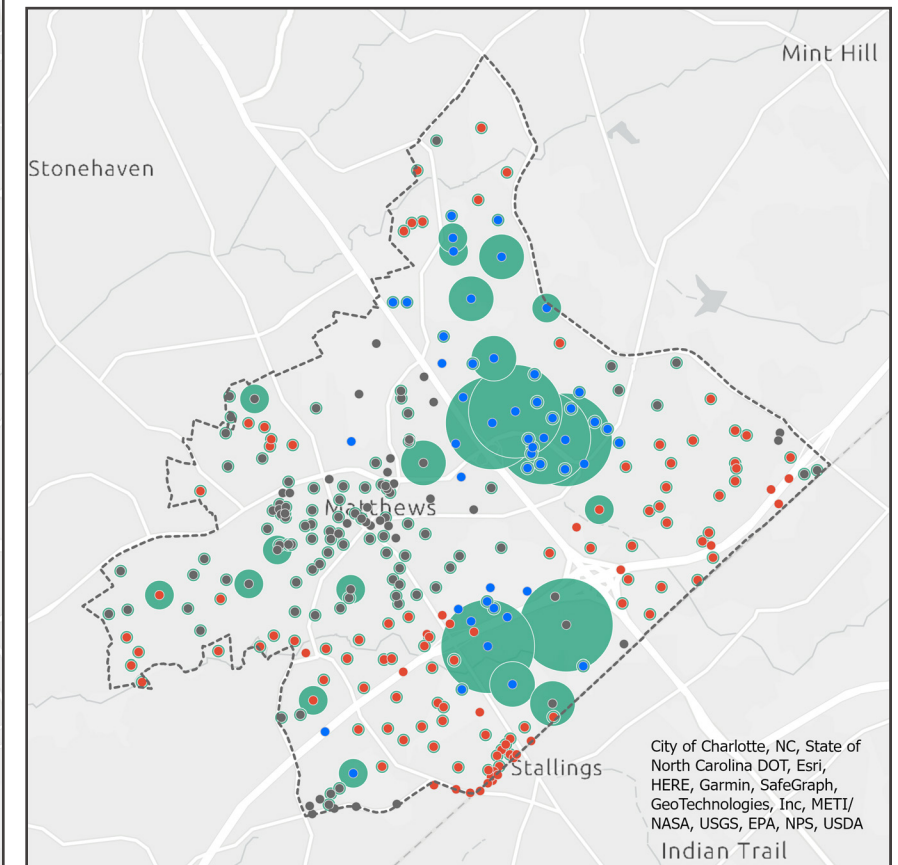
- Future Light Rail Station
- Future Light Rail Line
- Existing Greenways
- Future Greenways
- High Density Node (Area 1)
- LRT Node (Area 2)
- Neighbourhood Node (Area 3)
- New Transit Route
- Greenway Connection
- New Street
- Planned Project
- Regional Thoroughfare
- Multi-Modal Corridor
- Grocery (proposed)
- Medical Centre (proposed)
- Fire Station (proposed)
- Bus Stop (proposed)

CHANGE IN MOBILITY SCORE

- Improvement
- No Change
- No Mobility Score

FULL BUILDOUT HOMES

- 1 - 250
- 250 - 500
- 500 - 750
- 750 - 1,000
- 1,000 - 1,090



Interventions

Outcomes

City of Charlotte, NC, State of North Carolina DOT, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA

City of Charlotte, NC, State of North Carolina DOT, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA

SOLUTIONS

DEVELOP MULTIPLE MIXED-USE NODES ACROSS MATTHEWS

By developing walkable centers in different parts of town, residents can access amenities and services within their neighborhoods. Shorter distances also allow for people who would otherwise drive to walk or bike to their destination. We propose three new redevelopment areas within Matthews. The first is the **commercial mall area north of Matthews Township Parkway**. This space has numerous retail opportunities – including Lowe’s, Costco, Best Buy, and Michaels – but by developing a grid street network and building in the parking lots and above the existing stores, this area could become a thriving mixed-use center. The second is **transit oriented development**, centered on the planned LRT station south of I-485. This

master planned community will focus on walkability and incorporate the Central Piedmont Community College into its network. It will support a larger percentage of affordable housing to ensure that 900 units are within walking distance of light rail. Together, these two areas are anticipated to handle approximately two-thirds of the projected population growth within Matthews. A third area, accommodating about ten percent of project growth is a neighborhood along Sam Newell Road with **“missing middle” housing types** incorporated within. The use of master planning helps better control outcomes, can be quickly responded to by the market, and insulates the town from the pressures of gentrification.

