



## Technical Guide to the Creation and Analysis of Alternative Scenarios in the *Destination 2055* Metropolitan Transportation Plan

### Purpose

This document is an initial discussion draft designed to:

1. Clarify what scenarios are and what they consist of.
2. Guide the CAMPO and DCHC MPO staffs in reaching consensus among the policy boards on the nature and number of alternative scenarios that will be developed.
3. Capture the issues that MPO staff will need to address in order to engage their policy boards.
4. Identify tasks and responsibilities to describe and analyze scenarios.
5. Provide clear labels and terminology to use in communicating this information to the public and decision makers in order to have meaningful engagement.

### Overview

A scenario describes a way that a future *might* be, but it is not the same as a forecast (a prediction of the way the future *will* be) or a plan (a statement of the way the future *should* be). Since it is very difficult to know what the future will actually be like, we go through a process of developing multiple alternative future scenarios to understand the potential impacts of different variables. These alternative scenario characteristics are asserted based on both evidence and judgment – making these assertions and the reasoning behind them both explicit and transparent is key to the effective creation and analysis of alternatives.













Scenarios are most helpful in understanding how *realistic changes* to current trends or current adopted plans might influence mobility and access. In theory, just about any variable could be part of a tested scenario; however, since the purpose of *Destination 2055* is to make informed decisions about mobility investments (largely in response to anticipated growth) we typically decide early in the process to focus on the following overarching variables in building the alternative scenarios: decisions about future land use patterns and decisions about future transportation investment choices.

There are two fundamental foundations to each alternative scenario:

- A *development foundation* that describes a regional pattern of land use/future development; and

- A *mobility investment foundation* that defines the road, transit, cycling, and pedestrian networks and transportation services that could be invested in or implemented in relation to the proposed land development pattern.

The two foundations can be combined in different ways to form a matrix of alternative analysis scenarios, as shown below. The combinations highlighted in green are the scenarios that were analyzed as part of the *Destination 2055* process.

<b>Destination 2055 Scenario Framework</b>		<b>Mobility Investment Foundation</b>				
		 Existing & Committed	 Trend	 Mobility Corridors	 Complete Communities	 Unconstrained
<b>Development Foundation</b>	 Community Plans	 Deficiency & Needs Scenario	 Plans & Trends Scenario	 Shared Leadership Scenario		
	 Opportunity Places				 All Together Scenario	
	 Build Out					

*Note: moving from left to right, and from top to bottom, each scenario builds on the elements of the preceding scenarios.*

This document *describes* a number of potential ways to build alternative scenarios; depending on guidance received from CAMPO and DCHC MPO, a subset of these potential alternative scenarios was *analyzed* using CommunityViz and the Triangle Regional Model to report results and performance measures in the MTP. Based on the outcome of the Alternative Analysis, a “Preferred Scenario” will then be developed to serve as the basis for the final adopted plan.

In Winter 2023-24, a pre-MTP scenario analysis was conducted with the intent of creating a number of “learning scenarios” designed to answer a variety of what-if questions and more extreme/less realistic possibilities. Applicable lessons that were learned from those pre-MTP “learning scenarios” have been incorporated into the alternatives being studied for *Destination 2055*, as highlighted in the sections below. Because the learning scenarios had already addressed some of the more extreme what-if questions, the scenarios tested for *Destination 2055* focused on more realistic options that reasonably align selected development foundations with similar/related mobility investment foundations as shown in the matrix above.

## Alternative Scenario Characteristics & Definitions

This section outlines the characteristics of each of the potential Development Foundations and Mobility Investment Foundations that can be used to create each Alternative Scenario.

### Development Foundations

Transportation serves development, so it is important to first define the development foundation of each scenario. Scenarios can be based on existing development patterns or existing policies such as local land use plans, or based on other policy-driven factors to shift development toward or away from certain locations or features or asserting development in certain locations or situations for policy reasons.