Table 1: Breakdown of Unit Development By Area

Area	General Description	Height (storeys)	New Buildings	Market Units	Affordable Units	Total Units	Anticipated Population Growth
1	Mix of medium density & mixed-use development (primarily apartment units with some townhomes)	2-6	66	3,008	340	3,348	8,370
2	Primarily mixed-use, medium density (standalone and/or above retail-at-grade apartment units)	3-6	44	1,920	830 †	2,750	6,875
3	Missing middle housing additions (variety of townhomes, apartments, duplex, etc.)	2-3	86	876	100	976	2,440
*	Additional ADUs (secondary suites, incentivized in key areas and incentives for registering as affordable ADUs)	-	-	1,935	215 ‡	2,150	5,375
TOTAL		-	196	8,899	1,485	9,224	23,060

† Affordable housing = 30%

‡ 50% of affordable housing in communities within criteria communities

INCORPORATE AFFORDABLE HOUSING IN ALL NEW DEVELOPMENTS

All new developments in Matthews should seek opportunities to incorporate affordable housing as part of the development. For example, a new 28-unit townhouse complex should look to dedicate 3-4 of them specifically for below market housing (ownership or rental). This can be done through policy direction without the need to modify existing zoning through grants, tax-exempt bonds, municipally led programs, among others (where available), helping offset the costs carried by developers. The same principle applies for apartments, duplexes, brownstones,

etc., where a percentage of units in new developments are reserved for below market housing. State and municipality led programs that provide financial relief and/or incentives help ensure that affordable housing is viable from a financial perspective at the start and has long-term sustainability benefits that maintain units set for lower-income tenants for several years.

ACCESS MANAGEMENT

Regional Movement: US 74/Independence Blvd and Interstate 485 function as regional thoroughfares to allow residents and commuters to travel to and from Matthews, connecting residents with employment opportunities nearby. This is accomplished by removing commercial

Table 2: Number of Units By Catchment Areas

	# of Units	Base Network †		Future Network ‡		Full Plan §		Base Network	Future Network	Full Plan
		Existing	New	Existing	New	Existing	New	Total Units		
Walk (1/4 mile)	Services:									
	Grocery	67	0	67	0	650	3,881	67	67	4,531
	Medical Centre	104	0	104	0	635	3,881	104	104	4,516
	Transit:									
	Bus Stop	300	1,078	300	1,078	395	7,157	1,378	1,378	7,552
	LRT	57	2,156	57	2,156	57	2,156	2,213	2,213	2,213
Cycle (1 mile)	Services:									
	Grocery	5,042	6,018	6,104	6,018	7,993	13,612	11,060	12,122	21,605
	Medical Centre	7,975	3,009	8,620	3,009	10,506	9,600	10,984	11,629	20,106
	Transit:									
	Bus Stop	4,631	5,792	4,684	5,792	5,775	7,157	10,423	10,476	12,932
	LRT Station	2,862	2,783	3,208	2,783	3,208	2,783	5,645	5,991	5,991
Drive Time (10 min)	Emergency Response:									
	Fire	11,811	7,519	11,811	9,224	11,811	9,224	19,330	21,035	21,035
	Ambulance	11,018	7,519	11,212	9,224	11,212	9,224	18,537	20,436	20,436

† Base Network = Existing conditions + committed Town of Matthews projects (e.g., LRT)

‡ Future Network = Base Network + mobility improvements only

§ Full Plan = Future Network + full units (all anticipated future units) + new grocery, medical centres, & fire station

access points to US 74, of which there are 61 along the 2.5 miles closest to downtown Matthews, and converting two signalized intersections to separated grade overpasses. By proposing to remove the commercial access points and replace (2) signalized connections with bridges, US 74 may operate more efficiently due to the absence of turning traffic. Access will be provided in this stretch through one signal and two interchanges. Corridor right-of-way allows for new multimodal frontage connections to the businesses that once had access to US 74, preserving existing economic development, reallocating pavement space, and improving cross-corridor connectivity for bicyclists and pedestrians who can now travel via greenway or crosswalks along these frontage roads.