#### **P** Community Plans

The Community Plans development foundation is based on the future land use category designations shown on locally-adopted land use plans (or the most-likely future land use designations based on a local plan that is currently in-development). Initial input for this was gathered from local communities in late 2023/early 2024, and local staff were given an opportunity to review and provide corrections to this data in late 2024. This information is fed into the CommunityViz land use model as “place type” information that shows what type and density of development is possible within a particular location and “development status” information that shows whether a specific location is developable in the future or not.

#### **O** Opportunity Places

Much of the Opportunity Places development foundation is built upon the same assumptions as the Community Plans foundation. However, there are four discrete types of defined “Opportunity Places” where there are changes in land uses and densities as compared to the Community Plans development foundation:

- **Anchor Institutions** where future development was asserted in the Community Plans foundation—Duke University, NC Central University, NC State University, and UNC Chapel Hill. *Each of these anchor institutions has an asserted 20% increase in its job growth.*
- **Mobility Hubs** along major corridors at designated activity centers, largely taken from centers identified in other studies. *For undeveloped or redevelopable parcels in each Mobility Hub area, underlying assumptions about the future land use of the parcel are modified to allow transit-supportive densities of future development.*
- **Affordable Housing Opportunity Sites**, where new legally-binding affordable housing could be placed on publicly-owned property in close proximity to frequent transit services. *A total of 10,000 future added multi-family residential units are asserted in these areas.*
- **Equitable Transit-Oriented Development (TOD)** - Parcels that are coded as *undeveloped*, *underdeveloped* or *redevelopable* in the Community Plans development foundation and are

within ½ mile of a frequent transit service, rail station, or Bus Rapid Transit station. *For these parcels, underlying assumptions about the future land use of the parcel are modified to allow transit-supportive densities of future development.*

For more information on the definition of these opportunity places, see Appendix A of this document.

## **B Build Out**

The Build Out development foundation has the same basic input information about future land use types, densities, and locations as the Community Plans foundation, but does not constrain the future growth amount based on a guide total of overall growth. It answers the question of what the total capacity for potential development in the region might be, based on plans. The Build Out development foundation is not a realistic one, so is rarely used in an official scenario, but can still provide useful data for analysis.

## **Mobility Investment Foundations**

Mobility investment consists of both networks and services. Separate but related networks include roads, transit, and pedestrian/bicycle facilities. Services include activities and investments designed to make the use of the networks most effective—examples include the use of advanced technologies, transportation demand management, and pricing of parking and transit.

*Destination 2055* develops these mobility foundations using two principal sources:

- *Fiscal Constraint* – sources that start with current state and federal transportation funding legislation and local government historical investment patterns, then supplements these in some scenarios with potential changes to funding expectations, usually in the second or third decade of a scenario.
- *Plans and Programs* – sources that are bracketed by a floor of the current Transportation Improvement Programs (TIPs) and a ceiling of the Comprehensive Transportation Plans (CTPs) for the region. The mix of roadway and transit investments can be varied in scenarios by selecting sets of transit and roadway projects closer to the floor (constrained) or closer to the ceiling (aspirational).

The mobility investment foundations described below represent different combinations of future transportation networks and services based on different assumptions about funding expectations and programmatic constraint versus aspiration.

## **E Existing & Committed**

In the Existing & Committed foundation, we only include existing roadways, transit facilities/services, and bicycle/pedestrian facilities, plus those that are underway or committed for funding within the current Transportation Improvement Program (generally expected to be built within the next 4-5 years). This serves as a baseline for comparisons to other scenarios.

**T****Trend Investment**

The “trend” mobility investment foundation is based on a future condition where funding and policy conditions will be similar to current conditions, including the following funding assumptions:

- State funding in line with NCDOT forecasts
- Constrained by STI limitations (funding categories, mode caps, corridor caps, etc.)
- Federal funding maintained at current IIJA levels
- Transit investments consistent with county plans/funding forecasts
- Rail – partnerships for increased intercity passenger services
- Local funding as identified by jurisdictions

**M****Mobility Corridors**

In the Mobility Corridors foundation, funding is generally higher across the board based on the following assumptions:

- Building on the baseline assumptions of the Trend Investment foundation
- Additional state funding based on NC First Commission recommendations, starting in the second decade
- Modest growth of federal funding to keep pace with inflation
- Additional transit investments beyond the horizon of county transit plans
- Added flexibility in STI restrictions beginning in second decade
- Modest increase in local funding compared to historical trend

**C****Complete Communities**

The Complete Communities mobility investment foundation builds upon the Mobility Corridors foundation above, but with additional focused investment on complete and safe streets, active transportation, and transit based on the following assumptions:

- Building on the baseline assumptions of the Mobility Corridors investment foundation
- Additional local/regional funding (source of funding is agnostic, estimated based on multiple potential methods)
- Potential for additional funding from state or other regional partners
- Additional focus on transit, active transportation and Complete/Safe Street investments

**U****Unconstrained (Comprehensive Transportation Plan)**

The unconstrained mobility investment foundation represents the full list of potential transportation investment projects that have been identified in Comprehensive Transportation Plans (CTPs). CTPs are “needs-based” plans that identify potential future projects without regard to the availability of funding. These represent the universe of projects that would be desirable to build if funding were not a constraint.

Additional information about the projects included in each mobility investment foundation, see Appendix B of this document.

## Alternative Scenarios

Each of the alternative scenarios developed and tested for *Destination 2055* is based on the combination of a development foundation and a mobility investment foundation as described above.



### Deficiency & Needs Scenario

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The Deficiency & Needs scenario combines the Existing & Committed mobility foundation and the Community Plans development foundation in order to depict what would happen if development continues in line with current plans, but no additional investments are made in new transportation improvements beyond those already “in the works.” This can be thought of as a “worst-case” scenario in which anticipated population growth takes place but a commensurate level of transportation investment does not. This is not intended to be a *realistic* scenario, but does provide us with useful information. The analysis of the *transportation system deficiencies* that come out of this scenario serves as a basis for determining locations where additional transportation improvements may be needed. This scenario also serves as a useful baseline for comparison against other scenarios.



### Plans & Trends Scenario

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The Plans & Trends scenario represents the case of what is likely to occur without any changes to existing patterns of transportation funding and investment decisions or land use planning policies. It is created by merging the Community Plans development foundation with the Trend mobility investment foundation. This is the “simplest” alternative to implement, but that does not mean it is “easy” to achieve. This scenario assumes that we can rely on tried-and-true revenue streams and transportation/land use decision-making policies and procedures.



### Shared Leadership Scenario

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The Shared Leadership scenario can be thought of as a stronger partnership between local governments and state and federal governments, emphasizing multi-modal investments in key corridors, which the scenario terms “Mobility Corridors.” It examines what would happen if there is a shift in the type of mobility investments being made in the region, but development patterns are still in keeping with the vision laid out in existing local land use plans, and is created by combining the Community Plans development foundation with the Mobility Corridors investment foundation. State and federal governments would provide both more funding and more flexibility in the use of said funding in order to better reflect the priorities of the community. The increased funding assumptions are based largely on the recommendations of the NC FIRST Commission

which highlighted a need for additional state transportation funding, as well as modest increases in expected federal and local funding sources.



### **All Together Scenario**



The All Together scenario is the region's most ambitious scenario. It is based on the Opportunity Places development foundation, in which communities would reorient land use/development patterns in specific locations to enable more sustainable and efficient travel, with an emphasis on linking neighborhoods to major job hubs along transportation investment corridors. This scenario largely builds on the “mobility corridors” of the Shared Leadership scenario, but with added flexibility in state revenue sources and increased local tax revenues in order to fund additional transit, active transportation, and complete street investments as outlined in the Complete Communities mobility investment foundation.

## Appendix A – Definition of Opportunity Places

The Opportunity Places development foundation emphasizes three types of especially important places: job hubs, “REINVEST” neighborhoods, and “Travel Choice” neighborhoods.