GREENWAY CONNECTIONS

New Greenways: Two new greenways improve multimodal accessibility between regions of Matthews that are currently disconnected by I-485 and Independence Boulevard. The first follows the utility easement north of the existing parking mall development east of Independence to provide a vehicle-free alternative to Matthews-Mint Hill Road and connect residents of the new high-density residential node and East Matthews with

downtown Matthews and the planned LRT station. The second connects the community college to downtown Matthews and provides a comfortable crossing of I-485 alternative to Old Monroe Road.

Neighborhood Greenway Connections: Scattered throughout the City, these connect the culs-de-sac that silo neighborhoods and create a disjointed multimodal network. These short connections between neighborhoods create more direct movement for bicyclists, pedestrians, and micromobility users, allowing active modes to avoid the less comfortable arterial network and remain on slow speed residential streets to reach their destination.

SHARED MOBILITY

As the multimodal network expands, shared mobility solutions including cars, bike and scooter share can reduce the reliance on single occupancy vehicles. A citywide bike and scooter share program provides residents reliable transportation options between the new mixed use nodes, downtown Matthews, and other destinations throughout the City. These services should be rolled out with specific equity protections, including subsidized rides, a maintenance plan, and ways to rent the equipment with unreliable cellular service and limited access to banking.

MICRO TRANSIT NETWORK

Microtransit service will facilitate public transportation access in low density areas. Requested trips can go origin to destination within the City's borders, or provide access to fixed route transit stops and LRT. Microtransit services can have inequities for individuals who are underbanked or without mobile service; our proposal mitigates this by recommending microtransit "stops" at major destinations and within neighborhoods. These stops will be equipped with safe curb access, shelters/benches, WiFi, and payment centers that accept cash.

COMPLETE STREETS NETWORK

Multimodal corridors: using Matthews' existing roadway network, pavement space should be reallocated for bicyclists, pedestrians, transit, and smart mobility solutions to create a parallel, connected network of multimodal facilities. Cross-sectional elements of each street are designated based on Matthews' existing functional classifications, as indicated in Table 3. These Complete Streets, incorporating bikeways, pedways, and transit, create safe, direct, and convenient connections for all modes, allowing residents to quickly access destinations, whether they have reliable access to motor vehicles or not. As the cost of housing increases, affordable transportation options that provide directness and convenience are competitive, particularly for vulnerable users and lower-income residents.

Table 3: Street Design Guidelines

	LOCAL RESIDENTIAL	LOCAL COMMERCIAL/MIXU	COLLECTOR RESIDENTIAL	COLLECTOR COMMERCIAL/MIXU	ARTERIAL
○ = Not present ● = Design Standard ◐ = Context Sensitive					
Number of travel lanes ¹	1	1	1-2	1-2	≥2
Speed Limit (mph)	25	25	<35	<35	<45
On-street parking	●	●	◐	◐	○
Sidewalk	●	●	●	●	●
Dedicated Bikeway ²	◐	◐	●	●	●
Transit lanes	○	○	◐	◐	●
Flex space for new mobility	○	○	◐	◐	●
Green Infrastructure	●	●	●	●	●
Pedestrian-scale lighting ³	◐	●	◐	●	●
Vehicle-scale Lighting ⁴	◐	◐	◐	◐	◐
Pedestrian crossings with signal or beacon ⁵	◐	◐	●	●	●
Wayfinding	◐	●	◐	●	●

¹ Number of lanes refers to each direction of travel

² Bikeway facility type should be selected based on the FHWA Bikeway Facility Selection Guide: https://safety.fhwa.dot.gov/ped_bike/tools_solve/docs/fhwasa18077.pdf

³ Lighting design and placement should consider light pollution and local character

⁴ Lighting design and placement should consider light pollution and local character

⁵ Refers to the highest order functional classification for an intersection. In commercial areas, no more than 1/4 mi between pedestrian crossings

FIXED ROUTE TRANSIT

Update CATS Route 51: The existing alternate local service should become a permanent route to support the recommended LRT node and growing college campus. Increased residential density and commercial growth associated with this TOD development will increase ridership potential that merits the increased service. These routes should be run frequently and reliably, with fifteen-minute service the goal in order to ensure competitiveness with other modes.

New Fixed Route Service: Operating in a figure eight, this route connects new development on the east side of Matthews to big box retail, Downtown Matthews, and the future LRT. The route will use Matthews Township Parkway, Trade Street, Charles Street, Ames Street, Sam Newell Road, and Northeast Parkway. The captive area of this combined transit service improvement will be expanded by microtransit service.

IMPLEMENTATION

ADAPTABILITY

Matthews may be the muse for this competition, but the problems posed here are not unique to Matthews and the team approached the design challenge with adaptability in the foreground. Both land use and mobility recommendations are easily adapted to fit communities of any size and makeup. ADUs, while commonly thought of as detached structures or tiny houses, can also accommodate basement or garage apartments or converted rooms within the same structure. With such variety, they are easily accommodated within an array of zoning ordinances to meet community needs, and inject needed density without changing community character. So too conversion of parking lots and commercial development with residential infill have been implemented across numerous communities, with established practice upon which to rely both for developers seeking to build, and municipalities to regulate.

Our proposal injects adaptability not merely into the design, but also the process. By planning to the "area" - nodes and development zones, rather than the block level,

our proposal creates a regional framework for cohesive growth that allows for adaptive, flexible implementation. Multiple uses can be accommodated without prescribing type, location or appearance. So too, the Complete Streets approach to multimodal corridor development centers on public engagement to identify corridor-level needs without prescribing specific cross-sections for each corridor. In so doing, the Complete Streets network can adapt to accommodate any present or future mode – whether that be dedicated lanes for transit, bike facilities, or CAVs. Complete Streets development, through its emphasis on safety, prioritization of the most vulnerable users, and consideration of all modes, translates inclusivity into infrastructure development.

TRANSFERABILITY

Transferability speaks to the capacity for solutions proposed herein to be applied in other community contexts. It's important to recall what we stated earlier: Matthews' equity issues are not unique – not to Matthews, North Carolina, or even the United States. Communities across the country and the world struggle daily to accommodate growth and equitably distribute the burdens and benefits of development. For solutions to be transferable, they should be well-known in their application, they should be simple in their design, and proven in their effectiveness. Our mobility system solutions are rooted in introducing market dynamics to the community's transportation network. By creating a level playing field with infrastructure, community residents have the option to choose their mode(s) of travel that most closely align with their resources and values. Corridor retrofitting, as proposed for multimodal corridor development, requires consideration of unique community needs, rather than prescribing treatments based on assumptions; furthermore, by basing modifications in standard concepts such as right-of-way width and curb space – concepts ubiquitous across the globe – the specifics of our approach are not bespoke to Matthews but common to all. Furthermore, our CDAT tool – powerful in its ability to assess how communities' strategies will actually improve connectivity, accessibility, and promote greater equity. And while shared mobility and microtransit services may be considered “emerging” or novel applications, they have history in North Carolina and across the country: Wilson, NC's RIDE microtransit

service functions as the community's transit system, while ride hailing services spanning from Uber to Zipcar are now ubiquitous across the landscape.

CONSTRUCTABILITY

Constructability begs the question: what is feasible? What is implementable? What can be funded – translated from lines and dots on a map to tangible streets, sidewalks, and residences? And in this regard, the innovative becomes not the most outlandish, or the most daring, but that which is most effective in marrying together diverse, innovative, and practical strategies for growth.

The jewel of this proposal is the constructability of these recommendations. It bears noting that nothing that has been said is beyond practical implementation – these strategies are tested, tried and true in communities like Matthews, as well as those very different from Matthews. ADUs, residential infill, and transit-oriented development are widely understood – and funding is available. By encouraging residential infill, our proposal targets an optimized utilization of space and targets an topic of development that has increasingly proven attractive for funding support from local, state, and federal government programs. From opportunity zones to the North Carolina Brownfields program (which provides funding support for remediation of environmental hazards through property development) to adaptive reuse, reducing the funding burden on private development will help to encourage construction of new, higher-density development. While access removal may cause business consternation, the negative externalities this may cause are both easily identifiable and mitigated during construction – and temporary. Furthermore, while this plan does entail minimal construction of new street connections that require property taking, this activity is minimized throughout the community by relying on reallocation of the existing pavement space between the curb on key Complete Street collectors – which keeps costs down significantly. And, recalling the very first paragraphs of this document – the growth anticipated in this plan is staggering. Difficult trade-offs must be balanced, and choices made. Minimizing takings and targeting these decisions to create internal connectivity only where it has greatest effect ensures that its public purposes is highest.