**Job hubs** are defined around information received both from local communities and from major institutions in the region:

Job Hub Type	Description	Examples	Current (Base)	Future
<i>Anchors</i>	Places with the highest concentrations of jobs and services, plus places with moderate intensity and an anchor institution that can influence mobility-based policy decisions.	<ul style="list-style-type: none"> <li>Metropolitan Central Business Districts</li> <li>Major Universities</li> <li>Major Medical Centers</li> <li>Research Triangle Park</li> </ul>	Existing data and institutions	Institution Plans
<i>Mainstays</i>	Places with regionally significant concentrations of jobs, either outright or in comparison to their surroundings.	<ul style="list-style-type: none"> <li>Many mid-sized town and city centers</li> <li>Some suburban centers, often along major transportation corridors</li> </ul>	Existing data	Plans and growth allocations

The **REINVEST neighborhood** element focuses on areas with an equity lens, giving weight within the decision making process to neighborhoods where households have lower incomes, lower access to vehicles, and/or have Black, Indigenous and People of Color (BIPOC) residents, or where legally-binding affordable housing units are located. Based on Environmental Justice analysis by CAMPO and DCHC MPO, a set of REINVEST neighborhoods are then identified based on the following characteristics:

<b>RE</b>	<i>Race/Ethnicity</i> – a neighborhood that is home to a larger number of people who are Black, Indigenous, or People of Color (BIPOC)
<b>IN</b>	<i>Income</i> – a neighborhood that has a larger number of households with lower annual incomes
<b>VE</b>	<i>Vehicles</i> – a neighborhood with a larger number of households that do not have access to a private motor vehicle
<b>ST</b>	<i>Status</i> – a neighborhood with a number of legally-binding affordable housing units

**Travel Choice Neighborhoods** are defined by the transit service provided. For those who rely on transit to serve their daily needs, transit service frequency is freedom—unless service is frequent, these transit-reliant users must arrange their lives to meet transit schedules (rather than the



transit services meeting their schedule needs). The degree to which residents have meaningful choices of when and where to work, shop, learn, and access services depends on the frequency of service:

- *Vital* service provides at least 3 buses or trains per hour, for an average of 20 minutes between each service
- *Freedom* service provides 4 or more buses or trains per hour, for an average of 15 minutes or less between each service

Travel Choice Neighborhoods are those locations where it is feasible for residents to choose transit as a mode of transportation because transit service is frequent enough as to be convenient.

### How the Opportunity Places Development Foundation is Created

Unlike the Community Plans development foundation, which was based on input from local planners on their land use plans and policies, the Opportunity Places development foundation is a mechanical “what-if” effort, designed to be quickly generated from GIS data, while still being market- and environmentally-realistic. The following steps were used:

1. For each step, the following types of locations remain unchanged from the Community Plans development foundation:
  - Developed single-family residential land
  - K-12 school campus
  - Protected open/green space
  - Floodplain areas
2. Anchor institution asserted development was increased by 20% across the board at the four universities for which growth information is asserted in the CommunityViz model (Duke University, NC Central University, NC State University, and UNC Chapel Hill)
3. 23 Mobility Hubs were identified, primarily based on Activity Centers already designated in the CommunityViz suitability layer and the CAMPO Commuter Corridors Study. The criteria for defining these Mobility Hubs were as follows:
  - Location along an existing major transportation corridor
  - Each mobility hub location should be served (within the mobility investment scenario) by a fixed guideway transit station, a direct shuttle service to a fixed guideway transit station, or frequent bus service (minimum 3 buses per hour)
  - If not previously-identified hubs, a preference for “Health Hubs” near existing medical facilities
  - Exclusion of parcels and acreage with developed single-family housing (smaller than 10-acre lots), protected green space and floodplains
  - A target of at least 200 acres (300-400 acres preferred) of developable or redevelopable land after accounting for the exclusion of land listed above
  - A minimum mixed use place type intensity that is supportive of frequent transit service on the developable redevelopable land

- A minimum 50% increase in the capacity for jobs for the developable or redevelopable land compared to the Community Plans capacity
- Designation as a new kind of activity center in CommunityViz (Mobility Hub)
- Assertion of at least one “LIHTC-equivalent” affordable housing development within each hub (100 housing units)

<b>Identified Mobility Hubs (this is currently the 2050 MTP list)</b>	
Wake County (11 - all taken from CAMPO Commuter Corridor Study)	Brier Creek
	Six Forks Road
	South Wake Forest
	West Knightdale
	Zebulon
	White Oak
	Crossroads
	Park West
	Parkside
	Veridea
	Sunset Lake Road
Durham County (4)	Lowes Grove
	NC 98/Sherron
	Braggtown
	Bethesda/Ellis
Orange County (2)	Buckhorn Road
	Eno Activity Center
Johnston County (2)	SE Clayton/Powhatan
	US 70 Bypass/NC 42
Chatham County (2)	Manns Chapel Road
	Brier Chapel
Harnett County (1)	North Lillington
Franklin County (1)	South Franklinton

- For parcels not already addressed in 1, 2, and 3 above, *undeveloped, under-developed and redevelopable parcels* within ½ mile of frequent bus services or BRT stations in the Trend mobility investment scenario were revised to increase the mix and/or intensity of permitted development as follows:
  - Parcels with one of the following place types were left unchanged:
    - Urban Residential
    - High Rise Residential
    - Metropolitan Center
    - TOD-I Urban Center
    - TOD-II
    - TOD-III

- Identified 100 undeveloped publicly-owned parcels greater than 1.5 acres and with a parcel shape factor  $\leq 35$  (parcel perimeter squared, divided by parcel area) within ½ mile of frequent bus services or BRT stations
    - Targeted 60 sites in Wake County, 30 in Durham County, 5 in Orange County, and 5 in Johnston County
    - Once all potential locations were identified, the actual sites were selected as follows:
      - In Durham, the GoTriangle-owned parcels in downtown Durham, at Alston Avenue, and Ellis Road, as well as a newly-defined parcel at the site of the likely Regional Transit Center between NC 54 and Select Drive should be included
      - For others, should prioritize as follows in selecting which sites to include within each county: (1) within ½ mile of Commuter Rail Transit station, (2) within ½ mile of Bus Rapid Transit station, and (3) within ½ mile of frequent bus service
    - Each of these 100 identified locations will be tagged as committed development with 100 multifamily residential units each
    - Above and beyond the locations identified above, any other known legally-binding affordability-restricted housing development that is underway or known to be upcoming should be recorded as committed development within CommunityViz
  - All other parcels meeting the selection requirements based on parcel development status and proximity to transit will have its place type changed to *TOD-Suburban Neighborhood* in order to allow increased intensity of development
5. County-level results of the above steps were reviewed in order to see if any further revisions might be warranted:
- Total number of parcels revised compared to the Community Plans development foundation
  - Total number of acres affected by revisions
  - Total amount of additional housing unit capacity compared to the Community Plans development foundation
  - Total amount of additional job capacity compared to the Community Plans development foundation

### **Use of REINVEST Neighborhoods and Travel Choice Neighborhoods in Analysis**

The defined REINVEST neighborhoods and Travel Choice neighborhoods are primarily used as an analysis tool for reviewing the results of the alternative scenarios, to better understand how well the scenario is addressing concerns related to transportation equity and transit accessibility.

## Appendix B – Definition of Mobility Investment Foundations

The following table provides a high-level overview and comparison of the different mobility investment foundations:

### Roadway Assumptions

Existing & Committed	Trend	Mobility Corridors	Complete Communities
<b>Both MPOs:</b> Projects in current STIP/TIP anticipated to be built within next 5 years	<b>CAMPO:</b> - Completion of Outer Loop - Widen/improve I-40, I-440, US 401, US 1, US 64, US 70, NC 42, NC 50, NC 54, NC 55, NC 98 - Smaller level of secondary roadway investments in 2 <sup>nd</sup> two decades	<b>CAMPO:</b> - Completion of Outer Loop - Widen/improve I-40, I-440, US 401, US 1, US 64, US 70, NC 42, NC 50, NC 54, NC 55, NC 98 - Smaller level of secondary roadway investments in 2 <sup>nd</sup> two decades	<b>CAMPO:</b> - Completion of Outer Loop - Widen/improve I-40, I-440, US 401, US 1, US 64, US 70, NC 42, NC 50, NC 54, NC 55, NC 98 - Higher level of secondary roadway investments in 2 <sup>nd</sup> two decades
	<b>TWTPO:</b> - 2050 MTP highway projects (with adjustments) - Capacity improvements on US 70 East, I-85 South, I-85 North, US 15-501, I-885 HOV Lane, I-40 managed lanes, NC 54 West, Churton St, Fayetteville St - New roads: Northern Durham Parkway & Southwest Durham Drive	<b>TWTPO:</b> - 2050 MTP highway projects, with adjustments - 2024 Congestion Management Process (CMP) projects - I-855 HOV lane - US 70 East parallel collector roadway	<b>TWTPO:</b> - same as Mobility Corridors, with adjustments

### Rail Assumptions

Existing & Committed	Trend	Mobility Corridors	Complete Communities
<b>Both MPOs:</b> Existing intercity stations (Durham, Cary, Raleigh, Selma)	<b>CAMPO:</b> - Partnership for additional intercity rail stops (a few) and services (1 or 2 additional)	<b>CAMPO:</b> - Trend, plus “Regional Rail” in Wake County, with additional stops and service	<b>CAMPO:</b> - Shared Leadership, plus expansion of “Regional Rail” into TWTPO and outside

			of Wake County within CAMPO
	<b>TWTPO:</b> - Continuation of current intercity passenger rail - Addition of rail stop at RTP on intercity services	<b>TWTPO:</b> - Same as Trend, plus addition of Hillsborough station	<b>TWTPO:</b> - Intercity rail and regional commuter rail

### Transit Assumptions

Existing & Committed	Trend	Mobility Corridors	Complete Communities
<b>Both MPOs:</b> Existing transit services, plus new or expanded services programmed for implementation within next few years	<b>CAMPO:</b> - BRT infrastructure and service in Capital, New Bern, Wilmington and Western/Chatham/ NC 54 corridors - BRT infrastructure and service in Harrison/Kildare Farm corridor - BRT infrastructure and service to Midtown - Continuation of Wake Transit Plan frequent bus network - Community Funding Areas	<b>CAMPO:</b> - BRT infrastructure and service in Capital, New Bern, Wilmington and Western/Chatham/ NC 54 corridors - Freeway-based BRT in I-40 corridor - BRT infrastructure and service to Midtown - Continuation of Wake Transit Plan frequent bus network - Community Funding Areas	<b>CAMPO:</b> - BRT infrastructure and service in Western Wake County corridor - BRT infrastructure and service in Capital, New Bern, Wilmington and Western/Chatham/ NC 54 corridors - BRT infrastructure and service in Harrison/Kildare Farm corridor - BRT infrastructure and service to Midtown - Continuation of Wake Transit Plan frequent bus network - Community Funding Areas
	<b>TWTPO:</b> - BRT: Chapel Hill NS BRT line - Bus improvements based on short-range plans (funded projects), county transit plans (funded projects), and a few	<b>TWTPO:</b> - BRT: Chapel Hill NS BRT, Durham-Orange BRT, Durham-RTP BRT - Bus improvements based on Trend, with adjustments	<b>TWTPO:</b> - BRT: all four BRT lines from 2050 MTP, with adjustments - Bus improvements based on Mobility Corridors, with adjustments

	service frequency/hour changes		
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**Other Assumptions (Bike/Ped, M&O, TDM/TSM, ITS, etc.)**

Existing & Committed	Trend	Mobility Corridors	Complete Communities
<b>Both MPOs:</b> As stated in current STIP and other funding programs	<b>CAMPO:</b> - text - text	<b>CAMPO:</b> - text - text	<b>CAMPO:</b> - text - text
	<b>TWTPO:</b> - text - text	<b>TWTPO:</b> - text - text	<b>TWTPO:</b> - text - text